

**Proceedings of the 8th International Conference
on Applied Economics Contemporary Issues
in Economy under the title
Market or Government?
18-19 June 2015**

Economics and Finance

EDITED BY ADAM P. BALCERZAK

IER
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OF ECONOMIC
RESEARCH



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edited by
Adam P. Balcerzak

Toruń, Poland

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Contents

Keynote Speakers Market or Government?

Kalim Siddiqui

Economic Policy – State versus Market Controversy26

Ezra Davar

Unemployment: Walras's Voluntary and Keynes's Involuntary51

Andrzej Cieřlik, Łukasz Goczek

On the Evolution of Corruption Patterns in the Post-Communist
Countries77

List of Papers

Adam A. Ambroziak

Income Tax Exemption as a Regional State Aid in Special Economic
Zones and its Impact Upon Development of Polish Districts 100

Lyubov Andrushko

Evaluation of the Meat Industry Efficiency in Poland, in the years
2000-2013 (Based on the data of the Central Statistical Office)..... 127

Arzybaev Askar

Synthesis of Pension System Parametric Assessment..... 142

Diana Elisabeta Balaciu, Lucian Cernusca

Ioana Teodora Mester

An Empirical Study on Students' Behaviour Regarding Creative
Accounting Techniques..... 155

Adam P. Balcerzak

Europe 2020 Strategy Implementation. Grouping the Countries
with the Application of Natural Breaks Method 172

Contents

Krzysztof Beck

Business Cycle Synchronization: A Regional Perspective 182

Dalia Bernatonyte

Estimation of Export Specialization: Lithuanian Case..... 208

Beata Bieszk-Stolorz, Iwona Markowicz

Influence of Unemployment Benefit on the Duration of Registered
Unemployment Spells..... 218

Nina Bočková

R&D Tax Incentives in Industry: Empirical Study Among Small and
Medium Electronics Manufacturing Enterprises..... 235

Katarzyna Boratyńska

Corporate Bankruptcy and Survival on the Market: Lessons from
Evolutionary Economics..... 252

Arkadiusz Borowiec

A Model Assessing Innovativeness of Administration Units Awarding
Public Contracts as a Tool to Conduct Economic Policy of the State..... 275

Sylwia Bożek, Izabela Emerling

Protecting the Organization Against Risk and the Role of Financial
Audit..... 295

Ivars Brīvers

Market or Government – Is There a Third Way?..... 310

Jurgita Bruneckienė, Jolita Sinkienė

The Specific of Economic Competitiveness Evaluation of Cities from
Cross-border Region Under the Context of Urban Shrinkage 323

Katarzyna Cheba

The Influence of Clusters on Economic Development. A Comparative
Analysis of Cluster Policy in the European Union and Japan..... 341

Contents

Jadvyga Ciburiene

The Evaluation of Economic Development Index: Theory
and Research..... 357

Andrzej Cieřlik

Export Versus FDI in Cournot Duopoly Framework 368

Andrzej Cieřlik, Jan Michałek, Iryna Nasadiuk

Determinants of Export Performance of Ukrainian Firms 396

Agnieszka Czajkowska

Mezzanine as an Alternative Form of Corporate Financing..... 409

Elżbieta Czarny, Paweł Folfas

World Trade and Regional Trade Orientation in the Context of
Forthcoming Transatlantic Trade and Investment Partnership..... 422

Sławomir Czech

Choice Overload Paradox and Public Policy Design. The Case
of Swedish Pension System..... 445

Ezra Davar

General Equilibrium Theory – Walras Versus Post-Walras
Economists: “Finding Equilibrium” – Losing Economics..... 472

Piotr Dominiak, Ewa Lechman, Anna Okonowicz

Fertility Rebound and Economic Growth. New Evidence for
18 Countries Over the Period 1970-2011 500

Anna Fornalska - Skurczyńska

How to Effectively Support Export Activity..... 523

Peter Friedrich

Determining Social Capital by Social Accounting..... 533

Contents

Bogna Gawrońska-Nowak, Wojciech Grabowski

Using Genetic Algorithm in Dynamic Model of Speculative Attack.....560

Michał Głuszak, Agnieszka Małkowska

Pro-investment Local Policies in the Area of Real Estate
Economics – Similarities and Differences in the Strategies Used by
Communes.....580

Łukasz Goczek

Semi-strong Informational Efficiency in the Polish Foreign Exchange
Market.....594

Katarzyna Gwóźdź

Assessing the Non-financial Investment Profitability with
Variable Discount Rate611

Bärbel Held

Comparison of Public, Non-Profit and Private Hospitals.....628

Anna Horodecka

Reasons for the Changes of the Concepts of Human Nature in the
Economics Exemplified on the Contemporary Trends652

Vladimír Hyánek, Zuzana Prouzová

Non-profit Institutions' Funding Resources in the Time of Crisis:
Market or Government?.....689

Małgorzata Magdalena Hybka

Allocating Tax Revenue to Sub-Central Government Levels:
Lessons from Germany and Poland.....702

Bogna Janik, Krzysztof Kołodziejczyk

Eco-innovations in the Business Practice of the Companies Traded
on the Warsaw Stock Exchange – an Overview of Selected Results721

Elżbieta Jantón-Drozdowska, Maria Majewska

Social Capital as a Key Driver of Productivity Growth
of the Economy: Across-countries Comparison.....732

Contents

Elżbieta Jantoń-Drozdowska, Maria Majewska

Investment Attractiveness of Central and Eastern European Countries
in the light of New Locational Advantages Development.....755

Jakub Janus

The Transmission Mechanism of Unconventional Monetary Policy.....779

Izabela Jonek-Kowalska

State Aid and Competitiveness of the Hard Coal Mining Industry
in the European Union.....794

Aldona Kamela-Sowińska

Accounting Integration issues of EU Member States.....814

Dorota Kawiorska

Healthcare in the Light of the Concept of Welfare State Regimes –
Comparative Analysis of EU MS.....828

Milka Kazandziska

Macroeconomic Policy Regime in Poland.....848

Emilia Klepczarek

Disclosure of Risk Information in the European Banking Sector.....875

Jacek Klich

Health Care Systems' Evolvement and the Changing Role
of the State in Selected CEEC.....893

Olga Kontorovich, Marina Alekseevna Fedotova

Olga Vladislavovna Loseva

Monetary Valuation of Intellectual Human Capital in Innovative
Activity.....905

Aleksandra Kordalska, Magdalena Olczyk

Global Competitiveness and Economic Growth: A One-Way
or Two-Way Relationship?.....921

Contents

Iwona Koza

The Modern Challenges of Regional Development
and Socio-economic Potential of Town Districts Belonging
to North Macro-region of Poland..... 943

Katarzyna Kubiszewska

Banking Concentration in the Baltic and Western Balkan
States – Selected Issues..... 968

Joanna Kuczevska, Joanna Stefaniak-Kopoboru

Export Specialization in Services of the Visegrad Countries 991

Justyna Kufel

Monopolistic Markups in the Polish Food Sector..... 1011

Błażej Łyszczarz

Public-private Mix and Performance of Health Care Systems
in CEE and CIS Countries..... 1035

Joanna Mackiewicz-Łyziak

Fiscal Sustainability in CEE Countries – the Case of the Czech
Republic, Hungary and Poland 1051

Ingrid Majerová

The Impact of Selected Variables on the VAT Gap in the Member
States of the European Union..... 1068

Joanna Małecka

Revenues, Expenses, Profitability and Investments of Potential
Contenders for the Status of a Listed Company in Poland 1087

Piotr Masiukiewicz

Doctrine of Public Good in Banking Versus State Intervention 1112

Agnieszka Matuszewska–Pierzynka

Net Profit Distribution Policy in Companies Using State-owned
Enterprises Against Payment 1124

Contents

Błażej Mazur, Łukasz Lenart, Mateusz Pipień

Statistical Analysis of Business Cycle Fluctuations in Poland Before and After the Crisis..... 1142

Tomáš Meluzín, Marek Zinecker

Trends in IPOs: The Evidence from CEE Capital Markets 1157

Aneta Michalak

The Cost of Capital in the Effectiveness Assessment of Financial Management in a Company 1171

Anna Moździerz

Strengthening the Post-crisis Fiscal Rules – the Case of Spain, Slovakia and Sweden 1184

Liudmila Nikolova, Dmitriy Rodionov

Irina Rudskaia

Regional Innovation Programs' Sustainability Under Risk and Uncertainty..... 1207

Małgorzata Olszak, Mateusz Pipień, Sylwia Roszkowskac

The Impact of Capital Ratio on Lending of EU Banks – the Role of Bank Specialization and Capitalization 1225

Irina-Doina Pășcan, Ramona Neag

Economic Consequences of the Adoption of the International Financial Reporting Standards: Evidences in the Research Literature..... 1242

Aleksandra Pieloch-Babiarz

Catering Approach to the Dividend Payment Policy on the Warsaw Stock Exchange 1254

Michał Pilec

What Determines the Reforms of Employment Protection Legislation? A Global Perspective 1276

Contents

Piotr Podsiadło

The Question of State Aid for Rescuing and Restructuring
Undertakings in Difficulty in the Context of the General
Government Sector Debt of EU Member States 1295

Elżbieta Pohulak-Żołędowska

Innovation in Contemporary Economies 1325

Mariusz Próchniak, Bartosz Witkowski

On the Use of Panel Stationarity Tests in Convergence Analysis:
Empirical Evidence for the EU Countries..... 1340

Agnė Reklaitė

Globalisation Effect Measure via Hierarchical Dynamic Factor
Modelling..... 1360

Małgorzata Renigier-Biłozor, Andrzej Biłozor

Optimization of the Variables Selection in the Process of Real
Estate Markets Rating..... 1371

Anita Richert-Kaźmierska

Demographic Changes in Poland – the Regional Dimension 1389

Tomasz Rosiak

Fiscal Capacity for Euro Area – Towards a Bigger EU Budget? 1405

Alina Rydzewska

Contemporary Nature of Stock Exchange from the Perspective of
Demutualization Process..... 1420

Artur Sajnog

Comparative Analysis of Economic Efficiency of Polish and German
Listed Companies..... 1434

Doaa M. Salman

Role of Institution, Government to Robust International
Entrepreneurial Activities and Economic Growth: New Evidence 1456

Contents

Saifullahi Sani Ibrahim

Budgetary Allocation and Poverty situation in Nigeria:
the Implication for Economic Insecurity 1481

Alicja Sekuła, Joanna Śmiechowicz

Systems of General Grants for Local Governments in Selected EU
Countries Against the Background of the General Theory
of Fiscal Policy 1492

Inna Semenenko

Energy security of Ukraine in the Context of its Sustainable
Development..... 1515

Ágnes Sipos

Shared State Taxes and Tax Policy of Local Self-governments in
Connection With Tax Morale..... 1535

Konrad Sobański

Valuation Effect as a Determinant of the International Investment
Position in Central and Eastern European Economies 1559

Joanna Stryjek

Tax Incentives for Innovation 1574

Paulina Szyja

The Role of the State in Creating a Green Economy 1586

Magdalena Szyszko, Karolina Tura

Can Inflation Forecast and Monetary Policy Path be Really Useful?
The Case of Czech Republic 1601

Karol Śledzik

“Fettered” and “Unfettered” Capitalism in J.A. Schumpeter’s
Concept of Tax State and Economic Development..... 1619

Contents

Dominik Śliwicki

Decomposing the Net Efficiency of Active Labor Market Programs 1630

Arkadiusz Świadek

The Economic Cycle and the Innovation Activity of the Polish Industry System 1646

Kamila Turečková

Income Inequality by Method of Non-weighted Average Absolute Deviation: case study of Central and Eastern European Countries 1664

Julia Włodarczyk, Jan Acedański

Dispersion of Inflation Expectations in the European Union During the Global Financial Crisis..... 1676

Grażyna Wolska

The Review of Theories of Mainstream Economics on the Example of Economic Models 1688

Beata Woźniak-Jęchorek

Institutional Determinants of Regional Diversity of Labor Market in Poland 1702

Gabriela Wronowska

Welfare and Higher Education in EU Member States – Comparative Analysis..... 1724

Magdalena Zajązkowska

Prospects for the Development of Prosumer Energy in Poland 1737

Anna Ząbkowicz

A Paradox of Reforming Pensions in Poland..... 1748

Małgorzata Zielenkiewicz

The Role of the Level of Development, Geographical Factors, and Culture for the Efficacy of Economic Freedom 1766

Contents

Mariusz Zieliński

Unemployment and Labor Market Policy in Visegrad Group Countries.....	1781
--	------

Dorota Żuchowska

Accession to the Eurozone as Lithuania's Exit Strategy From the Currency Board System.....	1798
---	------

Keynote Speakers

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Kalim Siddiqui

University of Huddersfield, United Kingdom

**Economic Policy – State versus
Market Controversy***

JEL Classification: *E61*

Keywords: *economic policy; 'market-centric' model; role of the state; and economic governance*

Abstract: There was wide ranging debate in the 1950s and 1960s in the developing countries about the role of the state in their economy when these countries attained independence, with developing their economies and eradicating poverty and backwardness being seen as their key priority. In the post-World War II period, the all-pervasive 'laissez-faire' model of development was rejected, because during the pre-war period such policies had failed to resolve the economic crisis. Therefore, Keynesian interventionist economic policies were adopted in most of these countries.

This is a theoretical paper, which is based on review of published papers in the field of economic policies, especially about the debate of the role of the state and market. In this study a wide range of sources of data are presented, which includes statistics generated by a number of organisations that are not agencies of a particular government. This is useful since data are compiled by a wide range of organisation such as IMF, World Bank and WTO. Secondary data would help our study to answer the research questions. There seems to be greater potential for examining

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statistical data produced by various organisations that are relatively independent of the national government.

The study finds that more than two decades of pursuing neoliberal policies has reduced the progressive aspects of the state sector. The on-going crisis in terms of high unemployment, poverty and inequality provides an opportunity to critically reflect on past performance and on the desirability of reviving the role of the state sector in a way that will contribute to human development.

Introduction

This paper examines the role of the state and the market in the economic policy in developing countries. Following World War II, the all-pervasive ‘laissez-faire’ model of development was rejected, because during the pre-war period such policies had failed to resolve the economic crisis. Therefore, Keynesian interventionist economic policies were adopted, and North America and the western European countries witnessed a long, uninterrupted phase of growth, often referred to as the ‘Golden Period’ of capitalism. State intervention was seen as the only possibility way to avoid the market failures of the past.

During the 1970s and 1980s, as the economic crisis began to bite hard in the US and the UK, neoclassical economists gained new respectability. They advocated a greater role for the market by reducing the state’s role in areas such as the labour market, supporting privatisation of state enterprises, and the removal of price and interest rate controls (Harcourt, 2014; Little, 1982).

More than two decades of pursuing these neoliberal policies has reduced the progressive aspects of the state sector. The on-going crisis in terms of high unemployment, poverty and inequality provides an opportunity to critically reflect on past performance and to consider the desirability of reviving the role of the state sector in a way that would help contribute to human development.

This study will briefly examine the industrial policies previously adopted by developed countries in addition to their more recent experiences of state intervention. This issue merits discussion because the role which the state plays in setting economic policies impacts on levels of employment, income, education, the standard of living and, most importantly, national sovereignty. The major financial crisis of 2008 has generated conditions which prompt a reassessment and consideration of alternatives to the status quo.

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Throughout the years of the Great Depression, debate continued between Keynes and Hayek. During the post-war period of reconstruction, the Keynesian model was adopted by western governments but with the arrival of the economic crisis in the 1970s, neoclassical economists gained new importance and their recommendations were adopted by the US and UK governments as an alternative way out of the crisis.

Neoclassical or neoliberal economists such as Friedman, Hayek, Krueger, and Little, strongly opposed state intervention, on the grounds that the state was not an impartial agent but led by politicians and bureaucrats who faced constant pressure from interest groups. This led to the introduction of various forms of regulatory laws, which ultimately resulted in increased corruption, red tape, and rent seeking (Little, 1982; Hirschman, 1982; Krueger, 1974).

By focusing on corruption, favouritism and other forms of self-seeking behaviour, the neoliberal economists highlighted how a government with 'good intentions' was, in reality, controlled by special interest groups. Therefore, they advocated a minimal role for the state, arguing instead that it should be left to price mechanisms in the competitive market to decide what should be produced and in what quantities. Their model completely shifted the focus from 'getting the policies right' to an overriding concern with 'getting the price right'. The IMF and the World Bank accepted their recommendations and imposed 'Structural Adjustment Programmes' on developing countries to increase the role of the market, putting pressure on governments which were seeking loans to adopt these policies (Siddiqui, 1994a).

In the past, governments intervened in business affairs, frequently correcting market failures, which is now seen by neoliberals as futile and even wasteful behaviour. Therefore, a critical approach is required to understand the role of the state in the economy in the 21st century which draws on the past experiences of both the developed and developing countries. Lessons may be learnt from this that could be of specific benefit to developing countries, enabling them to build manufacturing sectors which could in turn, ultimately help to reduce unemployment and poverty, and also address environmental issues.

This paper is organised as follows: The opening section provides the background to this topic, outlining the key issues to be addressed and their importance in the 21st century. This is followed by an overview of the 'market-centric' model and an examination of the past experiences relating to industrial policies in the developed countries. The focus then shifts to the

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

issue of state intervention and industrial policies in the developing countries and the East Asian countries, highlighting some key aspects of this continuing debate. The study concludes by making the case for a reconsideration of the role of the state in the economic affairs of the developing countries.

The methodology to be followed here is derived from the aims of the study. This engages an understanding of the issues in the research project. The research question requires international comparisons statistics and provides the main source to answer the research questions and address the objectives of this paper. Analysing the secondary data which has already been presented is the only possible way to get macroeconomic data. The secondary data sets together provide quantifiable information and statistics published by the governments for their country. Country based multiple source data sets are also available from governments' publication and international organisations. These include data such as IMF, World Bank, OECD and UNCTAD statistical data collected for member countries.

Analysing existing secondary data offers the prospects of being able to explore research questions of interest to our study without having to go through the process of collecting. It also offers the opportunity of being able to employ high quality data sets that are based on large macroeconomic data.

'Market-Centric' Economic Theory

Following the economic crisis in the early 1980s in North America and Europe, the 'market-centric' paradigm re-emerged as a viable alternative to neoclassical economic theory. Let us briefly examine its key elements. Neoclassical economic theory emphasises that the market is an ahistorical phenomenon which functions as some sort of universally applicable mechanism for the efficient allocation of resources. Neoliberals visualise the market as socially 'neutral' and human beings as selfish (Little, 1982). They reject any limits to the free market and insist that voluntary actions in the market sphere are inevitably harmonic, peaceful and mutually beneficial for the whole society (Hirschman, 1982; Krueger, 1974). However, market failures can be witnessed in areas such as education, the environment and pollution.

State regulation can be widely seen in the setting of taxes and tariffs and in the regulation of the macroeconomic dynamics of the system of finance and credit. Regarding the role of the state in economic affairs, Thomas

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Friedman argues: “The hidden hand of the market will never work without a hidden fist – McDonalds’ cannot flourish without McDonnell Douglas, the builder of F15. And the hidden fist that keeps the world safe for Silicon Valley’s technologies is called the US Army, Air Force, Navy and Marine Corps” (Friedman, 1999, p. 373).

The neoliberals insist that the state and public sectors are inefficient and only markets and the private sector are capable of creating growth, employment and human welfare. But in reality, for the last three decades, neoliberal policies have resulted in largely benefitting financial capital, monopolies, and the very rich. Working people and the rest of society witnessed a rise in joblessness, poverty, stagnation or a decline in wages, and cuts in welfare payments. Austerity has added to the misery of the majority by shrinking the public services on which people depend.

By focusing exclusively on the market, which is said to epitomise freedom and equality without also concentrating on the social relations inside the production system, renders the effect of the market system and the broader economy invisible. The idea of the market economy was a set of policies intended to force people to accept market discipline, meaning they had to adjust their economic and political life to the dictates of the market (Perelman, 2011). Neoliberal ideas have become instruments for explaining, legitimising and controlling workers within the market system.

Neoclassical economists assume that ‘in the beginning was the market’ (Williamson, 2003). The model also assumes that markets are perfectly competitive. The market is seen as something which naturally existed from the very beginning of human civilisation. They argue that the state, on the other hand, should be seen as man-made, an idea which emerged as society itself evolved. Contrary to their beliefs, however, economic historians have found there were no markets in the beginning, except those which operated at a very local level to supply the most basic necessities; markets were not important nor did they play a key role within ancient communities.

The neoliberal model does not take into account the social relations of production and disregards the well-being of workers. It is the marriage of macroeconomics with the individualistic-driven market economy. The market is being used to create a fear of losing employment, reducing wages to further power the corporations. The emphasis on efficiency at micro level and on market-based explanation is unable to explain the structural inefficiency which leads to the enormous waste of resources (Perelman, 2011).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Today's developed countries pioneered and relied on state interventionist policies for their industries and trade during the early stages of their industrialisation. Moreover, well-designed interventionist policies in the developing countries have not only been impressive with regard to their performance but overall have fared better in relative terms with their developed counterparts at comparable stages in their development. This is not to claim that state intervention always works. If we consider, for example, the most recent experiences of the industrial policies followed by East Asian countries, these were based on interventionist policies, except in the case of Hong Kong, previously a British colony. Dramatic growth rates were formulated and applied with the state actively promoting industrialisation in the early 1950s (Wade, 2004).

Neoclassical theory rests on the mistaken premise that markets and politics are always autonomous; they are not autonomous as neoliberals claim, but are linked and mutually dependent. The growth of private enterprise does not take place in a vacuum. It requires government support for an environment conducive to price mechanisms and the appropriation of surplus and investment to develop.

Bhagwati (1982) argues that, irrespective of the possible genuine intentions on the part of the government, interference with the economic functioning of private enterprises can create incentives for rent-seeking behaviour. Even when there are market failures, this can make things worse by shifting resources from productive to unproductive activities. On the question of market failure, Chang argues that, "the same market could be seen as failing by some while others regard it as normally functioning, depending on their respective theories of the market [...] Many people think that one of the biggest 'failures' of the market is its tendency to generate an unacceptable level of income inequality" (Chang, 2002, p. 544).

Ian Little (1982), another neoclassical theorist, has argued that a micro-economic approach, which relies on profit and growth maximisation at firm level, will be able to outperform and be more efficient than state intervention, because the latter will be based on wholly insufficient information. Like other neoclassical economists, Little(1982) has stressed there is bound to be a significant discrepancy between the intended official policies and their implementation due to the self-seeking of the bureaucracy (Hirschman, 1982).

A non-competitive market is seen as a failing market by the neoclassical economists, but others, such as Schumpeter, accept that the existence of a non-competitive market is an inevitable feature of a successful capitalism

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

(Goldsmith, 1995). The issue of perfect information is seen as necessary for a competitive market to exist and may lead to the diffusion of new technology, which may, in turn, mean no incentives for entrepreneurs to innovate with new technologies. Certain environmental regulations and minimum wages have often been criticised as interference in business freedom and adding to business costs but nowadays regulations concerning factory pollution standards and safety in the work place are hardly seen as intrusive policies.

The outcomes of neoliberal policies in terms of socio-economic variables indicate that in the US and the UK the benefits of such growth have disproportionately gone to the top income groups. For instance, since the adoption of neoliberal policies, both these countries have witnessed growing disparities in incomes and wealth, and this rise has been accompanied by shifts in wealth from wages to capital, cheaper imports and the relocation of some manufacturing industries to cheaper cost countries, squeezing wages further and curtailing the power of unions in the Western countries. Neoliberal policies have created wealthy financial centres in big cities such as New York and London, while the traditional manufacturing areas have suffered from low investment and high unemployment (Wade, 2009; Stiglitz, 2006).

State, Free Market and Economic Governance

It is useful here to briefly trace the links between state, market and economic governance in the past. The state's role in providing guidance and playing a leading role in economic policies in Britain and US, for example, was originally very different to how it is currently portrayed. When developed countries such as Britain and the US were laying the foundations for the modern manufacturing sector, the state was very active in promoting and protecting domestic business interests against those of foreign companies. In fact, in the early phase of their industrialisation, most of today's developed countries adopted industrial policies which were very proactive, and certainly not 'open door' policies of the type now recommended to developing countries. For example, Britain had protectionist policies in place when it was trying to catch up with Holland, which had more advanced industries than Britain (Chang, 2007).

For example, the Corn Laws in Britain, which had protected farmers since the 13th century, were finally repealed in 1846. Over the next two decades, most of the import tariffs were removed (Polanyi, 1957). There is

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

also evidence that the British government intervened in establishing industries: “During the early phase of Britain’s industrial development, Robert Walpole, the British Prime Minister in 1721, launched an economic policy to transform the country from an exporter of raw material into an industrially developed nation. He sponsored legislation directed towards protecting domestic industry from foreign competition and export companies, supported through export subsidies. Moreover, import tariffs were raised on foreign goods, while import tariffs on raw materials were removed to make imports cheaper for the country’s export industry. Walpole’s policies were not those of a “free market”. Instead his government provided heavy protection and subsidies to infant industries” (Girdner and Siddiqui, 2008, p. 9). Only after the Industrial Revolution was well established did the government open up domestic markets to foreign completion.

The British Crown granted monopoly status to their companies and also made treaties with foreign governments to obtain exclusive trading privileges for them (Polanyi, 1957). At the same time, the government put up import taxes and paid subsidies to domestic manufacturers: “The [British] East India Company and other companies chartered by the monarchy opened markets around the world to British goods. Other grants of monopolies were designed to encourage new industries from abroad to start up in Britain. For instance, the Navigation Acts, once calling them ‘perhaps, the wisest of all commercial regulations of England’ because they promoted national defence’ [...] The net effect of British mercantilism was to nurture companies that, when *The Wealth of Nations* appeared, were strong enough to exploit new markets and new technology, making England the workshop of the world” (Goldsmith, 1995, p. 645).

Thus, the state initially played a defining role in Britain in the development of the market economy, rather than this having naturally existed as assumed by the neoclassical theorists. As Polanyi has argued, “The road to the free market was opened and kept open by an enormous increase in continuous, centrally organised and controlled interventionism. To make Adam Smith’s ‘simple and natural liberty’ compatible with the needs of a human society was a most complicated affair. Witness the complexity of the provisions in the innumerable enclosure laws; the amount of bureaucratic control involved in the administration of the New Poor Laws which for the first time since Queen Elizabeth I’s reign were effectively supervised by the central authority [...] new powers, organs, and instruments required for the establishment of laissez-faire (Polanyi, 1957, p. 140)

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

In the US, too, state intervention was seen at the time as the best available policy tool to establish property rights, facilitating the provision of infrastructure such as the railroads, and even the success of early industrialisation. Right up until the beginning of World War II, the US had a heavily protected economy. For example, it had by far the highest tariff rates among the Western countries for most of the 19th century when its average tariffs rates were approximately 40%, while those of Austria, Belgium, France and Sweden were no more than 20% during the same period.

The first Secretary of the US Treasury, Alexander Hamilton (1789-95), set out a clear strategy concerning how the country should develop an industrial base in his *Reports of the Secretary of the Treasury on the subject of manufactures* (Chang, 2007). It is well-documented that in the past, the state was clearly involved in creating the conditions for industrial development (Girdner and Siddiqui, 2008). It is well known that infrastructure plays a crucial role in economic development and, therefore, the government should take a lead in making investments in infrastructure. For example, the US government took the responsibility for investing heavily in infrastructure such as railroads and telegraph lines, due to their high costs and long gestation periods. During the latter half of the 19th century, millions of acres of land were made available by the government for these tasks. Education was another area which was seen as too important to be left to private initiative alone. For instance, schooling was made mandatory for the first time in 1852 by the state of Massachusetts. Soon other states followed, because it was considered that businesses often chose to invest too little money on their employees' skill development; it was also feared that if workers could leave any time, they would ask for higher wages to stay (Polanyi, 1957).

The National Banking Act of 1863 was the first US bank regulation to provide a stable financial system and currency, which assisted the business sector (Polanyi, 1957). The state also took the lead in investing in the education sector to improve the general skill level within the country. The US government involvement in agricultural R&D began in Connecticut in 1875 where the government funded research into hybrid corn; a further breakthrough came from a government-funded research laboratory in 1917 with new seeds producing a higher yield. This was soon spread to other states; the government also provided financial incentives to farmers (Chang, 2007; Polanyi, 1957).

Similar state intervention policies were part of the official policies in 19th-century Germany, too. In the 1840s, a German academic, Friedrich

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

List, argued that his country firstly needed to build a successful manufacturing sector and only then would it be able to follow ‘free trade’ policies. He concluded that “in order to allow freedom of trade to operate naturally, the less advanced nation [Germany] must first be raised by artificial measures to that stage of cultivation to which the English nation has been artificially elevated” (List, 1966, p. 131). Similarly, Japan later followed state intervention policies to strengthen its industrial base against foreign competition. As Cowling and Tomlinson’s (2011) study concludes: “The Japanese case also demonstrates that, with a degree of protectionism, industrial strategy and state investment can deliver dynamic growth for a (significant) period. However, in the long term, Japan (and Russia) also highlight that where a corporatist policy is pursued and hierarchical governance structures emerge, then long term development paths are likely to be determined by the few with the public interest being compromised” (Cowling and Tomlinson, 2011, p. 843). In short, in almost all present day developed countries state intervention was seen as the best-option policy to establish the manufacturing sector and it played a key role in their economic development and sectoral transformation.

The Role of State in the Developed Countries

The passion for the ‘free market’ has emerged from various sources, beginning with Adam Smith’s ideological premise that by means of market forces each individual’s free and selfish pursuit of gain will be transformed as if by an invisible hand to achieve socially optimal results. It is worth revisiting Adam Smith’s ideas, since they are so often quoted by neoclassical economists to support their laissez-faire policies. Other economic theorists, such as Amartya Sen (1999), strongly support the role of the state, especially in areas of social responsibility including health care, education and other welfare measures, and the maintenance of adequate levels of employment. Sen attempts to combine Adam Smith’s economic ideas with moral philosophy (Smith, 1976), noting, for instance, that Smith acknowledges that the government has an important role to play, namely, “the duty of erecting and maintaining certain public works and certain public institutions” (Smith, 1937, p. 651). These public goods include provisions to accumulate and encourage the development of technology and education, both of which can be expected to contribute positively towards raising the productivity and wellbeing of society.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

It is argued that the private sector does not have the necessary resources to provide sufficient social capital by itself. As Adam Smith points out, these tend to be assets “which it can never be for the interest of any individual, or small number of individuals, to erect and maintain; because the profit could never repay the expense to any individual or small number of individuals, though it may frequently do much more than repay it to a great society” (Smith, 1937, p. 862). He argues that Law and Order, property rights and the re-enforcement of contracts prepares the ground for market exchange to take place. He suggests that the government can act as a referee in various contract disputes, which could be prerequisites for market-based resource allocation (Goldsmith, 1995).

The assumption is that the state should serve as a rational actor for the benefit of society as a whole i.e. in the interests of the common good. Broadly speaking, the main arguments in favour of state intervention seem to centre on five areas: 1) the re-enforcement of property rights, contracts and procurement of institutions for production and exchange; 2) macroeconomic policies; 3) procurement of infrastructure and provision of public services, such as health and education, 4) operational control over private companies, and 5) participation in the production of goods and provision of services.

State intervention in economic policies was adopted by Britain, the US and Germany during the 19th century. Whilst in Britain and the US, the state remained in the background but continued to play a crucial role, in Germany the state’s role in policy initiatives to build the domestic manufacturing sector was very visible and it successfully managed to transform the economy during that period. Later, in the 1950s in Korea and Taiwan, the state played a crucial role in issues including land distribution, construction of infrastructure, and industrialisation whilst during in the 1980s in China, the ‘revolution from above’ state played a more active role in supporting domestic industrialisation (Chang, 2007; Wade, 2004; Amsden, 1989).

Rather than prematurely opening their industries to foreign competition, other western European countries followed Britain’s lead as soon as their industries were strong enough to compete. However, the neoclassical economists choose to ignore these historical facts, and deny governments a role in formulating industrial policy in the developing countries.

In recent years, there has been growing dissatisfaction with the neoliberal paradigm (i.e. free-market) that has dominated economic policy over the last few decades. In fact, in the early 1980s, the so-called ‘Washington

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Consensus' emerged which included the promotion of policies such as the free-market economy, de-regulation, privatisation, and trade and capital liberalisation. These were widely backed by international financial institutions, including the World Bank and the IMF, and the British and US governments (Williamson, 2003; Siddiqui, 1994a). Such policies have increased corporate power and this dominance of the corporate sector and the economic crisis that have followed have led many to question the relevance of such policies and seek alternative policies for the 21st century (Narcis and Stiglitz, 2009; Fine *et al.*, 2003).

According to Mohanty and Miraglia (2012) although neoliberalism "inevitably places capitalist interests above the needs and hopes of the people, it is the people's movements (anti-colonial/anti-imperial, peasant, ecological, labour...) that have exposed the faults-line of neoliberal capitalism and placed questions of democracy, equity and justice at the centre of the struggle for emancipation" (quoted in Harcourt, 2014, p. 1308).

There is an on-going debate concerning the role of the state in economic policy measures between those who favour state intervention in designing economic policy and the neoliberals, who will not countenance any economic intervention by the state. Some of these issues involve the design and implementation of public policies aimed at improving the economic well-being of citizens by fostering economic development and preventing crises. The interventionist argument has its origins in the early period of capitalism in Britain, when some defended protectionist policies and monopoly concessions granted by the government in the 16th and 17th century. Later, however, in the 18th century, the continuation of such policies was opposed by Adam Smith who favoured free trade and laissez-faire capitalism. However, in the 19th century, with the exception of the UK, all the major European countries and the US followed protectionist policies, employing active state intervention to protect their domestic industries against foreign competition (Chang, 2002).

Any comparative analysis of economic performance requires the analysis of a longer period of data. For example, between 1945 and 1980, the western European economies recorded higher growth rates than the US. A closer examination of the state role in the US economy since the mid-1990s provides some interesting facts. For during that period, despite assigning a major market role to the crucial sectors of the economy, the state continued to play a leading role in both the decimation and the development of research and innovation, often through state-controlled defence industries (Kitson, 2005). Cowling and Tomlinson (2011, p. 847) conclude that "wid-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

er public interests are likely to be better served through an inclusive approach where governance structures are relatively diffuse and allow opportunities for all stakeholders to participate in the development process”.

In the developed economies state ownership can be vast. For instance, in the much celebrated free enterprise of Singapore, the land is fully owned by the state and also about 85% of the housing is provided by the state. Also more than 20% of the Gross National Product (GNP) is produced by the state owned enterprises in Singapore (Siddiqui 2010b), whilst in the UK, the public sector National Health Service is still the largest employer. The state plays an important role in most countries by providing backing for the monetary and credit system. Certain public goods such as street lighting should be provided from public expenditure. The procurement of infrastructure and the provision of public services are based on the notion that these are the necessary preconditions for economic growth and social progress. The private sector would be unable to produce by itself. For the proper functioning of contemporary economies, it is widely acknowledged that areas such as mediation, contract and regulation can assist the market.

Role of the State in the Developing Countries

The neoclassical model of economic development suggests the primacy of the market as a means of improving the standard of living and income in the developing countries (Little, 1982). Top economic experts and financial officials from all the Latin American countries, except Brazil, were trained in the neoclassical tradition in the US in the 1980s and were assigned to oversee the implementation of the IMF’s prescriptions after the debt crisis. These countries mostly focused on macroeconomic stabilisation programmes including privatisation of state enterprises, trade liberalisation and restricting the role of the state in the economy (Siddiqui 1994b). These governments had no inclination to learn from the East Asian experiences of the recent past. They saw the state as the source of all ‘distortions’ and associated this with the failure of their own previous ‘import substitution’ policy (Amsden, 2009a).

Neoliberal economists say that the invisible hands of the market are the best allocating forces to bring about rapid growth. Economic developments are regarded as best driven by private enterprises with little or no state intervention (World Bank, 1993; Little, 1982). Latin America’s ‘import substitution’ policies were blamed for producing inefficient, rent-seeking behaviour, slow growth and macroeconomic imbalances. Another proponent

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

of neoliberalism, Deepak Lal (1983), is highly sceptical about the role of the state in the government of developing countries. According to him, “many developing countries are closer in their official workings to the rapacious and inefficient nation-state of 17th- or 18th-century Europe, governed as much for the personal aggrandizement of their rulers as for the welfare of the rule” (quoted in Wade, 2004, p. 10).

Latin American governments began to embark on interventionist policies in the 1930s, their aim being to encourage and lay the foundations for domestic industrial development. By encouraging a policy of ‘import substitution’, domestic producers would develop the capacity to produce goods that would otherwise be imported. High tariff rates discouraged imports, while subsidies and local demands encouraged domestic producers. This policy was rooted in populist movements led by individuals such as Perón in Argentina, Cárdenas in Mexico, and Vargas in Brazil. This strategy was initially successful in developing an industrial base in countries such as Argentina, Mexico and Brazil, but in the 1970s, such policies began to experience crisis (Shapiro and Moreno-Brid, 2014).

Moreover, these countries generally relied on imports of new machinery and technology and also capital investment by multinational companies (MNCs). In Brazil, MNCs accounted for 44% of all domestic sales in 1965, while domestic private and public companies together accounted for the remaining 56%. By 1972, MNCs controlled more than half of the total manufacturing investment in both Brazil and Mexico. By the mid-1970s, this model had entered deep crisis with public sector management and the growth of vast bureaucracies encouraging corruption. By the late 1970s, these countries faced chronic financial difficulties, particularly with balance of payments deficits.

Since Latin America’s exports consist of naturally based products, these sectors have limited potential for productivity growth and technological upgrading. In 2012, just ten commodities and mineral products including coffee, soya beans, sugar, fruit, iron ore, copper, gas and oil, accounted for more than 40% of Latin America’s total exports: “In Mexico, Latin America’s alleged success story in reorienting domestic production to foreign markets, high-tech manufactured goods do represent more than 80% total exports. However, a vast number of these exports are essentially produced in maquiladoras that locally assemble imported inputs with scant use of domestic intermediate products or raw materials [...] in reality, they are high-tech exports produced through rather simple assembly process that neither rely on local R&D capacities nor have significant backward or for-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

ward linkages with domestic suppliers” (Shapiro and Moreno-Brid, 2014, p. 193).

It seems that the governments in Latin America equated export promotion with trade liberalisation and deregulation, and their industrial policies were abandoned and their fiscal policies to promote competitiveness of selected industries were dropped. The liberalisation and open-market policies which they adopted in the 1990s were supposed to align domestic prices with international prices. This was completely the opposite of what Amsden found in her earlier study of industrial policy in South Korea (Amsden, 1989) where, in the early phase of industrialisation, the prime issue was not to ‘get the price right’, but to deliberately ‘get the price wrong’ (Amsden, 2009b).

In recent years Latin America has improved its terms of trade and experienced a commodity export boom, which has been associated with rising imports from China but it is difficult to predict how long this will continue.

When President Lula came to power in the 1990s, Brazil adopted a long-term developmental policy to promote specific industries. With the help of its development bank (BNDES), the government provided a massive amount of finance to promote a few selected industries in the country. As a result, a number of Brazilian companies emerged in the 2000s as internationally competitive. For example, Petrobras emerged as a leading company within the oil and petrochemical sector, not only in Brazil but also internationally, an achievement which was made possible due to massive state support. In contrast to this, Mexico’s government decided to scale down the role of the development bank in assisting and financially supporting other key domestic industries. For example, the investment potential of Pemex was severely affected due to this government decision; similarly government policy measures were taken to withdraw the support previously extended to Nafinsa and Bancomex (Shapiro and Moreno-Brid, 2014).

The economic crisis in the developing countries in the 1980s and 1990s provided an opportunity for international financial institutions to impose ‘Structural Adjustment Programmes’ in the name of aid, which has since proved disastrous (Siddiqui, 2013). To cite but one example, Stiglitz found that the market liberalisation process led to foreign investors increasing their control over African resources rather than assisting them towards long-term independent development. Moreover, these policies brought further cuts in public spending in the health and education sectors (Siddiqui, 2014b), leading to further deterioration in the availability of these vital

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

services which has impacted most negatively on the poor in the developing countries (Stiglitz, 2006).

The question arises, then, as to why the state is once again playing a leading role in South Africa's power sector, and why a similar situation can be found in some Latin American countries. The experience of South Africa's power sector represents an interesting case in which the 'standard model' of competition and privatisation was seriously considered due to pressure from the World Bank but was soon rejected.

Eskom, the South African electricity supply company, remains state owned: "Eskom has led an impressive national electrification drive. The proportion of households with access to electricity has risen from below 49% in 1993 to nearly 70% in 2003. In the years 1994-2002, 3.8 million new households received electricity [...] Eskom was and continues to be a relatively well functioning public utility. Unlike many other developing countries, which suffer from serious operational inefficiencies, Eskom delivers reasonably reliable and quality power at low prices and it is financially viable" (Eberhard, 2005, pp. 5309-5310).

The electrification programme in South Africa represents a remarkable achievement perhaps without any international precedent, with access to electricity doubling from 33% to 66% of the population in the short period of time from the end of the 1990s to the early 2000s. Facing this challenge was necessary in order to overcome the legacy of the inequalities of apartheid. The South African experience demonstrated that it is possible to make substantial progress in widening access to electricity services for the poorer sections of society who historically have been underprivileged. Although this was achieved by a state-owned enterprise, it was made possible due to technically competent and financially sound and most of all, the state's willingness to support it throughout.

This is particularly important in countries where industrialisation historically began much later than in West European countries. When there is a need to undo historical legacies and backwardness, the state's role can be quite important. The experience of neoliberal reforms in Russia in the early 1990s highlights the dangers of ignoring the issue of governance and of giving greater powers to foreign investors. It is useful to quote Wade here: "Low private saving, dependence on primary product exports, declining prices of exports in relation to imports, small internal markets, limited skills, few entrepreneurs adept at large-scale organisation, and pervasive under employment – required an even bigger role for the state than in the more developed countries" (Wade, 2004, p. 8). In fact, there has been a

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

long history of state intervention to promote innovation and disseminate new technologies, primarily to negate market failure when a lack of incentives for generating new technologies may lead markets to underinvest and they prove incapable of taking the lead in the R&D of technologies.

In the Indian context, it is relevant to cite here the earlier debate between Amartya Sen and Jagdish Bhagwati (Ruparelia, *et al.* 2011). Sen (1999) argues in favour of state intervention in areas such as education and health, claiming that government measures should be a starting point for tackling mass poverty and the other ills that beset India. Bhagwati, however, prefers rapid growth, and assumes that the wealth generated will presumably be utilised later to solve deprivation of various kinds including poverty (Bhagwati, 1982). Sen emphasises the importance of both state and market forces as agents of development, and advocates strong intervention by means of social welfare schemes (Sen, 1999). He believes that food, employment, health and education should be provided through government schemes entailing active state involvement, whereas Bhagwati prefers direct cash transfer to the poor who can choose private or public providers for the services they require. The important issue is that of ecological sustainability. Sen often acknowledges the need to bring environmental regulation into the equation, while Bhagwati largely ignores it. For neoclassical economists, growth is the first priority and they are not concerned about increasing inequality.

For example, the past two decades of higher growth in India were characterised by a net decline in employment in most sectors. Some 93% of India's labour force continues to work in the informal economy without a living wage or any of the benefits or security of formal employment. While the Indian labour force has increased by 100-125 million, employment in the formal economy has grown from a meagre 26.7 million in 1991 to a still meagre 29 million in 2001 (Siddiqui 2014a).

Neoliberalism promotes a market model of development. In education it has already brought about state withdrawal from its wide ranging responsibilities (Siddiqui, 2014b). To follow a liberalisation policy in the agricultural sector in a country with a large population like India could prove catastrophic. For instance, it could lead to land-use shifts from cultivation of grain for domestic consumption to a preference for export crops. As a result, such development could undermine domestic food security (Siddiqui 1999). Sharp fluctuations such as a rise in prices could hurt consumers, while a sharp fall would undermine farmers' incentives to invest in the land

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

and thereby contribute further to slowing down overall economic development (Siddiqui, 2014a).

In fact, neoliberal reforms in developing countries in recent years have weakened the state regulation of the economy and also created the conditions to promote and expand the role of private enterprises and markets (Siddiqui, 2012b). At present, with the increased process of globalisation and integration into global markets, the governments in developing countries are seen reducing taxes and government spending, selling off public companies and minimising the role of the state in economic affairs to foster more individual initiative and business opportunities (Siddiqui, 2012b).

The international financial capital of the 21st century seems to be different in a number of such ways from the past. First, it determines the possibility of Keynesian demand management, which required state intervention to boost levels of domestic economic activity. This means using state intervention to build a productive economic base could prove controversial. Second, under capital liberalisation, the developing countries need to raise interest rates to attract capital and also foreign capital confidence becomes very important. This could lead to higher costs for borrowing, which could discourage investment and reduce aggregate demands. Higher interest rates will also increase costs for small businesses, meaning a further contraction in economic activity. On the other hand, the state will face more fiscal crises due to the increased cost of debt servicing, which cannot be met by raising taxes on the rich and corporate sector, because the open economy will be under pressure to maintain lower tax rates to attract investors and higher taxes would prove to be a disincentive. Moreover, import duties have to be reduced as a part of liberalised economic policy measures. All these further accentuate the fiscal crisis of the state, and as a result the government may have to cut social spending on development expenditure. These could further contract the domestic economy.

State Intervention in the East Asian Economies

The arguments in favour of extensive state intervention have been based around the experiences of historically backward countries, their underdeveloped institutions including markets, and the absence of a strong entrepreneurial class. Malaysia's industrial policy in the recent past offers important lessons for other developing countries. The implementation of its New Economic Policy (NEP) and its successful outcomes require the state to be actively involved in the economy. For example, looking more closely

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

at Malaysia's industrialisation, it is well established that state intervention in the last quarter of the 20th century did help it to diversify and the country was able to build a manufacturing sector. Poverty alleviation and income redistribution was also achieved successfully by means of active state involvement as well as market coordination in an ethnically sensitive country like Malaysia (Siddiqui 2012a).

Furthermore, Rasiah and Shari (2001) point out that from 1970 to 1990 the NEP was applied by providing strong incentives to both 'import-substitution' and 'export-oriented' policies to develop the manufacturing sector. The adoption of NEP during the period of 1970-1990 heralded an era of rapid economic growth, job creation and a rise in incomes throughout the country. Poverty and inequality have declined and the government has been able to address the historical legacy of the ethnic divide between communities which arose largely from the colonial policies of the past. Unemployment was reduced from 8% in 1970 to 2.6% by 1996 (Siddiqui 2012a; Rasiah and Shari, 2001).

There seems to be no doubt that Malaysia's growth and industrialisation strategy throughout the NEP period relied on state intervention, with a coordinated role for both the state and the market. In fact, the poverty reduction measures were launched under the close supervision of the state and the outcome was remarkable. The poverty level was decreased from 49.3% of households in 1970 to 16.7% in 1990 (Siddiqui 2012a).

Rasiah and Shari's (2001) study on the issue of state intervention concludes: "The experience of Malaysia demonstrates the need to formulate effective industrial policies, taking cognisance of the market and the institutions necessary to ensure effective coordination between firms, factor markets and product markets. Through preferential policies, the state expanded *Bumiputera* employment in public services and stimulated their greater participation in manufacturing, thereby succeeding in its efforts to restructure the occupational identification of ethnicity, which was complemented by land schemes and the distribution of shares among poor *Bumiputera* households" (Rasiah and Shari, 2001, p. 75).

China's changes in policies in the 1978 began in the agricultural sector by giving more production (Siddiqui, 2009) and sales responsibilities to households rather than village communes, which ultimately increased output and local participation at village levels, perhaps also allowing some wider participation in decision making. The Chinese government played a key role in all these initiatives, by changing the economic direction of the country in 1978. Later, a more active role in technological upgrading and

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

innovation enhanced the competitiveness of Chinese industries (Siddiqui 2009).

Regarding the question of the export success of East Asian countries, Amsden (2009a) claims it is irrelevant to argue against the ‘import substitution’ and ‘export promotion’ policies. In her study of the East Asian countries, she finds that both policies complemented each other. She further argues that “only one simple story tends to repeat itself: behind the rise of every export was an earlier import substitution investment policy” (Amsden, 2009a). It was argued that free-market and laissez-faire policies enabled East Asian countries to achieve spectacular rates of export growth as a result of the competitiveness enforced by their exposure to the international market (World Bank, 1993). However, contrary to such claims, it is now known that these economies were highly protectionist, dirigiste regimes (Chang, 2002; Amsden, 1989).

The East Asian economies experienced higher rates of growth for more than four decades until 1997 and became developmental success stories thanks to state intervention policies. These countries used government policy to guide the markets.

There has been an acceleration of growth rates in East Asian countries—such as South Korea, Singapore, Taiwan and Malaysia in the 1970s and 1980s, namely in countries who hardly followed neoliberal prescriptions (Siddiqui 2010b). These countries have achieved high rates of economic growth via strong state direction in economic policy matters (Wade, 2004). Moreover, the successful emerging economy also needs to be independent, dealing with their domestic classes whilst also controlling non-state agents. The state also uses power and resources to implement interventionist policies, which runs contrary to the prescription of international financial agencies. Unsuccessful emerging economies pursue interventionist policies but end up failing because they are pressurised by special domestic and international interest groups, and obviously lack relative autonomy. For example, the state played a key role in the development and performance of the Japanese and Korean steel industries and also in building other modern industries such as Korean shipbuilding, cars and electronics; Indian agriculture in the 1960s (Siddiqui, 1999), and its IT sector in the 1990s; Argentina’s finance sector; South Africa’s mining and power sectors (Siddiqui, 2014a). All these were successfully achieved with state assistance (Fine *et al.*, 2013; Amsden, 1989).

For more than two decades, economic policies, particularly those in Latin American and African countries, have been dominated by market-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

oriented policies. The imposition of neoliberal policies across the developing countries and in the economics profession via multilateral institutions such as the World Bank, the IMF and the WTO together with the Western governments could be clearly seen (Siddiqui, 1994b). In fact, both the debt crisis in the 1980s and the East Asian financial crisis in 1997 served to strengthen the grip of neoliberalism, with policies being revisited rather than dropped. But the IMF's credibility as an institution weakened in developing countries (Siddiqui, 2014b; Stiglitz, 2006).

Conclusions

This study has argued that economic governance is crucial for development since it is associated with the ability of actors to participate in decision-making processes, which have an impact on economic growth, job creation, income, investment and the environment within a country. With the adoption of neoliberal policies, the corporate and financial sector and bureaucrats have acquired increased power in developing countries. It also means that national sovereignty itself is being threatened in the name of so-called growth and market efficiency. Neoliberal reforms in developing countries have led to a reduction in the role of the state whilst market forces have been assigned a correspondingly greater role. Neoliberalism also promoted the interests of the corporate-financial capital on the grounds that what is good for them is good for the nation. Similarly they failed to predict and analyse the 2008 financial crisis, and also provided very little theoretical justification for the interventionist policy measures which were applied at the beginning of the crisis.

More than three decades of experience have shown that far from promoting economic growth, neoliberalism has not succeeded in reducing levels of poverty, particularly in Africa and Latin America, where such policies were launched more than two decades ago. For example, the average annual rise in per capita income in the developing countries has slowed down from 3% during the interventionist period of 1960-1980 to 1.5% during the following two decades 1980-2000. Moreover, the most disturbing fact is that in the poorest developing countries (i.e. those with per capita GDP of US\$ 375-1121), this declined from 1.9% in the first period to just 0.5% during the second period of the neoliberal reforms (Chang, 2002).

We should perhaps then make a concerted effort to dispel the myth that market competition is overwhelmingly a source of innovation and competitive advantage. The truth is that the government plays a huge role as the

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

ultimate risk taker, financier and social coordinator, both between firms and workers, and between firms and the state. The state should engage more in economic developmental and policy matters and that readjustment is required, shifting away from high levels of reliance on the financial sector and market forces towards more sustainable productive activities (Wade, 2009). Industrial policy could broadly include such aspects as support for 'infant industries', trade policies, and policies affecting foreign capital and investment. This means establishing guidelines covering the operation of the market and setting the boundaries between what should be governed by the market and what should not (Wade, 2009; Narcis and Stiglitz, 2009).

In the past the state had a good record of stimulating innovation-led growth, not only by mitigating private sector risks but also taking risks that the private sector would not take. For example, the development of aviation, nuclear energy, computers, biotechnology, and solar energy were all successfully achieved by means of state support. Developing countries require an industrial policy in which the government takes a clear role in leading innovation in renewable energy techniques, public transport, health and education.

The question of the distribution of surplus and the issue of social justice are not recognised in neoliberal analysis as economic issues requiring important consideration.

For neoclassical economists it appears that capital formation as an efficient allocation of resources is not viewed as a crucial factor of development. Once instructional arrangements are in place to generate efficient allocation of resources then investment can take care of itself. Their models totally ignore the historical legacies of underdevelopment, pretending that the past was free from difficulties and trying to blame the current problems on the developing countries themselves.

There are a number of reasons why the neoliberal model is not sustainable. In most of the developing countries, the income distribution was very unequal; therefore, the domestic markets remained highly unequal and were unable to absorb the manufactured goods produced (Siddiqui, 2010a).

The crisis which the developing countries have experienced for more than two decades shows how futile it is to assume that this could be resolved once the primacy of the market had been restored, and that the economy will naturally develop as long as the state does not interfere with its functioning. These claims are false with little if any support from historical precedents. The state should act in the interests of the majority in order to promote overall human development.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

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18-19 June 2015, Economics and Finance**

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18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
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Unemployment: Walras's Voluntary and Keynes's Involuntary

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Keywords: *Walras; Keynes; Voluntary Unemployment; Involuntary Unemployment; Aggregate Supply function.*

Abstract: This paper shows that Keynes's involuntary unemployment derived from Walras's voluntary unemployment by means of changing of the characteristic of the aggregate supply curve (function) of labour. When the original aggregate supply function is a strongly increasing function, as in Walras's approach, there might be only voluntary unemployment, and its magnitude is the difference between the available quantity of labour and the equilibrium point. At the other hand, if the supply curve of labour is a weakly increasing, which means that the supply function may has a horizontal segment then there might be involuntary unemployment if the equilibrium point locates between boundary points of the horizontal segment, and the magnitude of involuntary unemployment is the difference between the right boundary point of the horizontal segment and an equilibrium point. According to Walras's approach also might be considered "forced unemployment" which is the result of an intervention of external forces (government, monopoly, trade unions, and so on) into the market, and therefore, it is a disequilibrium phenomenon. Finally, in reality there are many types of labour, hence a suggested comprehensive approach of employment might be a useful tool for policy making and planning of economics.

Introduction

This paper shows that Keynes's involuntary unemployment derived from Walras's voluntary unemployment by means of changing of the characteristic of the aggregate supply curve (function) of labour. On the one hand, it will be shown that Walras's theory allows defining voluntary unemployment, despite of that post-Walras authors have been asserting that Walras economy is characterized by full employment. At the other hand, despite Keynes's vague and incomplete definition of full employment, voluntary unemployment and involuntary unemployment, it provides a theoretical framework for their definition. This paper demonstrates that Keynes defined the following main characteristics of a general definition of involuntary unemployment: (1) *It is an equilibrium phenomenon*; (2) *It may or may not exist, and, if it does, then equilibrium employment is less than the available quantity of the factor*; (3) *It may co-exist with voluntary unemployment*.

Seventy five years ago Keynes coined the term "involuntary unemployment" in his famous *General Theory*.¹ Since then, this central issue of Keynes's economic theory has been assessed in two very different ways. On the one hand, there are economists who consider "involuntary unemployment" to be an innovation, and one of Keynes's crucial contributions to economic science (Shapiro & Stiglitz, 1985, p. 1217). On the other hand, there are those who consider the concept of "involuntary unemployment" as an issue which does not contribute anything to the employment theory and, as such, is superfluous (Pissarides, 2000, pp. xv-xvi). Keynes himself asserted that 'my doctrine of full employment is what the whole of my book is about!' (Keynes, 1996-1960, XIV: 24).

The crucial reason for this bewildering situation in the definition of involuntary unemployment and its use for the policy making is the missing of the line of demarcation between pure theory and applied theory. Some economists deny the existence of involuntary unemployment claiming that in reality it is not possible to find statistical data about it. On the other hand, the reason for the absence of such data might be the above mentioned situation of the definition of involuntary unemployment. So, the theoretical treatment has to be a necessary condition of the practical issues, and there-

¹ The notion "involuntary unemployment" was in use prior to Keynes both by English economists (see Kahn, 1976, pp. 19-20; Ahiakpor, 1998, p. 17) and also by other countries' economists (see Boianovsky & Trautwein 2003). But their notion differs from Keynes's notion.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

fore, this paper will generally consider the theoretical aspect of involuntary unemployment (Walras, 2005, p. 53).

It will be shown that the kind of unemployment depends on the character of the original aggregate supply curve of labour. On the one hand, when the original aggregate supply function is a strongly increasing function, as in Walras's approach, there might be only voluntary unemployment, and its magnitude is the difference between the available quantity of labour and the equilibrium point. So, in such a case, an individual is unemployed according to his own wishes, because an equilibrium wage defined by free competition is less than a wage which he requires. But, at the same time it is incorrect to confuse Walras's voluntary unemployment with leisure. Moreover, unfortunately, some modern economists have been confusing Walras's voluntary unemployment with "involuntary unemployment".

At the other hand, if the supply curve of labour is a weakly increasing, which means that the supply function may have a horizontal segment then there might be involuntary unemployment if the equilibrium point locates between boundary points of the horizontal segment, and the magnitude of involuntary unemployment is the difference between the right boundary point of the horizontal segment and an equilibrium point. So, in such a case, an individual is involuntary unemployed against to his own wishes, because an equilibrium wage defined by free competition is equal to a wage which he requires.

Definition of full employment and the kinds of unemployment is a key issue of the theory of employment. Unfortunately, Keynes's definitions of full employment, voluntary unemployment and involuntary unemployment are extremely vague and incomplete (Hazlitt 1959; Patinkin, 1949, p. 314; Lipsey, et al., 1990, p. 751). These definitions only became murkier as Keynes's followers tried to explain them (*vide infra*).

For example, post-Keynes's economists have been discussing whether "involuntary unemployment" is equilibrium or a disequilibrium phenomenon. There are also two opposite claims, those that claim it is a disequilibrium phenomenon (Clower, 1965, p. 109; Hazlitt, 1959; Mises, 1998, p. 599; Patinkin, 1949, pp. 337-8; Rothbard, 2004, p. 780) and those that claim that it is an equilibrium phenomenon (Davidson, 1967, p. 567; Hahn, 1987, p. 1). In the latter case, the question is whether Keynes's equilibrium theory is equivalent to Walras's one. Unfortunately, Keynes himself alleged that 'Walras's theory and all others along those lines are little better than nonsense' (Skidelski, 1996, p. 615). A majority of economists assert that they are different theories (for example Blaug, Leijonhufvud, De Vro-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

ey, and Davidson), and unfortunately, only a few economists consider them to be related theories (Morishima 1977; Darity & Horn, 1983, p. 727). It is worthy recalling here Chick's assertion that 'It is doubtful, in fact, whether we would have got in such muddle over Keynes if we had understood Walras properly' (Chick, 1978, p. 20).

The second issue of the employment theory is the interconnection between full employment, voluntary unemployment and involuntary unemployment and their measurement. The point is whether voluntary and involuntary unemployment are mutually exclusive or can they co-exist. The economics literature to date either ignored the co-existence of these two kinds of unemployment or claimed they were both the same (Layard *et al*, 1994, p. 41, 11; Lucas, 1978; Pissarides, 2000; Taylor, 1987).

According to Walras's approach also might be considered "forced unemployment" which is the result of an intervention of external forces (government, monopoly, trade unions, and so on) into the market, and therefore, it is a disequilibrium phenomenon. Unfortunately, Keynes combined Walras's two types of unemployment, voluntary and forced, and called them "voluntary" unemployment. On the other hand, some economists interpreted Walras's forced unemployment as "involuntary unemployment".

The result is that in the economics literature, especially in the textbooks, either there is an abundance of variant definitions of involuntary unemployment or the concept, as well as voluntary unemployment, is not mentioned at all. Therefore, this paper will discuss whether "Involuntary employment" is an innovation or is irrelevant in economic theory.

This paper consists of five sections. Following the introduction, the second section discusses Walras's theory of employment, and shows that Walras defined voluntary unemployment and forced unemployment. The third section considers Keynes's definition of full, voluntary and involuntary unemployment, and demonstrates how Keynes's vague and incomplete definition of these categories causes serious confusion in the theory of post-Keynes's economist. The fourth section deals with the comprehensive approach to employment. Unemployment and Textbook of Macroeconomic is briefly considered in fifth section. Finally, conclusions are presented.

Walras and Unemployment

Walras's general equilibrium approach seems to be "conveniently" characterized by full employment in services included labour. For example, Hayek asserted that: 'But it does mean that we have to start where general economic theory stops; that is to say at a condition of equilibrium when no unused resources exist' (Hayek, 1931-1967, p. 34; see also Madden, 1992; Morishima, 1977, p. 58; Negishi, 1979, p. 17). This is incorrect since Walras's approach assumes that at equilibrium, there might be unemployment of services in Economies: Production, Capital Formation and Credit, and Circulation and Money, and unsold goods in an Exchange Economy (Davar, 1994, pp. 51-2 and 2014b). In order to define unemployment according to Walras's approach let's look at his general equilibrium theory concisely.

First, let's consider the relevant assumptions and definitions in his theory:

1. Walras assumed that the total demand function - as well as demand functions for individuals - is a strictly decreasing function (Walras, 1954, p. 466). The offer function first strictly increases and then strictly decreases. In other words, the offer curve considered first rises and then falls (Walras, 1954, p. 467). Throughout this paper we will assume that the first is the only case.
2. Walras assumed that demand and supply curves for an individual may be either continuous or discontinuous (Walras, 1954, p. 95).
3. Walras determined the effective supply as follows: "We shall apply the term effective offer to any offer made, in this way, of a definite amount of a commodity at a definite price" (Walras, 1954, p. 84). He defined effective demand as: "We shall apply the term effective demand to any such demand for a definite amount of a commodity at a definite price" (Walras, 1954, p. 85). This means that for both demand and supply, for a particular quantity, there is only one price, and vice versa.
4. Consequently, Walras determined the state of equilibrium by comparison of the effective demand and offer of a commodity (Walras, 1954, p. 85).
5. Walras stated that the demand and the offer curves are bounded by an available quantity from above for both the individual and total cases (Walras, 1954, p. 116, 166, 171). This means that, at equilibrium, if it exists, demand and offer always have to be less or equal than the available quantity for all commodities and services.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Second, let's discuss Walras's method of establishment and re-establishment of equilibrium. Walras employed the common method of equilibrium establishment and re-establishment (variation of prices) in the four types of economies. Namely, he first considered the problem of establishing equilibrium for given basic data for the economy of individual (utility functions for each commodity and services separately, and available quantities of goods and services). Determination of the supply and demand for goods and services for each individual economy is the first step in the random price system. The total supply and demand of goods and services may be calculated from the results of models of individuals' economies. At this stage, Walras formulated two models (equation system) for the equilibrium state and the disequilibrium state, and described the process of establishment of equilibrium by means of the *tâtonnement* algorithm (Davar, 1994, 2002, 2012, 2014b; Negishi, 1985, pp. 170-3). Namely, Walras shows how this iterative process transforms any initial disequilibrium situation to the equilibrium situation if it is possible, and by this, guarantee its solvability. The each isolated iteration of *tâtonnement* is divided into two stages: firstly, equilibrium establishment for a certain good (or service) – *partial equilibrium*; and secondly, general equilibrium establishment for all categories simultaneously – *general equilibrium*. Walras asserted that the partial equilibrium of a certain category would be exist if the essential assumptions (vide supra) plus the additional requirement, that is, the total (aggregate) demand curve and the total offer curve have *at least one intersections point* (Walras, 1954, pp.108 and 171). Walras concentrated throughout on the *Law of Equilibrium State*, which is different from the well-known “Walras’ law” formulated by his followers (Davar, 1994, 2012, 2014). While the Law for more advanced economies only applies to new markets entering the system, it automatically includes the law relating to earlier types of the economy. For example, the Law of Capital Formation and Credit only relates to new capital goods, saving, investment and rate of income. Thus the equilibrium law for consumer goods and services for earlier types of economy (exchange and production economies) is integrated into the law for the economy in question (capital formation and credit).

Moreover, Walras discussed the variation of prices, or re-establishing the equilibrium following changes in the given basic data for an individual or group. This means that, on the one hand, if any individual as supplier of services discovers that in the equilibrium state his services (or goods) are not traded, he might changes his initial data according to the results of ob-

tained equilibrium state. Yet, on the other hand, if any individual as demander of commodities discovers that his demand was not satisfied he also might change his initial endowment. Then, the new process of equilibrium establishment is required.

Walras's Voluntary Unemployment

Under the above assumptions, if there is a general equilibrium we could conclude that there should be at most one equilibrium point for a certain service and good (see Figure 1). If the equilibrium point for a certain service is on the upper boundary point of the supply curve (called the right boundary point in the case of post-Walras authors, who used Marshall's curves, with axes interchanged, namely, quantity on the horizontal axis, and price on the vertical one), that is, the available quantity point, then it *may be said this service is to be fully employed*. But, if an equilibrium point is located below the upper point (left side of the right border point), this indicates unemployment in that part of the service, which is given by the difference between the boundary point (available quantity) and equilibrium point, namely as $(t^0 - T)$. Of course, if we take into account the fact that the total offer for services is based on the solution of the model for individuals, we may conclude that, in such a situation, the individual is "voluntarily unemployed". This is because the wage he or she requires to be employed is higher than the equilibrium wage. In other words, in this situation that depends on a person's contribution to the whole economy, *unemployed means voluntarily unemployed*. It is important to emphasize that Walras's voluntary unemployment is generally confused with leisure. However, the leisure is determined by an individual prior to his arrival to the market, whilst the voluntary unemployment is obtained by market forces.

Thus, in Walras's approach, there would be full employment if the equilibrium point is identified with the upper (right) boundary point (available quantity) or voluntary unemployment if an equilibrium point is under the upper point (to the left of the right boundary point). The magnitude of voluntary unemployment is the difference between the boundary and equilibrium points. It should be stressed that in order to define unemployment of services, if it exists, *the available (existence) quantity of service is required*. The latter was not included in Lange and Patinkin's approaches (vide infra).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

such restrictions; but it is not impossible' (Walras, 1954, pp. 431-432). Walras discussed this for the three types of services, starting with land-services and then to labour-services: 'If the State established a minimum wage by legislation or if certain private organizations did the same by the use of threats and violence, either a certain number of workers would not be able to sell any labour at all, or all of them would find it impossible to sell as much of their labour as they would like - which has nothing to do with the question whether or not it is of benefit to the workers to work more hours at a lower wage or fewer hours at a higher wage' (Walras, 1954, pp. 432-33).

From the above discussion, the following conclusions may be drawn: (1) at the minimum price (wage), the unemployed part of the factor (labour) may be termed *forced unemployment*, determined as $(t' - T')$; which Patinkin calls "involuntary unemployment", (*vide infra*); and (2) at the maximum price (wage), the unsatisfied demand for the factor is the *forced unsatisfied demand for factor (labour)*, determined as $(T - t)$; which Patinkin calls "involuntary over-employment", (*vide infra*).

In this connection, it is interesting that Friedman's definition of "natural rate of unemployment" is consistent with Walras's voluntary unemployment.

Keynes's Definition of Voluntary and Involuntary Unemployment

Keynes's Definition of Voluntary Unemployment

Keynes started his theory of employment and his book with the central statement: 'The question, also, of the volume of the *available* resources, in the sense of the size of the employable population, the extent of natural wealth and the accumulated capital equipment, has often been treated descriptively. But the pure theory of what determines the *actual employment* of the available resources has seldom been examined in great detail' (Keynes, 1996-1960, p. 4). This means that Keynes, as well as Walras, determined unemployment, first of all, in the general form as the difference between the available quantity minus employed quantity; and then discussed possible various kinds of unemployment.

Keynes considered three kinds of unemployment: frictional, voluntary and involuntary. Throughout the paper it is assumed that "frictional unemployment" means fixed share from the available labour forces, and it cannot influence the discussed issues.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Keynes considered “voluntary” unemployment as being ‘due to the refusal or inability of a unit of labour, as a result of legislation of social practices or of combination for collective bargaining or of slow response to change or of mere human obstinacy, to accept a reward corresponding to the value of the product attributable to its marginal productivity’ (Keynes, 1936-1960, p. 6). Careful examination of this quotation shows that Keynes, unfortunately, combined Walras’s two types of unemployment: voluntary and forced (vide supra). Such an intolerable combination of two opposite directions creates serious confusion post-Keynes’s authors discussing of unemployment (vide infra). Keynes, however, by this definition of “voluntary” unemployment, declared that his own definition of unemployment (involuntary) differs from those (Viner, 1964, p. 236).

Moreover, Keynes’s definition of full employment includes “frictional” and “voluntary” unemployment (Keynes, 1936-1960, pp. 15-16). If “voluntary” unemployment is only considered according to Walras’s definition (vide supra), then such definition of full employment might have certain reasoning, because in this case each individual is either employed or unemployed by his own wishes. But Keynes also included “forced unemployment”, hence such definition of full employment is not only inconsistent with its practical definition (vide supra), but also creates a mystified situation (vide infra). Therefore, we cannot agree with M. de Vroey’s claim that Keynes considered two types of full employment using the supply curve of labour with the horizontal segment. What de Vroey calls the first full employment is an equilibrium employment, as there is the involuntary unemployment as Vroey indicates himself (Vroey, pp. 8-10).

Keynes’s Definition of Involuntary Unemployment

Keynes began his definition of “involuntary unemployment” with the following statement: *‘Men are involuntarily unemployed if, in the event of a small rise in the price of wage-goods relatively to the money-wage, both the aggregate supply of labour willing to work for the current money-wage and the aggregate demand for it at that wage would be greater than the existing volume of employment’* (Keynes, 1936-1960, p. 15).

Keynes understood that this definition of involuntary unemployment is very vague, so he clarified it further (Leijonhufvud, 1968, p. 94; 2000, p. 18): ‘An alternative, though equivalent, criterion is a situation in which aggregate employment is inelastic in response to an increase in the effective demand for its output’ (Leijonhufvud, 2000, p. 26). He then added two

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

simplified assumptions: '(1) That all unemployed resources are homogeneous and interchangeable in their efficiency to produce what is wanted; (2) That the factors of production entering into marginal cost are content with the same money-wage so long as there is a surplus of them unemployed. In this case, constant returns and a rigid wage-unit, as long as there is any unemployment' (Leijonhufvud, 2000, p. 295).

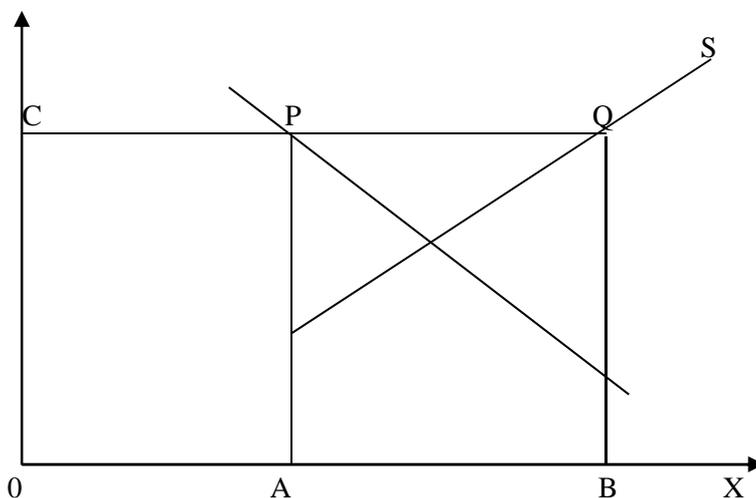
Careful examination of Keynes's definition and clarifications of involuntary unemployment enable us to conclude that Keynes changed Walras's assumptions. Namely, Keynes assumed that the total supply function of labour is weakly increasing function, and not strictly increasing (and decreasing) function as Walras assumed. This means that such supply functions might be characterized by a horizontal segment. And secondly, as a result of the first assumptions, in this case of a certain magnitude of wage, there might be a number of magnitudes of quantities of labour. Therefore, in the equilibrium state there might be involuntary unemployment if the equilibrium point is located on the horizontal segment that excluded its boundary points (vide infra). So, Keynes stated that involuntary unemployment is characterized by the rigid-wage phenomenon, and consequently, allows describing the supply curve of labour with a horizontal segment. Moreover, he also hinted to measure the magnitude of involuntary unemployment as a difference between the right boundary point of the segment and equilibrium point of employment. Thus, in the absence of rigid wages, there is also no involuntary unemployment. Hence, Keynes assumed that involuntary unemployment may or may not occur. Keynes's own words: 'Obviously, however, if the classical theory is only applicable to the case full employment, it is fallacious to apply it to the problems of involuntary unemployment - if there be such a thing (and who will deny it?)' (Keynes, 1936-1960, p. 6). Keynes also claimed that "involuntary unemployment," as well as "voluntary unemployment," is equilibrium phenomena (Keynes, 1936-1960, p. 28).

These assumptions, particularly (2), allowed post-Keynesian economists to define "involuntary unemployment" relatively clearly (Negishi, 1979, p. 27; Sachs & Larrain, p. 62).

On the other hand, Lange was one of the first economists to define involuntary unemployment graphically that is closely to its genuine meaning in economics literature. To gain understanding of Lange's version, here is a long quotation from *Prices Flexibility and Employment* (Lange, 1944, p. 6, note 4):

“Involuntary unemployment” in the Keynesian sense is not an excess supply of labor but an equilibrium position obtained by intersection of a demand and a supply curve, the supply curve of labor, however, being infinitely elastic over a wide range with respect to money wages, the point of intersection being to the left of the region where elasticity of supply of labor to money wages become finite. Thus “involuntary unemployment,” in the Keynesian sense, does not imply excess demand for cash balances, as well as for all other goods are supposed to be in equilibrium in the Keynesian theory. The difference is shown on the adjoining diagram (See Figure 2).

Figure 2. Lange’s Definition of Involuntary Unemployment



Source: Lange, (1944, p. 6).

D is the demand curve and S is the supply curve of the factor. In our treatment “underemployment” is the excess supply $AB (= PQ)$, while Keynes considers the line CQS as the supply curve, P an equilibrium point, and $PQ (= AB)$ involuntary unemployment. Change in price (OC) appears in the Keynesian theory as a shift of the horizontal part (CQ) of the supply curve. As is easily seen, our treatment is translatable into Keynesian terms

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

and vice versa. The choice is merely a matter of convenience. It seems that our method ties up more easily with general price theory.”

Lange correctly defined involuntary unemployment but, unfortunately, he identified it with total unemployment, which is only correct in one case (*vide infra*). Namely, by Lange’s definition “involuntary unemployment” only exists if the labor supply curve includes the horizontal segment (the part with rigid wages) (see Modigliani, 1944, p. 65) and the equilibrium point is located on this line, except at the borders. In other words, involuntary unemployment occurs if the employment equilibrium point is located to the left of the right border point of the horizontal segment and is determined as a difference between the latter and former equilibrium points. This means that “involuntary unemployment,” if it exists, *is an equilibrium phenomenon*. By this definition of involuntary unemployment, Lange made a *very important contribution*. At the same time, he did not connect his definition to the size of the available labour. Namely, he did not clarify if the right border point can be identified with the size of available labour force, or the latter is greater than the former, as might be understood from Lange’s figure. Thus, Lange did not define “voluntary” unemployment or discuss “full” employment. Therefore, he created a situation in which it seems that involuntary and voluntary unemployment cannot co-exist. Surely, this cannot be so.

Two Examples of Controversial Definition of Involuntary Unemployment

There are many controversial definitions of involuntary unemployment, but here we have chosen two examples because the major definitions are variations of these definitions.

Patinkin’s version of involuntary unemployment

Patinkin rejected Lange’s definition of Keynes’s involuntary unemployment claiming that: ‘... our interpretation does not tie the Keynesian theory of unemployment to any special form of the supply function for labor. In particular, it is independent of the all-too-frequent assumption that this theory presupposes a supply curve for labor as represented in figure XIV-1 (Patinkin, 1965, p. 342). The crucial characteristic of this curve is that it remains infinitely elastic at the prevailing-and presumed rigid-money wage rate ω_0 until the point N_0 . Accordingly, writers who make use of this curve identify the maximum amount of employment that workers

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

are to offer at the rate ω_0 with the level “full employment,” and define involuntary unemployment as the difference between this level and the one actually existing in the economy, say N_1 ’ (Patinkin, 1965, p. 341). In principle, this is the correct description of Lange’s definition of involuntary unemployment, but two observations should be made (*vide supra*). First, Lange did not consider “the maximum amount of employment” and “full employment”. Second, in Lange’s approach, involuntary unemployment is determined by the equilibrium point and not by “the one actually existing in the economy”, as Patinkin claimed. He continued: ‘If the curve did not have this shape, but instead always rose (no matter how slowly), and if at every wage rate workers were always at the uniquely corresponding point upon the curve, then, by definition, no involuntary unemployment could ever exist in the system: workers would always be receiving as much employment as they desired at the prevailing wage rate’ (ibid.). There are two important points: (1) (The) involuntary unemployment exists only if the labor supply curve includes a horizontal segment, which is correct. (2) Conversely, if the labor supply curve “always rose (no matter how slowly)”, then “workers would always be receiving as much employment as they desired at the prevailing wage rate”, which is incorrect. Patinkin rejected Lange’s “partial” definition of involuntary unemployment and tried to define it “generally” (see Boianovsky 2006).

Let to start with Patinkin’s definition of full employment: ‘It follows that a state of general equilibrium in the economy as a whole, or even a state of partial equilibrium in the labor market, by itself, is *ipso facto* of full employment. It also follows that the bench mark of full employment is not an absolute constant, but something which itself varies with every change in the real wage rate or in the subjective determinants of the labor supply curve’ (Patinkin, 1965, p. 315). Patinkin has defined, here, the full employment as an equilibrium employment which is incompatible neither with Keynes’s definition, which included voluntary unemployment into full employment, and not with a practical definition by which full employment means that the whole available labor has to be employed.

Patinkin’s definition of involuntary unemployment in its original form (Patinkin, 1965, pp.314-15; see also Leontief, 1947) is:

‘The norm of reference to be used in defining involuntary unemployment is the supply curve of labor; . . . Hence as long as workers are “on their supply curve” – that is, as long as they succeed in selling all the labor they want to at the prevailing real wage rate – a state of full employment

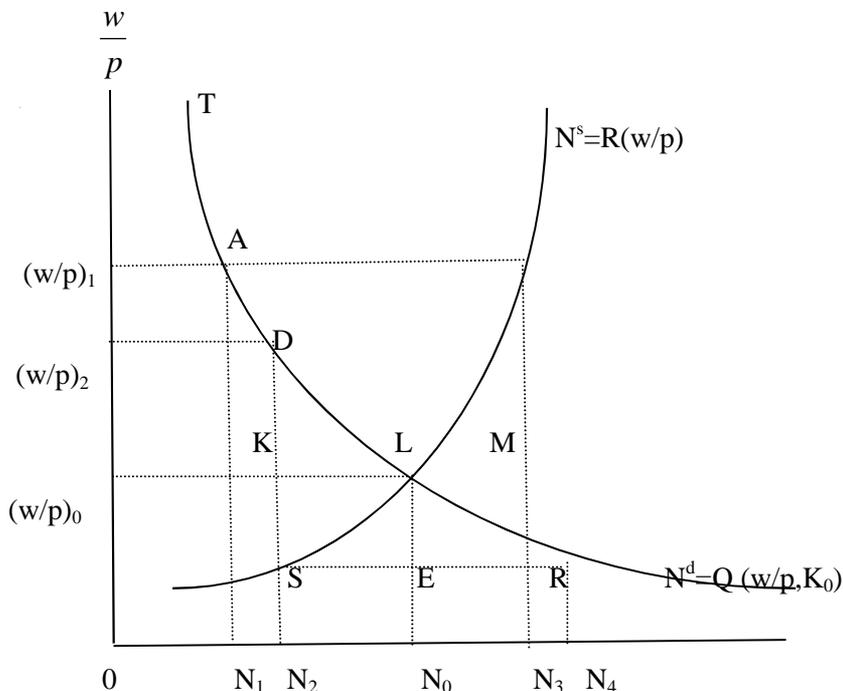
**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

will be said to exist in the economy. It follows that a state of general equilibrium in the economy as a whole, or even a state of partial equilibrium in the labor market by itself, is *ipso facto* a state of full employment. It also follows that the bench mark of full employment is not an absolute constant, but something which itself varies with every change in the real wage rate or in the subjective or objective determinants of the supply curve. ... Conversely, if workers are not on this curve, they are acting involuntarily. Thus, if they are at the point *A* in Figure XIII-1 (see Figure 3) ..., involuntary employment to the extent $N_3 - N_1$ exists. On the other hand, if they are at the point *E*, there exists involuntary unemployment to the extent $N_0 - N_1$.²

So, Patinkin gave two different definitions of involuntary unemployment. First definition, is the disequilibrium position, which contradicts Keynes's important statement that involuntary unemployment is an equilibrium phenomenon; and, moreover, he ignore Lange's statement that "Underemployment, having been defined by us as excess supply of a factor of production, implies thus existence of excess demand somewhere else in the economy. This treatment of underemployment differs from the "involuntary unemployment" as defined by Lord Keynes' (Lange, 1944, p. 6, note 4); and by this Patinkin replaced Lange's "underemployment" by Keynes's "involuntary underemployment"; yet, according to Walras's approach it is as "forced unemployment" at the *minimum* wage (point *A*) (*vide supra*). Second definition, is based on two different wages, equilibrium and disequilibrium, hence it is nonsense (absurdity) (see also Patinkin, 1949, p. 369).

² In the origin (N_2), but in the paper "Unemployment and Keynesian Supply Functions" Patinkin asserted 'involuntary unemployment (to the extent $N_1 - N_2$); which are parallel with $N_0 - N_2 - E. D.$), be said to exist in the system' (Patinkin, 1949, 1965, p. 369).

Figure 3. Patinkin's definition of Involuntary Unemployment



Source: (Patinkin, 1965, p. 316).

Patinkin also considered two additional concepts of involuntary underemployment in the spirit of interpretation of Keynes's macroeconomic theory. In this case only one side of economic phenomenon either aggregate demand or aggregate supply is dominant in the definition of involuntary underemployment. Patinkin asserted: 'In other words, only the desires of demanders influence the determination of national income, while the desires of suppliers are completely ignored. We would then have as a measure of the extent of involuntary underemployment (U) in the system

$$U = \eta - Y_0$$

That is, involuntary underemployment is measured by the difference between the level of national income in the norm reference, η , and the level actually prevailing, Y_0 ' (Patinkin, 1949, p. 371). On the other hand, he continued: "In brief, the level of national income desired by spenders (Y_7) is

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

greater than that desired by suppliers. If the level of national income is actually Y_7 , then a measure of the extent to which suppliers are over-employed is the negative quantity

$$U = \eta - Y_7$$

That is, involuntary over-employment is measured by the difference between the level of national income in the norm of reference, and the level actually prevailing' (Patinkin, 1949, p. 374; see also Trevithick, 1992, pp. 108-9). It must be stressed that what Patinkin defined as involuntary over-employment is equivalent with the *forced unsatisfied demand for factor (labour)* according to Walras's approach (vide supra).

To sum up, to define involuntary unemployment correctly requires the correct definition of full employment³. What Patinkin calls "involuntary unemployment" is underemployment according to Lange's determination and "forced unemployment according to Walras's approach; and what Patinkin calls "involuntary over-employment" is "forced unsatisfied demand of factor (labour)" at the *maximum* wage according to Walras's approach.

Shapiro and Stiglitz's version of involuntary unemployment

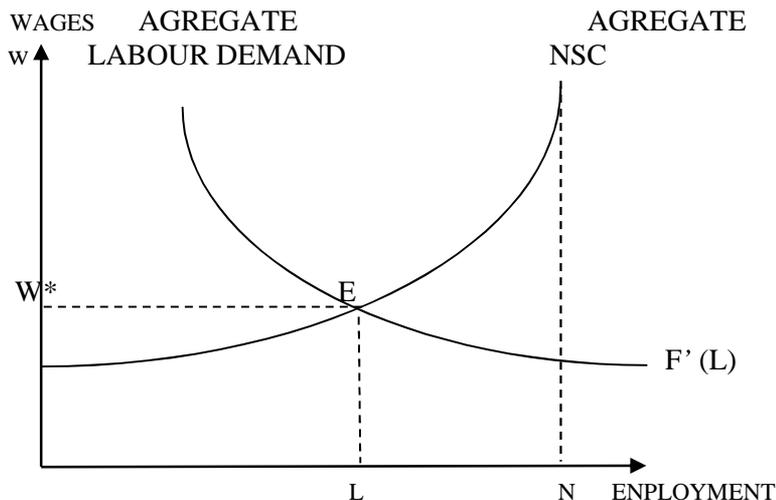
Shapiro and Stiglitz claimed (see Figure 4) that:

'The equilibrium is depicted in figure 2 (see Figure 4 – E.D.). It is important to understand the forces that cause E to be an equilibrium. From the firm's point of view, there is no point in raising wages, since workers are providing effort and the firm can get all the labor it wants at w^* . Lowering wages, on the other hand, would induce shirking and be a losing idea.

³ It is necessary to stress that Klein was the first, in our opinion, who defined "unemployment" similar to Patinkin (see Klein, 1952, pp. 80-87). We decided to use Patinkin's version because it is much more comprehensive and used in majority of the modern literature (or textbooks) for Macroeconomics (for example see Chick, 1984; Taylor, 1987; Sachs & Larrain, 1993).

From the worker's point of view, *unemployment is involuntary*: those without jobs would be happy to work at w^* or lower but cannot make a credible promise not to shirk at such wages' (Shapiro and Stiglitz, 1991, p. 131).

Figure 4. Equilibrium Employment



Source: Shapiro & Stiglitz, 1991, p. 132.

The first statement is correct, in our view, but not the second one. Thus, if the supply curves of labour is determined on the basis of labour supply of individuals, then 'those without jobs' are in that state because of the labor conditions they offer, or out of their own choice, and due to the market forces. But when they discover they are out of work, they might decide to change the labor conditions they offer. However, in such cases, there would be a new equilibrium process, and, hence, a new equilibrium point, would be established. Thus, it is incorrect to call it *involuntary unemployment*; it is the opposite, it is *voluntary* (vide infra).

The Comprehensive Approach to Unemployment

Based on the above, we can formulate the comprehensive theory of unemployment. According to Walras's approach, kinds of unemployment

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

depend on the type of economy under discussion, namely, is the economy characterized by free competition, where the market forces govern the activities of economy; or are there external forces (government, monopoly and so on) which intervene in the activities of economy. Walras shows that in the previous case, in the framework of his assumptions, there is voluntary unemployment and in the latter case there is forced unemployment. Keynes, unfortunately, combined these two types of unemployment and called it “voluntary” and introduced an additional type of unemployment – involuntary, which is also derived from the free competition such as voluntary unemployment, but with different assumption. This paper discusses only the approach of pure theory, so the term “voluntary” is used in Walras’s sense.

Several fundamental statements provide the general framework for the definition of unemployment. First, it is an equilibrium phenomenon, i.e., unemployment requires a definition of the equilibrium situation. The latter is established when effective supply of factor (labour), which is obtained by the supply curve of factor (labour), equals the labour demand, which is obtained either from the labour demand curve (Keynes-Lange) or the equation system, based on the demand for consumption goods (Walras). Second, if the quantity of the equilibrium point is less than the available quantity of the factor, then there is either involuntary unemployment (Keynes-Lange) or voluntary unemployment (Walras). But if the equilibrium point is equal to the boundary point of the supply curve, which is identified with available quantity, then there is neither involuntary unemployment nor voluntary unemployment, but there is full employment.

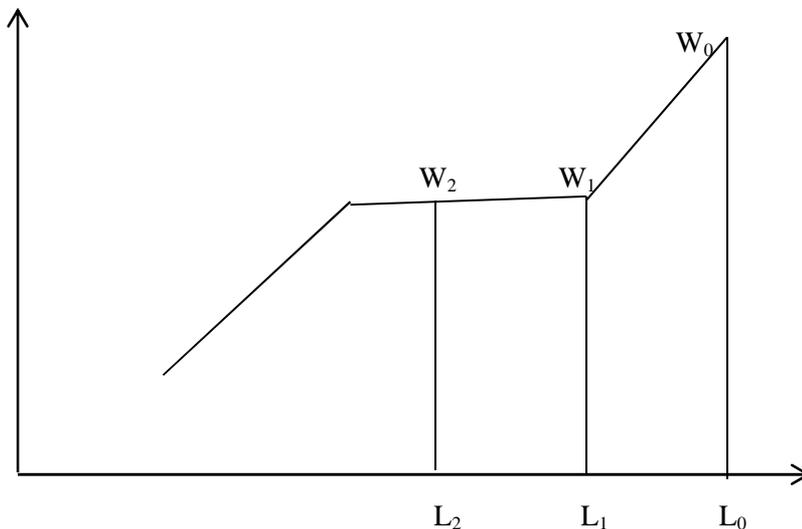
In Walras’s version, unemployment (voluntary) is obtained when the supply curve is strictly increasing and its right boundary point is identified with the available quantity of a factor. This means that in Walras’s approach, for every wage, there is only one effective supply; hence equilibrium point is established if it exists when effective demand is met by effective supply.

Lange’s version of Keynes’s involuntary unemployment is obtained when the factor supply curve has a horizontal segment. Namely, the supply curve is weakly increasing curve. In other words, in this case, for one wage of a labour, there are several quantities of supply, but there might be one equilibrium point, therefore, might be involuntarily unemployment and its

magnitude is a difference between the right boundary point and equilibrium point. Also, in this horizontal segment, the elasticity remains infinite⁴.

Thus, as concluded above, Walras defined voluntary unemployment and linked it to the full employment, but he did not and could not consider involuntary unemployment. On the other hand, Lange defined Keynes's involuntary unemployment, but he did not connect it with full employment and voluntary unemployment. Combining these two definitions of unemployment provides the comprehensive approach to unemployment. Therefore, for this purpose, assuming that the supply curve should include non-increasing segment and the right boundary point of curve is identified with the factor's available quantity (see Figure 5).

Figure 5. The Comprehensive Approach to Unemployment



Source: own work.

⁴ Hence we cannot agree with Darity and Young, who recently suggested that 'His definition would have been the following: involuntary unemployment exists if the elasticity of employment (and output) is greater than zero with respect to an increase in aggregate demand' (Darity & Young, 1997, p. 26) because if elasticity is greater than zero, then there might be only voluntary unemployment.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

If the equilibrium is at point W_0 (available quantity), then there is neither involuntary unemployment nor involuntary unemployment, that is, there is the full employment. If the equilibrium point is at W_1 , then there is only voluntary unemployment, which is determined as the difference between L_0 and L_1 . If the equilibrium point is at W_2 , then both voluntary unemployment and involuntary unemployment exist. The former is determined, as in the previous case, but the involuntary unemployment is the difference between L_1 and L_2 . The total unemployment is the summation of these two kinds of unemployment, i.e., it is determined as $(L_0 - L_1) + (L_1 - L_2) = (L_0 - L_2)$. Finally, let us consider two extreme forms of the supply curve: (1) If the supply curve is only a horizontal line, then there is either full employment if the equilibrium point is at the right boundary, or there is only involuntary unemployment, which is obtained as a difference between the boundary (available quantity) and equilibrium points (equilibrium employment). (2) If the supply curve is only a vertical line, there is full employment in all cases.

To sum up, in the framework of free competition, the kind of unemployment, if it exists, depends on the character of assumptions, i.e., on the form of the supply curve of labour. Generally, there are four possible cases: full employment, voluntary unemployment only, involuntary unemployment only, and, finally, both voluntary and involuntary unemployment.

Unemployment and Textbook of Macroeconomics

The problems of unemployment may be cured by a new generation of economists – if they understand these problems. Unfortunately, Macroeconomic textbooks do not facilitate this, because the definition of Unemployment is so confusing and unclear that it is impossible to study anything. To illustrate our above statement, we start with a discussion of the definition of voluntary and involuntary unemployment in macroeconomic textbooks. It is amazingly difficult to find textbooks where voluntary and involuntary unemployment are considered, and if they are considered then it is in a very confusing form (Lipsey *et al.* 1990). Mankiw and Krugman (2009), two eminent new-Keynesians, who are leading supporters and propagandists of the “Keynesian Revolution”, never mention term “involuntary unemployment” in their textbooks. But, it is Keynes’s truly unique contribution!

Sachs and Larrain (1993), correctly define involuntary unemployment in principle: ‘The notion of involuntary unemployment is that some people

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

who are willing to work for the wage received by other workers of comparable ability cannot do so' (Sachs & Larrain, 1993, p.62). But, following this, it is not clear how its magnitude is calculated. If we take into account the definition that the unemployment rate 'measures the number of people who are without a job and are actively, searching for a job, as a proportion of the total labor force' (Sachs & Larrain, 1993, p. 5), this means that to calculate any unemployment, two sets of data are required: the total labor force and the amount of employed people. They forgot about this statement when the voluntary and involuntary unemployment is discussed. Moreover, they asserted 'There is, in fact no standard accepted procedure to estimate the natural rate of unemployment, and leads to disagreements about methods and magnitudes' (Sachs & Larrain, 1993, p. 506).

This is not exact; because the natural rate of unemployment is calculated according to the equilibrium state: 'the "natural" rate of unemployment as the rate which corresponds to macroeconomic equilibrium, in which expected inflation is equal to its actual level' (Sachs & Larrain, 1993, p. 496). The problem is how to achieve macroeconomic equilibrium.

On the other hand, Krugman and Wells define the natural unemployment rate as '*The natural rate of unemployment* is the normal unemployment rate around which the actual unemployment rate fluctuates. It is the rate of unemployment that arises from the effects of frictional plus structural unemployment' (Krugman & Wells, 2009, p. 210). When "*Frictional unemployment* is unemployment due to the time workers spend in job search" (Krugman & Wells, 2009, p. 207) and 'Structural unemployment is unemployment that results when there are more people seeking jobs in a labor market than there are jobs available at the current wage rate' (Krugman & Wells, 2009, p. 208), where did the total labor force disappear? What about Macroeconomics equilibrium?

Conclusions

In this paper it was shown that Keynes's involuntary unemployment derived from Walras's voluntary unemployment by means of changing of the characteristic of the aggregate supply curve (function) of labour.

It was shown that the kind of unemployment depends on the character of the original aggregate supply curve of labour. On the one hand, when the original aggregate supply function is a strongly increasing function, as in Walras's approach, there might be only voluntary unemployment, and its magnitude is the difference between the available quantity of labour and the

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

equilibrium point. So, in such a case, an individual is unemployed according to his own wishes, because an equilibrium wage defined by free competition is less than a wage which he requires. But, at the same time it is incorrect to confuse Walras's voluntary unemployment with leisure. Moreover, unfortunately, some modern economists mistook Walras's voluntary unemployment with "involuntary unemployment".

According to Walras's approach also might be considered "forced unemployment" which is the result of an intervention of external forces (government, monopoly, trade unions, and so on) into the market, and therefore, it is a disequilibrium phenomenon. Unfortunately, Keynes combined Walras's two types of unemployment, voluntary and forced, and called them "voluntary" unemployment. On the other hand, some economists interpreted Walras's forced unemployment as "involuntary unemployment".

On the other hand, if the supply curve of labour is a weakly increasing, which means that the supply function may have a horizontal segment then there might be involuntary unemployment if the equilibrium point locates between boundary points of the horizontal segment, and the magnitude of involuntary unemployment is the difference between the right boundary point of the horizontal segment and an equilibrium point. So, in such a case, an individual is involuntarily unemployed against to his own wishes, because an equilibrium wage defined by free competition is equal to a wage which he requires.

The comprehensive approach of employment was presented in the end of the paper. It was shown that the existence of involuntary unemployment depends on the character of the original aggregate supply curve of labour, and is connected with the existence of voluntary unemployment and full employment. Involuntary unemployment might not exist if there is either full employment or only voluntary unemployment, or it might exist alone or together with voluntary unemployment. Finally, in reality there are many types of labour, hence a suggested comprehensive approach of employment might be a useful tool for policy making and planning of economics.

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
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On the Evolution of Corruption Patterns in the Post-Communist Countries

JEL Classification: *D73; P21; P37*

Keywords: *corruption; Markov transition probability matrix; post-communist countries*

Abstract: In this paper, we study the evolution of corruption patterns in 27 post-communist countries during the period 1996-2012 using the Control of Corruption Index and the corruption category Markov transition probability matrix. This method allows us to generate the long-run distribution of corruption among the post-communist countries. Our empirical findings suggest that corruption in the post-communist countries is a very persistent phenomenon that does not change much over time. Several theoretical explanations for such a result are provided.

Introduction

Corruption is a global phenomenon and no country in the world is completely free from corruption. In one characteristic or another, to a smaller or greater extent, it is present in all countries, at all stages of development and under all types of economic policies pursued by the state itself. Developed or developing, large or small, market-oriented or other, governments in all countries have fallen because of accusations of corruption. Top politicians not excluding heads of states have lost their offices, power, and sometimes even their lives in coups and revolutions caused by such allegations.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Corruption seems to manifest itself in all societies that pass a certain degree of complexity. It dates back to the very first instances of organized human life and has been present ever since (Klitgaard, 1988). One of the oldest examples of corruption is more than 2,300 years old. Chānakya, prime minister to the first Maurya Emperor Chandragupta (c. 340-293 BC), and the architect of his rise to power, analyzed the phenomenon of corruption in his work *Arthaśāstra* (Boesche, 2003; Bardhan, 1997). In China, the penal code of the Qin Dynasty (211-206 BC) included corruption and put heavy penalties on people accused of it. Dante Alighieri placed bribers in the deepest part of hell. Shakespeare gave corruption a prominent role in some of his plays. The American Constitution explicitly mentions bribery and treason as the two crimes that could justify the impeachment of a U.S. president.

The problem of corruption has always attracted a great deal of attention among the social scientists. However, due to the fact that limited empirical work exists on corruption prior to 1995 makes learning from history difficult. For example Bardhan (1997:1329) notes that: “Although the requisite time-series evidence in terms of hard data is absent, circumstantial evidence suggests that over the last 100 years or so corruption has generally declined with economic growth in most rich countries”. One possibility is that corrupt deal exposure is much more probable in more economically developed countries. In addition to its clear impact on democracy economic development improves the spread of education, literacy, and depersonalizes economical relationships — each of these ought to increase the likelihood that an misuse of public power will be detected and tackled (Treisman, 2000). Thus, policies that boost growth, if successfully implemented, are likely to reduce corruption in the long run. Paldam (2002, p. 20) suggests that with “the complex transition from a poor traditional country to a wealthy liberal democracy also comes a dramatic reduction in the level of corruption. The corruption transition is not placed at a precise location along the transition path, but follows an underlying transition-trend toward less corruption.”

In the context of the post-communist countries of Central and Eastern Europe, the Baltics, the Commonwealth of Independent States as well as Mongolia corruption has been recognized as an integral part of the communist system (Sandholtz, Taagepera, 2005). However, despite 25 years of transition and continuous economic development many people perceive that corruption, instead of falling, has risen in those countries after the fall of communism. The simultaneous processes of developing a market economy, designing new political and social institutions, and the redistribution

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

of state-owned assets in the post-communist countries have created fertile ground for corruption to flourish. After the fall of communism non-transparent privatization, stalled liberalization of prices and commerce, and underdeveloped legal and regulatory systems worsened the situation even further and have all come in for their share of sometimes well-deserved criticism. Not surprisingly, corruption in some of the countries that emerged from the former Soviet Union is perceived to be the heaviest in the world, imposing a heavy burden on their economies and slowing down their economic development.

The main aim of this paper is to study the evolution of corruption patterns in the 27 post-transition states during the period 1996-2012. The research methodology employed in this paper is as follows. First, we provide some stylized facts on corruption in the post-communist countries against a backdrop of various regions of the world using the Control of Corruption Index developed by the World Bank. Then, a corruption category Markov transition probability matrix is used to predict the long run distribution of corruption among the post-communist countries. Our empirical findings suggest that corruption in those countries is a very persistent phenomenon that does not seem to change much over time.

The structure of this paper is as follows. In Section 2 we briefly survey the literature on various types of corruption with the special focus on the post-communist countries. In Section 3 we discuss advantages and disadvantages of various measures of corruption. In Section 4 we study corruption patterns across the world and compare the whole group of the post-communist countries against other groups of countries and describe the corruption levels and trend in the particular post-communist countries. In Section 5 we investigate the stability of corruption patterns in the post-communist countries using the Markov transition probability matrix. Section 6 summarizes and concludes with policy recommendations and directions for further studies.

Overview of corruption in post-communist countries

Corruption is a complex phenomenon with multiple causes and effects as it takes on various forms and functions in different contexts. Accordingly, the problem of corruption has been seen either as a structural problem in political sciences, as an incentive problem in economics or as a cultural and individual moral problem in other social sciences. In any case, corruption is a multifaceted problem even in its concrete appearance and no single model

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

approach will be able to describe the whole picture in an adequate way. Consequently, there exists a whole multitude of definitions and each definition seems to be falling short in some aspect.

One of the most commonly used general definitions of corruption was introduced by the World Bank (2000) which defined it broadly as “the abuse of public office for private gain”. However, several subsequent World Bank studies attempted to go beyond this broad definition. These studies identified two forms of corruption and tried to capture qualitatively their extent (Hellman et. al 2000, 2003, and 2004). Their authors employed survey data from the 1999, 2002, and 2005 Business Environment and Enterprise Performance Survey (BEEPS) collected from firm managers and owners in Central European and the Commonwealth of Independent States countries. The data was used to quantify two kinds of corrupt behavior.

The first type is called State Capture and refers to the capacity of firms to shape and affect the formation of basic rules of the game (i.e. laws, regulation, and decrees) through private payments to politicians. This type of corruption is also commonly referred to as “political” or “higher level” corruption. The second type is called Administrative Corruption and refers to so called “petty” or “low level” forms of bribery in connection to implementation of existing laws and regulations by the bureaucracy.

Undoubtedly, many other definitions and classifications of corruption can be found in the literature. In fact, most of the work in sciences other than economics is dedicated to provide a more complex picture of corruption. Anthropological studies go even as far as to say that no possible definition of corruption can exist since all human actions are incomparable to one another. In contrast, most studies in economics take a parsimonious view focusing only on ‘as if’ market outcomes of corruption. Therefore, for the purposes of this study we decided to use the following definition: corruption is an act in which the power of public office is used for personal gain in a manner that contravenes the rules of the game (Jain, 2001).

In the context of the post-communist countries corruption was often recognized as a heritage of the communist system. While the collapse of communist regimes in many countries across the region altered the structure of opportunities and incentives for corruption, it did not eliminate them. In the face of the fall of the command economic system, the structure of informal personal ties between people did not cease to exist, nor did the distrustful attitude towards the state. With a change in the post-Soviet political regime after the subsequent progress of economic and social transformation initiated changes in the background and environment of corruption.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Furthermore, privatization after the collapse of communism created new incentives and opportunities for corruption (Kaufmann and Siegelbaum, 1997; Stiglitz, 1999; Hoff, Stiglitz, 2004).

The possibilities and the scope for corruption in the post-communist countries – given the mixture of massive privatization, weak states, and underdeveloped civil societies – have been considerable. The simultaneous developments that occurred along with economic and legal transformation sometimes led to an increase in large-scale corruption. This indistinct flux and institutional vacuum produced many economic rents which were later captured by the corrupt. The totalitarian power of the state has been relaxed and the formal and informal institutions that controlled and organized corruption in the past were eliminated or were in a decline (World Bank, 2006). This allowed corruption to flourish, since most of the countries had no civil society and therefore the accountability of the reformers (some of which were communist politicians) was non – existent. Moreover, it was argued, that corrupt masses democratically generated new corrupt elites even when the former communist elites were forced out (Sandholtz, Taagepera, 2005).

Therefore, after the fall of communism many people perceived that corruption instead of falling had in fact risen in the post-communist countries. A massive process of property redistribution resulted in a restoration of the informal personal ties, presently on the borders between the formerly omnipresent state and the newly emerged private sector. As the economic process was taking place, the existence of corrupt practices was shifting from one sector of economic activity to another. Corruption shifted chiefly from the sector of general services and sales of goods to the region of state and administrative services.

Åslund (2002) provided an excellent account of the process of rent grabbing. According to him these rents were used later to corrupt public officials and perpetuate the rents even further. This was easy, because the network of interpersonal connections between people of various public occupations had been already set up and deeply entrenched in the economy. As the captured rents were perpetuating and increasing, they soon brought about more money to be seized by the means of directly influencing the creation of law and regulation. Before long, the captured state was born.

The result of the strategy of stalled partial reform was the rise of the captured states, dominated by corruption. It is difficult to describe the model of such a country, as it is a rather indistinct mixture of laissez faire state with heavy state intervention, when it comes to the economy. The general

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

vision that was shared by the “founding fathers” of such states was “maximum freedom for us, maximum regulation and intervention for others”. Economic growth did not arise as an objective of such elites, as they were mainly concerned with capturing the wealth that had already been formed by the means of market distortions, caused by overregulation and certainly not in the formation of the new. Therefore, the larger the initial distortions, mainly caused by collapsing central planning and underdevelopment, the larger were the rents.

The frequently quoted example of the captured state is Russian Federation. Interestingly, the greatest fortunes in Russia were made not through privatization of state owned companies, but through privatization of the credit given out by the Central Bank of Russia (Dąbrowski *et al.*, 2001), through arbitraging the differences between controlled prices for raw materials within Russia and free market prices abroad (Åslund, 1999), and through favoritism in natural resource based industries. “It was the Russian treasury, which was directly asset stripped, not the firms”, and the riches made during this period have maintained the political power of the oligarchs (Dąbrowski *et al.*, 2001). The results analogous to the Russian experience can be observed elsewhere, and in many countries the situation is even worse.

While Estonia and Slovenia were initially relatively free from the state capture, Ukraine, Bulgaria, Moldova, and many countries of Caucasus and Central Asia could be used as perfect examples of such captured states. Because only a select few had the access to the top officials being able to stall reforms, just these few gained on the process, creating immense wealth, at the cost of all of the public. Despite the common belief that the liberalization was the main source driving corruption, in reality, the relationship was opposite. Not privatization or stabilization stopped the post-communist economies in their tracks, but the outright extortion of rents and embezzlement of state assets. The money extracted, enabled to stop the necessary reforms, hence perpetuating corruption due to market distortions.

Therefore, in the subsequent sections we study the evolution of corruption patterns in the post-communist countries against the other regions of the world and then compare the levels of corruption among particular post-communist countries. However, prior to investigating the corruption patterns we discuss advantages and disadvantages of various corruption measures.

Measuring corruption

Despite the fact that a large number of press articles documenting individual cases of corruption in particular countries have been published, it is still difficult to estimate precisely the extent of corruption and to make cross country comparisons. No available quantitative information is based upon direct observation, with the exception of case studies that are extremely scarce and therefore not commonly used. The main problem in research on corruption has been the lack of systematic and internationally comparable statistical data. In a perfect world, the data used in empirical studies should be based on objective, direct, and firsthand observations of corrupt transactions made by unbiased observers who are experts on the rules and routines in the scrutinized sector.

However, the aforementioned conditions are rarely met in reality as corruption is usually deeply concealed. None of the parties of the corrupt deal has incentives to inform anyone else about it since corruption is illegal. Moreover, in contrast to other crimes, corruption has typically no individual victim who would be motivated to report the crime. Furthermore, corruption usually takes the form of complex transactions taking place in large hierarchies to which outsiders have no access. It usually involves informational asymmetries and therefore its observation is very indirect. As a result, corruption is hard to measure and empirical studies on this issue are in a short supply.

Some researchers have tried to estimate corruption indirectly with disputable success. In their studies, corruption was calculated from micro level data, like data on infrastructure projects, the use of cement, or data drawn from firm-level surveys. Even if argued to be successful, these accounts do not enable a comparative analysis since they concern two countries at most. Examples of such studies include Wade (1982) for India, Murray-Rust and van der Valde (1994) for Pakistan, Manzetti, L. and C. Blake (1996) for Latin America, Svensson (2003) for Uganda, Kuncoro (2004), and Henderson and Kuncoro (2004) for Indonesia, and Golden and Picci (2005) for Italy.

Asiedu and Freeman (2009) discussed and classified various measures of corruption used in previous studies into three categories: internal, external, and hybrid. Internal measures include those based on the perceptions of firms that operate within a single country. The external measures are based on the assessment of risk analysts who typically reside outside a country. Finally, the hybrid measures combine corruption data from different

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

sources into a single composite index. Each of those measures has its own advantages and disadvantages.

The typical procedure in constructing the internal measures is to survey firms in a particular country about their perceptions and experiences of corrupt practices. The main advantage of internal measures is that they reflect firms' perception of investment risks that affect firms' operational and investment decisions. At the same time, internal measures have several limitations. Firms that provide the corruption ratings operate in different countries face different economic and political environments and the collected data may not be easily comparable across countries. Moreover, the data can be affected by individual characteristics of firms, such as their age, size or industries in which they operate.

The external measures are compiled by commercial risk-rating agencies. The main advantage of those measures is that countries are rated by the same set of entities which makes the data more consistent and internationally comparable. External measures, however, suffer also from several disadvantages. The data coverage is usually limited and the country evaluations are usually not based on personal experience, but rather inferred from media reports. As a result, the levels of corruption reported by the consultants who compile those measures may not accurately reflect the actual levels of corruption.

The hybrid measures combine corruption data from different sources into a single composite index which allows mitigate the problems associated with the internal and external measures of corruption. In order to address those problems, researchers from the non-governmental organization Transparency International (TI) and the World Bank aggregated, using slightly different methodologies, various data on corruption gathered from a wide range of sources to create the so-called corruption perception indices. These two hybrid measures are the most widely used measures of corruption. Due to similarities in their construction these two indexes are correlated with each other. These indices allocate numbers for the level of corruption to almost every country in the world of some economic significance. Although some countries change the position from an index to an index and have different rankings in the TI and WB datasets, there is an overall constancy to the rankings. Therefore, most studies use one or the other of these two indices.

Perhaps the most popular hybrid index is the annual TI Corruption Perception Index (CPI) which is a compilation of corruption surveys and assessments that are averaged each three years around a given year and com-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

puted since 1995. Constructed as a poll-of-polls index, the CPI is designed to capture the perception of well-informed people on corruption which are scored on a range of 0 (high) - 10 (low). The index aggregates the perceptions of respondents with regard to the extent of corruption – defined as the abuse of public power for private benefit. Here the extent of corruption reflects the frequency of corrupt payments and the resulting obstacles imposed on businesses.

Although TI's CPI index has been the most popular hybrid index, it has not been free from criticism. For the 1995 and the historical data (1980-1985, 1988-1992), this index was constructed by taking simple averages after transforming the various different scales – drawn from different data sources – into 0-10 scale. The normal standardization technique was introduced in 1996 but stopped in 2001. The matching percentile technique and the transformation were introduced in 2002 and applied since then. Due to these changes, the CPI cannot be regarded as a consistent time series.

The World Bank has made use of the underlying sources that make up the TI index and has produced its own Control of Corruption Index (CCI) using an arguably better aggregation method and including more countries and sources. Kaufmann et al. (2006), authors of this index, provide a very extensive rebuttal (with empirical proofs) of most of the arguments raised by its critics. Arndt and Oman (2006) in their extensive survey of the many different indicators referred to the World Bank Control of Corruption Index as "probably the most carefully constructed governance indicator".

Therefore, our measure of corruption used in this study is the Control of Corruption Index compiled by Kaufmann et al. (2005). Since what actually matters in our empirical investigation are perceptions of outsiders, the World Bank data seems to be especially well suited. The World Bank index covers about 200 countries and is computed on the basis of individual variables relating to perception of corruption, drawn from about 40 data sources produced by more than 30 different organizations. In our study we focus on the sample of 27 post-communist countries for which data are available starting from 1996 until 2012.

Despite the fact that the CCI is "probably the most carefully constructed governance indicator", it has several weaknesses. In particular, it shares the common weakness of drawing on public opinion pools. Therefore, one must be aware that this index measures perceptions rather than being an objective measure of corruption. It could be the case that if a particular country's score differs from a survey to a survey, it occurs mostly so because of a shift in perceptions. For instance, media coverage of high-level

corruption prosecutions may increase public's perception of corruption, while the "real" level of corruption may actually decrease. Another important drawback of this index is that since the data are a composite measure, they do not differentiate among various forms of corruption, such as high-level versus low-level corruption or well organized versus poorly organized corruption or corruption with theft versus the one without, initiated by private party, extorted by the official and so on.

The most effective response to the arguments surveyed above is to be aware of the inherent limitations of any given statistical instrument. Despite all of the listed limitations and critiques, the hybrid indices provide a lot of useful information. They have laid solid foundations for anticorruption efforts of such prominent organizations as the World Bank, OECD, UNDP, IMF, and the EBRD.

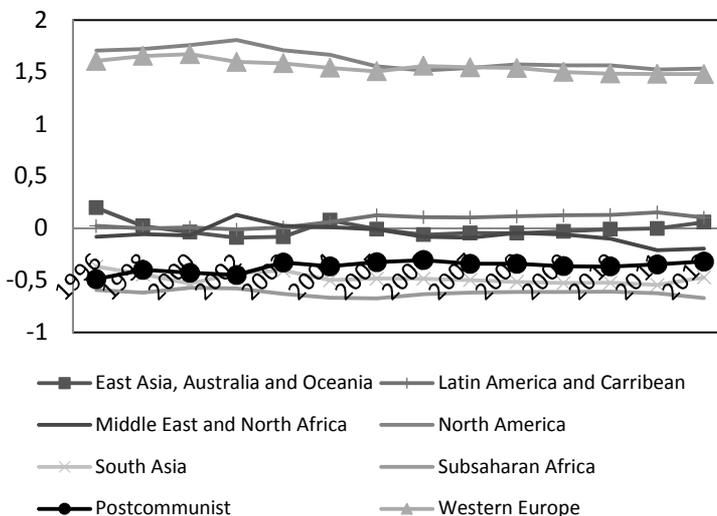
Corruption levels and trends in the post-communist countries

In this section we first study the general corruption patterns across the world and compare the whole group of the post-communist countries with other groups of countries and then we describe the corruption levels and trends in the particular post-communist countries. In Figure 1 we show the distribution of corruption across various regions of the world. The assignment of countries into each category follows the World Bank classification. The groups have been enumerated in the annex at the end of the paper.

It can be seen from Figure 1 that the post-communist countries constitute one of the clusters of countries in the world, which show the highest levels of corruption. Not surprisingly, the level of corruption in post-communist states makes this region on par with the most corrupt countries in the world. In particular, post-communist corruption goes hand in hand with corruption in Sub-Saharan Africa and South Asia, and is visibly higher than corruption in the Middle East and North African (MENA) countries.

Until the early 2000s the post-communist countries as a group were the most corrupt countries in the world. Although there seems to be a positive trend, it is very weak and the post-communist countries still exhibit one of the worst instances of corruption. Thus, it could be concluded that despite the advances in reforms, the level of corruption in the post-communist countries remains high and does not seem to diminish significantly over time.

Figure. 1 Distribution of corruption among various country groups



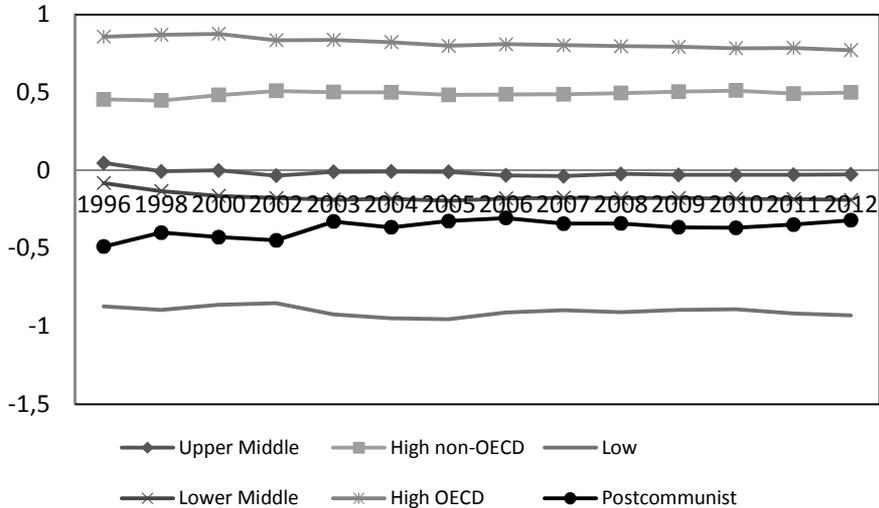
Source: own elaboration based on World Bank CCI data.

Moreover, a further point could be made that the post-communist countries exhibit a higher level of corruption than their level of development would suggest. This can be seen in Figure 2, which shows the income distribution of corruption.

In terms of material wealth, majority of the post-communist countries fare between lower middle income and upper middle-income groups. Some of these countries even managed to reach the highest-income group, as seen in the appendix. However, it can be seen from Figure 2 that the group of communist countries displays corruption behavior of the in between the two low-income and lower middle-income countries.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Figure. 2 Income groups distribution of corruption

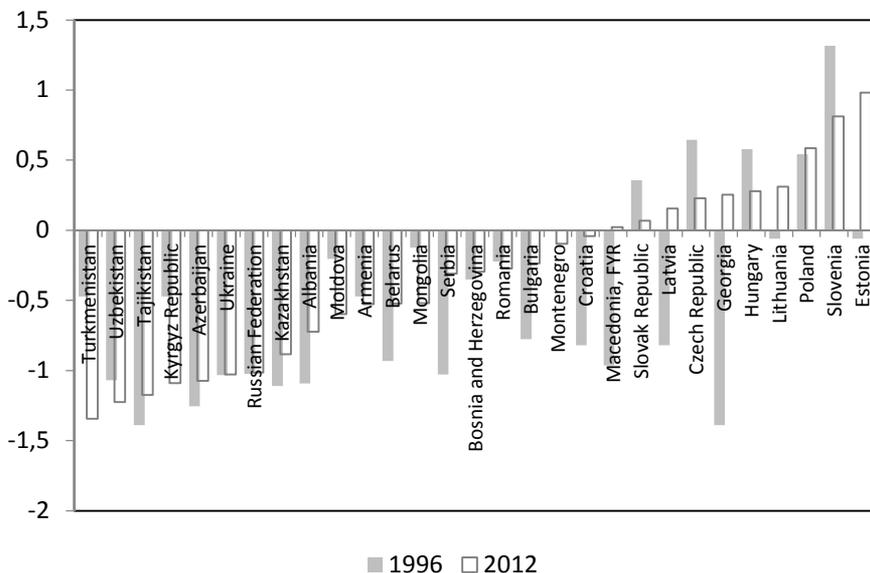


Source: own elaboration based on World Bank CCI data

In Figure 3, we compare the levels of corruption in particular post-communist countries in the first year of our sample – 1996 and in the last year – 2012.

It can be noted from Figure 3 that a great deal of heterogeneity exists among the post-communist countries. The highest levels of corruption are reported in the successor states of the former Soviet Union with the exception of three Baltic countries that from the beginning opted for integration with the West, radically reformed their economies, and joined the European Union in 2004. Among those states, Estonia is the absolute leader in which has the lowest and even further decreasing level of corruption among all the post-communist countries. Among the former Soviet Union countries in which the levels of corruption are the highest are the Central Asian and the Caucasus states such as Turkmenistan, Uzbekistan, Tajikistan, Kyrgyz Republic, and Azerbaijan. These countries are followed by the East European countries such as Ukraine and the Russian Federation. Among the least corrupted states, in addition to the Baltics, are the Central European countries such as Slovenia, Poland, and Hungary.

Figure 3. Corruption levels in particular post-communist countries

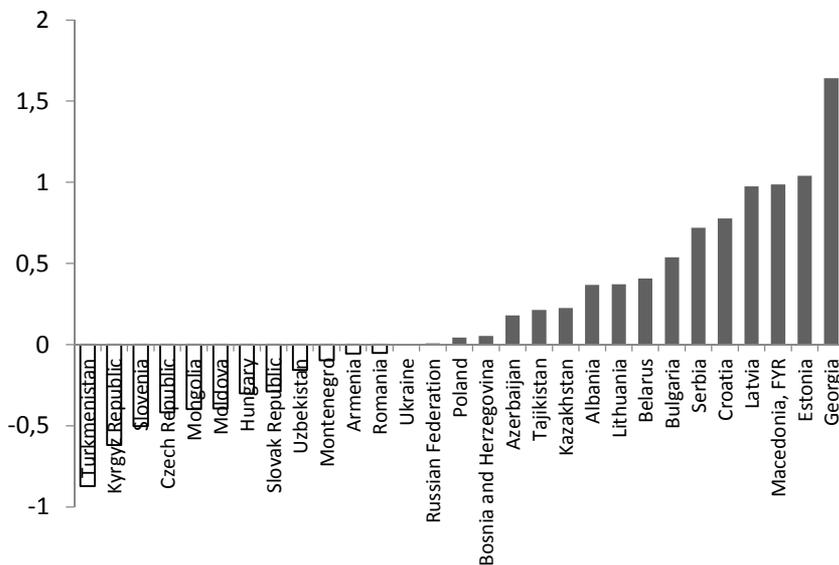


Source: own elaboration based on World Bank CCI data.

In Figure 4, we show the changes in the level of corruption for particular post-communist countries in the period 1996 – 2012. This allows us to identify countries in the region, which experienced the biggest decreases, and increases in the level of corruption.

It can be noted that the level of corruption in the most corrupt countries in Central Asia such as Turkmenistan or Kyrgyz Republic has increased over time while the level of corruption in the majority of the least corrupt countries, such as the Baltic countries, decreased. Interestingly, in many Central European countries, such as Slovenia, the Czech Republic, Hungary, and the Slovak Republic, which initially started with low levels of corruption, corruption increased over time. The only exception in this group was Poland where the level of corruption slightly decreased. The most spectacular decrease in the level of corruption was reported in Georgia. Other significant decreases in corruption were also reported in the Balkan countries such as FYR Macedonia, Croatia, Serbia and Bulgaria.

Figure 4. Changes in corruption levels in particular post-communist countries



Source: own elaboration based on World Bank CCI data.

Corruption persistence in post-communist countries

In this section, we study the stability of corruption patterns in the post-communist countries using the Markov Transition Matrix (MTM). The MTM is a square matrix that contains the probabilities of moving from one state to another state. The use of MTM has gained popularity in social sciences, especially in economics to study the long-run world distribution of income among various groups of countries and to identify “growth miracles” and “growth disasters” (Jones, 1997). By analogy, in our study we can identify “corruption miracles” and “corruption disasters” and study the long-run distribution of corruption among the post-communist countries.

For the purposes of our study, the post-communist countries were assigned to four different corruption categories: high, medium high, medium low, and low corruption. The categorization was carried out for the sample of 27 post-communist countries, which were divided into quartiles. Therefore, this categorization was based on the entire distribution of post-communist countries. We considered sixteen different types of transitions between these states, including staying in the same corruption category.

This corresponds to the 16 quadrants of the transition matrix. If the probability of moving from category i to a category j at a given one time step is:

$$\Pr(j | i) = P_{i,j}$$

The four-state stochastic matrix P is given by using these probabilities, where

$$P = \begin{pmatrix} P_{1,1} & P_{1,2} & P_{1,3} & P_{1,4} \\ P_{2,1} & P_{2,2} & P_{2,3} & P_{2,4} \\ P_{3,1} & P_{3,2} & P_{3,3} & P_{3,4} \\ P_{4,1} & P_{4,2} & P_{4,3} & P_{4,4} \end{pmatrix}$$

Since the probability of transitioning from state i to some state must be 1, this matrix is a right stochastic matrix, so that:

$$\sum_j P_{i,j} = 1$$

An initial distribution is given as a row vector V (presented in Table 2). A stationary probability vector π is defined as a vector that does not change under application of the transition matrix; that is, it is defined as a left eigenvector of the probability matrix, associated with eigenvalue 1:

$$\pi P = \pi$$

The Perron–Frobenius theorem ensures that every stochastic matrix has such a vector, and that the largest absolute value of an eigenvalue is always 1. In general, there may be several such vectors. However, for a matrix with strictly positive entries, this vector is unique and can be computed by observing that for any i we have the following limit,

$$\lim_{k \rightarrow \infty} (P^k)_{i,j} = \pi_j$$

where π_j is the j -th element of the row vector π .

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

This implies that the long-term probability of being in a state is independent of the initial state i . Thus, the system evolves, over time, to a stationary state. Intuitively, a stochastic matrix represents a Markov chain with no sink states, this implies that the application of the stochastic matrix to a probability distribution would redistribute the probability mass of the original distribution while preserving its total mass. If this process is applied repeatedly, the distribution converges to a stationary distribution for the Markov chain. This allows us to obtain the long-run distribution of corruption in the post-communist countries.

The calculated transition probabilities among particular states are reported in Table 1.

Table 1. Corruption level category transition probability for post-communist countries (Markov transition matrix)

Corruption level	quartiles for post-communist countries			
High	89.64%	09.89%	00.47%	00.00%
Medium High	10.25%	80.13%	09.62%	00.00%
Medium Low	00.16%	12.09%	82.79%	04.96%
Low	00.00%	00.00%	04.24%	95.76%
Corruption level	High	Medium High	Medium Low	Low

Source: Own estimation.

It can be seen from the transition matrix that the probabilities of staying continuously in particular quartiles are the highest relating to large persistence in corruption results. In particular, the probability of staying in the low corruption quartile is the highest and close to one while the probability of staying in the medium high quartile is the lowest and equal to 0.8. Among the highest probabilities of changing the quartiles are the probability of moving from the medium low to the medium high quartile equal to 0.12 and the probability of moving from the medium high to the high quartile equal to 0.10. This suggests that in the long-run we should expect corruption in the post-communist countries to increase. This can be seen in the

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

long run distribution of corruption in the post-communist countries shown in Table 2.

Comparing the initial and long run distributions of corruption in post-communist countries it can be seen from Table 2 that in the long run we should expect corruption to increase as the size of the high and medium high quartiles are going to expand at the expense of the medium low quartile. This result is not surprising given the fact that the probabilities of moving from the high and medium high levels of corruption to the lower levels of corruption are smaller than the probabilities of moving from the lower levels of corruption to the high and medium high levels. It seems that corruption levels are highly persistent across time. Some countries remain trapped in "corruption" traps characterized by pervasive corruption whereas others end up in high corruption equilibrium and stay there. Here, the important results concern the countries of the former Soviet Union, most notably Ukraine and Russia, which ascend in their corruption control in the mid-sample only to fall back to the lowest category.

Table 2. Initial and long-run distribution for post-communist quartiles

Starting distribution post-communist quartiles			
High Cor- ruption	Medium High Cor- ruption	Medium Low Cor- ruption	Low Cor- ruption
24.95%	25.42%	24.48%	25.15%
Limiting distribution post-communist quartiles			
High Cor- ruption	Medium High Cor- ruption	Medium Low Cor- ruption	Low Cor- ruption
26.45%	26.39%	21.73%	25.43%

Source: Own estimation.

The most interesting cases are of course countries that managed to cross the borders between the corruption groups. Here most notable examples of such countries are the cases of Georgia and Estonia, which managed to "jump" two categories. In both countries, a significant liberalization has taken place associated with the withdrawal of the state from regulation, however, this was joined with institutional reform relating also to judiciary and crime prevention. This mixture provided the best results. Third case of a significant improvement was Croatia, which in the observed sample was during accession to the European Union. This process required putting an

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

anticorruption framework in place associated with significant deregulation of "national champions" - big state owned companies with significant market power in the local market.

Conclusions

Over two decades of the simultaneous political and economic transitions in the region, a dynamic market economy has emerged in some countries, yet in some nothing changed, and the boundaries between the state and the economy remained murky. In this article, we studied the stability of corruption patterns in the post-communist countries. Though a small positive trend is visible, it is mainly initiated by those post-communist countries that joined the European Union. In general, we should not expect radical changes in the levels of corruption in other countries. On the contrary, corruption in the long run in the post-communist countries may even increase. Nevertheless, the story of an overwhelming majority of the post-communist countries is staying on approximately the same corruption level.

A possible explanation for this is that "corruption corrupts". The expected profitability of engaging in a corrupt transaction relative to not engaging in it depends on the number of other people doing the same. Gain from being corrupt from the point of an individual depends on how many other individuals in the same organization or society are expected to be corrupt. This is so for many different reasons:

- It is harder to seek out and punish corrupt officials in environments where everybody is corrupt.
- Corrupt individuals prefer to interact with other corrupt individuals and continue to be corrupt if they have interacted with corrupt individuals in the past.
- The reward to rent-seeking relative to entrepreneurship is high in societies where most individuals seek rents and accept bribes.
- Internalized moral feelings of guilt by fraudulent behavior decrease as the number of corrupt officials increases.
- The stigma and reputation costs associated with breaking social norms are higher in a situation when few other staff members are corrupt.
- Officials act upon a social convention arising under the assumption that they tend to imitate relatively more rewarding behaviors either by learning from experience in dynamic interactions or by progenitors transmitting their strategy to their progenies.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Each of these mechanisms has the potential to make corruption self-reinforcing and to generate multiple equilibriums whereby organizations or countries with the same characteristics can experience very different corruption levels. This gives a role to history as a major determinant of corruption and explains its persistence. Countries can be “stuck” in density dependent equilibriums; the level of corruption in a country moves towards either a high or a low equilibrium depending on the initial situation. However, this setting leads to density dependant effects: i.e., critical population thresholds, which separate equilibriums with low levels of corruption from equilibriums with high levels of corruption. The presence of multiple equilibriums in turn raises the possibility of moving from a current “bad” equilibrium to one that is socially superior. This suggests that a ‘big push’ strategy is needed to reduce corruption levels in societies where corruption is pandemic. The question of how to make such a move has apparently not received much attention other than reports of various institutions. We know only that some countries remain trapped in the bad equilibrium and that radical action is needed, but what exactly should be done is not exemplified in the literature. This shows pathways for further research on causes of post-communist corruption. An interesting extension of the current research would be to study the effects of European integration on corruption in the post-communist countries.

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18-19 June 2015, Economics and Finance**

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List of Papers

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**Income Tax Exemption as a Regional State Aid
in Special Economic Zones and its Impact Upon
Development of Polish Districts**

JEL Classification: *H25; H32; R11; R58*

Keywords: *regional state aid; special economic zones; regional development; poviats in Poland; public support*

Abstract: Special Economic Zones (SEZs) were established to attract entrepreneurs to invest in Polish regions in order to increase their social and economic development. One of the most important incentives offered in SEZs is state aid in the form of an income tax exemption. The objective of this paper is to verify if the intensity of regional state aid granted to entrepreneurs in SEZs has had a positive impact on the social and economic development of Polish *poviats* (a *poviat* is an administrative district). The public aid was received by beneficiaries when they made some profits and, instead of investing, used a tax allowance to decrease their tax base. However, part of the positive outcome of economic activities envisioned in SEZs should be the development of existing businesses and the emergence of start-ups, as well as the improved attractiveness of the region and the inflow of new investors (which should be manifested by an increase in the gross value of fixed assets per entrepreneur and a decrease in the unemployment rate at *poviat* level). The conducted research allowed for the conclusion that regional state aid in SEZs in the form of an income tax exemption was of a relative higher importance to the poorest regions (higher share in the amount of regional state aid), while its significance was much lower in better developed areas in Poland (lower share in the amount of regional state aid). The year-to-year study showed no relation be-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

tween state aid granted in SEZs and an increase in GVFA per company or a decrease in the unemployment rate. However on the basis of analysis of the cumulated value of state aid in SEZs for the whole period from 2005 to 2013, we can say that regional state aid in the form of an income tax exemption in SEZs had a positive influence mainly in poviats located in the poorest voivodeships.

Introduction

Special Economic Zones (SEZs) were established in Poland based on the Act of 1994. However it should be underlined that they consist of many subzones created under the Council of Ministers Ordinances. According to available data, they were localized in 151 towns/cities and 217 gminas (townships) at the end of 2013 (UOKiK, 2014). This means that there were 368 subzones in Poland. This was an effect of an evolution of changes in areas and borders (as new plots were either included or excluded from them).

The main goal of the SEZs was regional development, deriving from an inflow of investors and the creation of new jobs. Due to the lower level of development of certain Polish regions and their poor quality of infrastructure and labour force, a special investment incentive was offered in the form of an income tax exemption. Due to its character, it was not available to entrepreneurs in the most sensitive and risky period, i.e. during the investment process or the launching of economic activities (production) in the SEZs. It was accessible only when economic operators gained profits from their businesses in a given region.

Therefore income tax exemption in SEZs was classified as regional state aid. From the theoretical point of view it should be mentioned that there are two polar opposite arguments on the need for regional incentives. On the one hand, regional policy undertaken by nation should assist areas (and thus the populations therein) that are deemed to be in need of assistance by virtue of their poor levels of economic performance: an inappropriate spatial structure within a particular region may adversely affect its economic performance and reduce its ability to adjust to changes (Parr, 2014, pp. 2-5). One of the main goals of regional policy is not only to increase welfare levels in the problem regions, but also to lead to efficiency gains within the national economy: utilisation of unused resources in lagging areas and reduction of congestion and other negative externalities in the relatively prosperous regions (Hansen, 1965, pp. 7-8). An OECD report stated that fostering growth, even in lagging regions, is in the interest of national governments as it contributes to national output without hindering growth op-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

portunities elsewhere (OECD, 2009, p. 17). Thus a particular place might require intervention from outside in response to two sets of market and government failures: (a) a place can be trapped in a vicious circle of inefficiency or social exclusion; and (b) there can appear agglomerations' effects, which are always the result of public as well as private decisions, the former consisting of the design of institutions which are tailored to places (Barca, 2009, p. XI, 18-19).

On the other hand, there are arguments against governmental interventions at the regional level. The Keynesian approach to economic policy would allow for tackling regional development problems deriving from market failure, while completely ignoring governmental failures. Thus regional policy that includes broad incentives for firms to locate in less-developed regions is flawed and doomed to failure, because these areas lack supporting infrastructure and face competitive disadvantages (Porter, 1996, pp. 88-89). It also opens up the very real possibility of competition among governments, both at the national and sub-national levels (Gray and Duning, 2002, p. 412). The degree of labour or infrastructure scarcity necessary to induce sufficient firms to move to the outlying regions would lead to a general price increase: (a) businessmen know better than any civil servant how to choose the most efficient, lowest-cost location; and (b) if they have to set up plants at other locations the loss in efficiency may be substantial (Needleman and Scott, 1964, p. 157-158, 160). It seems that this kind of instrument generates some increase in investment and directly subsidises some output. However, only when the substitution of public for private funds has been completely eliminated, the private sector contribution to investment can be increased above the without-subsidy level, and assistance can act as an incentive to attract private funds (Wren, 1996, p. 535). In the end it seems that the taxpayers' money should not be used to subsidise private firms, and that companies themselves should decide on the most efficient location for their business (Armstrong and Taylor, 1999, pp. xiii-xiv). Thus, referring to the OECD report, any interventions should be evaluated against other uses of public funds (OECD, 2009b, p. 53).

There is a great deal of research into the factors determining investors' decisions in Poland generally, as well as in special economic zones (IBNGR, 2014). Thus in this study we do not discuss if the financial incentive in SEZs was attractive to entrepreneurs and what was its position in a ranking of the most important location factors to invest both in Poland and in SEZs. The objective of this paper is to verify if the regional state aid

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

granted to entrepreneurs in SEZs had a positive impact on the social and economic development of poviats in Poland.

The impact on a regional development was studied by analyzing changes in the gross value of fixed assets (GVFA) per entrepreneur and the unemployment rate in the period of 2005-2013. It is assumed that state aid in the form of an income tax exemption was granted to an entrepreneur when a company gained profit due to operating its business within the framework of special economic zones. A positive outcome of economic activities in SEZs should be accompanied by the development of existing businesses through new investments and the emergence of start-ups, as well as in an improved image and attractiveness of the region and an inflow of investors not necessarily interested in the allowances offered by SEZs (which should be manifested by an increase in GVFA per entrepreneur). A greater involvement of manufacturing and service businesses in the region should increase the demand for labour and, consequently, stimulate the labour market (which should be reflected in a drop in the unemployment rate).

Methodology of the research

The data relating to selected indicators of regional development (gross value of fixed assets per entrepreneur and unemployment rate at the poviats level) comes from Local Data Bank of the Central Statistical Office (GUS). Data concerning state aid derives from the Office for Competition and Consumer Protection. It should be noted that there are many forms of granting regional state aid to entrepreneurs in SEZs, however this study covers only income tax exemption granted to entrepreneurs with a SEZ valid permission. Data concerning the size of investment in SEZs comes from entrepreneurs obliged to report them to the Ministry of Economy.

Research was conducted in poviats (NUTS 4) because recent studies for voivodeships (NUTS 2) have not enabled researchers to capture the impact of selected categories of financial public assistance (Ambroziak 2014b). While other research suggests that companies in SEZs attracted workers and suppliers from the poviats in which they were based or from their neighbouring areas (Ambroziak 2009).

In order to capture the potential impact of SEZs on selected indicators of social and economic development we conducted counterfactual impact evaluation, i.e. the comparison of achieved results with estimated outcomes which could have emerged in the absence of the intervention in the form of an income tax exemption in SEZs (European Commission 2014, Gertler et

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

al. 2011). This method should allow for verifying the assumed causal effect between the intervention - consisting of the functioning of SEZs and attracting investors – and the effects for the poviats measured by changes in indicators of regional development. To this end, we selected an experimental (treatment) group composed of poviats with enterprises in SEZs and a control group of poviats without SEZs.

Since the study was aimed at assessing the impact on social and economic development, poviats from both groups should be statistically equivalent: a) identically respond to intervention, b) be identically influenced by external factors and interventions, c) be identical when it comes to their characteristics. The first two criteria were fully met by all poviats in Poland. SEZs might be established anywhere in Poland without any location restrictions and there were no administrative regulations, which would change the position of individual poviats. However, the third condition concerning the homogeneity of characteristics was not met by all poviats due to unequal regional development and their location in a particular voivodeship (what meant differences in maximum ceilings on regional state aid – the highest level was available in the least developed voivodeships). To identify the subgroups of poviats within the experimental and control groups we took into account:

- their relative regional development calculated as GDP per capita in relation to the EU average in 2005 (since GDP data for NUTS 4 poviats were not available, we used the data for sub-regions NUTS 3, treating them as relatively close to the real-life situation in poviats);
- relative regional development level in the voivodeship (NUTS 2) where a given poviat is located (calculated as GDP per capita in relation to the EU average in 2005).

To eliminate statistical differences in regional development and in admissible aid intensity in SEZs (i.e. with respect to characteristic features) we applied the matching technique. This consisted in distinguishing and comparing analyzed data from poviats in experimental and control groups based on the 3-point regional development scale. The scale was used by the European Commission in its works on the regional aid map (Guideline 2006; Ambroziak 2014a). It included the following areas:

- where GDP per capita was not higher than 45% of the EU average,
- where GDP per capita was above 45% but not higher than 60% of the EU average,
- where GDP per capita was above 60% but not higher than 75% of the EU average.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Finally, seven categories of poviats in Poland in each group (experimental and control) were identified (Box 1). It was also important to grasp the differences among poviats of the experimental group taking into account the average of state aid intensity in SEZs (counted as an average of the ratio of the value of state aid granted to entrepreneurs to their investments in SEZs). Taking account of the above indicator, we identified four subgroups within the experimental (treatment) group of poviats:

- where the average of state aid intensity in SEZs was not higher than 5%;
- where the average of state aid intensity in SEZs exceeded 5% but was not higher than 20%;
- where the average of state aid intensity in SEZs exceeded 20%
- where state aid was not granted in SEZs.

Box 1. Categories of poviats depending on the regional development of voivodeships, in which they were located

Categories of poviats reflecting their relative development and the development of voivodeships, in which they were located:

- I.1. poviat whose GDP per capita was not higher than 45% of the EU average located in a voivodeship whose GDP per capita was not higher than 45% of the EU average (191 cases); (classification: voivodeship I, poviat 1.; category: I.1. (cat. I.1.);
- I.2. poviat whose GDP per capita was above 45% but not higher than 60% of the EU average located in a voivodeship whose GDP per capita was not higher than 45% of the EU average (5 cases); (classification: voivodeship I, poviat 2.; category: I.2. (cat. I.2.);
- II.1. poviat whose GDP per capita was not higher than 45% of the EU average located in a voivodeship whose GDP per capita was above 45% but not higher than 60% of the EU average (97 cases); (classification: voivodeship II, poviat 1.; category: II.1. (cat. II.1.);
- II.2. poviat whose GDP per capita was above 45% but not higher than 60% of the EU average located in a voivodeship whose GDP per capita was above 45% but not higher than 60% of the EU average (22 cases); (classification: voivodeship II, poviat 2.; category: II.2. (cat. II.2.);
- II.3. poviat whose GDP per capita was above 60% but lower than 75% of the EU average located in a voivodeship whose GDP per capita was above 45% but not higher than 60% of the EU average (15 cases); (classification: voivodeship II, poviat 3.; category: II.3. (cat. II.3.);
- III.1. poviat whose GDP per capita was not higher than 45% of the EU average located in a voivodeship whose GDP per capita was above 60% but not higher than 75% of the EU average (25 cases); (classification: voivodeship III, poviat 1.; category: III.1. (cat. III.1.);
- III.2. poviat whose GDP per capita was above 45% but not higher than 60% of the EU average located in a voivodeship whose GDP per capita was above 60% but not higher than 75% of the EU average (15 cases); (classification: voivodeship III, poviat 2.; category: III.2. (cat. III.2.).

In addition we identified three groups of poviats which were not included in the study because they were individual cases and no comparative analysis was feasible:

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

- I.3. powiat whose GDP per capita was above 60% but not higher than 75% of the EU average located in a voivodeship whose GDP per capita was below 45% of the EU average; (classification: voivodeship I, powiat 3.; category: I.3. (cat. I.3.);
- II.4. powiat whose GDP per capita was above 75% of the EU average located in a voivodeship whose GDP per capita was above 45% but not higher than 60% of the EU average, (classification: voivodeship II, powiat 3.; category: II.4. (cat. II.4.);
- III.4. powiat whose GDP per capita was above 75% of the EU average located in a voivodeship whose GDP per capita was above 75% of the EU average; (classification: voivodeship III, powiat 4.; category: III.4. (cat. III.4.).

Explanatory note:

Numbering X.Y.: X – voivodeship category, Y – powiat category.

Classification: I/1 - GDP per capita not higher than 45% of the EU average (the poorest/the least developed voivodeships/poviats);

Classification: II/2 - GDP per capita above 45% but not higher than 60% of the EU average (less developed voivodeships/poviats);

Classification: III/3 - GDP per capita above 60% but not higher than 75% of the EU average (more developed voivodeship/poviats).

Source: own studies.

In the study we decided to apply the difference-in-differences approach. This consists in deducting the difference in the outcome before and after the intervention in the control group from the same difference in the experimental group, in order to estimate the impact of the intervention. The method allows for ignoring (a) constant differences in the performance of poviats resulting from the level of regional development (and investment attractiveness); (b) effects of external factors, which influence them; and (c) characteristics which are irrelevant or difficult of statistical observation. It also enables one to capture the effects which emerge in relation to the intervention in the experimental group (European Commission 2012, Gertler et al. 2011). Differences in changes in the experimental group observed in comparison to the changes in the control group were interpreted as the impact of regional state aid in SEZs on the development of poviats.

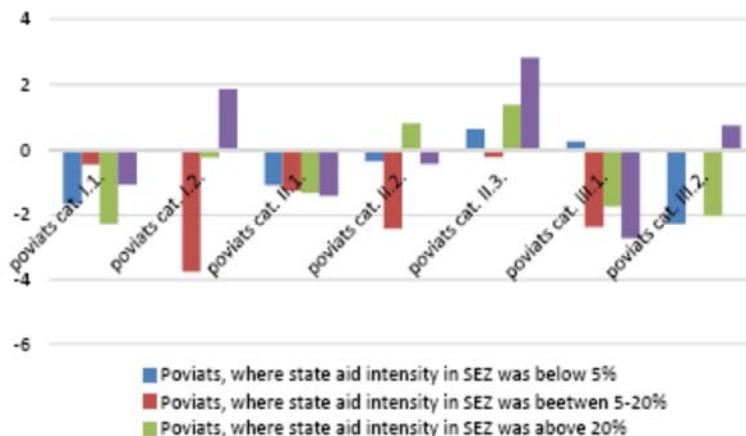
Regional state aid in special economic zones

Public aid granted in special economic zones is a type of regional state aid. The regional character of public assistance is revealed in goals and problems which are addressed, as well as in the territorial dimension of permissible assistance. It was permitted, under the EU law, if it was granted to assist the development of the most disadvantaged regions by supporting investment and job creation. Moreover it should promote the expansion and diversification of the economic activities of enterprises in the less-favoured

regions, in particular by encouraging firms to set up new establishments there (Guidelines 2006).

Regional state aid became one of the most important components of public support to entrepreneurs in Poland following its accession to the European Union. In 2005 it amounted 1,057 mln PLN, which represented about 9.1% of the total public support in Poland. In subsequent years, due to a huge inflow of EU funds and their distribution mainly to entrepreneurs in the poorest areas, the value of regional state aid increased to over 9,000 mln PLN, which constituted 54.3% of state aid in 2013 (UOKiK 2006, 2014). As regards public support in SEZs, its share in value of regional state aid has varied from 38% in 2005 through to 74% in 2007, when there was a break in the offering of EU funds, to 16% in 2013. The drop in the overall share was the result of the dramatic increase in the total value of regional state aid, not a decrease in public aid granted to SEZs (Figure 1.).

Figure 1. Changes in value, dynamic and share of regional state aid and public support in SEZs and in Poland



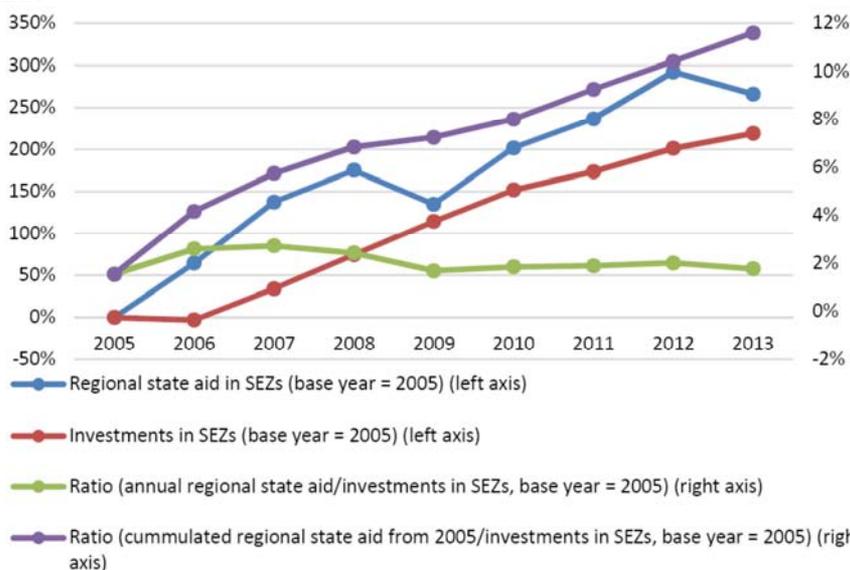
Sources: Own calculations based on data from the Office for Competition and Consumer Protection and the Ministry of Economy.

The annual value of state aid granted to companies in special economic zones grew from 406 mln PLN in 2005 to 1,488 mln PLN in 2013 (3.7 times), while in that same period the value of investments in SEZs at the end of the year increased from 26,455 mln PLN to 84,350 mln PLN (3.2 times). Both values rose in the three years after Poland's accession to the EU, while the value of public support decreased in 2009 as a result of economic crisis in the EU. In the next years, the value of public aid in SEZs

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

grew, with the exception of 2013, when it dropped slightly again. It is worth observing that on the basis of year-to-year analysis we can state that the relation of value of regional state aid to investments in SEZs reached 2.7% in 2007, then decreased to 1.7% and 1.8% in 2009 and 2010 due to economic problems in Europe, followed by a rather moderate increase in subsequent years (Figure 2.).

Figure 2. Dynamic of changes in the value and ratio of state aid and investments in SEZs



Sources: Own calculations based on data from the Office for Competition and Consumer Protection and the Ministry of Economy.

In order to evaluate the intensity of state aid in SEZs the ratio of cumulated state aid to investments in SEZs should be analyzed for the period 2005-2013. First, the value of investments in SEZs increased due to the inflow of new entrepreneurs, as well as the expenditures of existing companies within the SEZs every year. However at the same time it was also decreased as a result of either an outflow of investors or a closure of economic activities within the SEZ permits. Second, the cumulative amount of regional state aid granted to entrepreneurs in the form of an income tax exemption in SEZs increased every year, including when annual growth in value decreased in comparison to the previous year. Finally, we can observe that a relation between the value of cumulative state aid and invest-

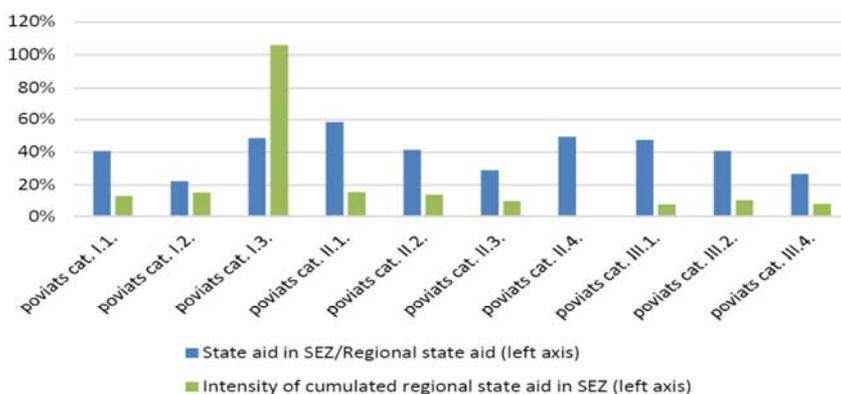
**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

ments in SEZs increased on average by 1 percentage point yearly, from 1.5% in 2005 to 11.6% in 2013. This was the result of a lower dynamism of an investment inflow into SEZs in comparison to the cumulative amount of tax breaks granted to companies in SEZs. It seems that this trend is irreversible. First, all investors in SEZs are interested in benefiting from all admissible amounts of money available resulting from tax exemptions. Second, the period of functioning of SEZs was extended twice: to 2020 and recently to 2026, which still limits the investment attractiveness of SEZs to new entrepreneurs and reduces the opportunity to benefit from tax breaks for a longer time.

As regards regional distribution, the highest average ratio of public support in the form of an income tax exemption in SEZs to total regional state aid was observed (excluding the individual poviats classified in cat. I.3, II.4 and III.4) in poviats cat. II.1 (58.4%), III.1 (47.5%) and II.2 (41.3%) in the period of 2005-2013. The lowest level was reached by poviats cat. I.2 (22.3%) and II.3 (29.3%) (Figure 3.).

This means that regional state aid in the form of an income tax exemption in SEZs was of a relative higher importance in the least developed regions, while other sources and types of regional state aid (including more complicated to use EU funds) were more widely offered in the better developed areas in Poland.

Figure 3. Average ratio of state aid in SEZs to regional state aid and average intensity of cumulative regional state aid in SEZs in selected poviats in Poland in 2005-2013



Sources: Own calculations based on data from the Office for Competition and Consumer Protection and the Ministry of Economy.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The biggest nominal amount of regional state aid in the form of an income tax exemption in SEZs was granted to entrepreneurs in poviats cat. I.1, II.1 (c.a. 2,386 mln and 2,691 mln PLN) and in cat. II.2, II.3 (which reached half of those amounts) (Figure 4). The ratio of public support in SEZs to total regional state aid amounted to over 80% in poviats cat. I.1 in 2005-2007, and dramatically dropped to 25-40% in subsequent years. In case of the second group of poviats (cat. II.1), the share of state aid in SEZs to regional state aid lowered from the level of 60-70% to 26-38% in the period of 2005-2013. In case of poviats I.2, III.1 and III.2 one can observe that the cumulative amount of public support granted in SEZs was much lower (below 500 mln PLN), while the share of its annual value in regional state aid dramatically changed in the period 2005-2013. This means that entrepreneurs in poviats at all levels of development, but located in a more developed voivodeship, where the share of public aid in SEZs in total regional state aid was the lowest, received regional public support mainly outside the framework of special economic zones. Probably the majority of this assistance came from EU funds, which are much more complicated to use, but available immediately. At the same time, companies from the poorest and less developed regions got relatively much more assistance from the national budget through tax exemption in SEZs, which however was offered after the investment period and depended on profit from sales of goods and services produced in SEZs.

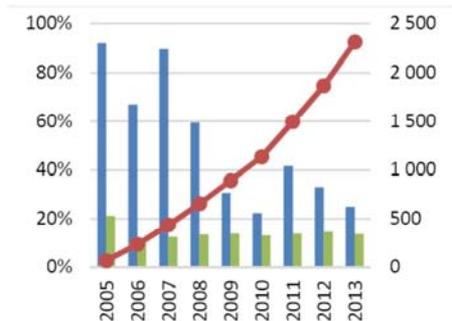
As it was stated earlier, the amount of state aid available to each entrepreneur in the SEZs depends on three factors: (a) the date of receipt of permission (if it is before 2001, then the rules concerning regional state aid intensity do not apply); (b) the investment localization according to voivodeship (different ceilings on regional state aid for different voivodeships); and (c) the amount of capital invested by an entrepreneur in a given SEZ. The highest average intensity (counted for each entrepreneur without considering date of receipt of permission to conduct economic activities in an SEZ) was observed in poviats cat. II.2 and II.1, I.2, and I.1, where the average intensity was estimated at the level c.a. 14-16% (Figure 4). This intensity level was much lower in poviats cat. III.2 (10.7%) and only half in the case of the other poviats cat.: II.3, III.1 and III.4.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Figure 4. Changes in the value and ratio of state aid in SEZs to regional state aid in selected poviats in Poland in 2005-2013

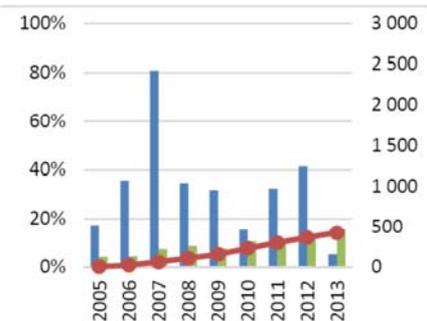
Poviats whose GDP per capita \leq 45% of the EU average in voivodeships whose GDP per capita \leq 45% of the EU average

(cat. I.1.)



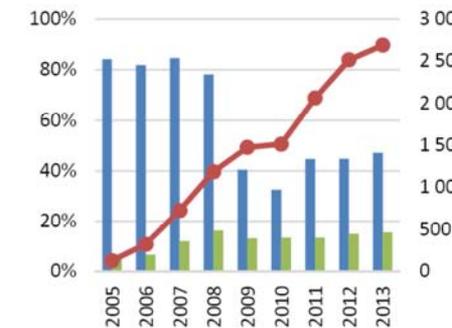
Poviats whose GDP per capita $>$ 45% and \leq 60% of the EU average in voivodeships whose GDP per capita \leq 45% of the EU average

(cat. I.2.)



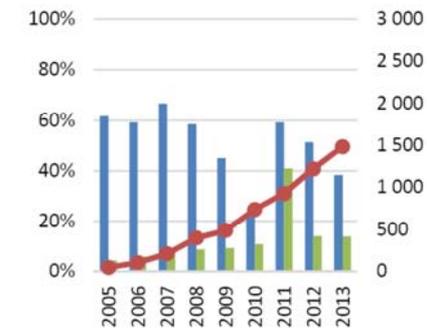
Poviats whose GDP per capita \leq 45% of the EU average in voivodeships whose GDP per capita $>$ 45% and \leq 60% of the EU average

(cat. II.1.)



Poviats whose GDP per capita $>$ 45% and \leq 60% of the EU average located in voivodeships whose GDP per capita $>$ 45% and \leq 60% of the EU average

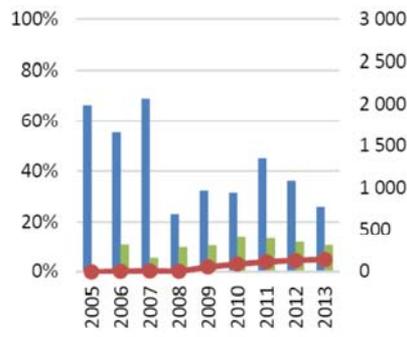
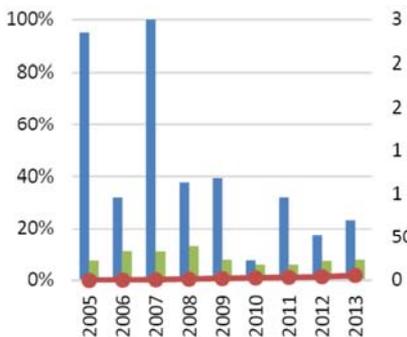
(cat. II.2.)



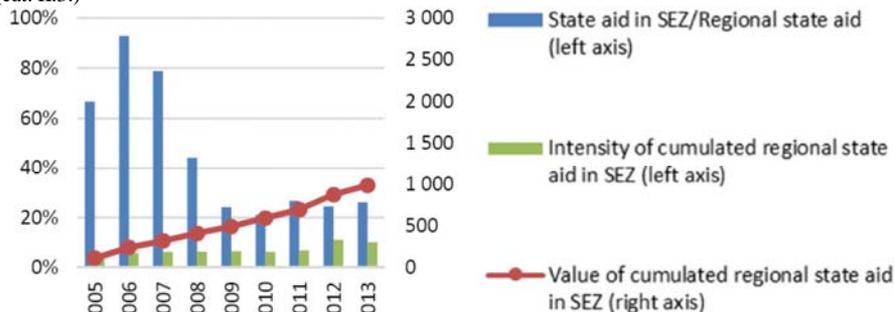
**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Poviats whose GDP per capita $\leq 45\%$ of the EU average in voivodeships whose GDP per capita $> 60\%$ and $\leq 75\%$ of the EU average (cat. III.1.)

Poviats whose GDP per capita $> 45\%$ and $\leq 60\%$ of the EU average in voivodeships whose GDP per capita $> 60\%$ and $\leq 75\%$ of the EU average (cat. III.2.)



Poviats whose GDP per capita $> 60\%$ and $\leq 75\%$ of the EU average in voivodeships whose GDP per capita $> 45\%$ and $\leq 60\%$ of the EU average (cat. II.3.)



Sources: Own calculations based on data from the Office for Competition and Consumer Protection and the Ministry of Economy.

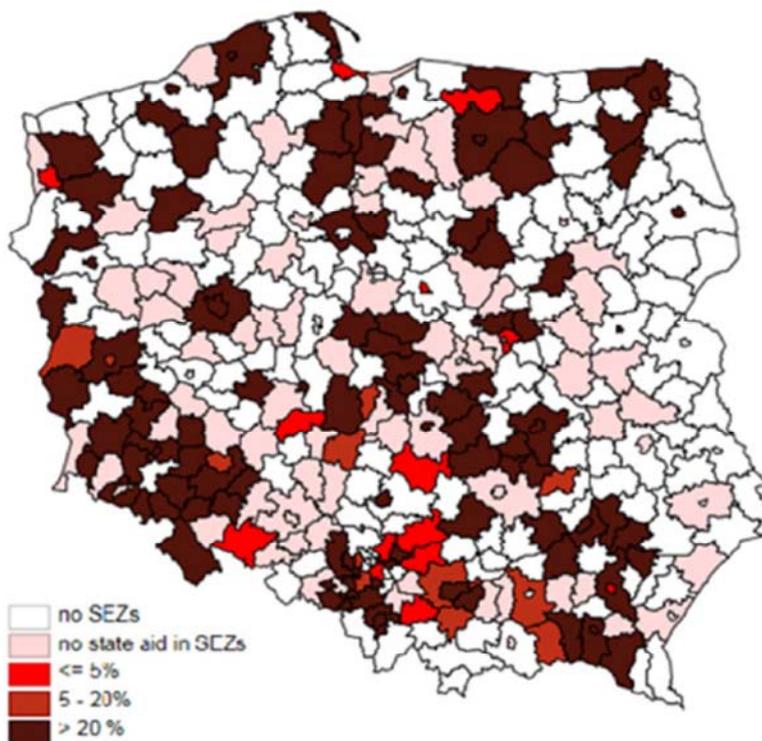
Thus the highest average intensity of state aid in the form of an income tax exemption in SEZs was recorded in poviats from the least and less developed voivodeships, where the ceiling on the aforementioned admissible regional state aid was the highest, while in case of the more developed voivodeships, where the ceiling on admissible regional state aid was lower, the intensity was about half. However, it should be underlined that this does not mean that ceilings on regional state aid matters in this regard. Until now there are only a few cases of companies which reached the maximum ceiling of admissible state aid in SEZs. Thus, in the case of almost all entrepre-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

neurs, the average intensity of granted state aid in SEZs was much below the acceptable thresholds at the end of 2013.

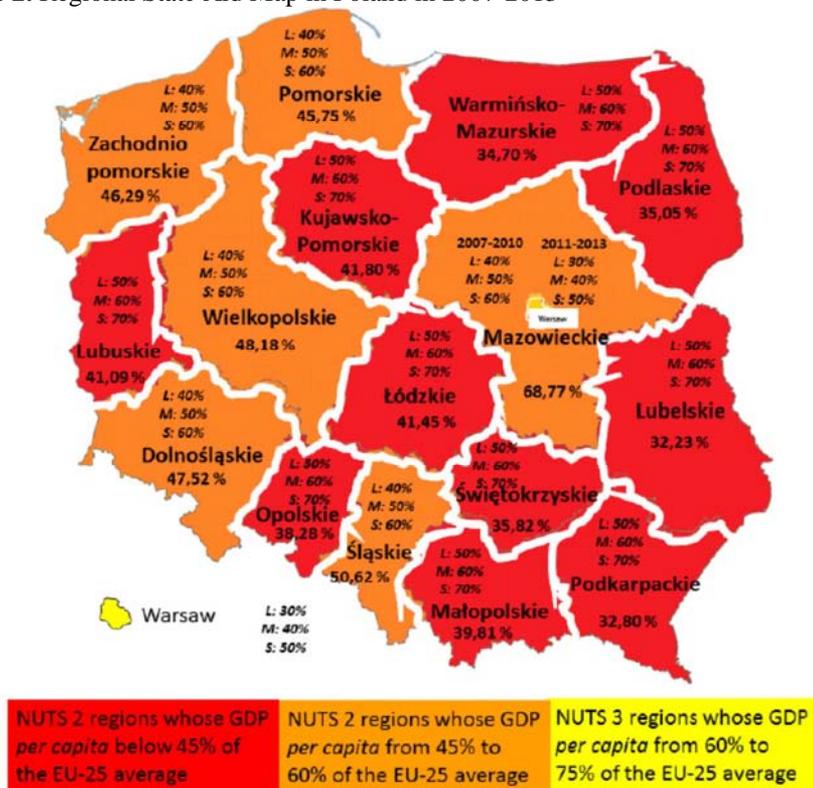
This means that differences in the intensities of state aid in SEZs among poviats depended on the value of investments located in SEZs. It confirms the conclusion of the previous research (Ambroziak 2015) that a relatively higher value of capital was invested in SEZs established not only in the poorest regions, but also in the slightly more developed regions of Poland (i.e. less developed, in contrast to the poorest and more developed regions) (Maps 1 and 2).

Map 1. Average intensity of regional state aid in SEZs in 2005-2013



Source: Own studies based on the Office for Competition and Consumer Protection and the Ministry of Economy.

Map 2. Regional State Aid Map in Poland in 2007-2013



Impact of regional state aid in special economic zones upon gross value of fixed assets in companies

As was already stated, regional state aid in special economic zones has a specific character and mechanism of receiving, and thus influencing, a region's economic and social development. Since it is granted in the form of tax exemptions from income tax, it is noticeable to entrepreneurs only after the period of investment and during the regular operation of a business in SEZs. Thus lower tax liabilities should (a) allow entrepreneurs to increase their investments; and (b) attract external capital to territories located next to SEZs (however e.g. within this same powiat). Therefore one of the measures of the impact of regional state aid granted in special economic

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

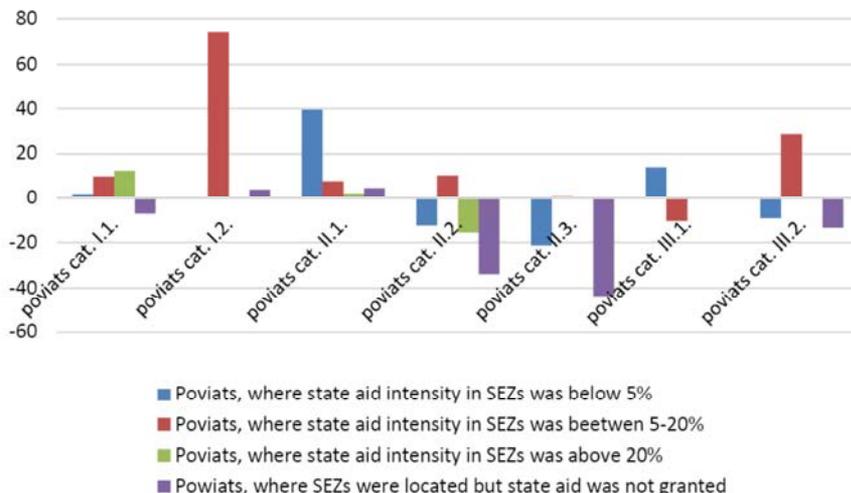
zones upon the regional development of poviats is the change in the gross value of fixed assets (GVFA) per company, which identifies the directions and dynamics of their development. Changes in the GVFA per company result from investments not only within SEZs but also from, inter alia, the general situation in the country, voivodeship and poviat, the quality of economic, legal and administrative environment, infrastructure and labour. To eliminate the impact of these factors and to reflect solely the impact of regional state aid granted within the framework of SEZs on the gross value of fixed assets in companies, we divided poviats into categories reflecting the level of their regional development and that of the voivodeships in which they are located. To this end we:

- compared the ratio of average gross value of fixed assets per company in 2013 to that of 2005 in (a) poviats in the experimental group and in (b) poviats in the control group (without SEZs), broken down by levels of regional development (calculated as GDP per capita in relation to the EU average) and, in the case of the experimental group, also by average of the intensity of regional state aid granted in SEZs in poviats;
- compared the average year-to-year change in the average gross value of fixed assets per company for subsequent years between 2005-2013 in (a) poviats in the experimental group and (b) in poviats in the control group (without SEZs) broken down by levels of regional development (calculated as GDP per capita in relation to the EU average) and, in the case of the experimental group, also by the intensity of regional state aid granted in SEZs in poviats;

In the period of 2005-2013 the highest increase in gross value of fixed assets per entrepreneur in comparison to the control group (without SEZs) - was recorded in poviats cat. I.2 (Figure 5). Taking into account the cumulative values of state aid and GVFA per company at the end of 2013, one can say that poviats with an intensity of state aid in SEZs ranging between 5-20% were the biggest contributors to this growth. However, this is only a statistical effect, because the highest annual growth was observed in 2007, 2008 and 2011 in poviats where state aid in SEZs was not granted. Only in 2012 was a noticeably bigger increase in GVFA per entrepreneur observed in poviats where the intensity of state aid in SEZs ranged between 5 and 20% in comparison to the control group. Then, in 2013 the increase in GVFA per entrepreneur in poviats cat. I.2 was dramatically smaller than in poviats without SEZs (Figure 6).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Figure 5. Changes in gross value of fixed assets per company in poviats with SEZs by categories, compared to poviats without SEZs, in 2005-2012 (in p.p.)



Source: Own studies, Office for Competition and Consumer Protection, Local Data Bank of GUS and the Ministry of Economy.

Also a higher increase in GVFA per entrepreneur in comparison to control group was observed in the period of 2005-2013 in both poviat categories: II.1 and I.1 (from the poorest voivodeships) (Figure 5). In case of poviats cat. II.1, the aforementioned increase was observed in poviats where average intensity of regional state aid in SEZs was below 5%. However, the highest increase in annual change of GVFA per company was noted in 2007, and in subsequent years in poviats with a low intensity or with SEZs where state aid was not granted. It should be noted that this outcome partially resulted from the different starting levels of GVFA in the poorest and in the best developed regions: the lower the original value the higher change in GVFA per company (Figure 6).

As regards poviats cat. I.1, where the average intensity of state aid in SEZs was above 5%, they recorded a higher increase in GVFA per entrepreneur in comparison to the control group in the period of 2005-2013. The highest increase in GVFA per company compared to results in the control group was noted in 2007, 2010 and 2011, thanks mainly to the poviats where state aid was granted in SEZs with an intensity even above 20%. It is worth underscoring that although the total amount and intensity of regional state aid in SEZs grew, there was a smaller increase in GVFA per entrepreneur in comparison to the control group in 2012-2013.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

As regards poviats II.2 and II.3, located in the less developed (in contrast to the poorest and more developed) voivodeships, a smaller increase in GVFA per company in comparison to the control group without SEZs was recorded in the period of 2005-2013. During that time one can observe a high fluctuation of their position vis-à-vis poviats without SEZs. In 2007, both poviat categories recorded higher increases in GVFA per entrepreneur in comparison to the control group. The main contributors of this success were poviats where state aid intensity did not exceed 20%, moreover there were also areas where SEZs were established but no state aid was granted. In subsequent years, the annual increase of GVFA per company was smaller in those poviats (regardless of the intensity of granted state aid) compared to areas without SEZs.

A similar situation was observed in poviats cat. III.1 and III.2, located in more developed voivodeships. As regards poviats cat. III.1, in the whole period of research, with the exception of 2009-2011, the increase in GVFA per company was smaller compared to poviats without SEZs. It is worth noting that this situation was observed also in poviats where the intensity of regional state aid in SEZs was above 5% and sometimes even above 20%. Referring to poviats III.2 one can observe that, in comparison to regions without SEZs, there was a higher growth of GVFA per entrepreneur in 2005-2007 and in 2011, and lower in the other years of the period covered by the study. This concerned all types of poviats cat III.1 and III.2, both those where the intensity of regional state aid was above 5% and even 20%, and those where state aid in SEZs was not granted.

Summing up this part of the study we can state that the poorest poviats, with SEZs located in the poorest and less developed voivodeships, recorded the biggest increase in GVFA per company compared to poviats without SEZs. It is worth noting that the aforementioned growth was observed in regions with a higher average intensity of state aid granted in SEZs. An increase in GVFA per entrepreneur in the less developed (but not the poorest) and more developed poviats with SEZs located in less developed voivodeships was smaller compared to poviats without SEZs.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

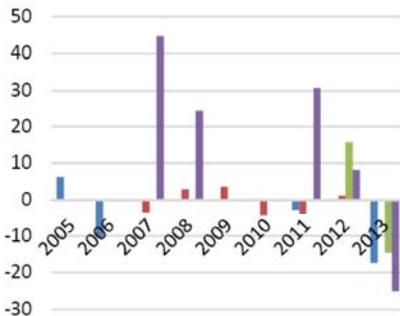
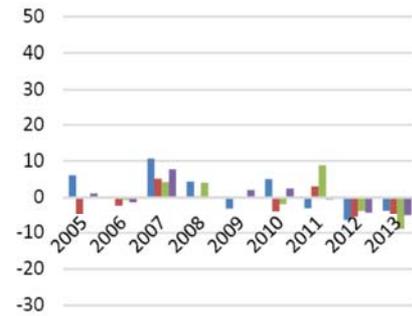
Figure 6. Changes (year-to-year) in the gross value of fixed assets in companies in poviats with SEZs compared to poviats without SEZs in the period 2005-2013 (in p.p.)

Poviats whose GDP per capita $\leq 45\%$ of the EU average in voivodeships whose GDP per capita $\leq 45\%$ of the EU average

Poviats whose GDP per capita $> 45\%$ and $\leq 60\%$ of the EU average in voivodeships whose GDP per capita $\leq 45\%$ of the EU average

(cat. I.1.)

(cat. I.2.)

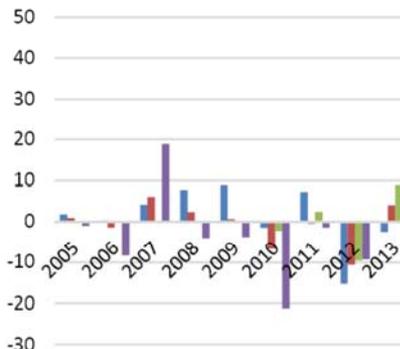
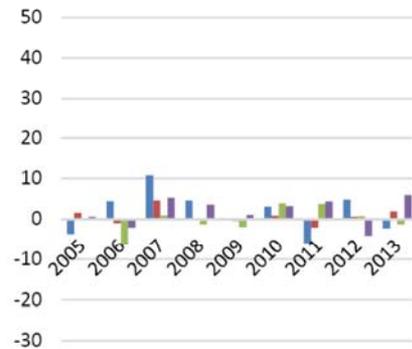


Poviats whose GDP per capita $\leq 45\%$ of the EU average in voivodeships whose GDP per capita $> 45\%$ and $\leq 60\%$ of the EU average

Poviats whose GDP per capita $> 45\%$ and $\leq 60\%$ of the EU average located in voivodeships whose GDP per capita $> 45\%$ and $\leq 60\%$ of the EU average

(cat. II.1.)

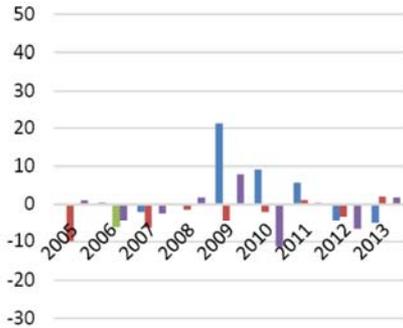
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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

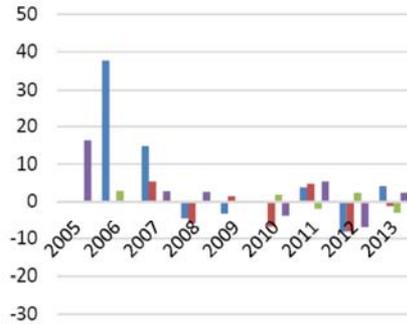
Poviats whose GDP per capita $\leq 45\%$ of the EU average in voivodeships whose GDP per capita $> 60\%$ and $\leq 75\%$ of the EU average

(cat. III.1.)



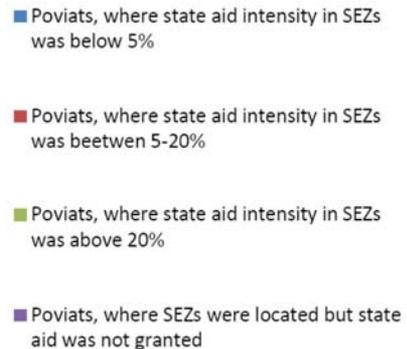
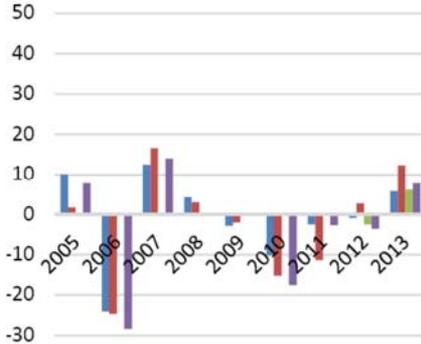
Poviats whose GDP per capita $> 45\%$ and $\leq 60\%$ of the EU average in voivodeships whose GDP per capita $> 60\%$ and $\leq 75\%$ of the EU average

(cat. III.2.)



Poviats whose GDP per capita $> 60\%$ and $\leq 75\%$ of the EU average in voivodeships whose GDP per capita $> 45\%$ and $\leq 60\%$ of the EU average

(cat. II.3.)



Source: Own studies, Office for Competition and Consumer Protection, Local Data Bank of GUS and the Ministry of Economy.

Impact of regional state aid in special economic zones on the unemployment rate

Special economic zones were established in Poland in order to, inter alia, decrease the high level of the unemployment rate observed in the mid-1990s. Therefore in this study we wished to verify whether regional state aid in the form of an income tax exemption, which should increase the attractiveness of regions to other entrepreneurs, assisted in reaching the aforementioned goal. To this end we:

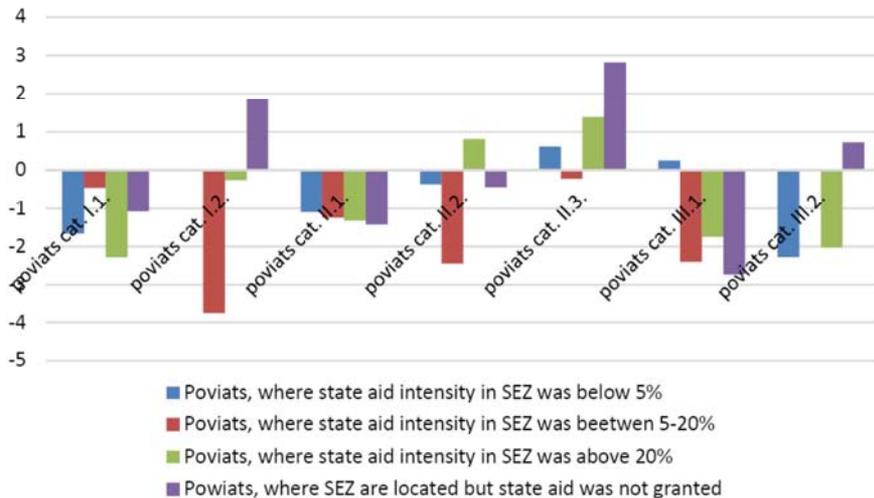
- compared the ratio of the unemployment rate in 2013 to that of 2005 in (a) poviats in the experimental group, and in (b) poviats in the control group (without SEZs), broken down by levels of regional development (calculated as GDP per capita in relation to the EU average) and, in case of the experimental group, also by intensity of regional state aid in SEZs;
- compared the year-to-year change in 2005-2013 of the unemployment rate in (a) poviats in the experimental group, and (b) in poviats in the control group (without SEZs), broken down by levels of regional development (calculated as GDP per capita in relation to the EU average) and, in the case of the experimental group, also by intensity of regional state aid in SEZs.

The highest reduction in unemployment compared to areas without SEZs was reported in the poorest poviats from all categories of voivodeships (cat. I.1, II.1 and III.1). The influence of poviats with SEZs on reducing the unemployment rate depended on their regional development and the intensity of state aid granted in SEZs: the poorest poviats (in terms of GDP per capita) with a higher intensity of state aid in SEZs were observed to achieve some reduction in their unemployment rate (Figures 7. and 8.).

In the less (in contrast to the poorest) developed poviats, cat. I.2, II.2 and III.2 from all categories of voivodeships, the total unemployment rate was also reduced much more in comparison to the control group. However it should be noted that there were regions in the experimental group which recorded worse results in comparison to those of poviats without SEZs. This concerned poviats I.2 and III.2 from the experimental group where regional state aid was not granted in SEZs, as well as poviats cat. II.2 with an intensity of state aid granted in SEZs above 20% of investments. As regards all other regions, the only category of poviats where the control group recorded a bigger reduction of unemployment rate than the experimental group was cat. II.3.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Figure 7. Changes in the unemployment rate in poviats with SEZs by categories, compared to poviats without SEZs, in 2005-2013 (in p.p.)



Source: Own studies, Office for Competition and Consumer Protection, Local Data Bank of GUS and the Ministry of Economy.

It is worth noting that by analyzing the year-to-year situation of all the above-mentioned poviats it can be observed that there was no common pattern or relation between the intensity of regional state aid granted in the form of an income tax exemption to entrepreneurs in SEZs and a reduction of the unemployment rate. This means that the intensity of state aid in SEZs did not matter in this regard on a yearly basis. In all poviat categories under study, despite a higher intensity of regional state aid in SEZs was recorded (with the exception of cat. I.1, II.1 and III.1), there were years when the reduction in the unemployment rate was higher in poviats without SEZs.

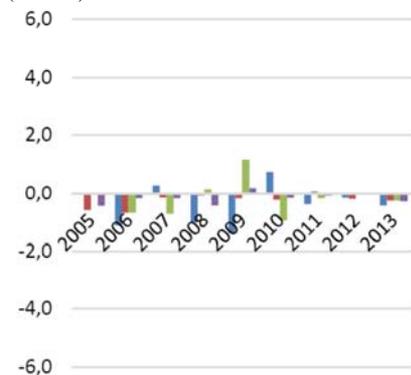
**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Figure 8. Changes (year-to-year) in the unemployment rate in poviats with SEZs compared to poviats without SEZs, in the period 2005-2012 (in p.p.)

Poviats whose GDP per capita $\leq 45\%$ of the EU average in voivodeships whose GDP per capita $\leq 45\%$ of the EU average

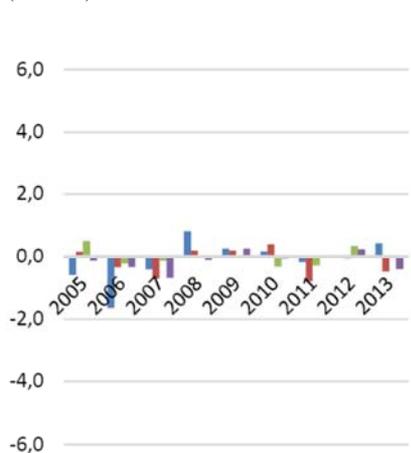
Poviats whose GDP per capita $> 45\%$ and $\leq 60\%$ of the EU average in voivodeships whose GDP per capita $\leq 45\%$ of the EU average

(cat. I.1.)

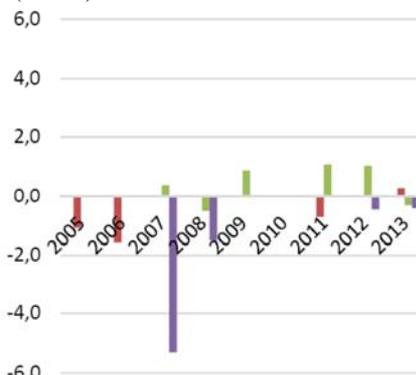


Poviats whose GDP per capita $\leq 45\%$ of the EU average in voivodeships whose GDP per capita $> 45\%$ and $\leq 60\%$ of the EU average

(cat. II.1.)

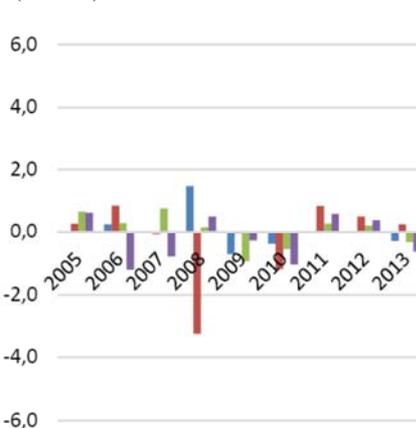


(cat. I.2.)



Poviats whose GDP per capita $> 45\%$ and $\leq 60\%$ of the EU average located in voivodeships whose GDP per capita $> 45\%$ and $\leq 60\%$ of the EU average

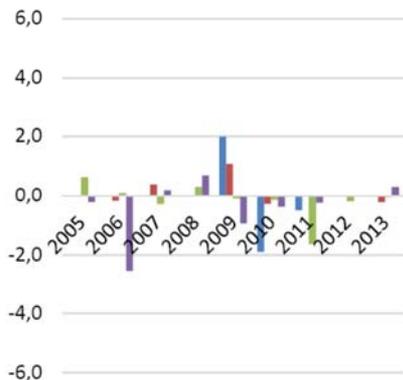
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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

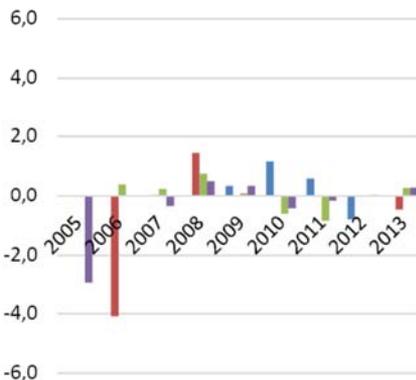
Poviats whose GDP per capita $\leq 45\%$ of the EU average in voivodeships whose GDP per capita $> 60\%$ and $\leq 75\%$ of the EU average

(cat. III.1.)



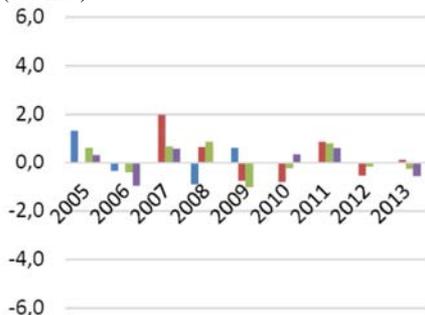
Poviats whose GDP per capita $> 45\%$ and $\leq 60\%$ of the EU average in voivodeships whose GDP per capita $> 60\%$ and $\leq 75\%$ of the EU average

(cat. III.2.)



Poviats whose GDP per capita $> 60\%$ and $\leq 75\%$ of the EU average in voivodeships whose GDP per capita $> 45\%$ and $\leq 60\%$ of the EU average

(cat. II.3.)



- Poviats, where state aid intensity in SEZs was below 5%
- Poviats, where state aid intensity in SEZs was between 5-20%
- Poviats, where state aid intensity in SEZs was above 20%
- Poviats, where SEZs were located but state aid was not granted

Source: Own studies, Office for Competition and Consumer Protection, Local Data Bank of GUS and the Ministry of Economy.

On this basis we can say that the biggest and most unambiguous reductions in the unemployment rate were recorded in the poorest and less developed poviats, where the intensity of granted state aid could have a much more significant indirect impact on the labour market. These poviats were from all types of voivodeships, which suggests that the ceilings on regional state aid have not had any impact yet. Partially this was the result of the

higher level of basic unemployment rates in the poorest and less developed poviats.

As regards the intensity of state aid in SEZs, it cannot be excluded that a future increase in the value of regional state aid in SEZ and a smaller inflow of investments to SEZs could lead to a decrease in the importance of the relation between intensity of state aid granted in SEZs and a reduction in the unemployment rate.

Conclusions

On the basis of the research into the relation between intensity of state aid in the form of a tax exemption granted to entrepreneurs in special economic zones and the regional development of Polish poviats, we can make some general conclusions:

- public support in SEZs, as a one of a kind of regional state aid, was of a relatively higher importance in the least developed regions, while other sources of regional state aid were more widely offered in the better developed areas in Poland;
- differences in the intensities of state aid granted in SEZs among poviats depended on the value of investments located in SEZs and were not related to the ceilings on regional state aid in voivodeships established in EU law;
- the poorest poviats with SEZs located in the poorest and less developed voivodeships recorded the biggest increase in the gross value of fixed assets per company compared to poviats without SEZs;
- there was a link between changes in the GVFA per entrepreneur, the intensity of state aid granted in SEZs, and the level of regional development of poviats: a higher average intensity of state aid was granted in poviats with lower regional development, and a bigger increase in GVFA per company was observed compared to poviats without SEZs;
- the biggest and most unambiguous reduction of the unemployment rate was recorded in the poorest and less developed poviats with the highest intensity of granted state aid in SEZs;
- the ceilings on regional state aid established in EU law did not have any impact on changes in the gross value of fixed assets per company or the unemployment rate in the period 2005-2013; however, it cannot be excluded that a future increase in the value of state aid in form of an income tax exemption in SEZs and a smaller inflow of investments into SEZs will lead to a decrease in positive relations between intensity of

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

state aid granted in SEZs and (a) increases in GVFA per entrepreneur;
(b) reduction of the unemployment rate.

Summing up, we can observe that the intensity of regional state aid granted to entrepreneurs in SEZs had a positive influence on the social and economic development of the poorest and sometimes less developed poviats in Poland, while the more developed poviats with SEZs did not record better or much better results compared to poviats without SEZs. The lack of certainty concerning the future of SEZs in Poland can stop the inflow of new investments, thus reducing the positive impacts of special economic zones vis-à-vis the value of state aid granted to existing investors in SEZs. This proves the common and well-known statement that one governmental intervention (i.e. setting up of special economic zones in 1994) leads to the next intervention: the closure or extension of SEZs' activities.

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
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**Evaluation of the Meat Industry Efficiency
in Poland, in the years 2000-2013 (Based on the
data of the Central Statistical Office)**

JEL Classification: *D4; L1; O130*

Key words: *food chain; efficiency evaluation; prices dynamics; meat products consumption pattern*

Abstract: The paper presents the synthetic results of research on the evaluation of efficiency of selected food industries in Poland, in the years 2000-2013. A dynamic approach was applied to the studies which were based on the analysis of prices of raw materials, meat products and product assortments of meat processing companies. The mechanism of prices impact on the efficiency of management was examined using the term "food chain" in the meat industry, which comprises: agriculture- food processing-consumers. The reasoning of the influence of micro and macro factors on the economic efficiency in the pursuit of sustainable development was applied in the study as well as theoretical knowledge. This was the knowledge on the price structure, the impact of internal transformations (changes) of enterprises on the level of prices of goods offered by them in the meat industry studied.

Introduction

According to M. Porter „... competitiveness of a particular company will be largely dependent on the four primary factors: 1. Available factors of production, 2. Demand factors, 3. Developing an appropriate industry

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

system (supporting and relating industries) of associated trades, 4. Conditions of creating, organizing and managing enterprises” (Goryń, 2009, p.72).

The efficient use of productive resources – competitiveness (competitive ability) of the economy depends not only on production factors that the economy has, but also on its efficient use, while the chance to hold the ability to compete depends on the efficient use of production resources.

Growing competition in respect of certain resources leads to shortages and price increase, which will have impact on the European economy. Resources should be managed more efficiently throughout their entire life cycle, from the time of their acquisition, through transport, transformation, consumption and waste disposal. The European Commission emphasizes the significance of “effective management of resources”. This means generating more value using fewer materials and a different method of consumption. It will reduce the risk of shortages and maintain environmental impact on our planet within natural frames. It is the overriding principle applicable to all natural resources, including food, timber, biodiversity, energies, metals, soil, water, mineral resources, air and land. More efficient management of resources in Europe will contribute to achieving the objectives of economic, social and environmental politics in an easier and less expensive way.¹

The Ministry of Economy has developed the strategy for innovation and efficiency of economy “Dynamic Poland 2020”. In this document efficiency is understood as maximization of effects using a specified number of resources or reaching the desired target by applying the smallest possible amount of resources (mainly capital, raw materials and material expenditures) or optimal allocated resources. Both increasing innovation and creating conditions for efficient operation and development of business activity is the key to raising the efficiency of management.²

Nowadays, the scientific problem in the field of efficient use of resources involves the evaluation of management not only at the level of a

¹ The Materials of the European Commission „Efektywne gospodarowanie zasobami – biznesowa konieczność”(Effective management of resources-business necessity), April 2011, http://ec.europa.eu/environment/pubs/pdf/factsheets/resource_efficiency/pl.pdf.

² Ministerstwo Gospodarki, Strategia Innowacyjności i Efektywności Gospodarki "Dynamiczna Polska 2020" Warszawa 2013 (The Ministry of Economy. Strategy for innovation and efficiency of economy “Dynamic Poland 2020”). <http://www.mg.gov.pl/files/upload/17492/Strategia.pdf>.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

single company or the entire economy, but also at the level of enterprises linked with one work theme.

In the literature the organizational form of such a linkage of companies was defined in the food sector as food supply chain.³

The aim of the research is to investigate the mechanism of price impact on the management efficiency of enterprises connected⁴ with one theme of work⁵ in a selected food sector in Poland, in the years 2000-2013.

Methodology of the research

The evaluation of management was based on the analysis of changes in the prices of raw materials and a selected assortment of the meat industry products. The data from the yearbooks of the Central Statistical Office (GSO) including the years 2000-2013, was used in the paper.

The food chain links in the meat industry included- agriculture, food processing, products distribution and consumers.

The assessment of the factor impact on the level of prices in the agricultural production was performed on the basis of indicators including farmlands in the years 2000, 2005-2013k ha; animal production (livestock) in the years 2000, 2005, 2010-2013 in Poland, thousand heads; animal production (pigs) in the years 2000, 2002, 2005, 2010-2013 in Poland, thousands heads; the dynamics of compound feeds prices in the years 2000, 2005-2013, for 1 decitonne; the dynamics of the average purchase prices of major agricultural products of animals for slaughter in the years 2000, 2005-2013, PLN/kg.

The analysis of prices of selected assortments of food processing was conducted on the basis of the meat industry by index: the dynamics of the retail prices of selected assortments of meat processing production in the years 2000, 2005-2013, PLN/kg.

The analysis of demand and production pattern of the meat industry was conducted by index: supply of certain consumer foods on the market in the years, 2000, 2005-2013, thousands tonnes.

The selection of indicators describing consumer behaviour included: the dynamics of household expenditure on meat consumption in the years

³ The study presents the food chain in the meat industry.

⁴ The study assumes that the enterprises can be formally and informally connected with various forms of organizations: business cooperation, horizontal or vertical integration.

⁵ The objects of work can include raw materials or materials, in this study it is meat, semi-finished products for manufacturing products.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

2005-2013, PLN per capita; average monthly household expenditure on raw meat, including poultry, cold meat and other meat products in the years 2005-2013, kg/per capita; meat consumption by the household in the years 2005-2013, kg/per capita; average monthly consumption of raw meat, cold meat and meat products by the household in the years 2005-2013, kg/per capita.

The evaluation of the food chain economic efficiency was carried out on the basis of knowledge on the economic theory of predictable and unpredictable, balanced and unbalanced inflation according to P. Samuelsson.

Theoretical knowledge on evaluation, value added in the structure of prices, and the influence of evaluation on the management efficiency

Nowadays, companies manufacturing products with higher value added will become a competitive force on the market.

The price structure includes intermediate consumption and value added.

Value added is the difference between the company gross proceeds from sales of its goods and services, and the sum paid for raw materials and to the external providers of services. In other words, the value added includes all the costs of all the efforts of the business activity and full compensation for them. All the measures the company put in the final product and the assessment of its efforts by the market are counted (Drucker, 1998, p.88).

Within the price structure one can distinguish intermediate consumption and value added. On the other hand, value added includes staff remuneration and social security insurance, depreciation, taxes and profit norm.

The analysis of the added value is necessary to find the optimal value of expenses in the form of remuneration. Value added as an economic category exists in business even when there is no tax on that value introduced by the state. Value added is the target, according to which a business entity is created. The company directs its activity to obtain a profit, but to achieve this goal it must generate value added (Немцов, Довгань, 2002, p.129).

The structure of value added: staff remuneration and social security; depreciation; taxes; profit standard.

Everything that is within the scope of business entity activity is the generation of value added (profit) on the basis of purchased materials, raw materials, energy and necessary services (intermediate consumption). In some types of activities one can generate new value from zero without purchasing essential material components or services.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Added value must be sufficient to:

- remunerate the staff,
- depreciate the worn part of fixed assets to exchange them in the future;
- clear various types of liabilities;

The remaining part of value added should be sufficient to obtain the expected profit (НЕМЦОВ & ДОВГАНЬ, 2002, p.129).

The company cannot exert influence on the level of depreciation value, let us assume, and does not deduct it because of the fact that in the production processes or while providing services the fixed assets are constantly used. The company is required to make transfers to various funds according to established standards of deductions. No entrepreneur would like to resign from profit. Thus, there remains only one element that “allows itself” to be regulated and it is the expenditure on labour.

Therefore НЕМЦОВ and ДОВГАНЬ conclude that the level of remuneration of staff depends entirely on the level of added value generated in a month.

The amount of charged remuneration should not be higher than the level of value added allows you to do so. The level of remuneration can be increased only through increasing labour productivity.

The increase in productivity, apart from production growth, allows us to raise the average income and lower the prices of goods. The increase in productivity may release the necessary resources to finance collective units. It may also lead to a reduction in working time, without concomitant reduction in the total production (Bremond, 2005, p.313).

According to Mill’s theory of production labour „... profits from unproductive labour employment are simply transfers of income; unproductive labour force does not produce a net value added. He adds, however, that labour force services involving the acquisition of qualifications or the protection of property should be considered as productive. It is his purpose to demonstrate that the capital accumulation rate is the function of the contribution of labour force employed “productively” (Blaug, 2000, p.194).

The level of human labour efficiency should, to a large extent, affect innovations implemented in the company activities, and by contrast ... innovation under conditions of perfect competition must lead to lower prices and increased production volumes.

If demand is entirely flexible then the total proceeds from sales will grow and the employers will increase their consumption and investment expenditure. However, if the demand will not respond to lower prices, the consumers will have unused purchasing power, which they will be able to direct towards other goods (Blaug, 2000, p.201).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Measuring productivity is the only criterion by which you can actually assess the competence of the management board and compare the management of different organizational units within the company, and also of different companies. Productivity includes all the efforts which contribute to achieving the results, and excludes everything that the company does not control (Drucker, 1998, p.87).

Labour productivity growth at a given level of pay leads to a decline in unit costs and allows the company to improve its competitiveness by reducing the sales price or increase the profitability of the capital invested as a result of profit enlargement (Bremond, 2005, p.312).

Otherwise, when no productivity growth is observed at the level of individual enterprises, and the prices increase steadily, one should expect decrease in efficiency of management or decrease in management efficiency with simultaneous repeated distribution of income at the level of all players on the market (Table 1).

Table 1. Inflation effects conditional on balance and prediction factors

Two dimensions of the inflation losses		
Inflation	Balanced⁶	Unbalanced
Predictable	Inflation does not contribute to losses	Reduction of economic efficiency
Unpredictable	Re-distribution of income and wealth	Reduction in efficiency and Re-distribution of income

Source: (Sammuelson, 1995, p.360).

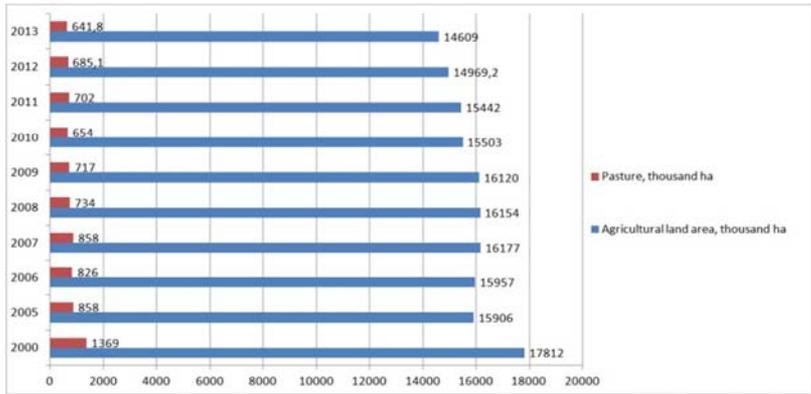
The cause-and-effect analysis of price changes in the food chain from raw materials to the final product

Agriculture. Since the year 2000 agricultural land area has decreased by 3203 thousand ha, in which pastures decreased by 727,2 thousand ha (Fig.1).

⁶ Balanced inflation – prices relations remain largely unchanged (all the prices grow at the same pace).

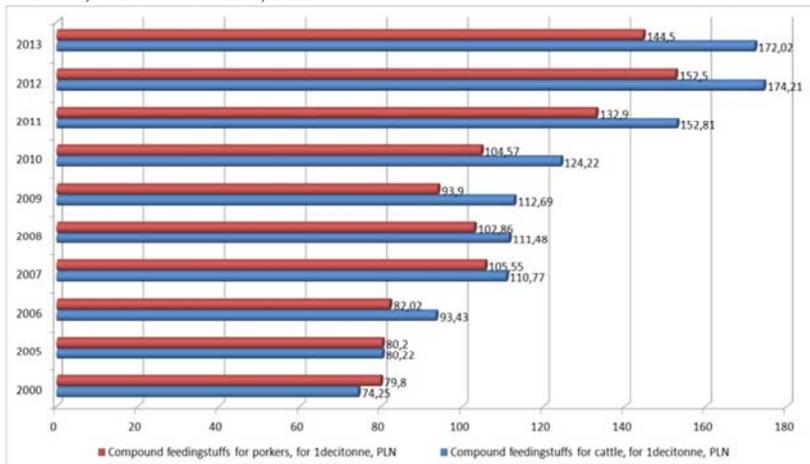
**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Figure 1. Agricultural land area in the years 2000, 2005 – 2013, thousand ha



Source: the author's study on the basis of Central Statistical Office data

Figure 2. Dynamics of the retail process of compound feeds in the years 2000, 2005-2013, for 1 decitonne, PLN

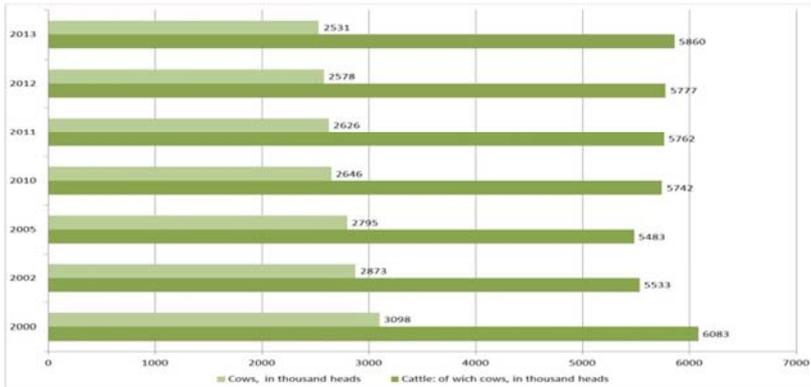


Source: the authors study based on the Central Statistical Office (CSO) data

According to the statistical data, CSO recorded an increase in compound feeds for porkers from 2000 to 2013- 1,81 times, for compound feeds for cattle- 2,32 times (Fig.2).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

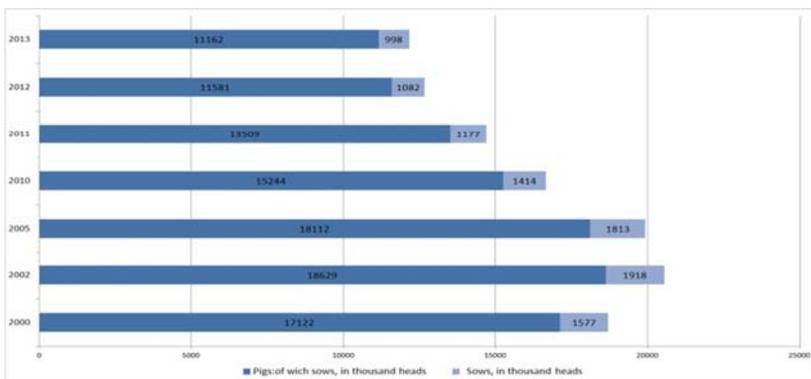
Figure 3. Animal output (cattle) in the years 2000, 2002, 2005, 2010-2013 in Poland, thousands of heads.



Source: the authors study based on the CSO data.

From 2000 to 2013 the headage of cattle decreased from 6088 to 5860 thousand heads (Fig.3). The headage of pigs considerably decreased from 17 122 thousand heads to 11162 (Fig.4).

Figure 4. Animal output (pigs) in the years 2000, 2002, 2005, 2010-2013 in Poland, in thousand of heads

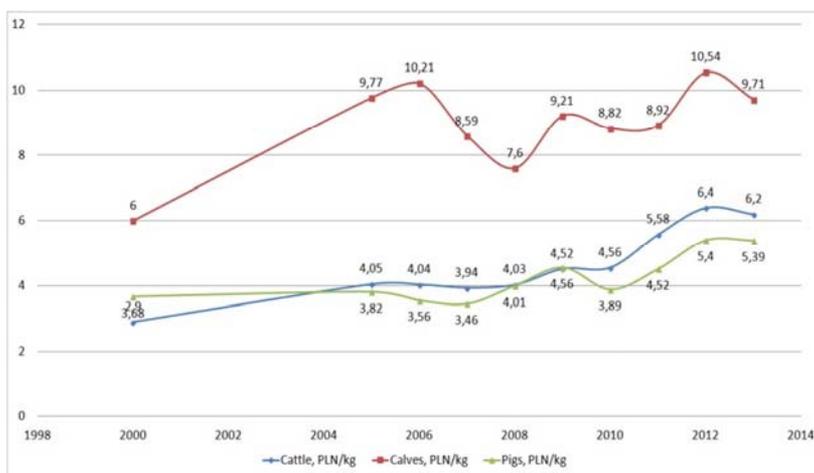


Source: the author's study based on the CSO data

Reducing the supply of animal output (cattle and pigs) caused fluctuation in purchase prices of agricultural products in the years studied. The

prices increased in 2013 in comparison to 2000 for agricultural products: cattle -1.68 times, calves-1.62 times and pigs- 1.86 times (Fig. 5).

Figure 5. Average procurement prices of major agricultural products of animals for slaughter in the years 2000, 2005 – 2013, PLN/kg



Source: the author’s study based on the CSO data.

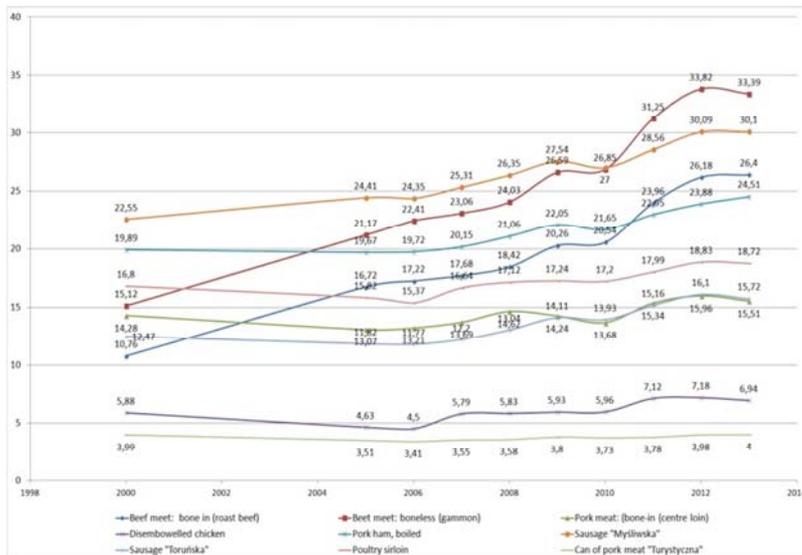
Meat processing. According to the data of the Central Statistical Office (CSO) the value of the fresh meat and meat products market (measured by the value of the sold output of the industry for this sub-sector) was in 2010 almost PLN 33.3 billion (while in 2005 it was 19 billion), which constituted about 30% of the value of the entire food sector. In the meat industry there operate more than 4000 companies.

The product range of large companies is quite diverse and includes more than 200 sorts of products. Expenditure on purchasing fresh meat and spices constitute 50% of the manufacturing costs. The growth of enterprises in this industry largely depends on the suppliers of meat.

Among the selected assortments (Fig.6) of the meat industry in the studied years 2000, 2005-2013 a general trend of increase in prices of these products was observed. The price of the canned meat “Turystyczna” was the only one that was reduced from PLN 3.99 in the year 2000 to PLN 3.98 in 2012, and in 2013 the weighted average price of this product was PLN4.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Figure 6. Dynamics of retail prices of major assortments of meat processing output in the years 2000, 2005-2013, PLN/kg



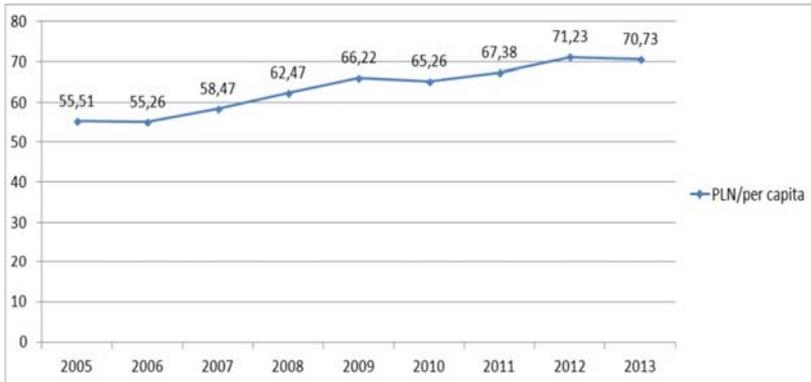
Source: the author's study based on the CSO data.

Consumer response to increase in production prices. Household expenditure on consumption of meat and meat products in 2005 was 55.51 PLN/per capita. The monetary value growth of expenditure was observed and in 2013 it was 70.73 PLN/per capita (Fig. 7).

Whereas the natural values (Fig.8) of monthly consumption of meat and meat products by a household in 2013 was 5.26 kg/per capita and in comparison to the year 2005 it dropped by 0.22 kg/per capita. The monthly pattern of expenditure and the pattern of consumption of meat and meat products by a household in the examined period is illustrated in Figures 9 and 10.

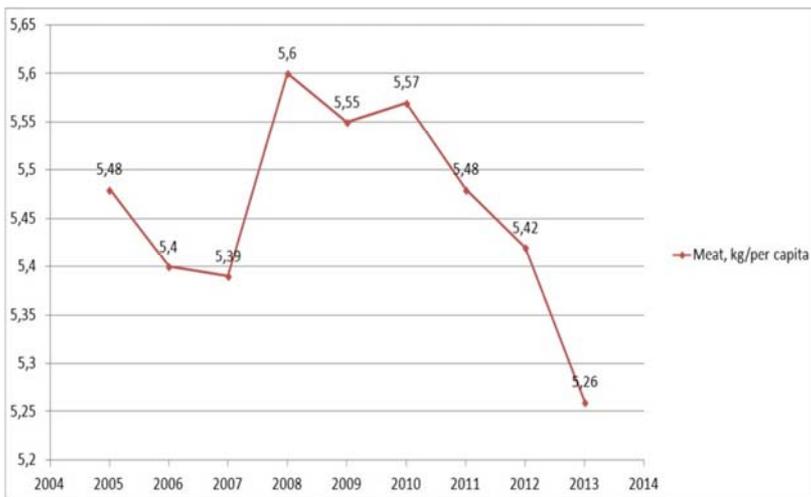
**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Figure 7. Average monthly expenditure on consumption of meat and meat products in the years 2005-2013, PLN/per capita



Source: the author's study based on the CSO data.

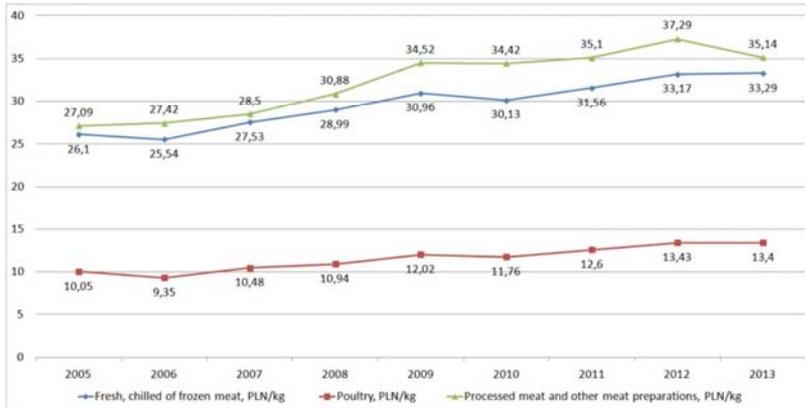
Figure 8. Monthly consumption of meat and meat products by a household in the years 2005 -2013, kg/per capita



Source: the author's study based on the CSO data.

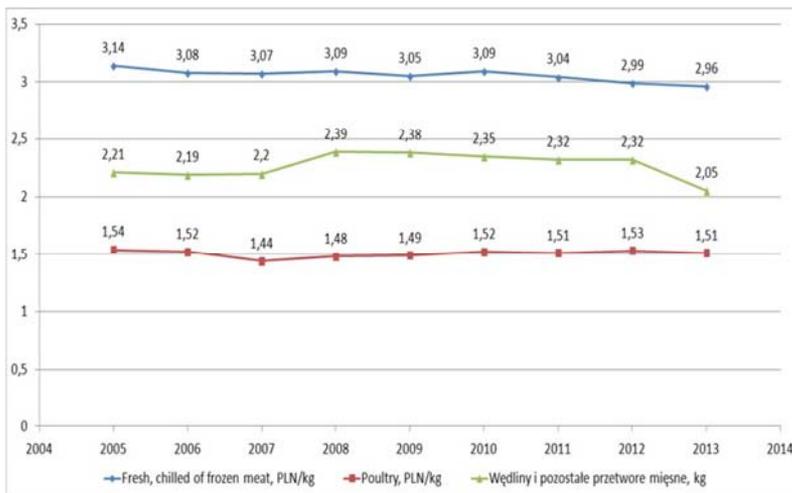
**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Figure 9. The pattern of average monthly expenditure of households on particular assortments of meat products, in the years 2005-2013, PLN/kg



Source: the author's study based on the CSO data.

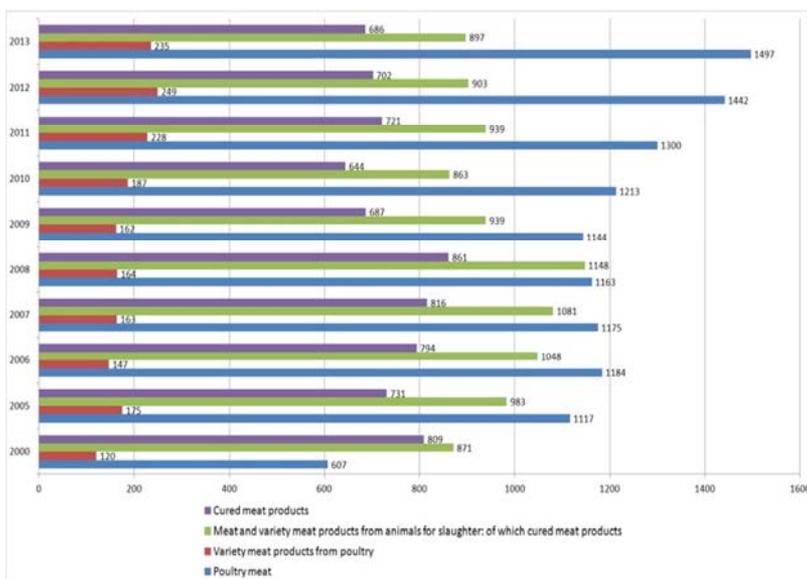
Figure 10. Average monthly consumption by a household according to the structure of the examined meat products in the years 2005-2013, kg/per capita



Source: the author's study based on the CSO data.

Changes in the output pattern. The pattern of consumer goods changed quite unfavourably for consumers. Consumers preferred to a larger extent less expensive products (canned meat and poultry). From 2000 to 2008 the consumption of processed meat products and slaughter animal offal, including cold meats, increased. From 2008 to 2010 the consumption of these products dropped and back in 2011 the consumption rose and in the subsequent years there was a fall in this output supply on the market.

Figure 11. Supply of selected consumer goods on the market in the years 2000, 2005-2013, thousands of tonnes



Source: the author's study based on the CSO data.

Conclusions

Price is a very important signal of the market condition in terms of the products sold. An increase or decrease in prices and sales volumes of output indicates the market power of a particular company in the economic sector. Price analysis in terms of dynamics at different stages of economic processes in the examined food chain in the meat industry indicates an increase in the growth rate in the initial links (agriculture) and reduction in the rate of price increase in the final products (intended for sale to consumers).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

In Poland, in the years examined every year the agricultural land area diminishes, including land used for grazing. Reduced profitability of the fragmented farms and higher prices of fuel, energy, and fertilizers determine the growth of compound feeds prices, which in turn is reflected in an increase in prices of raw meat.

Referring to the fact that meat consumption per capita has not increased, and a steady growth of prices of almost all assortments of the meat processing output (except for the canned pork meat "Turystyczna"), one can state that manufacturing companies of the industry studied face difficult operation conditions.

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
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Synthesis of Pension System Parametric Assessment

JEL Classification: *H2*

Keywords: *old age security; cohesive testing; public pension; pension indicators; international standards.*

Abstract: Population aging and last decade economic circumstances are the factors the pension systems should overcome. Private pension scheme are making its low records worldwide but trying to keep necessary minimum level accrued rights for asset holders. Public pension PAYG scheme with its redistribution nature is still being the main bearer of the role of the old age income security. How to keep a national public pension system sustainable? The only prescription how to do it is a periodical renovation by testing the public pension scheme on (i) soundness and effectiveness within national financial and economic system, (ii) appropriateness of its organization and administration, (iii) compliance of parameters with international standards. Being steadily studied separately, each indicator can be easily discussed and described. But when we try to synthesize multi-factor analysis, then we are limited only by narrative conclusions and reports. To obtain more calculable and tangible results, and in order to make the analysis more attractive, in the research, it is applied empirical quantitative approach of econometrics as a tool that mediates between factor analysis and decision making for explaining old age security national indicators behavior. Paper is suggesting analytical system for assessing national pension system by applying new techniques of (i) the pension indicators evaluation and (ii) its values synthesis for the following indicators: existence of first public and funded pillars, inflation adjustment rules, salary growing adjustment, system adequacy and affordability, dependency ratio, length of service, retirement age. As an evaluation base there will be used international social security standards which are composed to cohe-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

sive pension model (CPM) which consists of selected standardized indicators and its evaluation techniques. The model is tested to each pension system indicator and calculates its digital values. The values are resulted in the Cohesive Testing System index of the particular national pension system by applying CTS formula which is a linear equation.

Introduction

Pensions are still remain the main long term income replacement social benefit which perfectly reflects the social security main formula – the simple Fisher model which is a rational consumer choice over the citizen's life cycle (Barr N., 2001, pp.11-12). Over the time, and out of this macroeconomic question the old age security in the era of market and social changes becomes vitally important.

The main objective of the paper is to improve a public pension parametric analysis technique which is crucial for its further maintenance.

The research suggests standard mechanism of whole pension system parametric assessment and synthesis which makes a decision-making process more qualitative. The article presents the methodology of Cohesive Testing System (CTS) which is a new method of national pension systems indexing based on international standards of pension security.

The paper discusses two major methods of CTS system:

- Cohesive Pension Model (CPM);
- CTS Formula.

In the conclusion the CTS methods will be applied to the set of public pension systems of selected countries. Main pension indicators' values of the selected countries have been picked out from various articles and OECD statistical tables and quoted results and conclusions pertaining to the researched scope of pension systems.

Methodology

Cohesive Pension Model

Variety of pension parameters depends on policy choices but all of them aim at the goal of the income replacement in old age and the main composition of parameters of the pension systems and its behavior, in turn, falls under the more or less unique rules. Cohesive pension model of international standards is considered as a “scientific instrument” (Jos

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Berghman, 1986, pp.34-39) which is used for assessment of national old age security system.

Not always the similar parameters may be appropriate for comparison each other in various countries. It's important to find common denominator and in our case these are international social security standards and quasi comparative method which compares different variables with common pattern. Cohesive Pension Model is designed as one of the important step of CTS system and consists of coherent international standards for the examined parameters of the pension insurance and on the next step the CPM is compared set of national pension parameters and reach CTS index. CPM is a set of international standards for the following basic parameters:

- qualitative parameters are scored “Yes” or “No” based on the pension pillars and methods of pension benefits indexation;
- quantitative parameters are replacement rate, contribution rate, amount of persons protected or dependency rate, length of service, retirement age and other quantitative parameters of national pension system which may be measured by scores based on its values.

The dependent variables in the formula are numbers of mentioned parameters in the Table 1 and each of them has their own rate in accordance with its values.

The result of final calculations is CTS index of national pension system which determines how close the national pension system parameters to CPM harmonized international standards.

CTS index allows decision makers and reformers to estimate the current situation and also to understand how to refine the system and how to increase the cohesion rate. The high cohesion means that pension system is compliant with international social standards and does have an indication of sustainability of a national old age security system due to assumption that CTS rating considers how much the main indicators are coherent with economic theory of social security and classical pension equation $sWL=PN$, where “s” is a pension contribution rate, “W” is an average real wage, “L” is number of workers, “P” is average pension, “N” is a number of pensioners (Barr, 2001, pp. 96-100).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 1. CTS set of indicators and its evaluation techniques

N	Items	Variable in CTS formula	Mean	Low values	High values
1	First pillar	k1	Yes/No	0(No)	20(Yes)
2	Second pillar	k2	Yes/No	0(No)	5(Yes)
3	Inflation adjustment	k3	Yes/No	0(No)	5(Yes)
4	Salary growing adjustment	k4	Yes/No	0(No)	10(Yes)
5	Adequacy (replacement rate)	k5	Rate	0 if $x < 40$	$10 + (x - 10)$
6	Affordability (Contribution rate)	k6	Rate	0 if $x > 30$	$10 - (x - 20)$
7	Amounts of persons protected (dependency ratio)	k7	Rate	0 if $x > 40$	$10 + (40 - x)$
8	Length of service	k8	Rate	0 if $x < 30$	$10 + (x - 30)$
9	Retirement age	k9	Rate	0 if $x < 60$	$10 + (x - 60)$

Source: own work.

CTS Formula

The data (metrics) we have discussed above are processed by our multi-factor cohesive linear variables statistic formula.

Statistical processing of the results is carried out using the factorial analysis with post comparison of values with international standards.

The formula is an ordinary linear equation with number of indicators and strengthened by adding a square root index of total value of quadratic equation of the k variables which were explained in detail within the previous chapter. Values of those variables have predefined intervals of scores as it is described in the Cohesive Pension Model in the Table 1 above.

The CTS quadratic equation is of the form:

$$c = \sqrt{\sum k_i^2}$$

where,

- c - CTS index;
- k - digital value of the metrics which represents pension indicator. Here $k=0$ as lower value and higher value of the indicator is calculated by using of the evaluation techniques in the Table 1;
- i - sequential number of indicator.

The empirical part

Based on the methodology described above, further we will go through the indicators and how CTS scores each of them.

Pension pillars

Pension pillars are the major indicators within CTS system. Classical definition of the first pillar is a pension system which organized publicly and by the principle pay-as-you-go (Nicolas Barr, 2001, pp 89-95), thus mainly covers major part of population and second pillar is various types of funded pension schemes. CTS considers that PAYG scheme is more reliable and can withstand pressures and overloads and more isolated from external shocks as it was shown during the recent 2008-2009 financial crisis and main reason of the relative stability is in the redistribution of social contributions.

On the contrary, the fashion of the latest decade, funded pension scheme, is experiencing hard times due to risky nature of the pension assets which are to be managed through unstable market. Since the recent financial crisis the funded pillars were diminished in certain extend in some countries we studied. Many countries now are restructuring of the management of pension assets and some countries significantly shrinking funded pension scheme parts due to uncertainty, lack of information and risks (or any of combination of these three factors) of financial market and its possible impact to actuarial insurance as adverse selection and moral hazard (Nicolas Barr, 2001, pp 13, 91-93, 100-122). CTS treats funded pillar as a supplementary scheme and considers that PAYG is more appropriate pension scheme due to its stability, coverage, endurance and sustainability.

Base on the opinion concluded above, the “first pillar” indicator, or public pension security system is reputed to be a guarantee of income security in old age and CTS scores a presence of national public pension system

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

with 20 score and, in turn, funded system is evaluated with lower rate of 5 score.

Benefits adjustment

Research shows that mainly the pension adjustment techniques rely on economic situation of countries. Most popular techniques are simple adjustment of pension amount to CPI index but as a consequence, the real value of the pensions will be gradually diminishing every year. On the contrary, wage growth indexation which is financially reasonable and viable is not used by many countries. Some countries invented hybrid techniques of pension adjustment when calculation is based on combination of “wage”, “contribution”, and even on other factors like sustainability. Few of them use annual or one off compensations, for instance, a compensation due to pension reforms which might cause actuarial decline of pension amounts.

Pension adjustment based on consumer price index (inflation) is a minimum level of pension amounts indexation, whereas wage based indexation allows to reach more higher level of benefit adjustment and CTS evaluates the former pension adjustment technique with score 5 and latter one with 10.

Pension benefits adequacy

Adequate replacement rate, first of all, protects low-income workers from the old age poverty (OECD, 2011, p.118) and the low income groups of insured people gain more from the public pension scheme than average and higher earners.

Pension adequacy is one of the major parameter of CTS and 40 percent of replacement rate which is a minimum promulgated by ILO Convention 102 “Social Security (Minimum Standards) Convention, is considered by CTS as a minimum threshold. The value that lesser than the replacement rate threshold is not regarded as an appropriate level of pension. Developing countries now is struggling to obtain the minimum standards but still it is remaining high plank. Usually, developing countries where ILO standards are not ratified establish own national standards which are smaller than the ILO minimum standards. European Union average varies around 60 percent and some countries traditionally pay more. Most recent European member States still have low level replacement rates of public pensions. World Bank experience generally stipulates that for employee with full

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

service length as an initial target of retirement income replacement (net of tax) from public pension insurance systems would be about 40 percent of the real earnings to maintain subsistence levels of income in retirement taking into account a general trend that the replacement rate of low income workers is higher than those who get high salary and by the opinion of World Bank experts the replacement rates above 60 percent is not viable when it is kept over the long period as it would require higher contribution rates and negative effect to economy (Holzmann Robert and Hinz Richard, 2001, pp. 55-57). Based on the World Bank position and also the on articles 28 and 67 of the ILO Convention 102, CTS evaluates with 10 score the adequacy is equal to 40 percent and adjusted by each additional value above 40 percent.

Pension system affordability

Pension system affordability or social contribution rates refer to the economic and financial capacity of the business, individuals and whole society and uses contribution rate indicator which is balancing the social security equation by N.Barr (2001) $sWL=PN$ regarding old age security. Mainly, contribution rates are actuarial instrument used by countries and apparently the rates depend on the budget of the public pension fund and CTS, on the contrary, calculates its “degree of actuarial fairness” (Eliza Baroni, 2007, pp. 13-28) and regarding the formula, it refers to the link between pension contributions and pension benefits and it can be equated as $(sWL/PN)-1=0$ and any nonzero probability does not provide actuarial fairness of the pension system. According to the equation the contribution rate is direct proportional to pension fund ($s=PN/WL$) and it obviously means that the more contributions the more pension fund. On the other hand, the contribution rate is in the inverse proportion to wages and labour force (WL) and it says about economic pressure to employers and employees, hence, high contributions negatively affect wages and entire state budget. It is consistent to the

World Bank indications, and CTS takes into consideration the 10 percent of pension contribution rate as a standard and “comfortable minimum” threshold for national economy and the rates higher than 20 percent of wage bill causes “direct” and also “indirect” costs of high social contributions through budget burden and higher incentives for evasions accordingly (Robert Holzmann and Richard Hintz, 2001, pp. 55-57). It makes CTS establish the indicator’s score with maximum reasonable threshold of 20 per-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

cent of contribution rate and further adjustment within the interval of 10-30.

Dependency ratio

Dependency ratio will show the potential

Regarding dependency ratio standard, CTS applies ILO Convention 102 method of defining the norm of pension system coverage among active employees or among whole inhabitants. In accordance with Article 27 of the ILO Convention 102 a pension system should cover minimum not less than 20 percent of inhabitants or 50 percent of all employees. Also, it needs to be kept effective proportion of active population which is not less than approximately 2,5 active workers who pays social contributions to 1 pensioner (calculation was made in accordance with a statement in ILO Convention 102 where 50 percent of all employees is approximately 1/2 and CTS starts its assessment from 40 percent as minimum required dependency ratio) (ILO Convention 102, 1952). In our research it is used an economic old age dependency ratio which matters when a research deals with pension system sustainability (Woss J., 2011, pp. 66-68). The formula of the economic old age dependency contains inactive population related to active population.

Length of service

CTS treats length of service indicator standard by taking into account the requirement of the Article 29 of the ILO Convention 102 “a qualifying period which may be 30 years of contribution” (ILO Convention 102, 1952) and also minimum qualifying period which gives right citizens to be entitled to the state pensions. At the same time CTS is not concerning with various early retirement schemes which practically lead to additional deductions from pension amounts per pre-retirement periods (years, quarters or months) and this technique is actually grading and adjusting pension rights in accordance with the length of socially contributed service of citizen. Service length of 30 years will be scored as minimum rate 10 and every incremental year will increase the score accordingly.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Retirement age

The ages are “situated between 60-65”, but some countries establishes “flexible retirement age” an one can be retired “in a larger time span” (Pieters Danny, 2006, pp. 51-58) and, according to this, CTS retirement age concept is: the more (lengthy) pension age the better a pension system and person as well as society would gain more from longer employment period. Though, in the Article 26 of the ILO 102 social security standards establish “65 years or such higher ... with due to the working ability of elderly persons in the country concerned” (ILO Convention 102, 1952), CTS flexible retirement age concept establishes 60 years as a necessary minimum and lesser retirement age is scored as zero and in turns score will be higher as the higher the retirement age will be beyond that minimum.

Conclusions

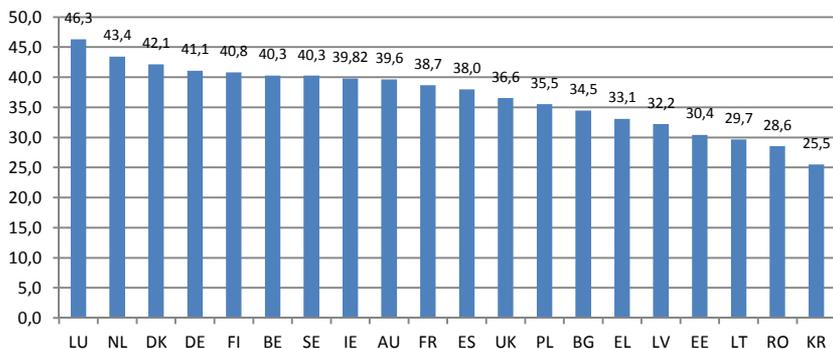
For cohesive testing, there were analyzed the old age security systems of selected countries by using open statistical databases (Eurostat database, 2014 and Pension watch, 2012) and applying CPM Model and CTS Formula. It resulted in CTS indices (see table below) and the following findings:

- Luxembourg, Netherlands, Denmark are leading the cohesive testing system range. Big group of continental countries Belgium, Germany, Austria, France and also Finland and Sweden composes stable CTS rates (which is considered to be 36,00 an higher).
- Post crisis measures of Ireland pension system which has tightened national pension system conditions brought necessary achievements and, as a result, Irish pension system is rated accordingly due to increased retirement age and length of service along with good perspectives in dependency ratio which may provide financial sustainability of public pension system in the future.
- Financial crisis dropped Greek pension system CTS rate by causing understandable negative effects to its adequacy.
- All indicators of EU recent new members Lithuania, Estonia, Latvia, Romania led by Bulgaria are quite low than studied countries with stable CTS rate. CTS brought these countries up the rare because of relatively high dependency rates, low service length which resulted in inadequate pension amounts level.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

- CTS calculations consider that universal pension system of United Kingdom is too liberal by having low level of required length of service and retirement age which resulted in low replacement although there is appropriate level of dependency of pensioners to active population (i.e. dependency ratio).
- Kyrgyzstan which is a single representative of Central Asia in the research, has a pension system which was updated during the post soviet period and poor economy affects pension system efficiency and CTS is equal to 25,5 is quite low.

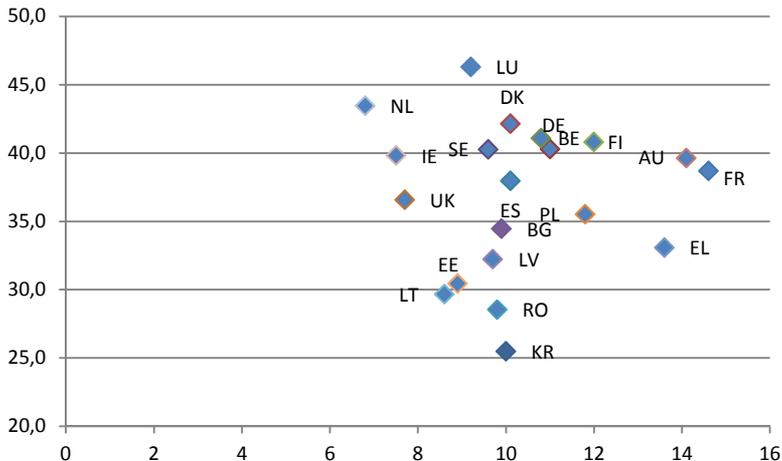
Figure 1. CTS index table



Source: own work.

CTS rates and public pension system expenditures dispersion shows that there is no correlation between them generally (correlation rate 0,014), which means that, in general, CTS rate doesn't depend on rates of pension expenditures in GDP.

Figure 2. CTS index table



Source: own work.

However, when we make analysis of various groups of countries separately, then we can observe a distinct dependency between the CTS rate and expenditures.

We ranged the pension systems in accordance with CTS rates and composed two groups of countries. First group contains CTS ratios less than 36,0 and represents mainly countries that join EU recently and their GDP size is lesser than other EU member states within studied scope. Second group consists of the EU developed Member States from both Atlantic and Continental Europe.

First group of researched pension systems' CTS rates depend on public pension expenditures and positive correlation, which is equal to 0,74, shows significantly high level dependency. It means that these countries' pension systems quality still relies on expenditures.

On the contrary, the rest of the studied countries, which are represented by EU developed Member States, have negative correlation rate -0,39 between CTS and pension expenditures and it means that in some developed countries a direct budget subsidies, in most cases, are not able to improve its CTS rates, and pension systems require more rational restructuring.

Based on the research we can make the following conclusions:

- A pension system synthesized CTS index helps to make comparative study in terms of international standards as well as to define an international rate of the pension system;

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

- The CTS results are logical and it generally fits with the main conclusions of other recent comparative researches of the EU Member States pension systems, but synthesized CTS index which composed from separately calculated values of pension indicators is more effective and results are more tangible, so that allows to look into the detailed indicators by using its digital values and, in turn, it simplifies analysis;
- CTS is economic index of a pension system and considers how much the main indicators are coherent with economic theory of social security which based on the classical equation $sWL=PN$, where “s” is a pension contribution rate, “W” is an average real wage, “L” is number of workers, “P” is average pension, “N” is a number of pensioners.
- Correlation of CTS indices and pension expenditures (in GDP) may show how far the expenditures are effective and consequently may define whether it should be done a rational restructuring of the pension system or it simply depends on budget subsidies.

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18-19 June 2015, Economics and Finance**

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**An Empirical Study on Students' Behaviour
Regarding Creative Accounting Techniques***

JEL Classification: *M41*

Keywords: *Creative accounting; ethics; risk propensity; student behaviour, International Financial Reporting Standards*

Abstract: The scope of this study is to investigate the accounting master students' attitude and perception regarding ethics and the existence and manifestations of creative accounting, in the context of harmonization of the Romanian accounting system. The sample of our research consists of accounting master student from three Romanian representative universities. Our survey regarding the students' perception on the accounting practices is a descriptive one, we have used as an instrument of research the questionnaire. These were posted on an Internet page

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

and also, we used the possibility of its direct approach, preserving the anonymity of the respondent. In order to attain our research's objectives we have first presented a descriptive analysis of the answers, but tested some research propositions from a practical point of view as well. These show that there is a correlation between the master students' tendency (as potential managers) to modify the accounting information and to distort the real image of financial reports and their ethical behavior. We consider our study is valuable and attractive from the perspective of the elements of introspection and connection that it detects, in the context of a clear interest expressed by the authors in the students' psychology and their irrational behavior regarding their potential future decisions.

Introduction

Currently, accounting worldwide is facing irreversible processes such as: economic globalization of business, the internationalization of economic relations, development of transnational corporations and foreign capital investment. Accounting has sought to modernize, to continuously improve and evolve over time in order to meet the information requirements of the moment. Romanian accounting could not remain indifferent to the profound changes that have taken place in the economic field, considering the phenomena of harmonizing financial reporting of companies worldwide and the idea of adopting a common language for financial reporting in order to develop the level of comparability internationally. An important role in this respect is played by the emergence and continuous improvement of IFRS.

Order no.3055/2009 plays the strongest impact on the Romanian accounting. These regulations have been subdued to permanent improvements since the moment of issue until present time, adapting to the EU Directives and IFRS.

Trying to harmonize the accounting system to IFRS has not been easy. Ristea et. al. (2010, pp. 177-178) lists a number of specific features regarding the transition to IFRS such as: "the call for estimates and professional judgment, as reference elements of the basis of accounting solutions; introduction of the IASB framework as the conceptual framework of the Romanian accounting; the adoption of concepts from international standards which did not originate in the national practice, such as deferred taxes; introduction of new accounting principles such as the principle of economic primacy over law and the materiality threshold principle; the existence of deviations from the principle of balance sheet intangibility, a tradition accounting principle in Romania; application of cost / benefit ratio in the

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

process of obtaining financial-accounting information; the use of new assessment base, such as fair value, current value, etc.

Certain international accounting standards were easily assimilated into practice while for other parts was more difficult and some will have to take some preparation to be assimilated. A modern accounting system based on IFRS standards requires disconnection of accounting from taxation. Feleagă & Malciu (2002) in the content of an essay on the battle between the ideal of honest accounting and the "creative accounting" practices in the context of the Romanian economy, made a plea to disconnect accounting from taxation. Disconnecting accounting from taxation will not be easy to achieve because the state will not accept too easily to be on the "tail" of users of accounting information and in this situation the ad littera introduction of IFRS standards in the Romanian accounting environment is facing difficulties. The efforts made by the Romanian accounting standard setters in terms of assimilation of IFRS in the Romanian accounting environment is positive taking into account that the Romanian accounting can not remain indifferent to the processes of business globalization, the internationalization of economic relations, the development of multinational companies, of foreign capital investment and the development of information systems.

In a study by Iftime, A.D. & Ioan G.C. (2013) which aimed to investigate the perceptions of professional accountants on the costs, benefits and implications of applying IFRS in Romania concluded that 73% of respondents considered that the application IFRS financial statements would improve to a great extent the quality of financial information. Even if the Romanian accounting regulations have not kept pace with the changes in IFRS, yet accounting treatments and options of the Order no.3055 / 2009 are in most cases similar to those of IFRS. In the content of these Romanian accounting regulations are found a number of accounting options which involve several policies (in terms of bases, conventions, methods, rules or practices) and/or estimation techniques to solve the same problems, treatments that have a different effect on the financial position and performance of firms.

The results of a study conducted over the years 2010-2013 by Pășcan (2014) suggest that IFRS adoption in Romania generates an enhancement of accounting quality, registered especially in the case of information about the book value of equity.

Both accounting standards and Romanian Fiscal Code provides a number of degrees of freedom and flexibility All these make the Romanian

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

accounting regulations approved by Order no. 3055/2009 to provide sufficient opportunities for professional accountants call creative accounting techniques. Both accounting standards and the Romanian Fiscal Code provide a number of degrees of freedom and flexibility All these make the Romanian accounting regulations approved by Order no. 3055/2009 provide enough opportunities for professional accountants to call on creative accounting techniques.

Professional judgment is one of the basic concepts underlying the Romanian accounting system with accrual accounting and business continuity. The way in which this concept is understood causes the occurrence and temptation to creative accounting practices. In the context of today's Romanian accounting regulations, the professional accountant is decisively the dependent element: the manner in which he exercises in his professional activity this professional judgment. Coman, Diaconu & Gorgan (2008, p. 25) state that "the exercise of professional judgment must be made in the spirit of the objective of true image (fair accounting) and not in the vie of creative accounting use (bad accounting)."

Literature review

The temptations of creative accounting can be alluring and nothing undermines more seriously the trust in a system than the occasional impositions generated by creative accounting. As well know, creative accounting is not a new practical activity. It has been both a temptation and a problem since the accounting principles were used for the first time in order to draw up the financial reports on company performance. Throughout time, creative accounting has been the subject of numerous research studies, many researchers trying to provide a definition related to this concept. A complex vision of creative accounting is given by Naser (1993), according to which creative accounting is: "1) the process by which, given the existence of gaps in the rules, accounting figures are manipulated and, taking advantage of the flexibility, are chosen the measurement and disclosure practices which allow the transformation of synthesis documents from what they should be into what the mangers would like them to be; 2) the process by which transactions are structured in such a way as to enable "the production" of the desired accounting result. Raffournier (2003) defines creative accounting as "the use of flexibility and lacks in regulations to present the financial situation of the company in a manner different from that which would result from the ordinary application of the existing rules."

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Tabără & Rusu (2011) believe that "creative accounting refers to accounting practices derived from standard accounting usage, characterized by certain, more or less complex creative accounting techniques, the ultimate goal being the change by the accounting information producers, for the desired purposes, of the financial position and the performance of the entity reflected in the financial statements".

Creative accounting is negatively perceived given that accounting professionals seek to apply those accounting policies in order to beautify the financial statements and the firm's performance. Dumitrescu (2013) does not exclude either the "positive alternative, in the sense of innovation that should lead to engineering able to answer the question: How to manage resources more efficiently, to build performance?"

Groșanu (2013) wonders whether the best solution is to use creative accounting in good faith or to prohibit some creative accounting techniques. According to the researcher, there is no answer that will lead to a permanent resolution of the problem since human society is particularly complex and there is always a fundamental disturbing factor that is the man. And man is subjective by nature. The accounting dictatorship might be a valid solution in this view. With the development of human society there are protection systems against viruses that affect society and hence accounts. Tabără & Rusu (2011) state that "creative accounting practices will disappear only with the disappearance of the causes that generated them, thus the accounting setters' desire to limit creative accounting must consider the circumstances that allow its expression."

The literature presents a number of assumptions according to which the entity's management chooses contextually those accounting policies that aim either the decrease or the increase of its result. Dumitrescu (2013) shows that "as a norm, the accounting methods that lead to increased profits are preferred by firms with high leverage, by large companies that have a significant dividend policy and by companies in which the directors' remuneration is conditioned by the size of the result or where the administrators have little capital participation. An interesting point of view belongs to Bîgioi (2014) who believes that when tax legislation is not very clear, this can give rise to different interpretations of the companies, their tendency being to interpret the law in their interest.

The accounting methods that result in diminishing profit margins are generally preferred by enterprises under the direct control or influence of the state (operating in a strategic area or heavily subsidized or which have state capital), by large enterprises, to avoid political costs, as well as by

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

small and medium enterprises, with lower debt and a high rate of dividend distribution.”

An empirical study conducted by Vladu, A. B. & Groșanu, A. (2011) on how creative accounting is perceived in Romania by the regulators, Financial Auditors and professional bodies, found that the overstatement and understatement of profit and leasing are the main creative accounting techniques applied to the Romanian accounting environment. The respondents in the study mentioned consider that it is difficult to use creative accounting techniques and their detection process requires high professionalism. The respondents consider important the role of professional accounting and accounting regulation bodies to limit creative accounting practices. There are various methods used in order to corrupt the result.

Gabriels, X.&Van de Wiele (2005) investigated the level of ethical awareness, as well as the attitude towards creative accounting, among accounting and non-accounting students of the post Enron generation. The findings of the study refer to the fact that accounting students find creative accounting less acceptable than non-accounting students. The authors believe that a possible explanation is that accounting students through their education are more aware of the possible consequences of creative accounting for financial statement users. The difference does not only apply to students' attitude towards creative accounting, but also to more ethical orientation.

Another result of the study refers to the fact that there is not a significant difference in the ethical perception of creative accounting between men and woman. The researchers find that both accounting and non-accounting students tend to hold themselves responsible for creative accounting decisions in professional life.

In principle, people trust accounting figures, yet it is possible that, by breaking some of the accounting principles and rules, the accounting representation might provide a deceiving and distorted image of the economic reality of the enterprise. In other words, the behavior of the users of accounting information can be influenced by the distorted accounting image and, thus, the users might be manipulated. Just like in life, *for many times, the truth is beyond appearance...* these practices are made under the endorsement of the auditors who are called in to ensure the social reliability of the accounting information by certifying the fact that the financial statements reflect the economic reality due to their conformity with a certain referential. The results of an empirical study regarding auditors perception conducted by Balaciu et. al (2012) show that most of respondents (44%)

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

consider that financial statements prepared by companies are not transparent enough, 68% of them consider that accounting manipulation is a frequent procedure encountered in practice and 68% of the respondents believe that the stakeholders' interests can be affected by using creative accounting; 72 % of the investigated auditors consider that a consolidated control can diminish the tendency to use creative accounting.

In accounting, all the organizations recognize the need for a code of conduct. Profound economic crises that mankind barely cross force us back to the fundamentals, the current world trying to discover morally and spiritually. Growing virtues was a frequently debated issue since the ancient philosophers. According to Platon, virtue can be taught, if it is taught by a real teacher.

This is why he emphasizes the Socratic idea that doing injustice is, in all circumstances, a thousand times worse than suffering an injustice. Therefore, one who commits injustice, even if they are in possession of all power and riches, of reputation and all pleasures, is in all circumstances unfortunate and unhappy especially when escaping punishment for his actions, because he does not have the opportunity to move. Happy is only one who is in possession Justice and Goodness. Hence, we continue our efforts to bring into question the words of a disciple of his, Aristotle according to which, in terms of virtue, it is not enough to know the theory, but must try to possess and make use of it, or any other existing means to become a good man. Scribner (1989) describes the case of a consolidation approach to content on ethics in accounting courses. According to him, a weakness of the existing accounting courses is their failure to include the adequate exposure of ethical dimensions of accounting practice. Students will probably have a better chance to make ethical decisions when they have been less naive about the existence of ethical issues in practice and have been warned. MahdaviKhousi and Khotanlou (2012) support the idea of introducing a new approach to ethics education in the accounting profession by incorporating the Islamic ethics in all accounting education courses.

The solution proposed by Lehman (2014) is that professionals act as phronemos, without forgetting the ethical ambiguities in accounting and the critical role the syllabus / curriculum of accounting, education and pedagogy plays

Starting from the behaviour of the characters of the controversial biblical parable of the unjust steward, Balaciu and Bogdan (2012) carried out an exploratory research that bring into discussion the implications regarding

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

the compliance or non-compliance with ethical principles in the accounting profession.

Breban, Dumbravă & Crișan (2008, pp.18-19) believe that "ethics establishes principles of right and wrong by standards of conduct (professional), an attitude designed to facilitate the application of values by the existence of a Code of Ethics for almost any activity; in this regard there is the Hacker's code of ethics: "Information must be free"; the Cowboy's code of ethics: "Do not shoot first and do not hit the weak"; the Code of Ethics for galactic trade: "Committed to ensure the free alien market conditions".

In a study that present the perception of male and female accounting majors and non-accounting majors on ethics in accounting before and after Enron/Arthur Anderson scandals Onyebuchi (2011, p.76) shows that "all the accounting majors male and female, of the respondents indicated that the adoption of code of ethics would help organizational integrity. Among non-accounting, 67% indicated that the adoption of code of ethics would help organizational integrity, while 13% indicated that it would not".

Among the authors preoccupied with the necessity of morality and ethics in the field of accounting we can mention: LaGrone (1996), Armstrong at all (2003)

Locally, Feleagă & Malciu (2008), bringing into question a number of ways to analyze ethics and ways to combat creative accounting practices, believe that "although legal, creative accounting is considered ethically dubious". An argument in favour of ethical regulations is, according to Țurlea et all (2011), the need to legitimize the profession (macro level) and maintain the professional's reputation (micro level).

Currently, humankind lives within an interactive social system based on «being the first», «being more successful» encouraging the old-fashioned corruption and unfair behaviours when, actually, in a truly enlightened society, the purpose would be everybody's survival, a better life for everybody, the secret being transparency, as it has already said: «Know the truth and the truth will set you free.» (Walsch, 2003), because in such a society nobody would want to get anything on someone else's expense. Instead, the governments, the politicians, the world corporations do not want to allow the promotion of such an economic-social system, taking into account that the law of gain and the law for power are promoted. We are invited to remain open in order to live the experience of a new system of thinking within a society based on the principle of transparency, without being afraid that someone might have something to lose. Our contemporary thinkers agree that the new model of economic-social development will depend on a re-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

newal of minds, mentalities, and of human beliefs, by directing human will towards the reception of the source of superior Consciousness, generator of unconditioned love, freedom of expression, creativity, inspiration and intuition that human mind can transform into material, concrete experiences and manifestations, for everybody's welfare.

We intend that, by this study, to expand the scope of investigation regarding the field of creative accounting. We will analyze the perception of the Romanian students from Accounting specializations in Romania regarding the manifestation of creative accounting phenomenon in the current context that the accounting Romanian system Romanian goes through on its harmonization with the European accounting referential and IFRS.

Methodology of the research

Our research regarding the students' perception on the accounting practices is a descriptive one of transversal type, we have used as an instrument of research the questionnaire. Our survey was carried out between May-July 2014. Our sample consists of accounting master students' in three of the Romanian representative universities.

The objectives of our research are: to determine the perception of the master students from 3 major Universities in Romania regarding the existence and forms of manifestation of the creative accounting phenomenon. We will use a descriptive analysis of the answers provided by the sample subjects and also a test of some research hypotheses. Synthetically, these are:

H1: The students' propensity towards risk is correlated with their accounting manipulation inclination.

H2: There is a correlation between the master students' tendency (as potential managers) to modify the accounting information and to distort the real image of financial reports and their ethical behavior.

H3: The master students' perception regarding the managers' interests are associated with their willing to help them modify financial reports.

The total population under analysis is represented by the 158 (the total number of students) master students the Academy of Economic Studies, București Faculty of Accounting and Management Information Systems (41%), master students from the Aurel Vlaicu University, Faculty of Economics Arad (29%), as well as master students at the University of Oradea, Faculty of Economics (30%).

Discussion

In order to analyse the answers given by the students, we built one-dimensional tables (based on a single variable) as well as crosstabulation tables, in which we presented the absolute and relative frequency of the answers, at the sample level. The survey contains two categories of questions: general questions, their role being to provide an as faithful as possible image regarding the personal profile of the students as well as questions regarding their perception on the existence and forms of manifestation of the creative accounting phenomenon within Romanian companies.

Descriptive analysis of answers

I. General questions

- a) The first general aspect which has been emphasised with the help of the survey questions is the *distribution of students according to gender*.

Table.1. Distribution of respondents in the sample of students according to gender

Answer choices	Simple absolute frequencies	Simple relative frequencies
Female	117	81.0
Male	27	19.0
Total	144	100.0%

Source: the authors, based on survey answers.

The results presented in *Table 1* show us that the majority of students answering the survey questions are women.

- b) Distribution according to age groups. Another variable characterising the sample of students from the demographical point of view is age.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 2. Distribution of respondents in the sample of students according to age.

Answer choice	Simple absolute frequencies	Simple relative frequencies
18-25 years old	112	78%
26-35 years old	20	20%
Over 36 years old	12	12%
Total	144	100%

Source: the authors, based on survey answers.

One of the conclusions that can be reached after looking at *Table 2* is that most of students are aged between 18 and 25 years old, moreover 98% of the master students are under 35 years old.

c) We also wanted to emphasize the *distribution according to their professional history*. We have noticed that most of the master students (71%) had previously an accounting related job, 83% of them are currently employed, out of which 71% work in an accounting related job. A half of the students that are currently employed are satisfied with their wage.

II. Questions regarding the financial students' perception on the existence and the forms of manifestation of creative accounting phenomenon.

The most important part of our research has as purpose the determination of the students' perception regarding creative accounting techniques. We present here a part of the descriptive statistics referring to these aspects, and we will tackle the subject again and more thoroughly analyse them in the part dedicated to testing some research hypotheses.

The students in our sample were asked about their opinion about the phenomena that encourage the existence and the forms of manifestation of creative accounting. Most of the students (50% of them) believe that the accounting rules are the ones that are the main cause of the existence of creative accounting while 39% of the students from our sample believe that it is the managers' need of fiscal optimisation that generates creative accounting practices.

The bivaried analysis. Testing the research hypotheses

In this stage of our research we tried to validate the research hypotheses in our sample of students as well as to expand the results at the level of the total population. For this purpose, each hypothesis was analysed and inter-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

preted, using for this specific statistic calculations, qualitative appreciations and direct observations of data gathered.

H1: The students' propensity towards risk is correlated with their accounting manipulation inclination.

Regarding the first hypothesis, we tried to investigate a possible correlation between the students' propensity towards risk and their accounting manipulation inclination. For the validation of this hypothesis we have analysed the answers to the following questions: II. 2. Would you buy a green card if you had a car? and a set of five questions regarding the willingness of the student to use creative accounting techniques. For these five questions we have determined an average score for each student, ranging from 1 to 5, the highest value indicating a maximum disponibility of the student to use creative accounting techniques. The distribution of answers at the sample level is the following:

Table 3. Distribution of answers to questions II.2 and average scores used in the validation of H1 research hypothesis

II.2. Average scores	Answers to question		
	Yes	No	Total
[1-3)	58	23	81
3	8	2	10
(3-5]	35	18	53
Total	101	43	144

Source: the authors, based on survey answers.

To analyse the existence of a correlation between students' propensity towards risk and their accounting manipulation inclination, we will use the χ^2 – Chi squared test, which is a non-parametric test, being applied both for numerical, quantitative variables as well as for qualitative characteristics, no matter their probability distribution. The Chi square value in our sample is 0,97, the value is slightly higher than 0, which indicates a weak correlation between the students' propensity towards risk and their accounting manipulation inclination. The value is not statistically significant as the critical value for 5% level of confidence and 2 degrees of freedom is 5,99, much higher than our calculated value. The H1 research hypothesis is therefore not validated.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

H2: There is a correlation between the master students' tendency (as potential managers) to modify the accounting information and to distort the real image of financial reports and their ethical behaviour.

The questions based on which we will test the validity of this research hypothesis are *II. 13. When taking a strategical managerial decision, are the ethics and deontology important?* And a set of five questions regarding the willingness of the student to use creative accounting techniques. For these five questions we have determined an average score for each student, ranging from 1 to 5, the highest value indicating a maximum disponibility of the student to use creative accounting techniques. We have constructed a crosstabulation between these values, which is presented in Table 4.

Table 4. Distribution of answers to questions II.13 and average scores used in the validation of H2 research hypothesis.

Answers to question II.13.	Average scores			Total
	[1-2,5]	[2,5-3,5]	[2,5-3,5]	
Strongly disagree	1	0	0	1
Disagree	2	2	6	10
Neither agree nor disagree	2	6	6	14
Agree	26	29	16	71
Strongly agree	29	17	2	48
Total	60	54	30	144

Source: the authors, based on survey answers

The Chi square value in our sample is 27,84, the value is much higher than 0, which indicates a strong correlation between the master students' tendency (as potential managers) to modify the accounting informations and to distort the real image of financial reports and their ethical behaviour. The value is statistically significant as the critical value for a 5% level of confidence and 8 degrees of freedom 15,5 lower than our calculated value. The H2 research hypothesis is validated.

H3: The master students' perception regarding the managers' interests are associated with their willing to help them modify financial reports.

The questions based on which we will test the validity of this research hypothesis are:

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

*II.8. The managers' concern when choosing their accounting policy is (...):
b) Maximising the financial result for a beautiful financial position and financial and economic output:*

c) Minimising the financial result for fiscal optimisation purposes.

II.9. If the manager asks you to, would you maximise the financial result in order for the firm to get a loan?

II.10. If the manager ask you to, would you minimise the financial result for fiscal optimisation purposes?

The students were asked to express their opinion regarding the managers concern, by choosing from a list of possible answers, ranging from “Strongly disagree” to “Strongly agree”. First we have associated values for each answer – 1 for “Strongly disagree” and 5 for “Strongly agree” and then we have determined an average score for each student. The higher the average score, the more open minded the students are regarding the managers' interest to use creative accounting techniques. We have also calculated an average score using the answers to questions II.9 and II.10, by associating the same scores for the answers as before.

The distribution of the scores at the sample level is the following:

Table 5. Distribution of the average scores used in the validation of H3 research hypothesis.

Answers to question II.9. and II.10	[1- 2,5)	[2,5- 3,5]	[2,5- 3,5]	Total
Average scores to question II.8				
[1-2,5)	1	1	0	2
[2,5-3,5]	16	17	17	50
[2,5-3,5]	23	28	41	92
Total	40	46	58	144

Source: the authors, based on survey answers

The Chi square value in our sample is 2,98, the value is higher than 0, which indicates a correlation between the students' perception regarding the managers' interests and their willing to help them modify financial reports. The value is not statistically significant at the critical value for 5% level of confidence and 4 degrees of freedom is 9,48, much higher than our calculated value.

The H3 research hypothesis is not validated.

Conclusions

Accounting helps managers in their efforts to improve the company's performance and its image but, unfortunately, some managers, exceeding their powers, seek a number of solutions without questioning the observance of ethical standards. Thus, they are tempted to ask the firm's accountants to use those creative accounting techniques that lead to them obtaining the desired result. The professional accountants will not have to let themselves influenced or constrained by them in the performance of their mission, but they have to comply with the International Code of Ethics for Professional Accountants developed by IFAC and the National Code of Ethics for Professional Accountants developed by CECCAR (The Body of Licensed Accountants and Expert Accountants in Romania). They will need to show, during their mission, integrity, honesty and professionalism. It is important that the manager of the company is a model of conduct within the firm, to model the behaviour of the employees, including the accountant, without requesting to use creative accounting practices that aim to "smooth the earnings", either the providing of a favourable image on it even if the existing gaps in the standards, their flexibility, the accounting choices and estimates are a number of factors that allow the expression of creative accounting techniques.

In the study reflected in our paper we started with three hypotheses but only one was validated. This hypothesis shows that there is a correlation between the master students' tendency (as potential managers) to modify the accounting information and to distort the real image of financial reports and their ethical behaviour. We explain this situation by the fact that the students had not enough information about ethics. This demonstrates that the information regarding ethics in the accounting field is poor in the Romanian economical education. We consider this situation must be improved because the students are not capable to make the difference between good accounting and bad accounting.

The obvious limitations of our study are mostly circumscribed around the determined sample and the research propositions. In our future researches we will try to extend our sample, including master students from abroad.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
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**Europe 2020 Strategy Implementation.
Grouping the Countries with the Application of
Natural Breaks Method**

JEL classification: *C00; E61; O52*

Keywords: *Europe 2020 strategy; multivariate analysis; zero unitarization method; natural breaks method*

Abstract: In the year 2015 the European Union reaches the five year period of Europe 2020 strategy implementation. Thus, the aim of the research is to group the European countries based on the level of fulfillment aims of the strategy with the application of natural breaks method. Special consideration was given to the results of New Member States of European Union. As a result in the first part of empirical research a ranking of EU countries with application of zero unitarization method for the year 2004, 2008 and 2013 was made. Based on the rankings the countries were grouped in five classes with natural breaks method. The analysis showed that in spite of economic difficulties in Europe after global financial crisis, from the year 2004 till the year 2013 New Member States had made an important progress in the implementation of Europe 2020 strategy.

Introduction

In the year 2015 the European Union has reached the halfway of implementation of Europe 2020 strategy, which should result in building the conditions for sustainable and inclusive economy delivering high levels of employment, productivity and social cohesion. The strategy is based on three mutually reinforcing priorities: a) Smart growth: developing an economy based on knowledge and innovation; b) Sustainable growth: promoting a more resource efficient, greener and more competitive economy; c) inclusive growth: fostering a high-employment economy delivering social and territorial cohesion (European Commission 2010, p. 3).

Europe 2020 is a continuation of the Lisbon Strategy. With its implementation Europe was aiming at “becoming the most competitive and dynamic economy in the world; based on knowledge, capable of sustainable economic growth with more and better jobs and greater social cohesion” (see. Royuela-Mora et al., 2005, p. 54-58; Lenain 2005, pp. 9-31). The Lisbon Strategy was adopted during the economic changes associated with development of the global knowledge-based economy (see. Balcerzak 2009, p. 3-22).

The aim of the paper is to analyze the fulfillment of the goals of Europe 2020 strategy from the perspective of the years 2004-2013 with special consideration to the progress obtained by ten New Member States.

The first year of the analysis is the year of the biggest European Union enlargement, which can be considered as the most significant institutional change in Central and Eastern Europe. In the same time it is the first year of the availability of the data for all the specific diagnostic variables for reaching targets of Europe 2020. The year 2013 is the last year when the data is available.

This article is a continuation of the research on the realization of Lisbon strategy made in the year 2008 (Balcerzak et al., 2008, pp. 77-88) and refers to the further research, which was aimed at evaluation of “starting position” of Poland in the context of Europe 2020 (Balcerzak 2011, pp. 31-41, Balcerzak 2015, pp. 343-352).

Method of dynamic taxonomic research

European Commission has proposed the following headline targets for Europe 2020 Strategy (Europe 2020..., 2010, p. 3; Balcerzak 2011, pp. 31-41):

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

- a) 75 % of the population aged 20-64 should be employed.
- b) 3% of the EU's GDP should be invested in R&D.
- c) The "20/20/20" climate/energy targets should be met (including an increase to 30% of emissions reduction if the conditions are right).
- d) The share of early school leavers should be under 10% and at least 40% of the younger generation should have a tertiary degree.
- e) 20 million less people should be at risk of poverty.

The problem of fulfillment these aims should be considered as a complex phenomenon. As a result, in order to evaluate the progress of European Union member states a classic taxonomic approach for organizing and sharing of objects was applied based on normalization of variables with zero unitarisation method (Kukuła 2000, pp. 7-16; Kukuła, Bogocz 2014, pp. 5-13). In the research a constant reference point for the years 2004-2013 was used¹.

The method allows to create rankings of countries. Based on the method it is possible to group the countries into five classes: a) countries with very high level of synthetic measure of fulfillment aims of the strategy; b) countries with a high position; c) the countries with an average position; d) countries with low position; e) countries with very low position in the sphere of reaching the targets of Europe 2020 strategy. For this purpose the method of natural breaks (Jenks optimization method) was applied. The idea of natural breaks method consists of minimization of variance for objects from the chosen subsets and maximization of variance between the subsets (Jenks, 1967, pp. 186-190). The division of object into subsets gives the possibility for obtaining relatively homogeneous classes of objects in terms of the level of development of the analyzed phenomenon (see Balcerzak, Pietrzak 2014a, 2014b). The grouping procedure was applied for three years: 2004, 2004 and 2013.

In the research the data form Eurostat was used (Europstat, Europe 2020 indicators, <http://ec.europa.eu/eurostat/data/database>, 15.03.2015).

The fulfillment of headline targets is monitored with the following specific diagnostic criteria:

¹ The research for Europe 2020 and Lisbon Strategy with changeable reference points for different years can be found in the following papers: Balcerzak et al., (2008, pp. 77-88, 2011, pp. 31-41; 2015, pp. 343-352), Olczyk (2014, pp. 21-43), Baležentis (et al. 2011, pp. 6-21).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Target 1. 75 % of the population aged 20-64 should be employed

x_{1t} – Employment rate of females – age group 20-64 (% of the population);

x_{2t} – Employment rate of males – age group 20-64 (% of the population);

Target 2. 3% of the EU's GDP should be invested in R&D.

x_{3t} – Gross domestic expenditure on R&D (% of GDP)

Target 3. The "20/20/20" climate/energy targets should be met (including an increase to 30% of emissions reduction if the conditions are right)

x_{4t} – Greenhouse gas emissions, base year 1990;

x_{5t} – Share of renewable energy in gross final energy consumption;

x_{6t} – Intensity of energy consumption estimated final energy consumption in millions tons of oil equivalent in relations to GDP;

Target 4. The share of early school leavers should be under 10% and at least 40% of the younger generation should have a tertiary degree

x_{7t} – Early leavers from education and training – females – % of the population aged 18-24 with at most lower secondary education and not in further education or training;

x_{8t} – Early leavers from education and training – males – % of the population aged 18-24 with at most lower secondary education and not in further education or training;

x_{9t} – Tertiary educational attainment – females – age group 30-34;

x_{10t} – Tertiary educational attainment – males – age group 30-34;

Target 5. 20 million less people should be at risk of poverty

x_{11t} – People at risk of poverty or social exclusion – percentage of total population;

x_{12t} – People living in households with very low work intensity – percentage of total population;

x_{13t} – People at risk of poverty after social transfers – percentage of total population;

x_{14t} – Severely materially deprived people – percentage of total population;

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Among the diagnostic variable one can find both benefit ($x_{1b}, x_{2b}, x_{3b}, x_{5b}, x_{9b}, x_{10b}$), and negative variables ($x_{4b}, x_{6b}, x_{7b}, x_{8b}, x_{11b}, x_{12b}, x_{13b}, x_{14b}$). The stimulants were normalized with the formula 1 and the destimulants with the formula 2.

$$z_{ijt} = \frac{x_{ijt} - \min_{it} \{x_{ijt}\}}{\max_{it} \{x_{ijt}\} - \min_{it} \{x_{ijt}\}} \quad (1)$$

$$(i = 1, 2 \dots n); (j = 1, 2 \dots m); (t = 1, 2 \dots l), z_{ij} \in [0, 1]$$

$$z_{ijt} = \frac{\max_{it} \{x_{ijt}\} - x_{ijt}}{\max_{it} \{x_{ijt}\} - \min_{it} \{x_{ijt}\}} \quad (2)$$

$$(i = 1, 2 \dots n); (j = 1, 2 \dots m), (t = 1, 2 \dots l), z_{ij} \in [0, 1]$$

Assessment of the variable that characterizes the objects – a synthetic measure SM_{it} – was obtained with the formula 3.

$$SM_{it} = \frac{1}{m} \sum_{j=1}^m z_{ijt} \quad (3)$$

$$(i = 1, 2 \dots n); (j = 1, 2 \dots m); (t = 1, 2 \dots l); SM_i \in [0, 1]; z_{ij} \in [0, 1]$$

The result of the research is presented in table 1 and in figures 1 and 2.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

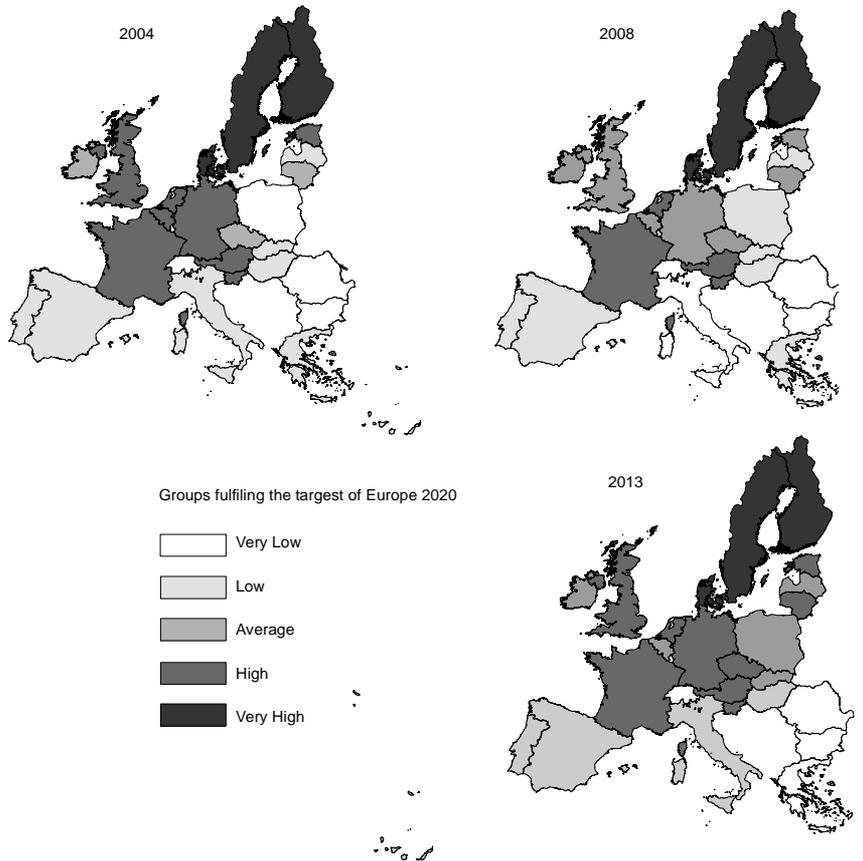
Table 1. The result of multivariate analysis of fulfilment targets of Euro 2020 strategy in the years 2004, 2008 and 2013

No	2004			2008			2013		
	Country	SM	Group	Country	SM	Group	Country	SM	Group
1	Sweden	0,8012	A	Sweden	0,8715	A	Sweden	0,8814	A
2	Finland	0,7768	A	Finland	0,8209	A	Finland	0,8117	A
3	Denmark	0,7643	A	Denmark	0,7746	A	Denmark	0,8047	A
4	Slovenia	0,6716	B	Netherlands	0,7308	B	Netherlands	0,7444	B
5	Netherlands	0,6631	B	France	0,7045	B	Estonia	0,7440	B
6	France	0,6598	B	Slovenia	0,7026	B	Slovenia	0,7290	B
7	Austria	0,6434	B	Estonia	0,6969	B	France	0,7261	B
8	Germany	0,6242	B	Lithuania	0,6904	B	Austria	0,7208	B
9	Estonia	0,6136	B	Austria	0,6693	B	Germany	0,7114	B
10	United Kingdom	0,6133	B	Ireland	0,6602	C	Lithuania	0,7041	B
11	Belgium	0,6105	B	Belgium	0,6560	C	Czech Republic	0,6972	B
12	Ireland	0,5880	C	Germany	0,6534	C	United Kingdom	0,6861	B
13	Czech Republic	0,5731	C	United Kingdom	0,6414	C	Belgium	0,6776	C
14	Lithuania	0,5599	C	Czech Republic	0,6285	C	Latvia	0,6651	C
15	Latvia	0,5091	D	Latvia	0,6018	D	Poland	0,6404	C
16	Spain	0,5066	D	Slovakia	0,5892	D	Ireland	0,6279	C
17	Hungary	0,4967	D	Poland	0,5683	D	Slovakia	0,6181	C
18	Slovakia	0,4907	D	Spain	0,5592	D	Portugal	0,5764	D
19	Greece	0,4896	D	Portugal	0,5382	D	Hungary	0,5613	D
20	Portugal	0,4674	D	Hungary	0,5305	D	Spain	0,5271	D
21	Italy	0,4525	D	Greece	0,5194	E	Italy	0,5215	D
22	Poland	0,4250	E	Italy	0,5033	E	Romania	0,4815	E
23	Romania	0,3815	E	Bulgaria	0,4712	E	Bulgaria	0,4665	E
24	Bulgaria	0,3417	E	Romania	0,4305	E	Greece	0,4661	E

Source: own estimation based on Eurostat data: <http://ec.europa.eu/eurostat/data/database> (15.03.2015).

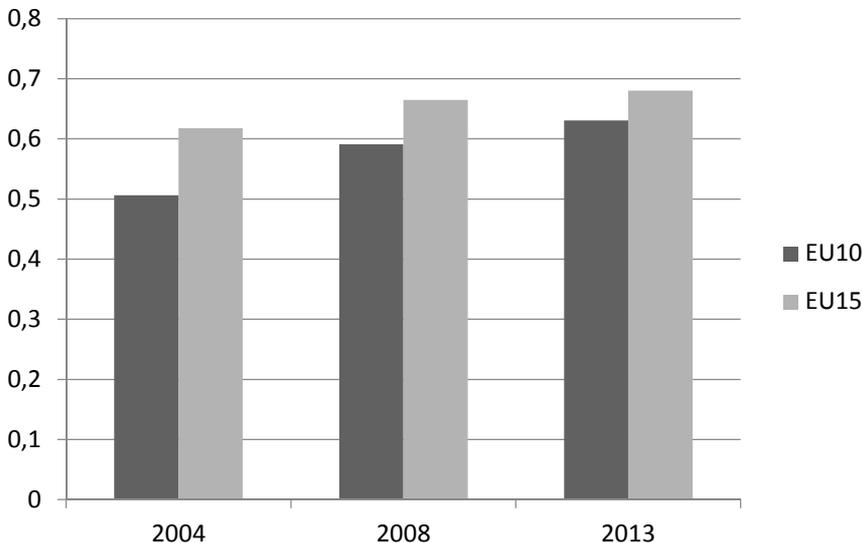
Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance

Figure 1. Grouping of the countries with natural breaks method in the years 2004, 2008 and 2013



Source: own estimation based on Eurostat data: <http://ec.europa.eu/eurostat/data/database> (15.03.2015).

Figure 2. The average level of fulfilment targets of Euro 2020 strategy in case of EU10 and EU15 in the years 2004, 2008, 2013



Source: own estimation based on Eurostat data: <http://ec.europa.eu/eurostat/data/database> (15.03.2015).

Figures 1 and 2 show significant heterogeneity between New and Old Member States in the beginning of the analysis. However, during the following years the NMS reached an important progress in reducing the gap to the Old Member States of the European Union. In 2004 the average value of synthetic measure for fulfillment the Europe 2020 targets for EU-10 was equal to almost 82% of the average value reached by EU-15. In the year 2013 this relation reached 92%. Also very good results of Baltic countries or Czech Republic with grouping in the same clusters with Old Members states, can be considered as significant success.

Conclusions

The analysis confirms existing diversity between Old EU members and NMS in the sphere of reaching all the targets of Europe 2020 strategy. However, the research also points that since 2004 till 2013 NMS achieved significant progress and managed to reduce the gap to EU15 by half. When one concentrates on the results of most important economies of Eurozone

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

the research shows rather moderate progress made by Germany and very weak results of Italy, which is analogous to the results obtained by these economies at the halfway of implementation of Lisbon strategy in the period 2000-2005 (Balcerzak et al. 2008, pp. 77-88). Taking into consideration the leading political and economic role of these economies, their lack of significant progress for almost last ten years shows the scale of structural problems of the EU.

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18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
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Business Cycle Synchronization: A Regional Perspective

JEL Classification: *E32; E50; F44; R10*

Keywords: *business cycle synchronization; regional economics; optimum currency area theory; Hodrick-Prescott filter; European integration*

Abstract: Turmoil in euro area once more forces EU authorities to rethink future of further monetary integration. One of the most commonly used criteria for successful monetary in contemporary research is business cycle synchronization (BCS). Though BCS has been vastly described at country level, not as much attention has been put on the degree of BCS at regional level. Topic is important for 2 main reasons. The first is that determining degree of BCS at regional level can help in assessment of monetary policy effectiveness at country level, as well as giving point of reference for evaluation of perspective costs of participation in monetary union. The second is that there is theoretical dispute within the optimum currency areas literature between 'European Commission' and "Krugman" view that can be resolved a great deal through regional analysis. In order to assess BCS in EU Hodrick-Prescott, as well as Christiano and Fitzgerald filter to time series of real GDP for 24 countries, 82 NUTS 1, 242 NUTS 2 and 1264 NUTS 3 regions over the period of 1998-2010. Data was later used to create bilateral measures of BCS, which gave 276 observations on country level, 3321 on NUTS 1, 29161 on NUTS 2 and 798216 on NUTS 3 level. Results of the analysis support "European Commission" view and show very high degree of BCS within EU countries. Country level analysis also reveals that within the EU there exist groups of countries that could form effectively working monetary union based on BCS criterion.

Introduction

Turmoil in euro area once more forces EU authorities to rethink future of further monetary integration. One of the most commonly used criterions for successful monetary integration in contemporary research is business cycle synchronization (BCS). This paper tries to assess the degree of business cycle synchronization at regional NUTS 1, 2 and 3 level and for country pairs. This analysis allows to assess the extent to which each of the national central banks, as well as European Central Bank can conduct monetary policy effectively. The higher is the business cycle synchronization between two countries/regions the better it the ability of central bank to conduct common monetary policy for these two countries/regions.

This article proposes measure of business cycle synchronization base on correlation coefficient of deviations of cyclical component of real GDP from trend. Than measure is used to check what groups of countries can introduce common currency at relatively low cost. Same measures are used to check monetary policy effectiveness within countries.

Section 1 presents literature review, which is mostly concentrated around theory of optimum currency areas and business cycle synchronization at country and regional level. Section 2 presents data source and methodology used to construct the business cycle synchronization measure. Section 3 presents results and section 4 concludes.

Literature Review

The prospect of monetary unification in economics is usually considered in context of theory of optimum currency areas (OCA) based on seminal works of Mundell (1961), McKinnon (1963) and Kenen (1969). Nowadays 'New' theory of optimum currency areas (Tavlas, 1993) also considers more dynamic approach closely related to works of Krugman (1993) as well as Frankel and Rose (1998) and their *'The Endogeneity of the Optimum Currency Area Criteria'* hypothesis as well as Mundell (1973a, 1973b). Both international (Grubel, 1970; Mongelli, 2002 and 2008; Tavlas, 2008) and Polish (Nowak, Ryc, Żyżyński, 1999; Łon, 2007; Lis, 2008; Żyżyński 2009 and 2011; Osiatyński, 2011) economists have discussed potential benefits and costs of introducing common currency on the theoretical level. More complex measure of countries readiness to form a monetary union has been proposed by Bayoumi and Eichengreen (1997), who introduced unified index based on nominal exchange rate volatility,

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

trade intensity, trade similarity (intra-industry trade intensity) and differences in real GDP growth rate.

Empirical research in this area is very complicated due to problems with measurement of potential costs and benefits. For this reason researchers focus their attention on testing conclusions from OCA theory using two main approaches. In both cases authors try to find similarities in either economic shocks or business cycle – if there are strong monetary policy and externally flexible exchange rate are becoming very effective tool of common central bank.

The first one uses Structural Vector Auto Regression models (Blanchard, Quah, 1989; Taylor, 2004) for identification of economic shocks and was firstly utilized for OCA purposes by Bayoumi, Eichengreen, (1993). They examined demand shocks among European countries and US census regions, and found out that regions in US are characterized by higher degree of cohesion. Using similar approach Dumitru and Dumitru (2011) found significant role of idiosyncratic demand shocks among European countries, even some of the core countries. Beck and Janus using SVAR approach find low correlation of economic shocks among Euro Area countries (2013) and find high degree of synchronization of shocks for V4 countries (2014).

The second approach is concentrated on business cycle synchronization (BCS), and the literature on BCS has put high interest on parts of determinants. Using multi-equation approach Imbs (2004) find evidence for trade, inter-industry trade, structural similarity and financial integration are positively influencing BCS using data on Developed countries and states in USA. He also finds evidence for Endogeneity: direct and indirect of trade and financial linkages on business cycles synchronization. Results have been later reproduced on sample of European countries by Siedschlag (2010), as well as Déés and Zorell (2011). Kalemli-Ozcan, Papaioannou and Peydro (2009), in contrast with Imbs, find that financial integration influence business cycles synchronization negatively using single equation approach. They argue that cross-section analysis suggests positive impact of financial integration on business cycles synchronization, but panel approach reveals opposite effect. Beck (2013) using multi-equation approach intermediate effects of GDP per capita distance through structural similarity on business cycle synchronization and Chang, Kim, Tomljanovich and Ying (2013) impact of similarities in ruling parties.

Complex analysis with sensitivity checks (Leamer and Leonard, 1981; Leamer 1983, 1985; Levine and Renelt, 1992; Sala-I-Martin, 1997a, 1997b)

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

has been performed for BSC by Baxter and Kouparitsas (2004). They employ extreme bounds analysis to several potential determinants of business cycles synchronization, but beside the gravity variables they found only trade significant. In more recent approach Bower and Guillemineau (2006) using the same methodology but focusing their attention on the Euro Area, found only trade, economic specialization at industry level, fiscal deficits, price competitiveness and stock market differentials to be significant business cycles synchronization determinants. In yet another attempt to use extreme bound analysis Sachs and Schleer (2013) obtained significant results for institutional similarities and directions of structural reforms, but find trade, structural similarities and fiscal and monetary policy similarities insignificant in many of their specifications. Beck (2013) using Sala-I-Martin version of extreme bound analysis found robust impact of structural similarities and GDP *per capita* distance on BSC.

Gogas (2011) using one equation approach find positive effects of introducing common currency on BSC using sample of twelve European countries. On the other hand, Bordo and Helbling (2010) argue that increasing business cycles synchronization is a worldwide phenomenon. Lehwald (2012) using Bayesian dynamic factor model, argues that great part of increased business cycles synchronization among Euro Area countries comes from worldwide tendencies rather than ongoing integration.

All research mentioned above was taking into consideration only countries as a unit of measurement. As noticed by Alesina and Barro (2002), number of countries in the world is changing, but does not necessarily mean that the number of OCAs is changing with them. So country perspective instantly eliminates the possibility of OCAs being within countries or amongst parts of countries. In order to assess that lower level of aggregation is required – regional perspective. For these reasons this paper tries to concentrate on regional business cycles synchronization which did not have as much attention in the literature.

Artis, Dreger and Kholodilin (2009) find no evidence on convergence of regional business cycles for European regions and for USA, and claim that BSC have been stable over 1982-2007. Correia, and Gouveia (2013) examined business cycle synchronization in Portuguese regions between 1988-2010 and concluded that it has decreased over the period. Anagnostou, Panteladis and Tsiapa (2012) in comprehensive research find for 14 European countries differences in regional BSC that could be explain by trade and differences in the level of development. Marino (2013) on the sample from 12 European countries found that changes in regional business cycle

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

synchronization could be explained by distance and differences in economic structure.

Data and measurement

In investigation only European countries with data available on regional level were taken into considerations. List of all the countries and number of different NUTS 1,2,3 regions along with the number of possible pairs is available in table 1.

Table 1. Data description

Name	Country	NUTS 1	NUTS 2	NUTS 3
Belgium	1	3	10	42
Bulgaria	1	2	6	28
Germany	1	16	31	427
Greece	1	4	12	50
Spain	1	7	17	51
France	1	8	20	96
Italy	1	5	21	104
Hungary	1	3	6	20
Holland	1	4	12	38
Austria	1	3	9	34
Poland	1	6	16	66
Romania	1	4	8	42
Finland	1	2	4	19
Sweden	1	3	8	20
UK	1	12	36	130
Czech	1	-	8	11
Denmark	1	-	5	10
Ireland	1	-	2	8
Portugal	1	-	5	27

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Name	Country	NUTS 1	NUTS 2	NUTS 3
Slovenia	1	-	2	12
Slovakia	1	-	4	7
Estonia	1	-	-	5
Latvia	1	-	-	6
Lithuania	1	-	-	10
Sum (countries/regions)	24	82	242	1263
Maximum number of pairs	276	3321	29161	796953
Data Frequency	quarterly	annual	annual	annual
nominal GDP/GVA Source	Eurostat	Cambridge Econometrics		
P (national level) source	Eurostat	Penn World Table		
Period for filtration	1998q1-2014q1		1991-2010	
Period for correlation	1998q1-2010q4		1998-2010	

Source: own arrangement.

For countries quarterly data about nominal GDP and price level (2005=100) from the first quarter of 1998 to the first quarter of 2014 obtained from Eurostat was used. Data was seasonally adjusted with X-13 ARIMA. For regions (NUTS 1,2,3) annual data about nominal gross value added (GVA) and price level was collected. Due to lack of data about the prices at regional level data for national price level has been used as a deflator. This is a common practice in regional research (example: Sachs, Sala-I-Martin, 1991). GVA data comes from Cambridge Econometrics and for the price level from Penn World Table 8.0, both cover 1991-2010 period. For comparisons between countries and regions data for 1998-2010 has been used. Longer periods have been used in order to get better results from Hodrick-Prescott filter. For the same reason quarterly data was used for GDP and prices and national level.

To justify usage of detrending methods tests for the presence of unit root has been used. Since Nelson and Plosser (1982) there has been substantial disagreement over the nature of the GDP trend (Rudebusch, 1993) – whether it is deterministic or stochastic. Due to that fact ADF (Said, Dickey, 1984) test was performed with two variations of the following equation¹:

¹ Case with no drift is not considered due to increasing nature of real GDP

$$\Delta Y_t = \alpha + \beta t + \delta Y_{t-1} + \sum_{i=1}^p \gamma_i \Delta Y_{t-i} + \varepsilon_t \quad (1)$$

where ΔY_t denotes change in real GDP, α is a constant term (drift), βt is a deterministic trend, δ is coefficient on lagged real GDP and γ_i is coefficient on i th lag of change in real GDP and ε_t is a residual term. Number of lags has been chosen with Schwarz information criterion. In the first specification deterministic trend is ignored, but included in the second. Diebold and Senhadji (1996) shown that whether these test detect presence of deterministic or stochastic trend depends on analyzed time period – the longer the higher the chance of encountering deterministic trend. This implies that for used periods used in this paper the test is expected to be biased towards stochastic trend. Presence of the trend was also confirmed with KPSS (Kwiatkowski et al, 1992) test. Results for specification without deterministic trend for countries have been presented in table 2. Results for regions at NUTS 1 level are in the appendix. Due to too high number of observations (242 for NUTS 2 and 1260 for NUTS 3) results for lower levels are of dis-aggregation are not presented, but confirm presence of trend in the data.

ADF test detects presence of unit root in time series for all countries except Portugal and Spain – two geographical close countries that have experienced significant turmoil during recent crisis. According to KPSS test results unit root is present in cases of all countries. Results for the specification (1) are presented in table 3.

For specification (1) ADF test shows presence of unit root in time series for all countries. KPSS shows presence of unit root in all cases except for Germany. This result along with the analysis of p values in both specifications, gives strong support to deterministic trend only in instance of Germany, though evidence for stochastic trend can be found. Table 3 shows that deterministic trend is significant also for Bulgaria, Estonia, Greece, Poland, Romania and Slovakia. In most of the case result point to stochastic trend and drift. As mentioned above this result was expected because of not long enough time period. This result has consequences for measurement of business cycle component and final result. It points out to changes in trend underlying GDP. This difficulty is addressed and overcome later in the text.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 2. Results of unit root test: specification (1) without βt (ADF H_0 : series has a unit root; KPSS H_0 : series is stationary)

Country	ADF	t-1	d(-1)	d(-2)	d(-3)	d(-4)	d(-5)	d(-6)	d(-7)	d(-8)	C	KPSS
Austria	0.398	0.084									0.050	I(1)***
Belgium	0.451	0.104	0.00	0.84							0.075	I(1)***
Bulgaria	0.449	0.103	0.56								0.031	I(1)***
Czech	0.628	0.201	0.00								0.099	I(1)***
Denmark	0.305	0.055									0.047	I(1)**
Estonia	0.634	0.206	0.01								0.112	I(1)***
Finland	0.277	0.048	0.07								0.035	I(1)***
France	0.219	0.034	0.01								0.023	I(1)***
Germany	0.833	0.473									0.390	I(1)***
Greece	0.137	0.018	0.78	0.15	0.49	0.80	0.01	0.02			0.021	I(1)*
Holland	0.174	0.025	0.00								0.020	I(1)***
Hungary	0.362	0.072	0.00								0.052	I(1)***
Ireland	0.111	0.014									0.005	I(1)***
Italy	0.265	0.045	0.00								0.043	I(1)*
Latvia	0.365	0.073	0.05	0.00							0.053	I(1)***
Lithuania	0.781	0.369	0.02								0.203	I(1)***
Poland	0.996	0.317									0.532	I(1)***
Portugal	0.015	0.001									0.001	I(1)**
Romania	0.651	0.219	0.44								0.130	I(1)***
Slovakia	0.946	0.928									0.393	I(1)***
Slovenia	0.395	0.083	0.15	0.01							0.064	I(1)***
Spain	0.069	0.008	0.00								0.005	I(1)***
Sweden	0.769	0.354	0.29	0.00	0.18	0.00	0.22	0.42	0.02	0.00	0.197	I(1)***
UK	0.358	0.071									0.039	I(1)***

Table presents p values for ADF test as well as for all variables.

*/**/*** denotes 0.1/0.05/0.01 significance level for KPSS statistic

Source: own calculations.

For regions KPSS test find unit root for every region at NUTS 1 level. ADF test fails to find unit root at 5% level of confidence for 5 regions, namely: Brandenburg, Mecklenburg-Vorpommern, Sachsen, Sachsen-Anhalt (all Germany) and Alföld és Észak (Hungary). This results point to the presence of trend in analyzed data set, and allows proceeding with filtering.

In order to extract cyclical and trend component of real GDP time series high pass Hodrick-Prescott (HP) filter has been used. HP filter assumes

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

time series (y_t) can be divided into cycle component (c_t) the trend component (g_t):

$$y_t = c_t + g_t \quad \text{for } t = 1, 2, \dots, T. \quad (2)$$

The HP filter extracts trend component by solving following mathematical programming problem (Hodrick, Prescott, 1997):

Table 3. Results of unit root test: specification (1) (ADF H_0 : series has a unit root; KPSS H_0 : series is stationary)

Country	ADF	t-1	d(-1)	d(-2)	d(-3)	d(-4)	d(-5)	d(-6)	d(-7)	d(-8)	C	t	KPSS
Austria	0.598	0.052									0.039	0.120	I(1)*
Belgium	0.378	0.020	0.00								0.015	0.053	I(1)**
Bulgaria	0.962	0.438	0.52								0.220	0.761	I(1)**
Czech	0.947	0.359	0.00								0.233	0.582	I(1)**
Denmark	0.847	0.162									0.128	0.822	I(1)**
Estonia	0.321	0.015	0.03	0.43	0.01						0.009	0.054	I(1)**
Finland	0.871	0.188	0.07								0.124	0.676	I(1)**
France	0.589	0.050	0.00								0.037	0.169	I(1)**
Germany	0.121	0.003	0.01								0.003	0.005	I(0)
Greece	0.999	0.556									0.619	0.000	I(1)***
Holland	0.938	0.325	0.00								0.250	0.957	I(1)**
Hungary	0.803	0.128	0.00								0.079	0.564	I(1)***
Ireland	0.785	0.116									0.037	0.768	I(1)***
Italy	0.855	0.170	0.00								0.134	0.277	I(1)***
Latvia	0.423	0.025	0.04	0.00							0.015	0.134	I(1)**
Lithuania	0.804	0.129	0.01								0.076	0.204	I(1)**
Poland	0.627	0.059	0.17	0.54	0.10						0.037	0.058	I(1)**
Portugal	0.750	0.098									0.060	0.105	I(1)***
Romania	0.396	0.022	0.91								0.013	0.045	I(1)**
Slovakia	0.701	0.080									0.050	0.075	I(1)*
Slovenia	0.778	0.113	0.11	0.00							0.070	0.388	I(1)**
Spain	0.983	0.651	0.01								0.310	0.177	I(1)***
Sweden	0.725	0.091	0.18	0.00	0.06	0.00	0.31	0.31	0.01	0.01	0.070	0.122	I(1)*
UK	0.800	0.126									0.078	0.416	I(1)***

Table presents p values for ADF test as well as for all variables.

*/**/** denotes 0.1/0.05/0.01 significance level for KPSS statistic

Source: own calculations.

$$\min_{\{g_t\}_{t=-1}^T} \left\{ \sum_{t=1}^T (y_t - g_t)^2 + \lambda \sum_{t=1}^T [(g_{t+1} - g_t) - (g_t - g_{t-1})]^2 \right\}. \quad (3)$$

In that context HP filter can be seen as a generalization of the exponential smoothing procedures used analyzed by Brown (1962). If c_t and the second differences of g_t are normally and independently distributed, HP filter is an optimal filter (Rawn, Uhlig, 2002). λ is a parameter penalizing for variability of the trend component and its value is given by:

$$\lambda = \frac{\sigma_c^2}{\sigma_{\Delta^2 g_t}^2}, \quad (4)$$

which is the ratio of variance in the cyclical component to variance of the second differences in the trend component. The higher the value of λ the smoother the trend component is becoming and becomes OLS estimate as λ approaches ∞ . The value has been set to 1600 for quarterly and for 100 to annual data, which are values recommended by the authors as well as commonly used in the most of business cycles literature (eg. Backus, Kehoe, 1992). Great advantage of Hodrick-Prescott filter is the fact that it directly corresponds to commonly used in the economic literature definition of business cycle as a: *movements about trend in gross national product* (Lucas, 1977).

Finally cyclical component c_t is divided by the trend component g_t to create time series of deviations of cyclical part of real GDP from trend part, or in other words deviations of cyclical GDP from the natural level:

$$dev_t = c_t / g_t. \quad (5)$$

This transformation deals with the problem of stochastic trend, cause cyclical component is scaled by trend component.

For each pair of countries/regions i and j for each level of aggregation separately the value of the correlation coefficient is calculated for data obtained with HP (hp_{ij}) filter. This measure takes values from -1 to 1, where 1 reflects perfect business cycle synchronization. Because BCS can be analyzed using at least two countries, unit used in this research is pairwise

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

oriented. Advantage of that approach is that number of observations (o) for a given number of countries/regions (n) is given by:

$$o = \frac{n(n-1)}{2}, \quad (6)$$

so for 24 countries gives 276, for 82 NUTS 1 gives 3321, for 242 NUTS 2 gives 29161, 1263 NUTS 3 gives 796953 observations. In case of NUTS 3 one can be sure that all asymptotical theorems work very well. The rest of the reasoning is based on values of these results.

Results

Descriptive statistics for values of hp measure for region pairs at NUTS 1, 2 and 3 are presented in table 4. The headers of columns with „IN” present results only for pairs of regions inside the countries (Polish region with Polish region, German with German, but not Polish with German).

Table 4. Descriptive statistics of hp for NUTS 1, 2 and 3 region pairs: all and within countries

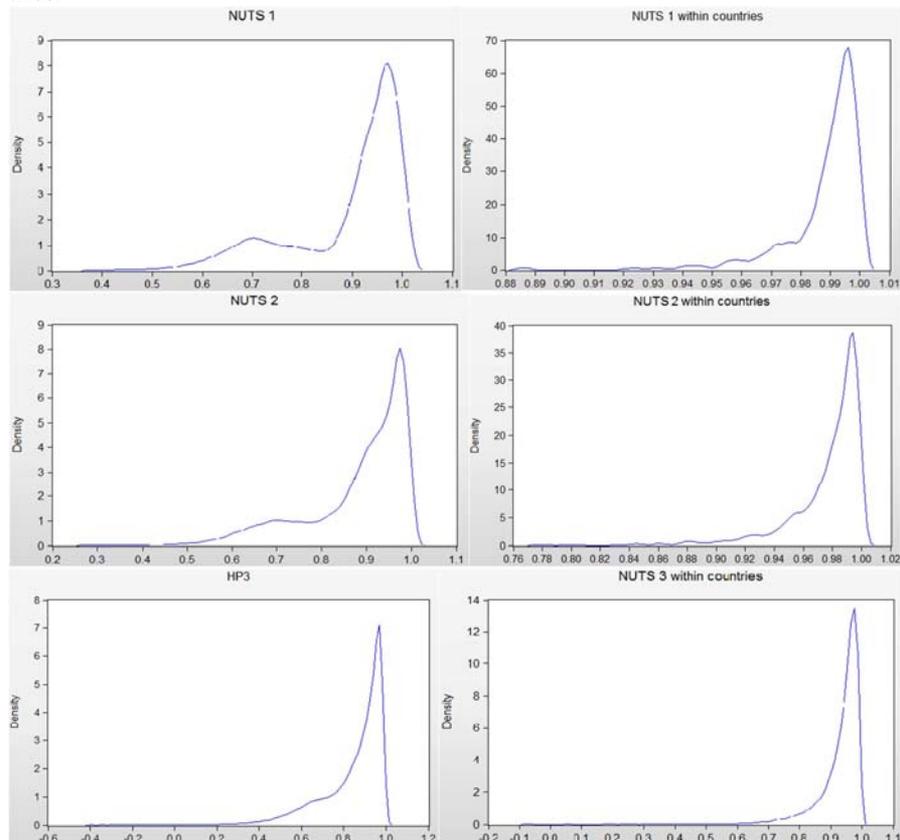
Statistic	NUTS1	NUTS1IN	NUTS2	NUTS2IN	NUTS3	NUTS3IN
Mean	0.89	0.99	0.88	0.98	0.85	0.93
Median	0.94	0.99	0.92	0.99	0.90	0.95
Maximum	1.00	1.00	1.00	1.00	1.00	1.00
Minimum	0.40	0.89	0.29	0.78	-0.39	-0.08
Std. Dev.	0.12	0.01	0.12	0.03	0.15	0.07
Skewness	-1.38	-3.03	-1.40	-2.45	-1.60	-2.59
Kurtosis	3.96	16.86	4.40	11.17	5.80	13.76
Jarque-Bera	1178	2784	11866	7992	602586	703580
P(J-B)	0.00	0.00	0.00	0.00	0.00	0.00
Sum	2962	289	25681	2064	675351	110500
Sum Sq. Dev.	44.57	0.05	392.55	1.35	16873.30	515.73
Observations	3321	292	29161	2112	795691	118449

Source: own calculation.

Degree of business cycle synchronization is very high at all three levels of aggregation though the highest is at NUTS 1 level (0.89). Average value of hp is decreasing with disaggregation, which is expected result. Nevertheless this very high value for all three levels of disaggregation indicate that

conduction of monetary policy would be on average rather effective judging from region perspective. On the other hand distribution in all cases is far from normal, which might indicate that there is some systematic factor attributing to skewness. For this reason statistics were calculated separately for pairs of regions within countries. Mean values within countries are significantly higher – by approximately 0,1 for NUTS 1 and NUTS 2 and 0,08 NUTS region pairs. Standard deviation for “inside” pairs is on the other hand significantly lower, approximately by factor of 12, 4 and 2.1 for NUTS 1, 2 and 3 region pairs respectively.

Figure 1. Kernel Densities for NUTS 1, 2 and 3 region pairs: all and within countries.



Source: own calculation.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Conclusions from table 4 are supported by comparison of the distribution between all pairs of regions and pairs within countries. Kernel densities for region pairs are presented in figure 1.

Distributions for all and inside pairs are not normal and I get more concentrated around mean with the level of aggregation, which can be attributed to the sample size changes. Distribution for “inside” pairs is more centered and covers only very high values of correlation coefficient. These results suggest that business cycle of regions inside countries are on average more synchronized than those of regions from different countries. This result contradicts “Krugman’s View” which states that elimination of barriers to all economic activities (ex. Trade, mobility of labor and capital) leads to higher degree of concentration of economic activity due to internal and external economies of scale. These in turn leads to higher specialization, fragility of regions exports to changes in demand and lower business cycles synchronization with other regions. Obtained result shows that regions are characterized by very high degree of business cycle synchronization, especially within countries. This also supports “European Commission View”. Further economic integration by eliminating barriers to economic activity and introducing similar policies – *ergo* making groups of countries more like one country – will lead to tighter business cycle synchronization and can make common monetary policy effective.

Table 5. Descriptive statistics of *hp* for pairs of countries and NUTS 3 level pairs within Poland, Germany, France and UK

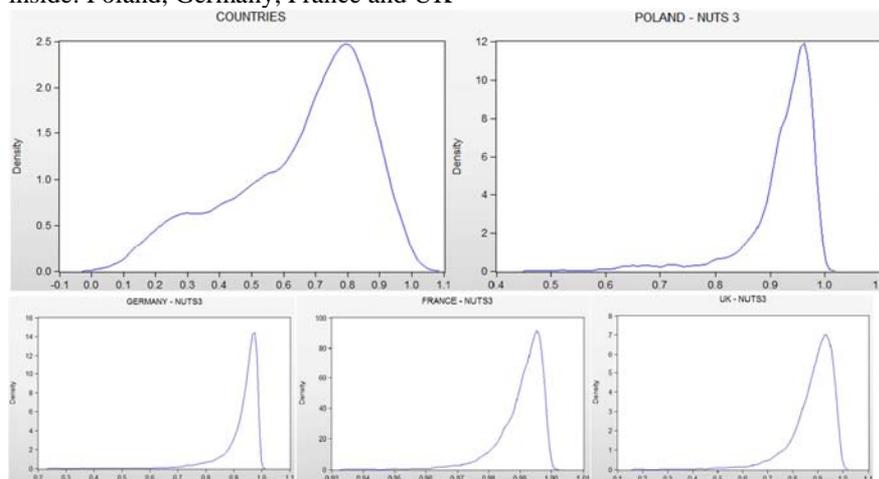
Statistic	COUNTRIES	POLAND	GERMANY	FRANCE	UK
Mean	0.65	0.92	0.93	0.99	0.88
Median	0.71	0.94	0.95	0.99	0.90
Maximum	0.95	1.00	1.00	1.00	1.00
Minimum	0.11	0.47	0.25	0.94	0.18
Std. Dev.	0.21	0.07	0.06	0.01	0.08
Skewness	-0.80	-2.58	-2.38	-2.04	-1.94
Kurtosis	2.61	11.23	10.97	9.77	8.67
Jarque-Bera	31	8424	327137	11875	16490
P(J-B)	0.00	0.00	0.00	0.00	0.00
Sum	180	1975	84843	4517	7377
Sum Sq. Dev.	11.71	10.09	332.78	0.23	60.11
Observations	276	2145	90951	4560	8385

Source: own calculation.

Results for regions are very different from pairs of countries, which are presented in table 5. Mean value of correlation coefficient for country pairs is equal 0.65, which is lower by 0.3 from NUTS 3 region pairs. Standard deviation is equal to 0.21, which in turn indicates lower concentration of the results. Distribution is not normal what can be seen from kernel densities in figure 2. Distribution almost entirely covers only values from 0 to 1. This suggests that in total business cycle synchronization among European countries is fairly strong, but degree differs significantly between pairs. The highest density of observations is around 0.75 what strengthens the point.

Table 5 also displays descriptive statistics for NUTS 3 region pairs inside Poland, Germany, France and UK. Result for these countries confirm that in all cases monetary policy can be implemented very effectively. This is especially true in case of France where mean value of *hp* measure is equal 0.99 with standard deviation equal to approximately 0.01 Degree of business cycle synchronization is also very high for Poland with mean of 0.92 and standard deviation of 0.07. Distribution in all cases is not normal, what can be seen in figure 2. Kernel distributions for regions inside countries are very concentrated and cover only very high values of correlation.

Figure 2. Kernel Densities for country pairs and pairs of regions at NUTS 3 level inside: Poland, Germany, France and UK



Source: own calculation.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Results of the detailed analysis are presented in tables 6 through 9. For each country possible partners for monetary union are arranged according to *hp* measure in a descending order. NUTS 1/2/3 denotes average value for region pairs inside this country at a different 1/2/3 level of aggregation, while mean denotes average value with all countries. If country has higher business cycle synchronization with some other country than with other country than between regions inside it, then this country is a good partner to form monetary union with. In other words monetary policy could be implemented in this two countries, as effectively as for regions of one country – costs of participation in monetary union do not apply. This criterion is extremely rigorous and has been met only in couple of cases.

Values of correlation coefficient for NUTS 1, 2 and 3 level region pairs is higher than with any other country in case of Belgium, Greece, Poland, Spain, Holland, Hungary, Sweden, UK, Romania, France, Austria, Czech, Denmark, Ireland, Portugal, Slovakia, Slovenia, Estonia and Lithuania. Bulgaria has *hp* value for NUTS 3 “inside” equal to 0.79, while with Lithuania 0.8, so this country is a suitable candidate for monetary union with Bulgaria. Germany has higher value of *hp* with Italy and France than for region pairs at NUTS 3 level of aggregation (0.93). Latvia is characterized by very low value of correlation coefficient for pairs of NUTS 3 regions within countries (0.75) in comparison with other countries. This indicates that from regional perspective monetary policy cannot be implemented very effectively (especially in comparison with other countries). Values of *hp* for Latvia with Estonia, Lithuania, Hungary, Czech Republic, UK, Spain, Finland, Slovenia, Denmark, Ireland (in descending order) are higher than for within country NUTS 3 level region pairs. This means that possible number of candidates for monetary union with Latvia is quite extensive. In case of Finland *hp* with France is higher than for inside regions at NUTS 3 level inside countries (0.92), and with Germany, Italy and Spain is higher for than for NUTS 1 level regions. This indicates 4 very good candidates to form monetary union with Finland.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 6. Ordered values of *hp* measure with all possible partners and inside countries at NUTS 1, 2 and 3 levels for Belgium, Bulgaria, Finland, Germany and Greece

No.	Belgium		Bulgaria		Finland		Germany		Greece		Poland	
	Partner	hp										
0	Partner	hp										
1	NUTS 1	1.00	NUTS 1	0.95	NUTS 2	0.97	NUTS 2	0.99	NUTS 1	0.98	NUTS 1	0.99
2	NUTS 2	0.99	NUTS 2	0.93	France	0.92	NUTS 1	0.98	NUTS 2	0.96	NUTS 2	0.98
3	NUTS 3	0.98	Lithuania	0.80	NUTS 3	0.92	Italy	0.95	NUTS 3	0.88	NUTS 3	0.92
4	France	0.92	NUTS 3	0.79	Germany	0.90	France	0.94	Slovakia	0.56	Belgium	0.77
5	Austria	0.91	Spain	0.75	Italy	0.90	NUTS 3	0.93	Spain	0.50	Holland	0.76
6	Italy	0.89	Romania	0.74	Spain	0.89	Austria	0.91	Czech	0.49	Austria	0.71
7	Germany	0.88	Slovenia	0.74	NUTS 1	0.89	Finland	0.90	Bulgaria	0.48	Slovenia	0.69
8	Holland	0.86	Finland	0.70	Austria	0.88	Belgium	0.88	Slovenia	0.46	Spain	0.68
9	Sweden	0.85	Czech	0.70	Slovenia	0.88	Holland	0.87	Lithuania	0.44	France	0.64
10	Denmark	0.85	Slovakia	0.70	Denmark	0.87	Denmark	0.87	Latvia	0.41	Czech	0.64
11	Finland	0.85	Latvia	0.66	Sweden	0.86	Spain	0.86	Poland	0.39	Germany	0.63
12	Spain	0.82	UK	0.63	Belgium	0.85	Sweden	0.85	UK	0.35	Finland	0.61
13	Slovenia	0.79	Estonia	0.61	UK	0.84	Slovenia	0.85	Romania	0.33	Ireland	0.59
14	Ireland	0.79	Austria	0.60	Czech	0.84	Czech	0.80	mean	0.32	Denmark	0.58
15	Poland	0.77	Hungary	0.59	Holland	0.83	Ireland	0.76	Holland	0.31	Italy	0.58
16	Czech	0.77	Mean	0.58	Estonia	0.82	Estonia	0.74	Estonia	0.30	mean	0.54
17	UK	0.71	Holland	0.56	Latvia	0.80	mean	0.74	Austria	0.30	UK	0.53
18	mean	0.70	Denmark	0.55	Lithuania	0.78	UK	0.73	Finland	0.28	Sweden	0.53
19	Hungary	0.70	France	0.54	Ireland	0.77	Latvia	0.73	Germany	0.25	Portugal	0.48
20	Latvia	0.67	Germany	0.54	mean	0.77	Hungary	0.72	Belgium	0.23	Latvia	0.48
21	Portugal	0.66	Italy	0.49	Hungary	0.77	Portugal	0.71	Hungary	0.22	Bulgaria	0.45
22	Estonia	0.65	Greece	0.48	Bulgaria	0.70	Poland	0.63	Ireland	0.22	Hungary	0.40
23	Lithuania	0.51	Poland	0.45	Slovakia	0.66	Lithuania	0.63	Italy	0.22	Greece	0.39
24	Slovakia	0.46	Belgium	0.45	Portugal	0.64	Slovakia	0.58	Denmark	0.22	Estonia	0.39
25	Bulgaria	0.45	Ireland	0.44	Poland	0.61	Bulgaria	0.54	France	0.19	Lithuania	0.37
26	Greece	0.23	Sweden	0.43	Romania	0.44	Romania	0.32	Portugal	0.15	Slovakia	0.36
27	Romania	0.19	Portugal	0.31	Greece	0.28	Greece	0.25	Sweden	0.11	Romania	0.23

Source: own calculation.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 7. Ordered values of *hp* measure with all possible partners and inside countries at NUTS1, 2 and 3 levels for Spain, Holland, Hungary, Italy, Sweden and UK

No.	Spain		Holland		Hungary		Italy		Sweden		UK	
	Partner	hp										
1	NUTS 1	1.00	NUTS 1	0.99	NUTS 1	0.98	NUTS 1	1.00	NUTS 1	0.98	NUTS 1	0.99
2	NUTS 2	0.99	NUTS 2	0.97	NUTS 2	0.96	NUTS 2	0.99	NUTS 2	0.97	NUTS 2	0.96
3	NUTS 3	0.97	NUTS 3	0.97	NUTS 3	0.90	NUTS 3	0.98	NUTS 3	0.95	NUTS 3	0.88
4	Slovenia	0.92	Spain	0.88	Estonia	0.87	Germany	0.95	France	0.89	Finland	0.84
5	Austria	0.90	France	0.88	Latvia	0.86	France	0.94	Denmark	0.88	Estonia	0.83
6	Finland	0.89	Germany	0.87	Lithuania	0.82	Finland	0.90	Italy	0.87	Latvia	0.82
7	Czech	0.89	Austria	0.87	Denmark	0.80	Belgium	0.89	Finland	0.86	Lithuania	0.81
8	Holland	0.88	Belgium	0.86	Sweden	0.79	Austria	0.88	Belgium	0.85	Spain	0.81
9	France	0.87	Slovenia	0.84	Czech	0.79	Denmark	0.88	Germany	0.85	France	0.79
10	Germany	0.86	Finland	0.83	UK	0.79	Sweden	0.87	Austria	0.82	Sweden	0.79
11	Denmark	0.86	Denmark	0.82	Finland	0.77	Spain	0.84	Hungary	0.79	Hungary	0.79
12	Italy	0.84	Italy	0.81	Italy	0.75	Holland	0.81	UK	0.79	Denmark	0.77
13	Belgium	0.82	Portugal	0.80	France	0.74	Czech	0.81	Estonia	0.78	Slovenia	0.77
14	Latvia	0.81	Czech	0.77	Austria	0.73	Ireland	0.80	Ireland	0.75	Italy	0.76
15	UK	0.81	Poland	0.76	Spain	0.73	Slovenia	0.78	Czech	0.74	Czech	0.75
16	mean	0.77	Sweden	0.70	Germany	0.72	Estonia	0.78	Spain	0.74	Austria	0.75
17	Ireland	0.77	Ireland	0.70	Slovenia	0.71	UK	0.76	Slovenia	0.72	Germany	0.73
18	Estonia	0.77	mean	0.69	Belgium	0.70	Hungary	0.75	Latvia	0.71	Ireland	0.71
19	Lithuania	0.76	UK	0.63	Ireland	0.69	Latvia	0.74	Holland	0.70	Belgium	0.71
20	Bulgaria	0.75	Latvia	0.59	mean	0.66	mean	0.73	mean	0.68	mean	0.70
21	Sweden	0.74	Bulgaria	0.56	Bulgaria	0.59	Portugal	0.69	Lithuania	0.60	Slovakia	0.65
22	Hungary	0.73	Slovakia	0.53	Slovakia	0.57	Lithuania	0.63	Portugal	0.58	Holland	0.63
23	Slovakia	0.68	Estonia	0.53	Holland	0.51	Poland	0.58	Poland	0.53	Bulgaria	0.63
24	Poland	0.68	Hungary	0.51	Poland	0.40	Slovakia	0.53	Slovakia	0.47	Poland	0.53
25	Portugal	0.60	Lithuania	0.48	Romania	0.36	Bulgaria	0.49	Bulgaria	0.43	Portugal	0.40
26	Greece	0.50	Romania	0.32	Portugal	0.24	Romania	0.25	Romania	0.23	Romania	0.37
27	Romania	0.50	Greece	0.31	Greece	0.22	Greece	0.22	Greece	0.11	Greece	0.35

Source: own calculation.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 8. Ordered values of *hp* measure with all possible partners and inside countries at NUTS1, 2 and 3 levels for Romania, France, Austria, Czech Republic, Denmark and Ireland

No.	Romania		France		Austria		Czech		Denmark		Ireland	
	Partner	hp	Partner	hp	Partner	hp	Partner	hp	Partner	hp	Partner	hp
1	Partner		Partner		Partner		Partner		Partner		Partner	
2	NUTS 1	0.96	NUTS 1	1.00	NUTS 1	1.00	NUTS 3	0.97	NUTS 2	0.99	NUTS 2	0.97
3	NUTS 2	0.95	NUTS 2	1.00	NUTS 2	0.99	NUTS 2	0.96	NUTS 3	0.99	NUTS 3	0.90
4	NUTS 3	0.87	NUTS 3	0.99	NUTS 3	0.98	Spain	0.89	France	0.93	Denmark	0.83
5	Bulgaria	0.74	Germany	0.94	Belgium	0.91	Slovenia	0.87	Sweden	0.88	France	0.81
6	Lithuania	0.54	Italy	0.94	Germany	0.91	Denmark	0.84	Italy	0.88	Italy	0.80
7	Spain	0.50	Denmark	0.93	France	0.90	Finland	0.84	Germany	0.87	Belgium	0.79
8	Slovenia	0.45	Finland	0.92	Spain	0.90	Latvia	0.83	Finland	0.87	Austria	0.79
9	Finland	0.44	Belgium	0.92	Finland	0.88	Estonia	0.82	Spain	0.86	Latvia	0.78
10	Austria	0.39	Austria	0.90	Italy	0.88	Italy	0.81	Austria	0.85	Finland	0.77
11	UK	0.37	Sweden	0.89	Holland	0.87	Germany	0.80	Belgium	0.85	Spain	0.77
12	Hungary	0.36	Holland	0.88	Slovenia	0.86	Austria	0.80	Czech	0.84	Germany	0.76
13	Czech	0.35	Spain	0.87	Denmark	0.85	France	0.79	Ireland	0.83	Estonia	0.75
14	mean	0.34	Ireland	0.81	Sweden	0.82	Hungary	0.79	Holland	0.82	Sweden	0.75
15	Greece	0.33	Slovenia	0.80	Czech	0.80	Lithuania	0.78	Estonia	0.81	Czech	0.73
16	Latvia	0.33	UK	0.79	Ireland	0.79	Belgium	0.77	Slovenia	0.80	UK	0.71
17	France	0.33	Czech	0.79	UK	0.75	Holland	0.77	Hungary	0.80	Holland	0.70
18	Germany	0.32	Estonia	0.75	mean	0.74	Slovakia	0.75	Latvia	0.79	Slovenia	0.70
19	Holland	0.32	mean	0.74	Latvia	0.73	UK	0.75	UK	0.77	Hungary	0.69
20	Estonia	0.31	Hungary	0.74	Hungary	0.73	Sweden	0.74	mean	0.73	mean	0.65
21	Slovakia	0.28	Latvia	0.72	Poland	0.71	mean	0.74	Lithuania	0.65	Poland	0.59
22	Italy	0.25	Portugal	0.71	Estonia	0.71	Ireland	0.73	Portugal	0.59	Lithuania	0.58
23	Sweden	0.23	Poland	0.64	Portugal	0.66	Bulgaria	0.70	Poland	0.58	Slovakia	0.47
24	Poland	0.23	Lithuania	0.61	Lithuania	0.64	Poland	0.64	Slovakia	0.57	Portugal	0.46
25	Denmark	0.22	Bulgaria	0.54	Bulgaria	0.60	Portugal	0.49	Bulgaria	0.55	Bulgaria	0.44
26	Belgium	0.19	Slovakia	0.50	Slovakia	0.54	Greece	0.49	Romania	0.22	Greece	0.22
27	Portugal	0.18	Romania	0.33	Romania	0.39	Romania	0.35	Greece	0.22	Romania	0.12
28	Ireland	0.12	Greece	0.19	Greece	0.30						

Source: own calculation.

Even though there are possible partners for monetary union in case of Bulgaria, Germany, Latvia and Finland none of them are conceding – there is not even one pair of countries that could form monetary union at virtually no loss in monetary policy effectiveness. But criterion used here was ex-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

tremely rigorous, especially if one takes a closer look at values of *hp*, one can see that they are very high in many cases. Values of *hp* measure above 0.8 were denoted in bold.

Table 9. Ordered values of *hp* measure with all possible partners and inside countries at NUTS1, 2 and 3 levels for Portugal, Slovakia, Slovenia, Estonia, Latvia and Lithuania

No.	Portugal		Slovakia		Slovenia		Estonia		Latvia		Lithuania	
	Partner	hp										
1	Partner	hp										
2	NUTS 2	0.99	NUTS 2	0.96	NUTS 2	1.00	NUTS 3	0.96	Estonia	0.92	NUTS 3	0.90
3	NUTS 3	0.96	NUTS 3	0.93	NUTS 3	0.99	Latvia	0.92	Lithuania	0.89	Latvia	0.89
4	Holland	0.80	Lithuania	0.80	Spain	0.92	Hungary	0.87	Hungary	0.86	Estonia	0.87
5	France	0.71	Slovenia	0.77	Finland	0.88	Lithuania	0.87	Czech	0.83	Hungary	0.82
6	Germany	0.71	Czech	0.75	Czech	0.87	UK	0.83	UK	0.82	UK	0.81
7	Italy	0.69	Latvia	0.73	Austria	0.86	Czech	0.82	Spain	0.81	Bulgaria	0.80
8	Belgium	0.66	Bulgaria	0.70	Germany	0.85	Finland	0.82	Finland	0.80	Slovakia	0.80
9	Austria	0.66	Spain	0.68	Holland	0.84	Denmark	0.81	Slovenia	0.80	Finland	0.78
10	Finland	0.64	Estonia	0.67	Denmark	0.80	Italy	0.78	Denmark	0.79	Slovenia	0.78
11	Spain	0.60	Finland	0.66	France	0.80	Sweden	0.78	Ireland	0.78	Czech	0.78
12	Denmark	0.59	UK	0.65	Latvia	0.80	Spain	0.77	NUTS 3	0.75	Spain	0.76
13	Sweden	0.58	Germany	0.58	Belgium	0.79	Ireland	0.75	Italy	0.74	Denmark	0.65
14	Slovenia	0.58	mean	0.57	Italy	0.78	France	0.75	Germany	0.73	mean	0.65
15	Czech	0.49	Hungary	0.57	Lithuania	0.78	Germany	0.74	Austria	0.73	Austria	0.64
16	Poland	0.48	Denmark	0.57	Slovakia	0.77	Slovenia	0.71	Slovakia	0.73	Italy	0.63
17	mean	0.47	Greece	0.56	UK	0.77	Austria	0.71	France	0.72	Germany	0.63
18	Ireland	0.46	Austria	0.54	mean	0.75	mean	0.68	Sweden	0.71	France	0.61
19	UK	0.40	Holland	0.53	Bulgaria	0.74	Slovakia	0.67	mean	0.70	Sweden	0.60
20	Slovakia	0.52	Italy	0.53	Sweden	0.72	Belgium	0.65	Belgium	0.67	Ireland	0.58
21	Bulgaria	0.51	France	0.50	Estonia	0.71	Bulgaria	0.61	Bulgaria	0.66	Romania	0.54
22	Estonia	0.25	Ireland	0.47	Hungary	0.71	Holland	0.53	Holland	0.59	Belgium	0.51
23	Latvia	0.24	Sweden	0.47	Ireland	0.70	Poland	0.39	Poland	0.48	Holland	0.48
24	Hungary	0.24	Belgium	0.46	Poland	0.69	Romania	0.31	Greece	0.41	Greece	0.44
25	Romania	0.18	Poland	0.36	Portugal	0.58	Greece	0.30	Romania	0.33	Poland	0.37
26	Lithuania	0.18	Portugal	0.32	Greece	0.46	Portugal	0.25	Portugal	0.24	Portugal	0.18
27	Greece	0.15	Romania	0.28	Romania	0.45						

Source: own calculation.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Chosen value of 0.8 is somehow arbitrary but expresses rather high degree of business cycle synchronization. Taking this value as a point of reference Poland do not find any suitable partners to form monetary Union with. The highest value of hp is observed with Belgium and its equal to 0.77. Similar situation can be seen in instance of Greece, which have the worst results among all examined countries. In other words Greek business cycle is very poorly synchronized with cycles all of analyzed countries – monetary policy that is optimal for any of these countries would be inappropriate for Greece.

Using 0.8 as references value some countries have rather big number of possible candidates for introduction of a common currency: Belgium (9 countries), Finland (14), Germany (11), Spain (12), Holland (10), Italy (11), France (12), Austria (12), Denmark (15) and Slovenia (10). Numbers for other countries are not as big, but still many pairs of countries with highly synchronized business cycle can be found. This also indicates that a lot of countries from Euro Area form organism that can be considered quite close to optimum currency area. Germany, France, Italy, Austria, Belgium, Holland, Spain, Austria and Finland constitute such an entity – optimal monetary policy for one of these countries is very close to optimal policies for all others. Unfortunately same thing cannot be said about other members of Euro Area with Greece being a leading outlier.

Conclusions

Extraction of cyclical components with Hodrick-Prescott filter from real GDP time series in order to obtain correlation coefficient of deviations of cyclical component from trend resulted in obtaining 276 measures for country pairs, as well as 3321, 29191 and 796953 measures for NUTS 1, 2 and 3 level region pairs respectively. Analysis revealed that average value of hp measure for countries and NUTS 1, 2 and 3 regions are equal to 0.65, 0.89, 0.88 and 0.85 respectively. This shows that business cycle synchronization at regional level is generally higher than at country level, but is mostly driven by high degree of business cycle synchronization among regions within countries. This result contradicts “Krugman’s View” which states that elimination of barriers to all economic activities leads to higher degree of concentration of economic activity due to economies of scale. These in turn leads to higher specialization, fragility of regions exports to changes in demand and lower business cycles synchronization with other regions. To the contrary it gives support to “European Commission View”.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Further economic integration by eliminating barriers to economic activity and introducing similar policies – *ergo* making groups of countries more like one country – will lead to tighter business cycle synchronization and can make common monetary policy effective.

Very restrictive criterion that used comparisons of business cycle synchronization at regional level within countries with country level correlations was used to access whether two countries can enter monetary union with each other with virtually no cost of monetary policy effectiveness loss. This restrictive criterion showed that 4 countries have candidates for effective monetary union formation, namely: Bulgaria, Finland, Germany and Latvia. On the other hand requirement must be fulfilled for two countries – and that criterion was not met. Using less restrictive criterion of correlation coefficient equal to 0.8 it turned out that a lot of countries have many good candidates to introduce common currency with. For example: Belgium (9 countries), Finland (14), Germany (11), Spain (12), Holland (10), Italy (11), France (12), Austria (12), Denmark (15) and Slovenia (10). Numbers for other countries are not as big, but still many pairs of countries with highly synchronized business cycle can be found. This also indicates that a lot of countries from Euro Area form organism that can be considered quite close to optimum currency area. Germany, France, Italy, Austria, Belgium, Holland, Spain, Austria and Finland constitute such an entity – optimal monetary policy for one of these countries is very close to optimal policies for all others. Unfortunately same thing cannot be said about other members of Euro Area with Greece being a leading outlier.

Results also show that Polish National Bank can use monetary policy very effectively, no matter what regional level of aggregation is used as reference point. On the other hand values of business cycle synchronization for Poland and other countries are very low. This indicates that there are no good candidates to form monetary union with Poland. Poland is also second outlier, after Greece, of the analyzed group. This result should not worry cause low degree of business cycle synchronization with other European countries can be attributed to well economic performance of Poland during recent crisis.

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18-19 June 2015, Economics and Finance**

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APPENDIX

Table A1. ADF and KPSS result for NUTS 1 region real GDP time series.

Country	Region name	ADF	KPSS	Country	Region name	ADF	KPSS
Belgium	Région de Bruxelles-Capitale	0,939	I(1)**	Italy	Nord Est	0,332	I(1)**
Belgium	Vlaams Gewest	0,854	I(1)**	Italy	Centro (IT)	0,699	I(1)**
Belgium	Région Wallonne	0,934	I(1)**	Italy	Sud (IT)	0,598	I(1)**
Bulgaria	Severna and iztochna Bulgaria	0,953	I(1)**	Italy	Isole (IT)	0,675	I(1)**
Bulgaria	Yugozapadna and yuzhna	0,996	I(1)**	Hungary	Közép-Magyarország	0,952	I(1)**
Germany	Baden-Württemberg	0,811	I(1)**	Hungary	Dunántúl	0,723	I(1)**
Germany	Bayern	0,880	I(1)**	Hungary	Alföld és Észak	0,045	I(1)**
Germany	Berlin	0,560	I(1)*	Holland	Noord-Nederland	0,908	I(1)**
Germany	Brandenburg	0,012	I(1)**	Holland	Oost-Nederland	0,890	I(1)**
Germany	Bremen	0,963	I(1)**	Holland	West-Nederland	0,825	I(1)**
Germany	Hamburg	0,906	I(1)**	Holland	Zuid-Nederland	0,790	I(1)**
Germany	Hessen	0,911	I(1)**	Austria	Ostösterreich	0,839	I(1)**
Germany	Mecklenburg-Vorpommern	0,010	I(1)**	Austria	Südösterreich	0,777	I(1)**
Germany	Niedersachsen	0,908	I(1)**	Austria	Westösterreich	0,906	I(1)**
Germany	Nordrhein-Westfalen	0,863	I(1)**	Poland	Centralny	0,940	I(1)**
Germany	Rheinland-Pfalz	0,883	I(1)**	Poland	Poludniowy	0,937	I(1)**
Germany	Saarland	0,787	I(1)**	Poland	Wschodni	0,860	I(1)**
Germany	Sachsen	0,009	I(1)**	Poland	Północno-Zachodni	0,943	I(1)**
Germany	Sachsen-Anhalt	0,007	I(1)**	Poland	Poludniowo-Zachodni	0,977	I(1)**

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Germany	Schleswig-Holstein	0,952	I(1)**	Poland	Północny	0,881	I(1)**
Germany	Thüringen	0,191	I(1)**	Romania	Macroregiunea unu	0,365	I(1)**
Greece	Voreia Ellada	0,664	I(1)**	Romania	Macroregiunea doi	0,353	I(1)**
Greece	Kentriki Ellada	0,473	I(1)**	Romania	Macroregiunea trei	0,860	I(1)**
Greece	Attiki	0,671	I(1)**	Romania	Macroregiunea patru	0,705	I(1)**
Greece	Nisia Aigaiou, Kriti	0,486	I(1)**	Finland	Manner-Suomi	0,961	I(1)**
Spain	Noroeste	0,804	I(1)**	Finland	Åland	0,976	I(1)**
Spain	Noreste	0,960	I(1)**	Sweden	Östra Sverige	0,989	I(1)**
Spain	Comunidad de Madrid	0,708	I(1)**	Sweden	Södra Sverige	0,971	I(1)**
Spain	Centro (ES)	0,996	I(1)**	Sweden	Norra Sverige	0,427	I(1)**
Spain	Este	0,875	I(1)**	UK	North East (ENGLAND)	0,898	I(1)**
Spain	Sur	0,789	I(1)**	UK	North West (ENGLAND)	0,786	I(1)**
Spain	Canarias (ES)	0,757	I(1)**	UK	Yorkshire + Humber	0,756	I(1)**
France	Île de France	0,872	I(1)**	UK	East Midlands (ENGLAND)	0,864	I(1)**
France	Bassin Parisien	0,581	I(1)**	UK	West Midlands (ENGLAND)	0,485	I(1)**
France	Nord - Pas-de-Calais	0,759	I(1)**	UK	Eastern	0,817	I(1)**
France	Est	0,321	I(1)**	UK	London	0,958	I(1)**
France	Ouest	0,662	I(1)**	UK	South East	0,764	I(1)**
France	Sud-Ouest	0,861	I(1)**	UK	South West (ENGLAND)	0,870	I(1)**
France	Centre-Est	0,871	I(1)**	UK	Wales	0,828	I(1)**
France	Méditerranée	0,945	I(1)**	UK	Scotland	0,982	I(1)**
Italy	Nord Ovest	0,575	I(1)**	UK	Northern Ireland	0,628	I(1)**

Source: own calculation.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
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**Estimation of Export Specialization:
Lithuanian Case**

JEL Classification: *F1; F11; F14*

Keywords: *trade; export; export specialization; revealed comparative advantage index; trade dissimilarity index*

Abstract: This paper investigates the nature and pattern of export specialization in Lithuania. The aim of this paper is to estimate the nature and pattern of Lithuanian export specialization under existing conditions. Seeking to define the nature and pattern of export specialization, the basic methods of export specialization measurement and the nature and pattern of export specialization in trade between Lithuania and the EU are determined. For measurement the pattern of export specialization in Lithuania two approaches are adopted. The index of export specialization is used to determine the pattern of comparative advantage. Secondly, trade dissimilarity index is used to predict structural changes in Lithuanian exports. Using these methods of measurement and standard international trade classification (SITC) was determined the nature and pattern of Lithuanian export specialization. It was found that the biggest flows from Lithuania to the EU are in such groups: food, drink and tobacco; raw materials; mineral fuels, lubricants and related materials. These calculation results show the main directions of nature and pattern of export specialization. This research could be useful for preparing and forecasting the possibilities of Lithuanian export development.

Introduction

International trade practice shows that economic instability of countries and lack of trust for foreign trade partners are the main factors impeding the development of export. For various countries, exports are a major source of foreign exchange, a way to maximize economies of scale and specialization and a channel to new technologies and knowledge spillovers (Lall, 2000, pp.337-369). Specialization patterns and an increasing higher value added of county's exports have important implications for productivity and economic growth. A country's specialization pattern should reflect structural phenomena such as its factor endowments, economies of scale, relative gap of factor productivity, or specific advantages of firms and industries (Santos-Paulino, 2010, pp.1095-1116). Existing research shows that the variety of goods that a country produces and exports is affected by specialization, which in turn affects economic growth (Amable, 2000, pp. 413-431, Hausman et al, 2007, pp.3-42). Countries specialize by exploiting their comparative advantage arising from differences in technology, innovativeness and differences in factor endowments (Bernatonyte & Normantiene, 2009, pp.7-17). Classical approaches to international trade and specialization, such as D. Ricardo theory of comparative advantage and Hecksher-Ohlin theory of factor endowments state that countries with different resources or factor endowments will trade with each other (Husted, Melvin, 2013, pp.104-105). This traditional approach emphasizes the role of specialization in international trade which increases operating efficiency and thus totals productivity.

Many studies suggest that traditional sources of competitive advantage (e.g. natural resources, access to financial resources, economies of scale, etc.) no longer suffice, growing relevance has recently been attributed by researches to human resources and their management (Kazlauskaite & Buciuniene, 2008, pp.78-84). Recent empirical studies confirm the argument that in which products economies specialize and what they export matters for economic performance (Lewer et al., 2003, pp. 39-46). Today specialization is a dynamic process and its effect on productivity depends on the circumstances in which industries operate.

EU enlargement creates a wider single market, which stimulates structural adjustment and economic specialization. This implies an increasing interest in analyzing export specialization patterns within the EU market. Several studies have assessed the evolution of the export patterns in the transition economies (Bernatonyte & Normantiene, 2009, pp. 7-17).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Lithuania's integration to the European Union has opened huge possibilities for export development. It was determined that in recent years export of Lithuanian goods into EU countries and import from the EU comprised the biggest share of all export and import. Researches show that the economic crisis and Russian embargo have a significant influence on the changes of nature and pattern of Lithuanian export specialization. At the same time, researches investigating such changes are missing. For this reason the actual problem is to estimate the nature and pattern of Lithuanian export specialization under the changed conditions. In order to estimate the nature and pattern of export specialization it is necessary to analyze the problem of its measurement.

Methodology of the research

The research examines the nature and pattern of export specialization in Lithuania. In order to estimate the nature and pattern of Lithuanian export specialization, the methods of assessment of export specialization were examined and the best methods were selected on these grounds.

Researchers have employed a number of measures of export specialization. They are used for studying the structure and determinants of country's export and to identify the basis on which to build competitive advantages (Bernatonyte & Normantiene, 2009, pp.7-17). The concept of comparative advantage is widely used in modern economic literature to evaluate the patterns of trade and specialization of countries in commodities which have a competitive advantage (Saboniene, 2009, pp.49-57). The indicator of the revealed comparative advantage provides a more concise picture of export specialization. The concept of revealed comparative advantage was introduced by Liesner (1958), but refined and popularized by Bela Balassa and known as the 'Balassa index' (Balassa, 1966, pp. 114-121). It is widely used empirically to identify a country's weak and strong export sectors. Michael Porter uses it to identify strong sectoral clusters (Porter, 1990, pp.45-50). Balassa (1965) explored the possibility of relying on various theoretical explanations of international trade to determine the patterns of comparative advantage (Balassa, 1965, pp. 35-55). The revealed comparative advantage (RCA) index is defined by Balassa (B) (1965) as follows:

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

$$B_{ij} = (X_{ij} / X_i) / (X_{wj} / X_w), \quad (1)$$

Where: X_{ij} is country's i export of sector j ; X_i – total export of country i ; X_{wj} – world export of sector j ; X_w – total world export.

If the share of sector j in total exports of country j is higher than the equivalent share of sector j in world exports, then $B_{ij} > 1$ and country j is classified as having a revealed comparative advantage in sector j . A value of less than unity implies that the country has a revealed comparative disadvantage in the sector j . The Balassa index has been subject to several critiques, leading some authors to propose several modified versions. Laursen (1998) suggests a transformation that produces a symmetric outcome, ranging from -1 to 1 with a threshold of 0; Proudman and Redding (2000) suggest a transformation that results in a constant mean across the different sectors for a given country. As in the Proudman and Redding (2000) contribution, the product specialization index suggested here has a clear and well-defined link with the original Balassa index (Laursen, 1998, pp. 30-42); Prodman & Redding, 2000, pp. 373-396).

The export specialization index (ES) is a slightly modified RCA index, in which the dominator is usually measured by specific markets or partners. It provides product information on revealed specialization in the export sector of a country and is calculated as the ratio of the share of a product in a country's total exports to the share of this product in imports to specific markets or partners rather than its share in world exports:

$$ES = (X_{ij} / X_{it}) / (m_{kj} / M_{kt}), \quad (2)$$

Where X_{ij} is the value of country's i export of product j ; X_{it} – total export of country i ; m_{kj} – the value of import of product j in market k ; M_{kt} – total import in market k .

The ES is similar to the RCA in that that the value of the index less than unity indicates a comparative disadvantage and a value above unity represents specialization in this market (Trade indicators, 2010).

A common measure for export specialization in the literature is the herfindahl index on exports. The evolution of the herfindahl index of export specialization might reveal to what extent a given country is becoming more specialized or diversified, regardless of how the economic structures of other countries are evolving. A higher index indicates that the country exports in a smaller range of sectors and hence is more specialized (Trade

indicators, 2010). Santos-Paulino (2010) used the trade dissimilarity index to illustrate how specialization might affect a country's export productivity (Santos-Paulino, 2010, pp.1095-1116). Trade dissimilarity index reflects the adequacy of a country's trade pattern or specialization, that is, it considers the uncertainty in the real growth of exports. The indicator tries to predict structural changes in a country's exports. Also, it evaluates if a change in the behaviour of exports is oriented towards more dynamic products demanded by the rest of the world, or by the main trade partners of a country. It is calculated as follows:

$$A_j = \frac{1}{2} \sum_k \left| \frac{X_{jk}}{X_j} - \frac{X_k}{X} \right|, \quad (3)$$

Where k is the product and j is the country. X represents total exports.

Trade dissimilarity index ranges from zero to one, with higher values indicating higher dissimilarity. This indicator is higher when a country exports commodities in an industry with relatively low international demand. Lower dissimilarity index mean higher diversification and diversification into new export products protects economies against unstable price and terms of trade shocks. As indicated by empirical exercise in Amable (2000), a decrease in trade dissimilarity index has a potential positive impact on the trade pattern of growth (Amable, 2000, pp. 413-431).

Regarding to the fact that export specialization index helps assess a country's export potential, it will be used for used to analyse the nature and pattern of export specialization between Lithuania and the EU. The structural changes in Lithuanian export are examined using trade dissimilarity index.

Comparative analysis of export specialization in Lithuania

Development of Lithuanian economy depends on foreign trade to a great extent. Development of foreign trade encourages structural changes of economy, helps to make close economic contracts to businessmen of other countries and to adjust to market conditions better. Lithuanian integration into the EU opened huge possibilities for Lithuanian foreign trade. Regional integration oriented transformations in the Baltic region Formation of the unified social, economic and technological space in the Baltic region could be comprehend as a successful case of the regional integration oriented

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

transformations in the European Union (Melnikas, 2008, pp. 54-64). It was determined that in recent years export of Lithuanian goods into EU countries and import from the EU comprised the biggest share of all export and import. In 2014 export of Lithuanian goods to the EU comprised 54.9% and import from the EU –63.8 % (Statistical Yearbook of Lithuania, 2014). While demand in Eastern markets is shrinking, export conditions to EU countries are getting more attractive (Snieska, 2008, pp. 29-41). Increase of the share of export of industrial products in comparison to the general export to EU market shows possibilities for industrial production to compete in these markets.

The analysis of Lithuanian export specialization is based on export specialization index and trade dissimilarity index. Using export specialization index (ES) and standard international trade classification (SITC) are calculated the nature and pattern of export specialization in trade between Lithuania and the EU (Table 1).

The export specialization index presented in Table 1 indicates that in 2007-2013 Lithuania has achieved comparative advantage in trade with the EU in: food, drink and tobacco, raw materials, mineral fuels, lubricants and related materials and other manufactured goods.

Table 1. Export specialization indices of Lithuanian trade with the EU in 2007-2013

SITC	Year						
	2007	2008	2009	2010	2011	2012	2013
Food, drink and tobacco (SITC 0+1)	3.19	3.31	3.23	3.43	3.41	3.42	3.44
Raw materials (SITC 2+4)	1.94	2.02	1.99	2.01	2.02	2.14	2.16
Mineral fuels, lubricants and related materials (SITC 3)	2.62	2.64	2.60	2.62	2.67	2.69	2.70
Chemicals and related products (SITC 5)	0.84	0.83	0.85	0.86	0.88	0.89	0.89
Machinery and transport equipment (SITC 7)	0.53	0.55	0.54	0.55	0.65	0.67	0.69
Other manufactured goods (6+8)	1.13	1.16	1.16	1.18	1.19	1.23	1.26

Source: own calculations based on Eurostat (2014).

Data of Table 1 show that Lithuanian trading with the EU in food products, drinks and tobaccos during 2013 not only increased if compared to 2007 but also were the largest. Such situation was determined by many reasons, mainly, abolition of customs taxes for food products and alcoholic

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

drinks from the EU states. This reduced the prices of these products in 2005, increased consumption and import thereof. On the other hand, during the examined period from 2007 to 2013 export of the said goods increased.

Using the trade dissimilarity index standard international trade classification (SITC) are calculated the pattern of export specialization between the Lithuania and the EU (Table 2).

Empirical results indicate a large variation in the trade dissimilarity index (Table 2). Results presented in Table 2 reveal that the trade dissimilarity index is lower in 2008. This situation is connected with trade structure of Lithuania (i.e. trade structure of Lithuania is rather similar to the EU trade). The EU trade policy and implementation of its principles had influence to new members of EU export and import marketable structure. It should be noted that since the Lithuania becoming the member of the EU common custom tariff of the EU is valid in Lithuania. This means that the same customs are applied for goods which are imported to the territory of Lithuania from the third countries as importing goods to any other EU country. In order to make sure implementation of solid foreign trade policy Lithuania and other members of EU applies custom tariffs, quantitative limitations, tariff quotas and other means of foreign trade regulation to the third countries, which EU applies. Lithuania has applied other means of EU foreign trade regulation: antidumping, protective, compensatory, reciprocal means, quantitative limitations, non-tariff limitations (veterinary and other standards), and means, introduced as sanctions according to the decisions of the United Nations.

Table 2. Trade dissimilarity indices of Lithuania in 2007-2013

Year	Trade dissimilarity index
2007	0.34
2008	0.30
2009	0.31
2010	0.32
2011	0.33
2012	0.35
2013	0.36

Source: own calculations based on Eurostat (2015).

Thus, the analysis of export specialization reveals that after Lithuania becoming the member of the EU, having national economics under development, structural changes of its economy takes place. Having Lithuania trade with the EU in a free trade regime influences the increase in the volumes of im-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

port and export. A country can simultaneously decrease the amount of produced goods and to increase the range of goods useful to the consumers. Thus, the nature of international trade is changing as well as its structure of goods due to increasing specialization within a branch and the variety of produced goods increases.

Conclusions

The conducted analysis enabled to draw the following conclusions:

Firstly, research shows that Lithuanian integration into the EU has influence on changes of export specialization. It was determined that in recent years export of Lithuanian goods into EU countries and import from the EU comprised the biggest share of all export and import.

Secondly, in order to understand the nature and pattern of export specialization of Lithuania it were examined the methods of assessment of export specialization and on these grounds were selected the best method. The analysis of these methods shows that researchers have employed a number of measures of export specialization for studying the structure and determinants of country's export and to identify the basis on which to build competitive advantages. It was determined that that export specialization index is the best of measuring export specialization in trade between Lithuania and the EU. This index helps to estimate a sector in which the country is relatively more competitive in terms of trade.

Thirdly, on the basis of study many methods of export specialization were determined that the most appropriate method for measuring how specialization might affect a country's export productivity is trade dissimilarity index. Trade dissimilarity index reflects the adequacy of a country's trade pattern or specialization, that is, it considers the uncertainty in the real growth of exports. The indicator tries to predict structural changes in a country's exports.

Fourthly, on the basis of standard international trade classification (SITC) and export specialization index was determined the nature and pattern of export specialization in Lithuania. It is found that the biggest flows from Lithuania to the EU are in such groups: food, drink and tobacco; raw materials; mineral fuels, lubricants and related materials. Such situation was determined by many reasons, mainly, abolition of customs taxes for food products and alcoholic drinks from the EU states. This reduced the prices of these products in 2005, increased consumption and import thereof.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

On the other hand, during the examined period from 2007 to 2013 export of the said goods in Lithuania increased.

Fifth, on the basis of standard international trade classification (SITC) and the trade dissimilarity index are calculated the pattern of export specialization between Lithuania and the EU. It was determined the low level of trade dissimilarity index because trade structure of Lithuania is rather similar to the EU trade.

Thus the analysis of export specialization reveals that after Lithuania becoming the member of the EU, having national economics under development, structural changes of its economy takes place. Having Lithuania trade with the EU in a free trade regime influences the increase in the volumes of import and export. Lithuania can simultaneously decrease the amount of produced goods and to increase the range of goods useful to the consumers. Thus, the nature of international trade is changing as well as its structure of goods due to increasing specialization within a branch and the variety of produced goods.

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**Proceedings of the 8th International Conference on Applied Economics
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Influence of Unemployment Benefit on the Duration of Registered Unemployment Spells

JEL Classification: *C01; C14; J64; J65*

Keywords: *Kaplan-Meier estimator; Cox hazard model; hazard ratio; unemployment*

Abstract: The purpose of the article is to present the analysis of the influence of the unemployment benefit on the duration of the registered unemployment spells. The authors made a hypothesis that the very fact of receiving the benefit prolongs the job seeking time and determines the intensity of unemployment leaving. The power of this influence varies depending on a subgroup the unemployed person belongs to. The study was conducted on the basis of data from the Poviast Labour Office in Sulęcın. The data were collected in the course of the European Union project implementation. The analysis covered two periods of time – before and after Poland’s accession to the European Union and the change in legal regulations concerning unemployment benefits. In each of the periods the authors observed separate cohorts of the unemployed registered in 2001 and 2005. The closing dates of the observations were: the end of 2003 and 2007, respectively. Also, the authors examined whether the EU projects implemented after 2004 had an effect on the length of the unemployment spells as well as on the intensity of finding a job.

Introduction

The influence of benefits, threshold salary and education on the unemployment duration is explained by the job search theory¹ which refers to certain principles followed by individuals in the process of job seeking. The job search theory represents a microeconomic approach. Its counterpart in the modern macroeconomic thought is a matching theory also called the search and matching theory². Nickell (1979), Hughes and Perlman (1984) have shown that the increase in unemployment benefits lead to prolonged spells of job seeking. The power of this interrelation is weakening as the unemployment spell is getting longer.

The purpose of this paper is to analyse the influence of the unemployment benefit on the duration of the registered unemployment spells. The study was conducted on the basis of data from the Poviát Labour Office in Sulęcín obtained under the European Union project³. The analysis covered two periods of time: before and after Poland's accession to the European Union and the change in terms of granting unemployment benefits (Act on promotion of employment and labour market institutions of 20 April 2004). In each of the periods the authors observed separate cohorts of the unemployed who had been registered in 2001 and 2005. The observation deadlines were the end of 2003 and 2007, respectively. In the paper the following hypotheses are made: the fact of receiving the benefit by an unemployed person prolongs their job seeking spell and affects the intensity of unemployment leaving; the implementation of the EU projects after 2004 has influenced the duration of unemployment spells. The effect of this influence varies among the sub-groups defined according to the categories of the job-seekers' attributes.

The job search theory explains why the unemployed individuals delay their employment decisions and extend their unemployment spell. The spells of frictional unemployment are the subject of the job search theory as

¹ The Nobel Prize winner of 1982 is regarded as the founder of the search theory.

² Noble Prize winners of 2001, Diamond, Mortensen and Pissarides contributed to the development of the search and matching theory and to its popularization in the job market analysis.

³ The project *The Analysis and Diagnosis of the Problem of Long-term Unemployment in the Poviát of Sulęcín (Analiza i diagnoza problemu długotrwałego bezrobocia w powiecie sulęcńskim)*, implemented as a part of the Operational Programme Human Capital 2007–2013.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

well as the search and matching theory, with both theories focusing on the demand issues. There are plenty of studies confirming the two theories.

Meyer (1990) investigated the impact of the amount and duration of the unemployment benefit on the duration of the unemployment spells. He was particularly interested in the analysis of events in the period before the termination of the unemployment benefit. He found out that higher benefits have a strong negative influence on the likelihood of unemployment leaving. This likelihood significantly rises towards the end of the period of benefit claiming. Meyer applied the methods for hazard function estimation and compared them with the methods that had been commonly used before, e.g. the Weibull model. He also discovered that the parametric approach gave more reliable estimations. The data came from the CWBH database and concern males from twelve US states observed in 1978-1983 (3365 observations). Their advantage was accurate information about the subjects' wages received in a week prior to unemployment and about the claimed benefits. The disadvantage was that the available information was restricted to the period of claimed benefits. The data concerning the unemployment period upon the benefit termination are considered to be censored. Meyer pointed to a high replacement rate amounting to 0.70 (the ratio of the average benefit to the average income earned before the unemployment spell). The presented empirical hazard defines the ratio of the number of unemployment exits over a given week to the number of the unemployed at the beginning of this week. High intensity is observed in the first few weeks, then between the 25th and 29th week, to be followed by the subsequent increase between the 35th and 38th week. Meyer attributes these intensity fluctuations to the period when benefit spells come to an end. His conclusions concerning the application of the model of proportional hazards include the finding that the 10% increase of unemployment benefits is associated with the 8.8% drop in the intensity of unemployment leaving. The obtained results refer solely to the period when the benefits are granted. According to Mortensen (1977), higher benefits may lead to stronger intensity in this period, while Katz (1986) claims that the intensity of unemployment leaving rises towards the end of benefit spells.

Han and Hausman (1990) conducted their study basing on the PSID database. It covered 1055 observations of breadwinners aged 20 to 65. The indicated a large number of unemployment exits in the 26th and 39th week (the moments when benefit spells come to an end in various American states). What is interesting, the intensity of unemployment leaving was strong also at the beginning of benefit spells. The authors divided the group

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

of the observed subjects into the ones who had found new employers and those who had returned to their previous employer. It turned out that job seekers who terminated their unemployment spells early were those who were re-hired by their former employer, even though they had been granted the unemployment benefits. In the case of the former group the unemployment leaving intensity does not increase until the end of their benefit spells.

Røed and Zhang (2003) did research into the effect of the benefit amount on the intensity of finding a job by people under 60 who had lost their full-time jobs in 1990 and did not qualify to be granted the unemployment benefit. The observation covered 103 thousand people. Those of them whose benefit spell ended and who did not find a new job were considered censored. Røed and Zhang proved that the benefit amount had a negative effect on the unemployment leaving intensity, especially in the case of the unemployed males. However, the threat of losing the benefit mobilised them (mainly women) to find a job. The researchers pointed out that the unemployment leaving intensity was rising by 60% (women) and 40% (men) at the end of their benefit spells. What is more, Røed and Zhang found out that the unemployment spells varied depending on the amount of the benefit: a 10% reduction shortened the job seeking time by 1 month in the case of men and by 1-2 weeks in the case of women.

This article is in line with the trend in the modern reference literature, which is the measurement of the unemployment benefit effects on the length of unemployment spells (Moffitt, 1985; Katz & Meyer, 1990; Hunt, 1995; Card & Levine, 2000; Hahn et al., 2001; Lalive, 2007). Unemployment brings negative effects to both the national economy and the well-being of households. This is why governments can and should use adequate tools to alleviate these effects, focusing in particular on the duration of unemployment. Unfortunately, there are no ready-made solutions to the problem. Both the unemployment rates and its mean duration vary from country to country, disregarding their development level. Governments offer diverse forms of support and activation programmes directed to the unemployed citizens in general as well as to their specific groups. The outcomes of individual programmes can be difficult to predict. Therefore, it seems essential to conduct studies on the effectiveness of these tools. One of the researchers dealing with this issue was Lalive (2007) whose interesting study focused on the possible effect of prolonging the unemployment benefit from 30 to as many as 209 weeks. Such an extended benefit was introduced by the Austrian government in 1988 and it was targeted at the 50+ unemployed who had been residents of the selected regions for at least

six months and who had been employed before. Obviously, such extension of the unemployment benefit resulted in the prolonged unemployment spells, especially in the case of women, which was due to the opportunity of early retirement. In the reference literature authors often point out that the maximum length of unemployment benefits is strongly correlated with structural unemployment (Nickell & Layard, 1999). The extended benefit time usually discourages the beneficiaries from job-seeking, thus leading to prolonged unemployment spells. For this reason, it is important to address support programmes to carefully selected groups of beneficiaries. In his research Lalive used the nonlinear regression model in its sharp form, with the thresholds of age eligibility and of distance to danger area border. Szmieder, von Wachter and Bender (2012) applied the nonlinear regression models with several age thresholds to study the effect of the potential benefit duration on the unemployment time throughout the whole economic cycle of 1980-2008 in Germany. The authors point out that they are basing their research on the model of job-seeking with limitations to liquidity and that the German system of unemployed benefits is ideal for this kind of studies. They adopt the age thresholds reflecting the potential benefit duration as the non-linearity thresholds (42, 44 and 49).

Methodology of the research

In this study the authors used the following methods to conduct the survival analysis: the Kaplan-Meier estimator (curves of surviving in unemployment, identification of hazards proportionality, the average time of unemployment spells, the intensity (hazard) of unemployment leaving) and the Cox model of non-proportional hazards (the relative intensity (relative hazard) of unemployment leaving). Kaplan and Meier (1958) proposed the way of estimating the survival function in the case of censored data:

$$\hat{S}(t_i) = \prod_{j=1}^i \left(1 - \frac{d_j}{n_j} \right), \text{ for } i = 1, \dots, k \quad (1)$$

where:

t_i – the moment when at least one event happened (deregistering),

d_i – the number of events in the time t_i ,

n_i – the number of units under observation in the time t_i .

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The hazard (the intensity of deregistering from PLO) was estimated by means of the formula:

$$h_j = \frac{d_j}{n_j} \quad (2)$$

where:

d_j – the number of deregistered subjects in a given month,

n_j – the number of the unemployed subjects under observation at the beginning of that month.

The relative intensity of registered unemployment leaving was evaluated by means of the model of non-proportional hazards⁴ (following the recognition of the absence of non-proportionality on the basis of the course of the survival curves) in a form:

$$h(t, Z) = h_0(t) \exp(\beta Z + \delta Z \times g(t)) \quad (3)$$

where:

$$g(t) = \begin{cases} 0 & \text{for } t < t_0 \\ 1 & \text{for } t \geq t_0 \end{cases} \quad (4)$$

$$Z = \begin{cases} 0 & \text{no benefit} \\ 1 & \text{benefit} \end{cases} \quad (5)$$

In the model (3) the parameter β defines the influence of the endogenous variable on intensity, while the parameter δ indicates if this influence changes over time. The value $\exp(\beta)$ is understood as the relative intensity (hazard ratio) of leaving unemployment by the deregistered job seekers entitled to the unemployment benefit to the unemployment leaving by the job seekers deprived of this benefit due to their deregistration over the period of time shorter than t_0 . The value $\exp(\beta + \delta)$ is the relative intensity when the unemployment spell was longer than t_0 .

⁴ See more on the Cox non-proportional hazard model in (Bieszk-Stolorz & Markowicz, 2012, Bieszk-Stolorz, 2013).

The effect of unemployment benefit on the job seeking process – study results

In the study the authors used individual data of 2799 unemployed individuals registered in 2001 and 3377 ones registered in 2005 by the Poviát Labour Office in Sulęcín. The sizes of sub-groups can be found in Table 1. The individuals considered to be censored were those who remained registered by the end of the observation, i.e. who failed to leave unemployment.

For both the periods of observation the authors determined the Kaplan-Meyer estimators that were used to compare the probabilities of leaving the register by the individuals who were claiming the benefit and by those who did not, in total (Figure 1) and in the sub-groups. In the first months of unemployment we can clearly see the difference in the survival models constructed for the unemployment claimants and to those who were not granted the benefit. It means the absence of hazard proportionality in those groups. A similar shape of the survival curves could be seen in the sub-groups discriminated according to gender, age and education.

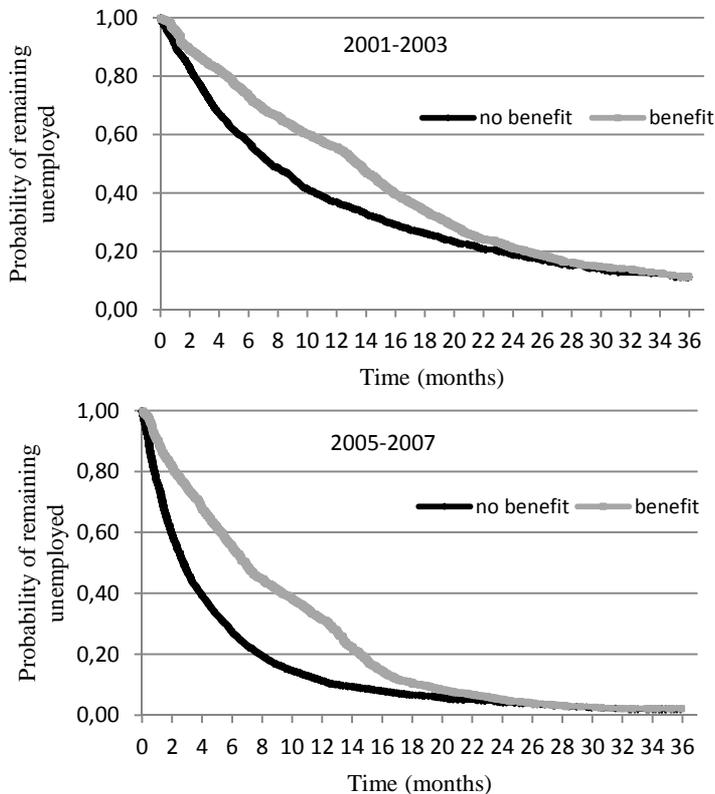
Table 1. Number of the observed unemployed according to their attributes and the fact of claiming the benefit

Groups	2001-2003				2005-2007			
	benefit	no benefit	total	censored	benefit	no benefit	total	censored
Total	1425	1374	2799	413	1146	2231	3377	96
K	519	550	1069	188	434	950	1384	49
M	906	824	1730	225	712	1281	1993	47
W ₁	390	453	843	94	319	695	1014	8
W ₂	388	370	758	98	352	665	1017	29
W ₃	356	340	696	122	209	436	645	19
W ₄	281	202	483	94	240	376	616	32
S ₁	336	399	735	134	252	618	870	36
S ₂	645	654	1299	200	475	961	1436	37
S ₃	74	57	131	19	75	107	182	4
S ₄	326	225	551	53	295	451	746	16
S ₅	44	39	83	7	49	94	143	3

Women (K), Men (M); Age: 18-24 (W₁), 25-34 (W₂), 35-44 (W₃), 45-54 (W₄); Education: lower secondary, primary and incomplete primary (S₁), basic vocational (S₂), general secondary (S₃), post-secondary and vocational secondary (S₄), tertiary (S₅)

Source: own study based on the data from the Poviát Labour of Sulęcín.

Figure. 1. Kaplan-Meier estimators for unemployed persons in 2001-2003 and 2005-2007 total



Source: own study based on the data from the Poviát Labour of Sulęcin.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 2. Mutual distance measures determined basing on the estimator for the unemployment spell duration for the unemployed registered in 2001. The observation by the end of 2003.

Groups	First quartile	Median	Third quartile	First quartile	Median	Third quartile
	benefit			no benefit		
Total	5.63	13.41	21.49	2.96	7.53	18.94
K	5.95	13.81	24.79	2.55	7.13	19.82
M	5.54	13.18	20.45	3.29	7.59	18.54
W ₁	5.64	13.32	19.55	2.19	6.26	15.28
W ₂	5.62	13.35	21.17	2.76	6.12	16.18
W ₃	6.54	13.78	22.52	3.91	9.90	24.65
W ₄	4.91	13.53	24.76	3.65	10.03	21.04
S ₁	6.94	14.83	24.10	3.51	8.86	22.90
S ₂	5.93	13.76	22.74	2.89	7.50	19.02
S ₃	4.09	8.25	19.97	3.67	7.53	16.61
S ₄	4.73	11.61	19.07	2.17	5.31	13.96
S ₅	2.40	10.78	17.69	2.41	6.61	14.56

Source: own study based on the data from the Poviát Labour of Sulęcín.

Table 3. Mutual distance measures determined basing on the estimator for the unemployment spell duration for the unemployed registered in 2005. The observation by the end of 2007.

Groups	First quartile	Median	Third quartile	First quartile	Median	Third quartile
	benefit			no benefit		
Total	2.96	6.90	13.35	1.12	2.76	6.48
K	2.73	7.17	13.97	0.82	2.27	5.93
M	3.02	6.58	13.08	1.28	3.16	6.90
W ₁	2.23	5.41	10.95	1.08	2.32	5.14
W ₂	2.89	6.90	13.35	1.13	2.75	6.09
W ₃	2.21	7.12	13.75	1.05	2.83	6.90
W ₄	4.27	8.98	15.62	1.12	3.78	9.21
S ₁	3.78	8.12	14.76	1.28	3.22	7.41
S ₂	2.75	6.05	12.90	1.09	2.89	6.67
S ₃	2.50	7.25	12.43	0.82	1.82	4.37
S ₄	3.70	7.22	13.82	0.89	2.27	5.38
S ₅	2.05	5.77	10.99	1.08	2.27	4.55

Source: own study based on the data from the Poviát Labour of Sulęcín.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

When analysing the results in Tables 2 and 3, we have come to the following conclusions:

- a) referring to the unemployed registered in 2001
 - 25% of the benefit claimants were de-registered after 5.6 months of job seeking, 50% – after 13.4 months, and 75% – after 21.5 months,
 - 25% of those who were not entitled to the benefit got de-registered after 3 months of job seeking, 50% – after 7.5%, and 75% after 18.9 months,
 - in the group of benefit claimants it was men who de-registered sooner, while in the group of the unemployed not entitled to the benefit women left the register earlier than men,
 - generally speaking, younger people were leaving unemployment more often,
 - unemployment spells got shorter with the rising level of education of the unemployed person.
- b) referring to the unemployed registered in 2005
 - generally speaking, the registered job seekers were leaving unemployment sooner than in the previous period of observation,
 - 25% of the benefit claimants got de-registered after 3 months of job seeking, 50% – after 6.9 months, while 75% – after 13.3 months,
 - 25% of those who were not entitled to the benefit got de-registered after 1.1 months of job seeking, 50% – after 2.8 months, and 75% – after 6.5 months,
 - in terms of gender, age and education the situation was similar.

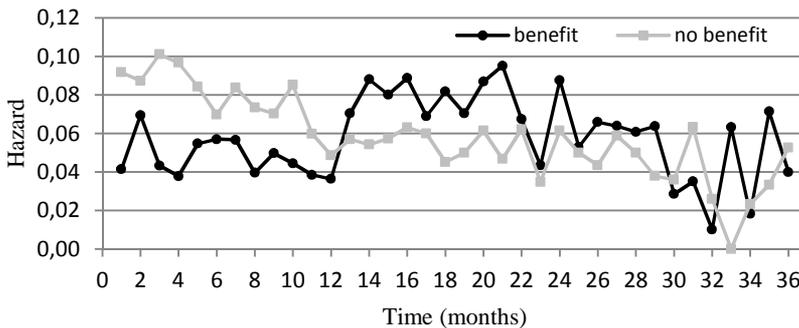
The mean values in Table 4 indicate the differences in the duration of unemployment spells. The unemployment spells were longer in the case of the benefit claimants in each of the sub-groups and in both observation periods. However, in 2005-2007 the average period of registration was shorter than in 2001-2003.

Table 4. Mean values of the unemployment spells duration

Groups	2001–2003		2005–2007	
	mean		mean	
	benefit	no benefit	benefit	no benefit
Total	14.3	11.4	8.9	5.3
K	15.0	11.4	9.6	5.0
M	13.9	11.4	8.4	5.5
W ₁	13.6	10.0	7.2	4.0
W ₂	14.4	10.3	8.8	5.0
W ₃	14.8	13.6	9.2	5.4
W ₄	14.6	13.0	10.8	7.2
S ₁	15.8	12.7	10.0	6.1
S ₂	14.8	11.6	8.2	5.5
S ₃	12.8	11.4	8.1	4.2
S ₄	12.6	9.1	9.4	4.2
S ₅	11.4	9.6	7.7	3.9

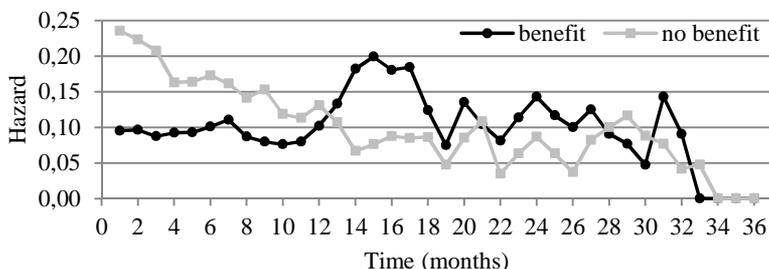
Source: own study based on the data from the Poviát Labour of Sulęcín.

Figure 2. Hazard of the unemployment leaving in months (group 2001-2003)



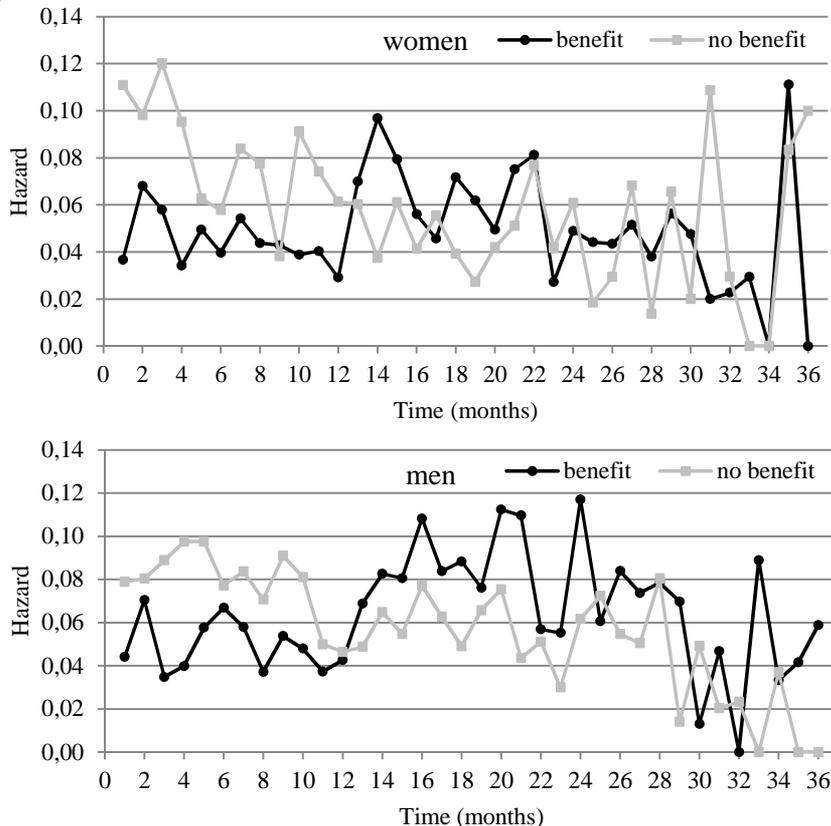
Source: own study based on the data from the Poviát Labour of Sulęcín.

Figure 3. Hazard of the unemployment leaving in months (group 2005-2007)



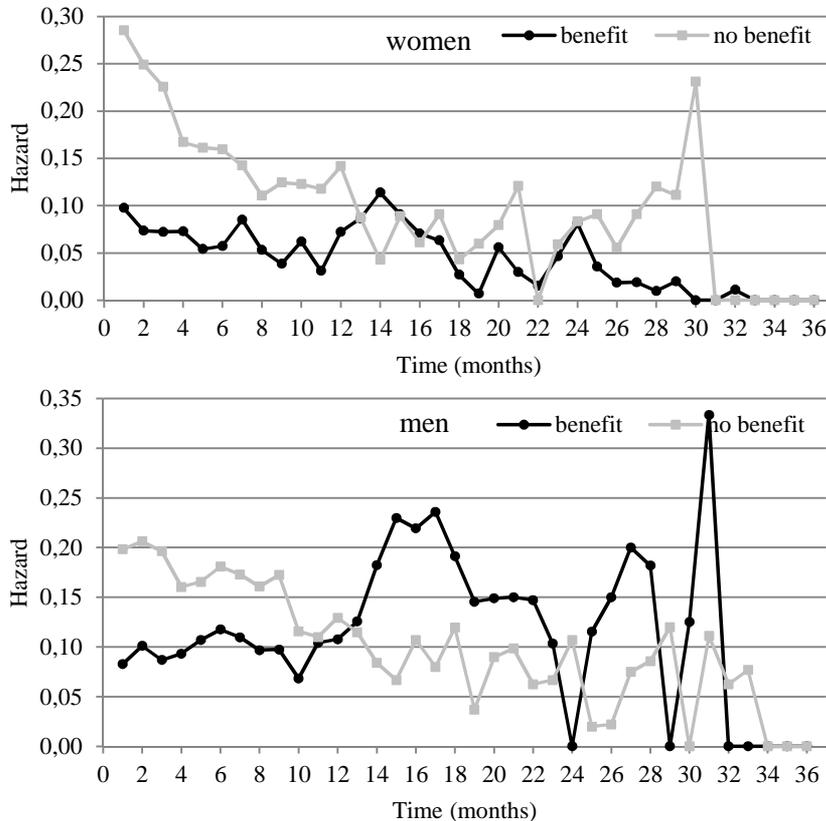
Source: own study based on the data from the Poviast Labour of Sulęcın.

Figure 4. Hazard of the unemployment leaving in months (group 2001-2003) by gender



Source: own study based on the data from the Poviast Labour of Sulęcın.

Figure 5. Hazard of the unemployment leaving in months (group 2005-2007) by gender



Source: own study based on the data from the Poviát Labour of Sulęcín.

The charts of hazards determined for benefit claimants and for the job seekers not entitled to benefits in both observation periods demonstrate the absence of proportionality (Figures 2 and 3). In the first 12 months we can see higher intensity of register leaving by the unemployed who were not entitled to the benefits than by the benefit claimants. In the 13th month the situation was reversed. A similar tendency took place in the gender, age and education sub-groups (see exemplary presentations of the age sub-groups in Figures 4 and 5). Therefore, in the Cox regression model (3) for the function (4) we adopted $t_0 = 13$. In the first period up to 13 months the values of hazard ratios were less than 1, which means that the intensity of the register leaving by the benefit claimants was lower than in the case of

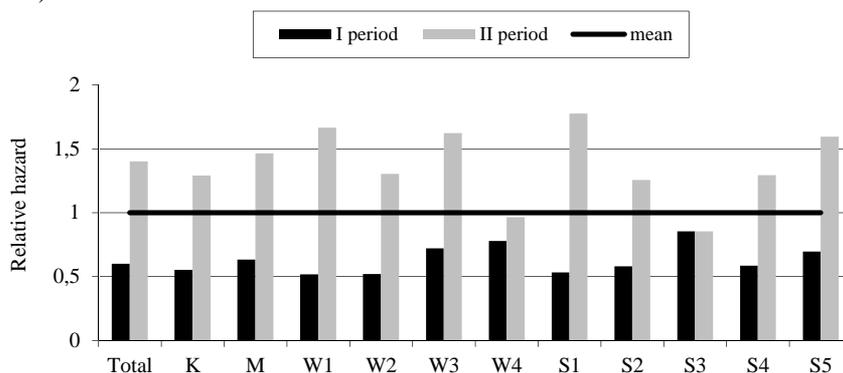
the remaining unemployed (Figures 6 and 7). When determining the hazard ratio, the peer group was the group average, which was marked in Figures 6 and 7 with a line in bold. After the 13th month (period II) the situation reversed in most of the sub-groups (excluding the insignificant ones). The parameter estimators together with errors and the significance level for the model in question are presented in Tables 5 and 6.

Table 5. Results of Cox's models parameters estimation (period 2001-2003)

Groups	Estimators of parameters (standard error)		<i>p</i>	
	β	δ	β	δ
Total	-0.5077 (0.0509)	0.8458 (0.0897)	0.0000	0.0000
K	-0.5907 (0.0834)	0.8474 (0.1495)	0.0000	0.0000
M	-0.4575 (0.0643)	0.8403 (0.1124)	0.0000	0.0000
W ₁	-0.6562 (0.0917)	1.1669 (0.1651)	0.0000	0.0000
W ₂	-0.6510 (0.0965)	0.9166 (0.1751)	0.0000	0.0000
W ₃	-0.3243 (0.1055)	0.8082 (0.1776)	0.0021	0.0000
W ₄	-0.2497 (0.1264)	0.2148 (0.2168)	0.0482	0.3218
S ₁	-0.6265 (0.1051)	1.2011 (0.1802)	0.0000	0.0000
S ₂	-0.5409 (0.0764)	0.7704 (0.1292)	0.0000	0.0000
S ₃	-0.1564 (0.2243)	-0.0009 (0.4262)	0.4857	0.9984
S ₄	-0.5343 (0.1083)	0.7934 (0.2134)	0.0000	0.0002
S ₅	-0.3606 (0.2730)	0.8288 (0.5390)	0.1865	0.1241

Source: own study based on the data from the Poviát Labour of Sulęcín.

Figure 6. Relative hazard of the unemployment leaving in months (group 2001-2003)



Source: own study based on the data from the Poviát Labour of Sulęcín.

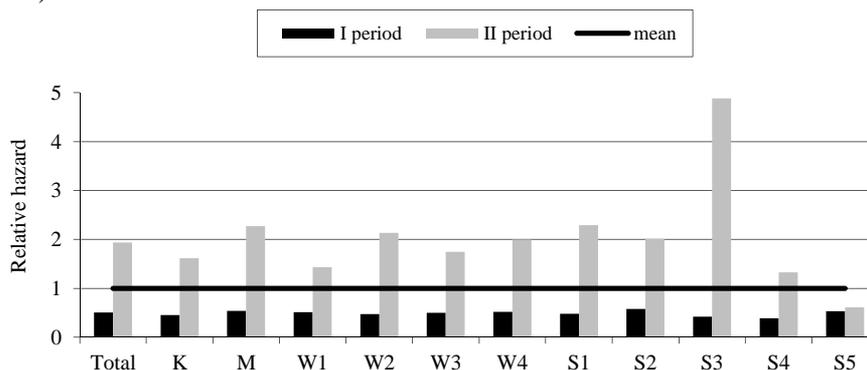
**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 6. Results of Cox's models parameters estimation (period 2005-2007)

Group	Estimators of parameters (standard error)		<i>p</i>	
	β	δ	β	δ
Total	-0.6895 (0.0416)	1.3501 (0.1078)	0.0000	0.0000
K	-0.7900 (0.0677)	1.2685 (0.1695)	0.0000	0.0000
M	-0.6202 (0.0529)	1.4411 (0.1409)	0.0000	0.0000
W ₁	-0.6735 (0.0741)	1.0328 (0.2377)	0.0000	0.0000
W ₂	-0.7485 (0.0755)	1.5064 (0.2070)	0.0000	0.0000
W ₃	-0.6956 (0.0981)	1.2510 (0.2399)	0.0000	0.0000
W ₄	-0.6552 (0.0992)	1.3471 (0.2127)	0.0000	0.0000
S ₁	-0.7374 (0.0897)	1.5662 (0.2017)	0.0000	0.0000
S ₂	-0.5529 (0.0631)	1.2500 (0.1656)	0.0000	0.0000
S ₃	-0.8764 (0.1698)	2.4630 (0.6007)	0.0000	0.0000
S ₄	-0.9511 (0.0866)	1.2330 (0.2586)	0.0000	0.0000
S ₅	-0.6269 (0.1929)	0.1347 (0.6175)	0.0012	0.8273

Source: own study based on the data from the Poviát Labour of Sulęcín.

Figure 7. Relative hazard of the unemployment leaving in months (group 2005-2007)



Source: own study based on the data from the Poviát Labour of Sulęcín.

Conclusions

The study confirmed the research hypotheses. The fact of claiming the unemployment benefit prolonged the unemployment spells in both periods of observation. The loss of the right to the benefit increased the probability of de-registration in each sub-group. The fact of claiming the benefit reduced the likelihood of leaving the register in the first 13 months following

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

the registration in both 2001-2001 and 2005-2007. Poland's accession to the European Union and access to funding under projects implemented by the Poviats Labour Office in Sulęcín had an effect on reducing the registered unemployment spells and on the intensity of unemployment leaving. Since 2004 the PLO have implemented numerous projects financed by the EU⁵ and aiming at improving the situation of job seekers on the job market. The projects were directed at concrete groups of job seekers, e.g. those affected by long-term unemployment, young people, women or those who were planning to start their own business.

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⁵ The examples of the projects: *Internship Abroad – an Opportunity for the Youth in the Poviats of Sulęcín, No to Long-term Unemployment, Active Start for Young People, Career Woman – Independent Woman*.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015
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**R&D Tax Incentives in Industry: Empirical
Study Among Small and Medium Electronics
Manufacturing Enterprises***

JEL Classification: *E61 ; H29; D 92*

Keywords: *small & medium-size enterprises; R&D tax deductible; own research and development; Czech Republic*

Abstract: The paper deals with the topic of direct and indirect support for research and development and its use in small and medium-sized enterprises operating in the electronic industry. The Czech Republic is the geographic segment to be explored. A chapter on theoretical issues is followed by a description of the current situation in the Czech Republic and abroad and access to legal support for research and development in the business sector. Primary data collected from a survey are analysed in the analytical part. Some small and medium-sized enterprises of chosen group of manufacturing industry focus on research and development performed by their own means and they searched the possibility of financing the research from various sources. The initiative of these enterprises increase considerably their competitiveness in the global market and they realize the necessity of the innovation policy in the strategic management of the business, but still they do not make full use of all available supports in research and development from public sources

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

and instruments of fiscal policy, which allows the legislation of the Czech Republic.

Introduction

The third millennium, the change of regimes in the countries of Eastern and Central Europe, the expansion of the European Union (hereinafter the EU) has brought the enlargement of globalization and the pressure on sustainable development and growth of competitiveness of enterprises of all sizes. Companies can no longer operate only regionally, but if they want to succeed in the global market, they must be flexible when responding not only to the demands of consumers and customers, but all stakeholders, on the legislative changes and to the changes in the business environment. The turbulence that occurred to the EU when accepting new member states caused, thanks to the process of economic integration, the reduction of the technology gap between new and old members of the EU. This emphasized the dynamics of the export of the member countries. The link between technological innovation and the growth of the international competitiveness of both new and existing EU member states has been empirically confirmed. (Antimiani & Costantini, 2013, p. 355-389) One of the ways to succeed in the global market is therefore a systematic research, development and innovation of products and services provided, all in accordance with the protection of the environment. (Borghesi, 2015, p. 669-683) Innovation is not only the modern trend, but this is a basis for sustainable growth of enterprises, regardless of size. Product, process, marketing and organisational innovations must respond to the development and trends in the demographic area. (Bierwisch, Goluchowicz, & Som, 2014, p. 343-357).

The forces that drive innovations at the company level, and innovations that will succeed in improving the performance of the enterprise, are essential to establish the strategic objectives. Recently, there was a connection of the practical interest of the business community and the professional public as for the creativity and types of innovations in enterprises, in particular the impacts of the types of innovation activities on the performance of the business. The fact, how to successfully make use of the innovation in enterprises is very important in the time when innovation strategy is nearly the question of survival. This solution is not surprising, because the innovation could be described as a differentiation from the others, which will lead to an increase of the performance level and to a gain of a competitive ad-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

vantage. Evaluation of the types of innovation in organizations should help the managers to develop of production processes and productivity (Gelard & Emamisaleh, 2014, p. 222-228).

The impact to differences in the structural characteristics of the selected member countries of the EU were described in a study conducted in the private sector of manufacturing enterprises. (Mate-Sanchez-Val & Harris, 2014, p. 451-463) The business innovations were described using the two-step Heckman model. The European Community Innovation Surveys (CIS4) revealed that Spanish companies were at a different stage and they are behind with the UK companies. According to (European Commission, 2012) the Czech Republic is in the same category as Spain, it means the week innovators (moderate innovators) while the UK belongs among the innovators - followers. Similar recommendations such as for Spanish enterprises - to try to reach the technological level of innovators followers - should be recommended for Czech enterprises. Therefore, it is recommended to make use of public or regional support for the increasing market share of the enterprise.

Research activities and the following implementation of innovation belongs among the expensive budget items with no guarantee that the investment would have a real rate of return in the future for the company and the owner. Investment in research, development and innovations (hereinafter referred to R&D&I) should be a reasonable expenditure, a presumption for the continuous evaluation of innovative projects and processes. Ongoing evaluation of innovative projects should accompany the enterprises when deciding whether a project is beneficial for the company and whether it is appropriate to continue the innovation.

Definition

Several authors define the terminology and concepts dealing with innovation, research and development used in the literature. The concepts of innovation, innovation ability, development and applied research must be defined for the purposes of this contribution. Joseph Schumpeter mentions the importance of innovations for the competitiveness of the enterprise. He worked out the way of inherence in the productive process of capital, called it creative destruction and its effect is called innovation. The positions and importance of the business were introduced in 1911. The entrepreneur is, according to him, the only one who is innovating and developing unproven technologies (Jirásek, 2002).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The main international source for the collection, analyse and use of information and data on the development and innovation is the Oslo manual. It summarizes the definitions and the legislations of the different EU countries. In the Czech Republic, the research is defined by the law 130/2002 Sb. as a systematic creative work of expanding knowledge, including knowledge of man or of society using methods enabling the confirmation, completion or overturn the previous results as basic and applied research. Development is then defined as the creative use of research knowledge to produce new or improved materials, products, equipment and services, including the acquisition and verification of prototypes. The result of research and development are, in many cases, innovations. The Oslo manual defines innovations in four types:

- Product innovation – means the introduction of new or significantly improved goods or services with respect to their characteristics or intended use. This includes significant improvements in technical specifications, components and materials, software, user friendliness or other function parameters.
- Process innovation – means the introduction of new or significantly improved production or supply methods. This includes significant changes in techniques, equipment and/or software.
- Marketing innovation – means the introduction of a new marketing method involving significant changes in product design or packaging, product placement, promotion of the product or of pricing. The distinguishing feature of a marketing innovation compared with other changes in the marketing tools of the company is the introduction of marketing methods, which were not previously used.
- Organization innovation – means the introduction of a new organisational method in business practices, the organization of the workplace or external relations. Organisation innovation in business practice includes the implementation of new methods for the organization of the standard practices and procedures for the implementation of the work (OECD - Eurostat, 2005).

This article examines the research, development and innovation in the field of electronic industry in the Czech Republic. The branch of electronic industry is one of the most important and significant part of the manufacturing industry and occupies a leading position in the Czech economy. It concentrates many groups and the total trade, capital and production consistency make electronic concerns the strong companies. These companies had to respond to globalization and entry of foreign investors. It is possible

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

to maintain continuity in business and achieve success only by developing innovative capabilities (Dul & Ceylan, 2014, p. 1254-1267).

The ability of competitiveness and sustainable growth are not possible at present without innovation capacity of enterprises. (Ebersberger & Herstad, 2013, p. 626-630); (Costa & Carvalho, 2013, p. 355-389) Small and medium - sized enterprises have due to the quick flow of information in the vertical direction and due to simpler administrative systems an advantage in pace of response to market demands and trends. Innovation can be interpreted as the ability to transform innovation inputs into outputs; it means the ability to transform innovation capacity and efforts to implement its results on the market. (Žižlavský, 2013, p. 234-250) Small and medium – sized enterprises have a position more difficult when financing R & D. Especially for this market segment the measures were taken in the form of direct support for R & D and deductible items (R & D Deductible) in 2005. The use of these types of aid is not frequent, as the following research reveals.

Methodology of the research

Respecting the identified objectives for basic research - to investigate the current state of the evaluation of innovative activities and sources of financing in the electronic industry enterprises in the Czech Republic were used scientific methods of work- secondary data analysis method. This method was used to obtain new knowledge about the quality and relevance. The source of secondary data was the literature, especially foreign literature - books, magazines, articles from scientific and professional conferences, published in the databases (Scopus, Science Direct, Web of Science, EBSCO). Questionnaires were used to obtain the primary data. The data obtained from the survey were enriched during structured interviews with owners or company managements. Logical methods were used for processing primary and secondary data. Analysis was used to study the records of interviews. Synthesis was the method used for data classification and processing of research results, induction was used for the generalization of all results gained in the survey. Statistical data processing was carried out in PC programme Statistica 12.

Before starting the research itself, the selection of respondents was done. The companies operating in NACE 26 and taking part in 2013 and 2014 at AMPER exposition were chosen to be analysed.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Companies in this group of the manufacturing industry were focused on and they were chosen according to the participation in specific research "Effective economic management of the company with regard to the development of global markets" and "Microeconomic and macroeconomic principles and their effect on the behaviour of firms" and according the participation in the research on the financing of innovative activities through indirect support R & D.

Table 1. Numbers of enterprises surveyed according to the industry group.

Industry group	Size of enterprise according to the number of employees			
	0 – 9	10 – 49	50 – 249	250 –
26.1	4	11	6	1
26.2	6	4	2	3
26.3	2	7	1	0
26.4	0	0	3	0
26.5	5	15	7	2
26.6	0	0	1	0
26.7	0	1	3	0
26.8	0	1	0	0
Total	17	39	23	6

Source: Own resources.

The intention was to contact enterprises based in the Czech Republic only. The Table 1 shows the number of respondents.

The investigation itself could be carried out under condition that the questionnaire would be simple, accurate and relatively short for a respondent. These conditions were an important criterion for the preparation of the questionnaire. The questionnaire was composed of four types of responses. There were questions with one or more optional answers. Questions aimed at measuring the innovations were pre-defined answers proposing the evaluation scale. Some questions were without predefined answers, free to be answered. In case of a company which does not implement any activity, the answer was redirected to the next block of questions.

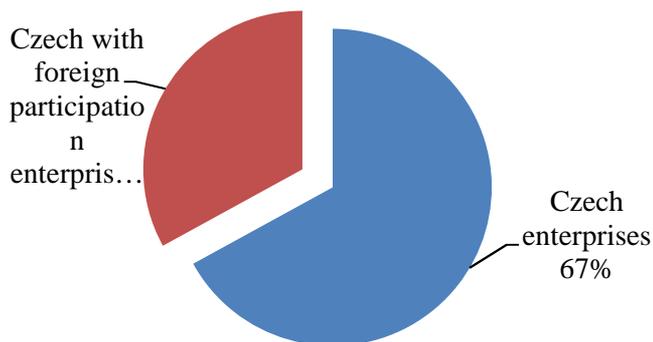
Research results

The questionnaire was divided in four sections:

- characteristics of the enterprise
- innovation activity
- sources of financing research and development
- evaluation of innovations for the enterprise

The questionnaires were distributed to companies, which I knew by name, so it was possible to add their economic data from the database or Amadeus Commercial register. The definition of micro, small and medium-sized enterprises used in the EU comes from Annex no. 1 of Commission Regulation (EC) No. 800/2008 of 6. 8. 2008, in accordance with Articles 87 and 88 of the EC Treaty declaring certain categories of aid are compatible with the common market (General Regulation of Block Exemptions). (Evropská společenství, 2006) Question N.1 and 2 were focused on the number of employees and the size of the turnover in 2013, possibly 2012. For simplification, the size of the company is based only on the number of employees. Micro and small enterprises prevail among the contacted companies, which are 63.9 %. That's mostly because the research was focused on companies based in the Czech Republic. The number of micro and small innovative companies was higher in a study conducted among manufacturing enterprises (Zizlavsky, 2013, p.234 – 251). Two-thirds of surveyed companies are owned by Czech owner, one third is a foreign-owned enterprise. These are mainly medium-sized enterprises.

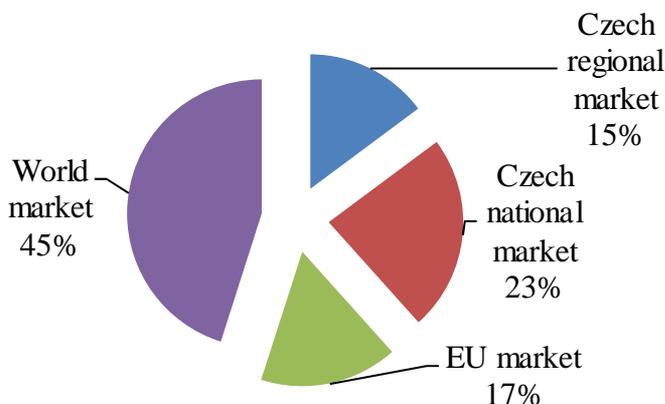
Graph 1. The ownership structure of companies



Source: Own research.

Surveyed enterprises answered the question about their regional influence. In terms of competitiveness, the presence in the global market is advantageous for the company. The deficit of customers can be compensated by the expansion of activities in another market. Territorial partition of companies is shown in graph 2. Companies focus the world market (45 %). Enterprises that not only exported to EU countries, but especially the Russian and American markets were represented in this category. Enterprises operating in the regional market were represented by 15 % and companies operating on the Czech national market were represented by 23 %.

Graph 2. Orientation to markets (%)

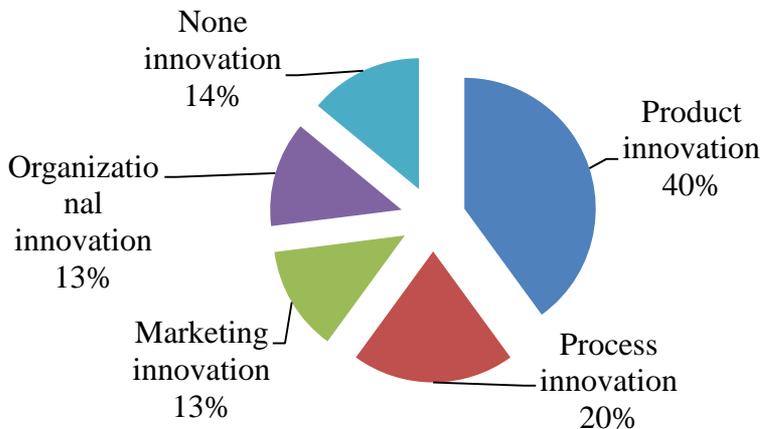


Source: Own research 2014

Further the respondents answered the question: what types of innovations were carried out in the company in 2011 – 2013. The information was used in the following questions relating to the evaluation of innovative means and funding R & D. The choice from 5 predefined answers corresponded to the classification according to the Oslo Manual (OECD - Eurostat, 2005). The most frequent type of innovations was the product innovation however, marketing and organization innovations were performed by the same percentage of companies. 14 % of companies only made no innovation. For more information see graph 3.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Graph 3. Effected innovations (%)



Source: Own research 2014.

In the period following the economic recession and increasing pressure of globalization, it is expected that small and medium-sized enterprises are forced by the external conditions and the threat of competition to invest in innovations. On the other hand, the larger medium enterprises and large enterprises can increase operational efficiency and reduce costs by economies by quantity. The importance that the respondents see in various types of innovations is shown in table. 1

Table 1. Importance of individual types of innovations for companies

Type of innovation	Evaluation 1 - 5 (%)					Average	Modus	Standard deviation	Σ 1+2 (%)
	1	2	3	4	5				
Product innovation	53	27	13	0	7	1.8000	1	1.2540	80
Process innovation	23	52	9	0	17	2.3636	2	1.3093	74
Organizational innovation	25	9	41	16	9	2.7500	3	1.2502	34
Marketing innovation	23	23	23	8	23	2.8514	Multiple	1.4650	46

Source: Own research 2014

The results of weighted averages accentuate the importance of individual types of innovation for the business, product innovation are important for companies, but the innovation of new products may accompany the innovation process and marketing. The importance of innovations was evaluated in the scale: 1 - Very important, 2 - Important, 3 - Neutral, 4 - Not im-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

portant, 5 – Completely unimportant. The table shows the percentage of positive responses, ie. the sum of responses 1 and 2. According to this summation of the respondents answer, the importance of innovation for the company is in the following order: product innovation, process, marketing and organizational innovation. Compared with research carried out throughout the manufacturing industry in the Czech Republic in the years 2010 - 2011 (Žižlavský, 2013, p.234 – 251) the difference is in ranking between marketing and organizational innovation. A higher percentage of enterprises in the electronic industry appreciate product innovation. Organizational innovations are according the percentage of answers less important for companies operating in electronic industry than for companies in manufacturing industry.

Other part of the questionnaire was to answer questions about the impetus for the introduction of innovations and to evaluate their significance for the company. Answers of respondents according to the level of importance in percentage and their statistical processing is shown in tab. 2.

Table 2. Effect of chosen innovative activities for companies

	Evaluation 1 – 5 (%)					Average	Modus	Standard deviation	Σ 1+2 (%)
	1	2	3	4	5				
Extending the assortment	69	23	8	0	0	1.3900	1	0.6339	92
Reducing material intensity of production	30	14	30	22	0	2.4583	Multiple	1.1600	44
The development of new technologies	31	45	8	8	8	2.1700	2	1.1896	76
The introduction of new work organization	31	15	46	8	0	2.3100	3	1.0020	46
Increase the utility qualities of the products or service	50	34	16	0	0	1.6600	1	0.7415	84
Increase the market share	46	23	23	8	0	1.9300	1	1.0076	69

Source: Own research 2014

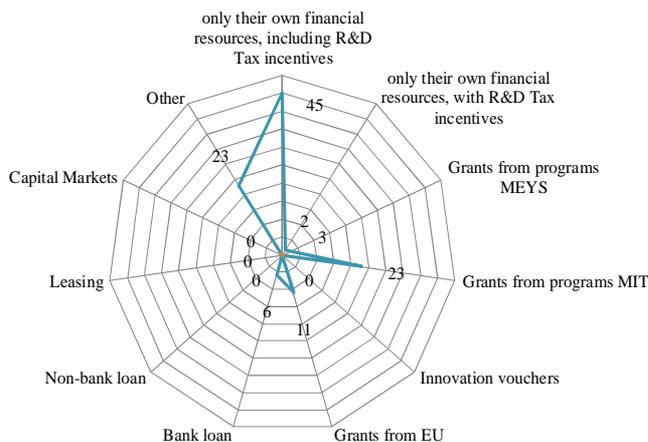
Extend the range of products and increase the quality of use of a product or provided services were the most significant impulses for the surveyed enterprises. R & D Council of the Czech Republic found that the Czech

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

production had relatively high expenditures of production, which is compared to the EU average of 28 countries 2.5 times higher to a production unit of GDP (R & D Council, 2014, p.3) and it is very alarming that to reduce energy and material costs of production is the least significant impetus for the introduction of innovations in the electronic industry. Similarly, the development of new forms of work organization, eventually organization of supplier relationships is considered “not very important” for enterprises. 44 % of respondents considered it “very important” or “important”.

The respondents provided information on sources of funding for innovation activities in the next part of the questionnaire. Small and medium-sized enterprises in the manufacturing industry often mentioned insufficient resources to cover R & D expenditures. (Nowakowska-Grunt, 2014, p. 789 - 795); (Kearney, 2014, p. 552 - 567) SMEs in the Czech electronic industry use mainly their own resources. The result of the survey is presented in the chart 1.

Chart 2. The sources of funding of research activities of SMEs in the electronic industry



Source: Own research.

The most common way of financing development activities of SMEs in the electronic industry are own resources. The enterprises use financing to their own detriment without the use of tax incentives. Tax incentives in the

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Czech Republic were legitimized in 2005. Companies, as a legal entity, could make use of the tax allowances for research and development in the reporting period according to § 34 para. 4-8 of the Act no. 586/1992 Coll., On income taxes, and deductions among individuals according to § 34 para. 4 of the Act no. 586/1992 Coll. Among the respondents there were only two companies that took advantage of tax incentives for reimbursement of a part of eligible R & D costs. The company representatives said that the deductible item for R & D was the form less demanding as for administration as well as less time-consuming form of support from public funds than direct assistance in the form of grants. Tax incentives were used repeatedly. A quarter of companies used direct support for R & D programs of the Ministry of Industry and Trade (MIT). 13 % of companies only reported that in 2011 – 2013 they used funding support from the EU for research. Any of the companies had no experience with the use of innovation vouchers. This tool of innovation support was introduced in 2009 in the Czech Republic by the South Moravian Innovation Centre (hereinafter referred to as JIC). It is a way of collaboration between Brno research institutions and enterprises in the region. Vouchers are designed especially for small and medium-sized enterprises, which enable the company to fully concentrate on business, while the selected researcher will supply the knowledge necessary for innovation. The aim of the cooperation is to create high added value and increase the competitiveness of companies in the region. According to the authors of this idea the innovation vouchers help to eliminate mutual distrust between the academic and business backgrounds. (Jihomoravské inovační centrum) A total of 300 innovation vouchers for over 32 - million CZK were issued during the calls from 2009 to 2014. This principle of innovation support was also adopted by other regions, eg. Zlin, Liberec etc. Small and medium-sized enterprises of electronic industry do not benefit of leasing, non-bank loans and financing through capital markets for funding innovation activities.

The enterprises of the manufacturing industry felt that the most important factor limiting their innovating activities was a lack of funds and too high costs and risks of innovation in the years 2009 - 2011. (Žižlavský, 2013, p. 242) The companies reported in other responses the reasons for not using innovation vouchers, indirect support, subsidy programmes and bank loans to finance their research activities. More than half of the companies stated that they did not trust the system of allocation of funds for innovation vouchers and indirect support. At the same time, however, two thirds of respondents stated that management did not know about the possibility to

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

finance R & D expenditures through innovation vouchers and deductions when they were asked questions about this kind of financing.

The last part of the questionnaire asked questions about the ways of evaluation of innovation processes. The most important indicator for the evaluation of innovation activities for SMEs of electronic industry was *revenues*, which 27 % of companies considered “very important”. The evaluation of innovative activities through the Balance Scorecard, indicators of profitability and market potential was behind the revenues.

Conclusions

The survey was based on the interest of companies in practical experience in use of methods of funding research activities in the Czech industry. Based on experience with the use of direct aid and tax incentives in advanced European economies (Bozeman & Link, 1985, pp. 370 - 382); (Bozio, Delphine, & Loriane, 2013, p. 1-28); (Baghana & Mohnen, 2009, pp. 91-107); (Cappelen, Raknerud, & Rybalka, 2012, pp. 334-345); and evaluation of the legislation in the Czech economy (Elschner, Licht, Spengel, & Ernst, 2011, pp. 233-256), it might be assumed that the Czech production companies would invest in accordance with the International Strategy of competitiveness in the Czech Republic in research and development and constantly innovate. The survey revealed that the reality was different.

Real numbers of innovations, measurement of innovation activities in connection with the competitiveness of countries are measured by international indicators such as Innovation Scoreboard, GCI etc. Countries whose indicators are lower look for a way to increase innovations and enhance the innovation process. One of the means is to identify barriers. Identification of innovation barriers was effected in the Spanish manufacturing industry with 294 companies (Madrid-Guijarro, Garcia, & Van Auken, 2009, pp. 465-488). The biggest barrier is the high costs of the innovation process. This barrier affects more the small-sized enterprises than large enterprises. A less significant barrier to innovation is the discrepancy between employees and owners. Innovative activities of companies depend on the company's position in the region, the size of company and public support for innovation in the private sector. The identification of barriers was conducted from the perspective of managerial perceptions. *Internal barriers*: lack of financial resources, low-skilled human resources, weak financial position of a company, the high cost of innovations and investment risk of innova-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

tions. *External barriers*: turbulence environment, lack of external partners for cooperation, lack of information, lack of public support. Similar results were reported by other authors (Cordeiro & Vieira, 2012, pp. 97-104); (Holmenlund, 2014); (Georghiou, Edler, Uyerra, & Yeow, 2014, pp. 1-12). In Finland, one of the most innovative and developed countries, the barriers of innovations are described to the smallest detail including recommendations on how to overcome these barriers. (Sandberg & Aarikka-Stenroos, 2014, pp. 1293-1305) Global European survey was performed in two stages and their results are presented by (Hölzl & Janger, 2013, pp. 1450-1468). They point to differences in barriers to the fast growing innovative companies and other enterprises in connection with the influence of public administration.

Identification of innovation barriers in countries with a similar historical development as the Czech Republic is based on a comparison of innovation barriers in different industrial branches. (Balcerowicz, Peckowski, & Wziątek-Kubiak, 2010, pp. 1-44) I did not find any detailed information in available resources about identification of innovation barriers in Hungary and Slovakia.

There are more authors in the local literature who deal with the issue of identification of innovation barriers, especially (Nečadová & Scholleová, Motives and barriers of Innovation Behaviour of companies, 2011); (Nečadová & Breňová, Inovační aktivity a konkurenceschopnost firem, 2012). They mention especially these kinds of innovation barriers:

1. high expenditures,
2. lack of specialists,
3. extremely long period of return on investment,

High expenditures and a long period of return on investment are the barriers of innovation activities that can be partially overcome by using direct and indirect support for research and development. Czech business sector has one of the best legislative support for tax incentives, ie the possibility to deduct incurred expenditures of research and development in the amount of 200 %. This possibility can be applied if the company is not profitable. Deductible item can be applied in three following tax years. There is existing legislative support for companies, therefore, SMEs finance the innovations mainly from their own sources and without the use of indirect support as the survey revealed. According to the survey the companies do not trust the subsidy programmes offered by MIT, MEYS and EU .

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Small and medium-sized manufacturing companies in the electronic industry in the Czech Republic implemented all four types of innovations in 2010–2013, mostly product innovations. Owners and management of companies consider the impact of innovation on the position of enterprises as beneficial and companies behave responsibly when measuring the impact of innovations. Measurement of results of innovations using financial and non-financial indicators was not the main aim of this paper, but could be the subject of further survey in individual groups of manufacturing industry.

In conclusion it is necessary to add that funding of research, development and innovation in small and medium-sized enterprises of certain groups of the manufacturing industry is influenced by the position of SMEs in comparison with the big players in the market - access to information, sources of financing, own research departments, ensuring their own research by skilled human resources. Yet SMEs innovate, overcome in some researches defined barriers and increase the competitiveness of SMEs in the electronic industry, and therefore contribute to increasing the competitiveness of regions according to their competence and increase the chances of the Czech economy to progress to the category of *Innovation followers* eventually *Innovation leaders*. It is important to note that Czech SMEs should make better use of available resources of funding research and development in cooperation with research institutions, which can significantly reduce their own costs for R&D.

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
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**Corporate Bankruptcy and Survival on
the Market: Lessons from Evolutionary
Economics**

JEL Classification: *G33*

Keywords: *corporate bankruptcy and survival; creative destruction; evolutionary economics*

Abstract: The following paper is a theoretical and empirical study. The terminological differences between bankruptcy and insolvency have been indicated and compared in the article. Most frequently considered aspects of bankruptcy appear in definitions. The first of them emphasises the economic character of bankruptcy. Insolvency is a culmination of a lack of financial means and the loss of solvency, which does not have a fading tendency but develops into a permanent phenomenon. In legal terms, solvency is an institution, whose purpose is to stop the accumulation of debts and most frequently it consists on the liquidation of the debtor's estate. A critical review of the scientific achievements of the representatives of evolutionary economics within the scope of bankruptcy and the survival of enterprises was presented. The analysed case of the Beta company, which went bankrupt, indicates that the companies which are not able to undertake proper adjustments to competitive conditions of the market at the right moment are eliminated from it. The theoretical law “the survival of the fittest” finds then its reflection in practice. The following research methods were used in the article: a descriptive analysis and the trajectories of J. Argenti in terms of models. Detailed examinations of files of insolvency proceedings of the Beta company have been carried out.

Introduction

Benjamin Franklin said that there were only two things certain in life: death and taxes. "Bankruptcy" and "insolvency" should be added to them (Cousins at al., 2000, p. 6). E. Mączyńska and Zawadzki (2006, pp. 21-24) point out that bankruptcies of enterprises are natural phenomena in the social market economy, ensuring necessary economic selection. However, they do not always facilitate a long-term increase of economic effectiveness. In relation to the increasing globalisation, a threat of the so-called insolvency chain (an insolvency domino effect) may be observed. According to A. Herman (2010) experiences arising from the last financial crisis in the global economy contribute to the awareness that insolvency and bankruptcy are an inherent feature of social market economies. According to F. Borman "Capitalism without bankruptcy is like Christianity without Hell." The market self-purifies itself from ineffective entities. Their resources may be utilised in a more effective manner by the more competitive entities. According to the theory of "creative destruction" by J. Schumpeter, the entities which are not adjusted or which are least adjusted are eliminated from the market. This raises many questions and doubts concerning the reasons of this phenomenon. But *scire est rerum cognoscere causas*. Many causes of bankruptcy, from strong market competition to tough luck, may be distinguished. Bankruptcy is a traumatic experience for many stakeholders, among others, owners, shareholders, employees and creditors. Bankruptcy contributes to the loss of: employment, savings, investments, movable and immovable assets. In the United Kingdom the loss of pension follows as well. As a result of insolvency the decrease of tax revenues and the destruction of regions also take place.

Herman (2010) points out that in contemporary market theory of enterprise there is still no developed bankrupt economics - such, which would demonstrate the processes and mechanisms of survival and insolvency of managing entities. There is a lack of one, consistent theory of bankruptcies and its elements are the part of separate economic theories. E. Mączyńska at al. (see 2010, pp. 5, 10) draws attention to the development of economics and bankruptcy economics.

The notions of bankruptcy and insolvency

Bankruptcy and insolvency are not identical terms. Insolvencies fulfil the function of necessary selection in business and they fulfil a significant function of rationalisation, purifying the market from the entities which cannot meet the requirements of effectiveness, which constitutes at the same time the element of the protection of creditors and other entities.

The notions of bankruptcy and insolvency are frequently treated as synonyms (Mączyńska, 2009, p. 57). It is not precise as bankruptcy is the notion of, first and foremost, economics, while insolvency is basically a legal category (*Bankructwa przedsiębiorstw...* 2009, p. 4). Identifying bankruptcy with insolvency is justified only in case of culpable bankruptcy, consisting on the penalty which is proportional to fault, which is regulated by specific provisions. Non-culpable insolvency is not regarded as bankruptcy in the economic terms as it does not arise from the irregularities in the management of an enterprise but from the external reasons, e.g. fraud of counterparty. The differences between bankruptcy and insolvency have been presented in table 1.

Table 1. The differences between bankruptcy and insolvency

Bankruptcy and insolvency Insolvency ≠ Bankruptcy		Insolvency = Bankruptcy	
Non-culpable		Culpable	
Is not subject to a penalty	Unintentional	Intentional	Intentional profit-driven
Is subject to a penalty			
Criminal liability of entrepreneurs (a fine, deprivation of the right to perform particular functions, a custodial sentence)			
Milder penalty	More acute penalty	The most acute penalty	

Source: Mączyńska (2009, p. 57).

From the point of view of economics, a bankrupt is an enterprise which is not able to settle its debts and the value of its assets is not sufficient to cover all liabilities (a bankrupt is also an enterprise which, in spite of the occurrence of the above-mentioned premises, still operates a business).

In legal terms insolvency of an enterprise occurs only after the declaration of bankruptcy by the court. Its purpose is to satisfy equally all creditors of a debtor, who is not able to satisfy each creditor separately. Bankruptcy should prevent carrying out enforcement against a debtor only by some

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

creditors (in the event the others don't have the enforcement title yet, e.g. when their claims have not been paid yet) and in case when there is a priority system in enforcement proceedings. This means that the fact of bankruptcy is established judicially on the basis of the request either from a debtor, or from some of creditors or a few creditors. In the first case it is voluntary bankruptcy and in the second one forced bankruptcy (Tokarski, 2013, p. 393-400). In economic terms, bankruptcy does not have to mean insolvency in legal terms, but each insolvency declared by the court means economic bankruptcy.

Methodology of the research

Research objectives

Scientific achievements of the representatives of evolutionary economics have been used to assess the adjustment of a selected enterprise to market requirements. The objective of the research was to recognise the mechanism of bankruptcy of a selected enterprise, whose object of economic activity was wholesale of food products, in the context of evolutionary economics. Among specific objectives the following have been indicated: the determination of the major reasons of bankruptcy as well as the presentation of bankruptcy trajectory of the purposely chosen young (around 5 years) food company Beta from Dolnośląskie Voivodeship.

The choice of the research object

The Beta enterprise, which declared bankruptcy, has been chosen for the purpose of research. The choice of the company was deliberate. A changed name of the enterprise was given in the paper due to business secret and data protection. The enterprise operated a business in a legal form of a limited liability company. Bankruptcy petition of a debtor was filed in the District Court in Wrocław. Relatively poor knowledge of the topic of bankruptcy of food enterprises supports the need to introduce research which may contribute to the better recognition of this phenomenon, including also the basic driving forces.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Methods of data collection

Data concerning bankruptcy of the selected Beta enterprise come from the insolvency court files and from the financial statements of the company. A critical analysis of subject literature, national and foreign one, has been carried out.

Methods of data processing

Methods used in the paper:

- research case study,
- ratio analysis of financial statements,
- bankruptcy trajectory method of Argenti,
- examination of insolvency files.

The appearance and the development of crisis was presented by J. Argenti. He also distinguished three bankruptcy trajectories:

- 1) the bankruptcy trajectory of a newly established enterprise,
- 2) the bankruptcy trajectory of a young enterprise,
- 3) the bankruptcy trajectory of a mature enterprise (Argenti, 1976, p. 121).

Argenti distinguished four stages, which ultimately lead to bankruptcy:

- 1) problems in the operation of an enterprise start to arise, but they do not cause significant changes,
- 2) all irregularities deepen, mistakes are made,
- 3) significant irregularities concerning particularly the sphere of solvency appear,
- 4) the bankruptcy of an enterprise follows.

Method of presenting results

The obtained results have been presented in a descriptive and graphic form.

Bankruptcy macroeconomic outlook

Companies have been and continue to be the actual victims of the ongoing global financial crisis. Corporate bankruptcies in the eurozone were expected to increase by 21% in 2013 before ebbing back to a moderate growth rate of 7% in 2014. In Spain, it was expected a new all-time high

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

with nearly 11 000 companies defaulting 2014. A high number of bankruptcies influences on soaring unemployment and a real phenomenon of deindustrialization. After record figures in 2009, another flood of bankruptcies – from the United States to China to France – poured into sectors with tax incentives coming to a halt such as construction and services. The acceleration in the number of bankruptcies is more a result of market fundamentals: from slowdown in household consumption in Europe to sluggish exports for Asia. In Europe, the retailing, furnishing, automobile and consumer electronics sectors have been hit strongly. It is this industrial Darwinism, against a backdrop of ongoing credit rationing. The consequences are significant: in Asia, for example, companies are seeing their export markets decreasing and overcapacity is posing a problem (Subran, 2013, p.3).

The question arises if this economic turbulence (with the number of companies created also increasing in many countries) come to be synonymous with a renewal. According to the evolutionary theory of Schumpeter, such economic entropy could indeed foster a new beginning. The least adapted and, especially, the least innovative companies will give way to those that reinvent themselves and meet the needs of today. After the 2008 and the current chill in the economy, now Schumpeter's "perennial gale"; it starts to make a lot of sense. It is in sectors with high value added, intensive in talent, human capital and social capital, driven by research, innovation and entrepreneurship that these needs can be found. So the news may be bad, with soaring corporate insolvencies and heightening non-payment risk at a time when margins are already eroded. However, this could be a case of a step back in order to make a bigger leap forward. The condition for success is that adequate policy steps are taken in terms of innovation, business environment and incentives, especially to support startups, before it is too late (Subran 2013, p. 3).

Most frequently, bankruptcy precedes crisis, which is the effect of the impact of the adverse internal and external factors with a macroeconomic character. Among macroeconomic factors, the most influential one is the phase of the economic cycle, which includes a country and an economic growth rate. Unfavourable economic situation increases negative selection of ineffective entities, contributing to the change of resources allocation.

In many countries, there is a close correlation between the business cycle and bankruptcy figures. Generally, it takes GDP growth of 2% to 3% to stem the rise in bankruptcies, and there is a very high elasticity of bankruptcies to growth. A GDP growth reduction of 1 percentage point implies

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

a 5% to 10% increase in bankruptcies. In the second half of 2008, however, these general approximations, seen in practice from the start of the 1990s, were significantly exceeded: on top of the normal shock resulting from the economic cycle came the abrupt addition of exceptional factors directly stemming from the nature and impact of the global crisis. In 2009, it was in fact the record collapse in economic growth, due to the collapse in demand, that explains the bulk of the rise in bankruptcies, which proceeded with exceptional ferocity (*Corporate insolvencies...*, p. 4).

The Banque de France stressed in particular that the higher level of business creations during the 2003–2007 period – itself correlated with the business cycle – may explain the increase in the number of bankruptcies (Bruneau et al., 2012, pp. 119 – 220).

There is agreement in the financial economics literature regarding the existence of a link between bankruptcies and the business cycle. This topic has already been extensively investigated and it is acknowledged that some interaction exists. However, there is no agreement on the channels by which bankruptcies and the business cycle interact, nor on how to measure the link. Regarding the channels of interaction, the business cycle affects the environment of firms, and hence may explain, with a lag, the changes in bankruptcies over time, in addition to firm-specific variables like financial ratios. On the other hand, bankruptcies may affect the business cycle, marginally through lost capacities of production, and more significantly through credit rationing as shocks to credit supply have often been shown to be leading indicators of the business cycle. In addition, banks may limit credit supply because they become more risk averse when they observe more bankruptcies or because larger losses constrain their ability to expand assets. As far as measurement is concerned, the approaches followed in many studies are usually partial, as they focus on one-way interactions between bankruptcies and the business cycle (Bruneau et al., 2012, s. 220). (Bruneau et al., 2012, s. 220) attempted to merge two strands of the quantitative economic literature regarding how the macroeconomic environment affects financial fragility, and conversely how financial fragility affects the business cycle. It also considered evidence that points to two-way interactions between business bankruptcies and the macroeconomy.

Staszkiwicz (2013, p. 14) conducted correlation analysis on dynamic of GDP and company failure rate for Poland, Europe and USA for the period 2003-2011. It was found a negative correlation. An analysis was also undertaken for the relation between the rate of corporate failure in Poland and the rate of change of overall company's net turnover profitability. It was

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

observed no statistically significant correlation. An alternative significant variable was pointed out for a linear regression model. Staszkievicz (see 2013, p. 14) partly confirmed others authors' results.

Evolutionary economists on bankruptcies

The object of research, which is the economy, alters continuously. A. Hansen regarded this change as the first law of economics (Hansen, 1939, p. 1). Physiocracy, which developed in France over the period 1750-1780, finally losing ground to classical economics, which began to come from the United Kingdom, should be considered as the first economic theory in history. Physiocracy means the mastery over nature. Domination of the laws of nature over the laws of economics is the underlying law in this theory. The laws of nature are independent of the human will. They may and should be learned in order to be able to use them in a business activity. Later on this issue was ignored in economics (Bartkowiak, 2003, pp. 29-30, 33].

It was only after environmental limitations for a business activity started to become increasingly apparent (e.g. hurricane, drought, flood, etc.), that physiocracy started to return again. It found its particular reflection in the evolutionary economic theory of R. Nelson and S. Winter in 1982, belonging to Schumpeter's economic theory. For the researchers of evolutionary economics the needs to learn about the human motivations, a human decision-making processes, mechanisms of economic development and understanding of the activity of business entities become significant (Kwaśnicki, 1996, p. 2).

The terms "evolution" and "development" are often used interchangeably. The term "evolution" comes from Latin *evolutio* - unrolling (of a scroll); opening (of a book), *evolvere* - to unroll. The term "evolutionary economics" is currently used in many, sometimes very different, approaches to the analysis of economic processes. In the most general terms, it indicates the significance of economic and developmental changes, which is done in order to emphasise the opposition in relation to the economic analysis focused on the problems of balance and statistical models. In narrower terms, it refers to the metaphor based on the ideas of biological evolution taken from Darwin or Lamarck. Kwaśnicki (1996, pp. 3-4) says that nowadays a few detailed explorations of economic processes analysis characterised by the adjective "evolutionary" have crystallised:

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

- the economists, who perceive the economic process in a way proposed by Joseph Schumpeter, use the term “evolutionary economics” in order to underline the importance of economic changes in the long-term perspective, the role of innovation in the economic process and the approval of the role of an entrepreneur in the stimulation of a socio-economic development process. This approach is sometimes called Schumpeterian or Neo-Schumpeterian approach. The journal issued by the International Joseph A. Schumpeter Society is entitled *the Journal of Evolutionary Economics*. According to this approach, an evolutionary process is a dynamic and historical process, whose macroeconomic characteristics are the result of the behaviour of single business entities acting in microeconomic scale, whose characteristic feature is the diversity and heterogeneity of behaviours and two of its basic mechanisms are the search for innovation and the mechanism leading to the diversification of development and the selection process;
- the perception of the economic development of the Austrian School of economics is frequently defined as “evolutionary”, the work of Carl Menger, in particular his theory of the appearance of money and other social institutions, has a clear evolutionary character; frequent use of evolutionary analogies and metaphors by Friedrich von Hayek, especially in his later works referring to the concept of spontaneous development (e.g. *Fatal Conceit*) also allow to regard his approach as evolutionary;
- institutionalised theory of economics originated by Thorstein Veblen was defined by him as “evolutionary” or “post-Darwinian” economics; the works of Adam Smith, Carl Marx and Alfred Marshall and many others' are defined as having an “evolutionary” character;
- occasionally, the term “evolution” is used in the implementation of different mathematical approaches to describe economic phenomena, e.g. the chaos theory; some computer stimulations use the mechanisms of selection and the game theory (compare Kwaśnicki, 1996, pp. 3-4).

Creative destruction

Unfavourable economic situation intensifies the phenomenon of negative selection of inefficient entities contributing to a change in the allocation of resources. J. Schumpeter abandoned the assumption of market balance between the demand and supply and balance in the enterprise – between the production size and price. According to him, the most important

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

factor shaping the behaviours of enterprises was competition understood as launching new products, technologies, resources, organizational forms. Insolvency of an enterprise does not result from unfavourable external conditions, but delayed adjustment to new market requirements or lack of such adjustment. For this is the consequence of implementing innovations by the competitors. J. Schumpeter (1942) considered the bankruptcy of an enterprise as a necessary component of economic growth in macroeconomic terms (“creative destruction”). Insolvent enterprises release the assets involved, the use of which may be enhanced due to the innovations implemented and better organization (Pieńkowska, 2005, p. 21).

Schumpeter's proposal was to treat a business entity not as somebody (or something) maximising their behaviour in any conceivable way, but rather as entities pursuing to improve their situation in comparison to the situation of other business entities (Kwaśnicki, 1996, p. 22).

Armen A. Alchian searched for the ways of replacing neoclassical concept of maximising through the biological theory of natural selection. The application of the “natural selection” idea in the company's model was discussed by Alchian for the first time in 1950 and two years later by Penrose (Alchian, 1950; Penrose, 1952). Alchian argued that competition between companies is not defined by the motive of maximising profit but by “adjusting, imitating and based on the trial and error method search for the possibility to increase their profit.” Therefore, “those, who obtain *positive profit* survive; and those who lose are eliminated from the market” (Alchian, 1950, pp. 211-213), which is the statement in the spirit of Darwinism. The work of Alchian was a significant, preliminary step towards the use of evolutionary analogies in the construction of mathematical models of economic changes. The scholar states that “the economic equivalents of genetic transfer, mutation and natural selection is imitation, innovation and positive profit” (Alchian, 1950, p. 220). Alchian presents the manner of the analysis of the companies' behaviour in the competitive environment in a suggestive way (see Kwaśnicki 1996, p. 22).

The evolutionary theory situates itself on the axis beginning with the theory of resources and capabilities. According to the theory of resources and capabilities (Noga, 2009, p. 177), enterprises which are not able to overcome the so-called Penrose effect [1959] (the surpluses of the growth advantages over the growth costs, also called the costs of E. Penrose), go bankrupt. According to Penrose (1959), the costs of the growth of enterprises are all additional costs, born by an enterprise during the growth, which were not born by it when it was smaller. The elements of a structure

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

("genes") of the evolutionary theory are routines. The approach proposed by Alchian and Penrose was developed and, more importantly, ingrained in the evolutionary paradigm by Nelson and Winter in their numerous articles and books - e.g. Winter (1964), Nelson and Winter (1980, 1982). In the evolutionary approach, both quantitative and qualitative changes are emphasised. The ways of making decisions by a human being are modelled in a manner which is much more satisfactory and closer to reality.

According to Marshall, companies have a defined period of duration in the intergenerational model, in which with the passage of time, family businesses lose their vitality and longevity originated by their founders systematically (Metcalf, 2007, p. 2).

Some of Marshall's successors, including the evolutionary researchers, have combined thinking about the companies and sectors in the category of population. Marshall perceived the analogy between a sector and a forest. He claimed that a sector is like a forest, which may grow and develop independently and transform and organise itself as it combines growing and falling trees becoming a mature and, it seems, a static plantation of similar and stationary members (Bloch & Finch, 2009, p. 141).

Marshall (1920, p. 280) argued that each new withdrawal from the market is an experiment, which may fail. Those, who stay on the market pay for their failures and the failures of others. Marshall underlined fair and harmonious adaptation rather than creative destruction in the explanation of the economic development. He drew attention to the fact that companies may survive more by benefiting from the environment rather than transferring benefits to it. Enterprises and sectors are in the centre of research of contemporary evolutionary economics, starting with the model research of Winter and Nelson (1982).

Steindl points out that entrepreneurs demand the risk premium for these investments, which are characterised by uncertain return, as compensation for the exposure to risk related to the variance of returns, extended to the risk of bankruptcy. Risk premium increases together with the sum of financial means necessary for the company in relation to equity. Steindl confirms the Kalecki's principle of increasing risk (Kalecki, 1937, pp. 440-447). Both small and big companies come across various opportunities to undertake an activity with a higher risk, which are characterised by a higher rate of return because of the economics of scale. Sufficiently high rate of demand growth in a sector may attract new entries of companies (Bloch & Finch 2009, p. 152). Initially, growing companies react to the unplanned increase of production capacities by the engagement in the aggressive price

or sales competition. Marginal companies are not able to cope with aggressive competition because of a lower gross profit margin so they are forced to transfer the market share to growing companies. Some of them go bankrupt and leave a sector. Decreased gross profit margins also discourage the entries of new companies into a sector. Concentration of a sector increases in the absolute categories in a sense that together with the decrease of the number and the size of margin companies, the decrease of the total sales volume of small companies and the increase of the total sales volume of big companies take place as well (Steindl, 1952, 1976, p. 42-43).

The survival of the fittest on the market

An enterprise (Noga, 2009, p. 179) is an organisation and an institution, a peculiar “phenotype”, which is the result of the interaction of a routine set (peculiar “genotype”, “hereditary” factors) and the environment conditions. Routines play a similar role to the genes in a living organism. Routines in an enterprise may be divided into:

- technical, allowing to manufacture,
- marketing, allowing to acquire better resources and to sell them,
- investment, allowing to create new production capacities,
- diversification, allowing to compete,
- tacit and idiosyncratic knowledge,
- innovative changes.

Changes of a routine set of an enterprise lead to evolutionary (stochastic) changes of its boundaries on the market, enterprises develop or go bankrupt. The objective of an enterprise is as fast entry into the market as possible (an enterprise using innovations is in the best situation) in order to achieve a high return on equity and to remain as long as possible on the market with the falling return on equity with which the competition cannot remain on the market (natural selection). The economy requires the development of routines (memories), which the market does not have but which enterprises and consumers have.

Competing between enterprises as a routine set and the ability of those routine sets to react to the environment contribute to the fact that the economy sectors (markets) evolve to the structures, in which only a certain group of enterprises, e.g. an oligopoly, remains. Yet, it is a stochastic process, non-deterministic, which is tried to be modelled, e.g. by means of Markov chains (probability distributions in time), as it is done in case of evolution of living organisms.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The relation between the development of enterprises and the overall economic advantages takes place through the natural selection. However, according to the principles of Lamarck and, therefore, not of blind selection, but the one, in which those, who are better at shaping routines (“genes”) and adjusting to the environment, survive. Macroeconomic policy does not have to select enterprises (routines sets) as it is done by the evolution. Macroeconomic policy may temporarily sustain weak routines but in a longer period (of evolution) they will be eliminated from the market. In this theory enterprises are “the engine” of growth and development. Selection results in the appearance of the most healthy enterprises, creating “healthy” growth, based on strong microfoundations (Noga, 2009, p.180).

The major representatives of the evolutionary theory are: Winter (1964, 1982, 1986, 1987a, 1987b), Nelson (1996), Nelson, Winter (1982, 2002), Teece, Dosi (1991), Mangolte (1992) and Kwaśnicki (2000). The main representative of the evolutionary economics in Poland is W. Kwaśnicki, who has formulated the evolutionary model of industry development (see Kwaśnicki, 2000).

Some of the basic evolutionary ideas were borrowed by Spencer from the biologist Jean Baptiste de Lamarck (1774-1829) and the embryologist Karl Ernest von Baer (1792-1857). In his works, the scholar often referred to biological analogies and compared society to a living organism.

In two essays from 1852, a few years before the publication of Darwin's *On the Origin of Species*, Spencer had presented an original concept of evolutionary development. In these essays, Spencer presented the evolution as “a shift from undefined, inconsistent homogeneity to defined, consistent heterogeneity by a constant variation.” The evolution is equivalent to the progress and the increase of effectiveness towards a certain ideal condition. Spencer perceived the evolutionary process as a shift from lower forms of an organisation or forms of life to higher ones, from worse ones to the better ones. He argued that complexity is usually related to the better forms, which are advanced and more adjusted (compare Kwaśnicki, 1996, p.12). Organisms which manage to survive are not necessarily the best ones, only relatively good. Organisms adjust to the local conditions in order to survive and to leave their offspring. The principle of the survival of the fittest was applied in the economics by the introduction of the principle of maximising profit - the company, which survived had the biggest profit. The unadapted entities, or least adapted are eliminated from the market. Similarly to the principle of “the survival of the fittest”, the principle of maximising is in contradiction with experience; enterprises which generate relatively high

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

profit survive on the market. Herbert Simon underlines the need to replace the concept of maximising with the concept of satisfying achievements (Kwaśnicki, 1996, p.12).

Veblen perceived institutions as the analog of biological genes. He interpreted social and economic development in the categories of Darwinian selection. "The life of a human being in society, similarly to the lives of other species, is the struggle for survival and, therefore, it is the process of selective adaptation. The evolution of a social structure was the process of natural selection of institutions." (Veblen, 1899, p. 188) (see Kwaśnicki, 1996, p. 18).

**The relation between "age" and the number of bankruptcies.
The survival of enterprises on the market**

The tests aiming to determine if there is a correlation between age and the number of bankrupt enterprises were carried out in the United States. S. Thornhill and R. Amit (2003, pp.7, 14-15) addressed the above-mentioned issue. The scholars carried out tests on 339 enterprises which went bankrupt in 1996. The lack of skills and experience in the field of the company management and a limited possibility of raising capital necessary to develop were the main problems of the enterprises which went bankrupt up to 2 years from the moment of setting up. The objective of the companies, which just enter into the market is the survival, managers and owners are very flexible and they try to adjust to the environment. Enterprises do not follow the changes in the competitive environment (Korol, Prusak, 2005, p. 64-67).

Similar tests were conducted in Europe and they had a questionnaire survey character as well. The above-mentioned analysis concerned such countries as the United Kingdom and Germany. From these it appeared that the lack of financial means was the biggest problem of enterprises. Respondents also drew attention to the insufficient flow of information, which arose from the lack of knowledge of entrepreneurs on the prevailing situation on the market.

A number of theories, whose purpose was to explain the probability of the survival of business entities on the market was developed in the economic literature. One of them is the liability of smallness concept, related to the liabilities of small enterprises. According to it, small companies have smaller chances to survive. P. Preisdorfer & T. Voss (1990, p. 107-129) claim that smaller enterprises are frequently incapable of competing with

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

bigger companies. Small enterprises often do not have permanent outlets and because of this they are not able to provide their employees with such possibilities of development as the ones which are offered by bigger companies (Mączyńska, 2009, p. 113). It is also worth to indicate the liability of newness concept concerning the liabilities of new enterprises. Research on the correlation between the duration of business entity activity on the market and the survival plays an important role. According to this concept young companies leave the market faster than the older companies. Competition the new enterprises must cope with is one of the underlying reasons behind this. Entering the market, the enterprises compete with organisations with well-established positions and they must gain reputation in order to acquire clients, suppliers and investors.

According to the concept, which has its roots in the industrial economics, only after entering the market are enterprises able to state if they can exist on it. The representatives of this approach search for the factors which will allow the enterprises to survive on the market and, in a broader sense, not only on the level of the company but also on the level of the whole economy. Assuming that structural characteristics of industry, such as market entry and withdrawal barriers and the intensity of applying new technologies exert a significant influence on the survival and the development of new enterprises on the market.

Corporate bankruptcy case of Beta: Lessons learned

Even though the scenario and stages of the course of crisis as well as its signs are similar for many bankrupt enterprises, the process is different in younger enterprises and in mature entities, which have been operating on the market for many years (Argenti, 1976, p. 121). Depending on the age of a business activity, different factors have impact on it in particular periods. The trajectory concept of J. Argenti was confirmed by the research carried out by S. Thornhill and R. Amit. According to the results, there is a correlation between the age of enterprises and the number of bankruptcies. Young companies are heavily burdened with the risk of bankruptcy. The main objective of business activities in the initial phase of their existence is the survival.

The enterprise Beta, selected for research, had its registered office in Oborniki Śląskie. The company had two owners and it operated a business from 27 February 2003. Initial capital amounted to PLN 50,000 (100 shares, worth PLN 500 each). The main objective of the business activity

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

was the wholesale of fruit, vegetables, meat and meat preparations, milk products, eggs, edible oils and fats, alcoholic and non-alcoholic beverages, tobacco products, sugar, chocolate and confectionery, tea, coffee, cocoa and spices, the retail of food, beverages and tobacco products. The balance sheet as at 30 November 2005 indicated the loss exceeding the sum of the initial capital and the assets of the company did not suffice to satisfy the repayment of receivables and the company lost financial liquidity permanently. The situation was caused by the circumstances independent of the company, in particular by the decline in the sales of food products of about 50%. As a result, on 13 December 2005 a bankruptcy petition including the liquidation of assets was filed in the District Court in Wrocław. The company settled all liabilities owed to the Tax Office, the Social Insurance Company (ZUS) and the employees.

The Beta company lost financial liquidity. As it is clear from court files, this condition was caused by the external causes. The sale of food products decreased by about 50%, which contributed to their expiry and withdrawal from sale. Enterprise struggled with the crisis caused by strong competition and a fast growing food discount, which used dumping prices. The Management Board of the company tried to defend itself against bankruptcy and, therefore, introduced the modernisation of the sales department, organised a self-service point of sale and expanded sales portfolio. It organised the promotion of sale in order to acquire new customers. The company reduced costs by reducing remuneration, redundancies and it decreased store space. Despite the undertaken actions, the revenues from sale decreased.

On 30 November 2005 the assets of the company amounted to PLN 375,237.91, almost 3 times less than in the previous year. The company had only current assets, in which inventory had the biggest share - 72%, short-term trade receivables from other entities constituted the remaining share. Short-term liabilities which amounted to PLN 564,011.95 dominated in liabilities. Equity of the Beta company constituted a negative value. The net loss in the amount (PLN -242,996.82) exerted the biggest influence on this item.

In 2005 a current ratio amounted to 0.67. It means that the Beta company had problems with the settlement of its liabilities from current assets. Short-term liabilities far outweighed current assets of the enterprise. The level of a quick ratio indicator was not satisfactory as well, since it amounted to 0,18. It was caused by the high level of inventory, which in case of this company was negative. It is clear from court files that the excessive

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

amount of inventory of food products became expired. A receivables rotation ratio amounted to 21.44, which means that the company conducted too restrictive policy of debt collection. A liabilities rotation ratio indicates the emerging problems of the Beta company with the settlement of liabilities. The reason of this situation was the significant growth of liabilities in relation to revenues. Despite the undertaken activities, whose aim was to emerge from crisis, the enterprise was not able to further carry out its business activity (tab. 2).

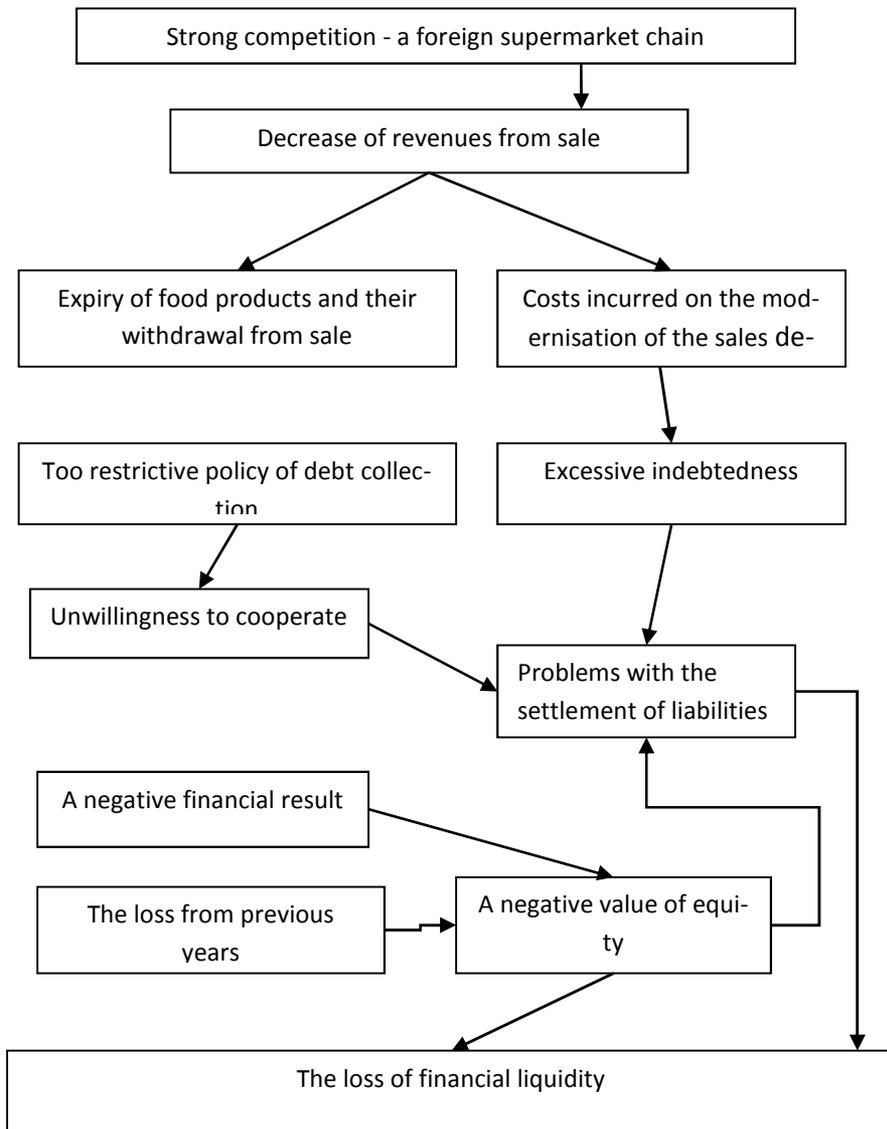
Table 2. The reasons of the Beta company bankruptcy

The reasons of bankruptcy	Specification
- strong competition,	+
- decline in revenues from sale,	+
- increase of liabilities,	+
- loss from previous years,	+
- negative financial result,	+
- high level of indebtedness,	+
- loss of financial liquidity,	+
- excessive amount of inventory,	-
- lack of fixed assets,	+
- restrictive policy of debt collection.	+

Source: Own research on the basis of information from insolvency files of the company.

The major determinant of crisis in its initial phase was the occurrence of decreasing sale share in the market, which is caused in many cases by the lack of a marketing strategy and an improper carrying out of marketing research (or its lack). The subsequent symptoms appear later, particularly those with a financial character. Permanent loss of financial liquidity was indicated as the main reason of insolvency. Additionally, the losses of the company in the previous years contributed to a difficult financial situation. Problems started from the expansion of foreign supermarket chains and markets. The enterprise lost its customers as the prices proposed by competition were much lower. Despite the actions aiming to lower business expenses, the company was not able to emerge from crisis. The problems related to the settlement of liabilities emerged. Subsequently, financial sphere factors occurred and, consequently, led to bankruptcy (fig.1).

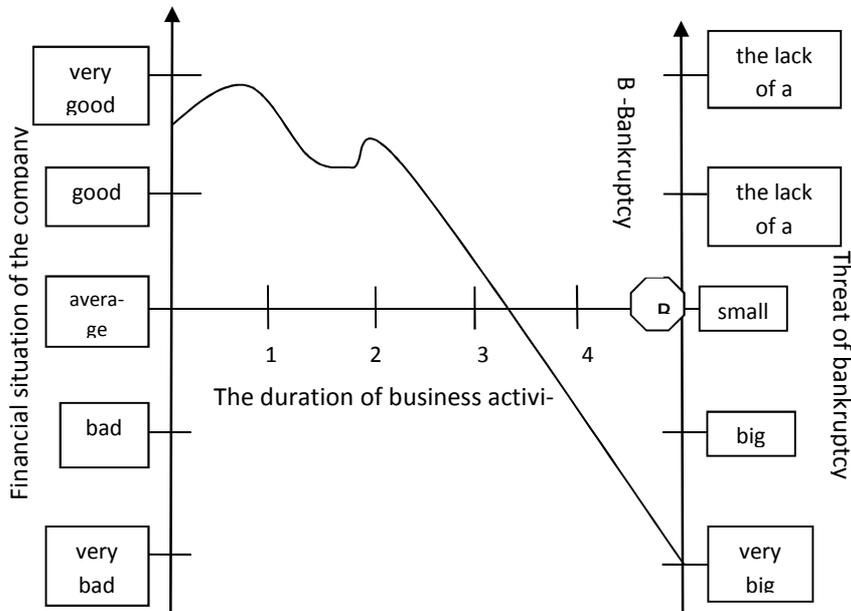
Figure 1. The mechanism of the Beta company bankruptcy



Source: Own research on the basis of information from insolvency files of the company.

The Beta company operated on the market for nearly 5 years, Within the period of two first years of its business activity, the financial situation of the company was good, and the enterprise was developing. Sales volume was at the appropriate level. After the second year of its activity, the financial situation of the Beta company deteriorated (fig. 2). The expansion of foreign market and supermarket chains exerted influence on this situation. The sale of products started to decline. The company undertook the activities aiming at the improvement of a financial situation but competition was very strong. The company started to bear losses, it was not able to settle its liabilities and it lost financial liquidity permanently. The owners were forced to file a bankruptcy petition.

Figure 2. The trajectory of the Beta company bankruptcy



Source: Own research on the basis of information from insolvency files of the company.

Conclusions

1. Young enterprises are more vulnerable to the risk of bankruptcy. The discussed example inserts itself into research between “age” and the survival of the company. The survival was the main objective of the studied entity in the initial phase of its functioning. According to the evolutionary theory, the entities which are best adjusted to the market conditions survive on it. Despite many undertaken adjustment activities, the Beta company was not able to compete and to stay on the market and, therefore, it finally went bankrupt.
2. Creating the bankruptcy trajectory according to the methodology of J. Argenti, it was indicated that the financial situation of the Beta company deteriorated as a result of the emergence of fast-growing foreign super-market chains, which used dumping prices. The purpose of foreign competitors was to conquer the market on which the Beta company was operating and eliminating it by applying much lower prices. The sale of food products decreased which was connected with the expiry of products and withdrawing them from the sales. Defending against the crisis the Beta company introduced the modernization of the sales department, expanded product portfolio and organised the promotion of sales in order to acquire new customers. Unfortunately, those activities involved additional costs and, therefore, the revenues from sale were still falling. The enterprise borrowed excessively. Additionally, too restrictive policy of debt collection discouraged cooperation with the company. The company had serious problems with the settlement of liabilities. The business activity generated losses and equity constituted a negative value. All of these factors exerted influence on the permanent loss of financial liquidity and, consequently, led to submitting a bankruptcy petition by the Beta company.
3. The issue addressed in the article becomes increasingly important from the point of view of the entities whose aim in the initial phase of their functioning is, first and foremost, the survival. The discussed case of bankruptcy is a specific lesson on evolutionary economics, from which the analysed company did not draw proper conclusions. Despite the repeated attempts to emerge from a difficult situation and to implement adjustment actions, the market eliminated the ineffective entity. Corrective actions were undertaken too late. Apart from this, they were not sufficiently intense and effective. The achievements of the representatives of evolutionary economics, especially the one concerning “the survival

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

of the fittest”, should be particularly significant in the age of uncertainty and the increase of the bankruptcy risk in times of the world economic crisis. The complex issue presented in the article requires further in depth research and conclusions should not be considered in relation to the whole population of enterprises.

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18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
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18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
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**A Model Assessing Innovativeness
of Administration Units Awarding Public
Contracts as a Tool to Conduct Economic
Policy of the State**

JEL Classification: *E1; E6*

Keywords: *Macroeconomic Policy; Policy Making; Innovations; Public procurement*

Abstract: In today's market economy factors concerning knowledge, new technologies and innovative solutions are essential for economic development. However, the Polish economy, despite its high innovation potential compared to other European Union countries, is characterized by a very low level of innovativeness. Implementing this potential is conditioned with an appropriate economic policy of the state and rational approach to its resources and legal solutions. One of the possibilities of such an action is the use of public procurement instrument through which it is possible to more effectively create demand for innovative products and services.

As shown by literature studies, the achievements of the subject literature associated with the creation of demand for innovations by public administration in Poland have been very modest. This gap is recognized the article and it attempts to build a model for assessing the innovativeness of these units. Network thinking methodology was used to build the model. As a result, after the identification of factors affecting the conduct of an innovative public procurement, a network of links was established between them and examined in terms of type, intensity and

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

duration of exposure. Building a model according to the methodology, the opinions of experts have been used along with long-term observations conducted in the course of participation in all kinds of conferences and trainings. The model was also subjected to validation in two selected units.

Introduction

In recent years innovativeness has been one of the priority areas of economic policy in Poland and other EU countries. This policy, in line with the understanding of innovations as a driver of economic growth (Romer, 1986), is reflected in many documents at Community level, as well as the actions taken by the governments of many countries. However, while analyzing the position of Poland in the ranking of the EU innovativeness, it should be noted that its economy is showing a low level of this indicator and scores the fourth place from the end in comparison to the remaining EU Member States¹. Especially worrying is the insufficient activity reported in connection with the decommissioning of the institutional barriers and the lack of adapting public institutions to the needs of entrepreneurs.

It seems that there are several reasons behind a growing importance of innovations in the Polish economy. Firstly, the 20th Century witnessed a great technological revolution - especially in the field of telecommunications and informatics. This considerably accelerated the aging process of many products and services available on the market. This situation obliges the producers to multiply their efforts to generate innovations, especially regarding products and processes, as well as rapid changes in the structure of employment. Secondly, the Polish market economy has been slowly entering a state of maturity, and after more than 22 years of operation it requires new challenges and effective actions. For this economy to be respected in the European Union efforts should be strengthened and expanded in order to accelerate its development and its competitive position should be improved as well. Thirdly, the beginning of the 21st Century showed how much countries like India, Brazil and China did to improve competitiveness of their economies. To maintain its position as a strong European country Poland should, therefore, take steps to maintain and perhaps strengthen its economic position.

As we can see, there can be numerous motives for introducing innovations and they may involve internal and external sources (Freeman, 1994). They should focus on many aspects of economic policy, including the pub-

¹ The innovative position has been determined using the Innovation Union Scoreboard

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

lic procurement market, which in Poland has been growing rapidly and its estimated value amounted to approximately 8.76% of gross domestic product by 2013 (PPO, 2014, p. 27). Thus, the value of this market indicates that the analysis of creating demand for innovations through public procurement system (and thus the use of the existing potential of this system) is a very important economic problem facing the Polish economy. Despite the lack of empirical achievements in this regard, the examples of highly developed countries show that through the effective use of existing resources and legal status (through solutions used by public administration) innovativeness of many economies could be raised.

Innovative potential inherent in the system of public procurement, as well as the lack of comprehensive research on this issue, have led to an attempt to build a model for assessing the innovativeness of public administration entities awarding public contracts. This model is a proposal of the first in the literature system recognition of key factors related to public procurement, which affect the innovativeness of the Polish economy. Moreover, such an assessment can be useful for decision makers for an effective, and most importantly, fair allocation of budgetary resources to the bodies responsible for organizing legal tenders in our country, as well as comparing them to responses favoring the creation of demand for new products and services.

Methodology of the research

According to J. Gmurczyk, in case of such complex issues as innovativeness, system thinking seems to be almost necessary (Gmurczyk, 2014, p.32). Network thinking methodology has been used to build the model to assess the innovativeness of public administration entities involved in public procurement. As a result, after the identification of factors affecting the conduct of an innovative public procurement, a network of links has been established between them and examined in terms of type, intensity and duration of exposure. This identification was made possible as a result of discussion in a group of experts dealing with procurement on a daily basis².

Network thinking methodology based on the cooperation of those involved in the analysis of the problem posed in front of them, provides very objective results. In this sense it certainly deserves to be called a moral methodology. Although it takes much more time than a simple methodolo-

² These people form a group of 43 postgraduate students participating in the course titled "public procurement and public-private partnerships."

gy of cause and effect, it also avoids the pitfalls of linear thinking and taking "shortcuts" and finding numerous unpleasant surprises. The methodology requires the use of a simple yet very precise language. Many of the concepts, definitions and problems require, therefore, the analysis and extensive consultations of participating experts. This is of great importance when it comes to a critical attitude toward the discussed problems. As stated by A. Piekarczyk and K. Zimmiewicz, the use of network thinking methodology allows us to discover the various limitations and barriers present in the decision-making process, which in the case of the provision of innovative public procurement is an extremely important issue.

The construction of a model for assessing the innovativeness of Polish public administration entities awarding public contracts

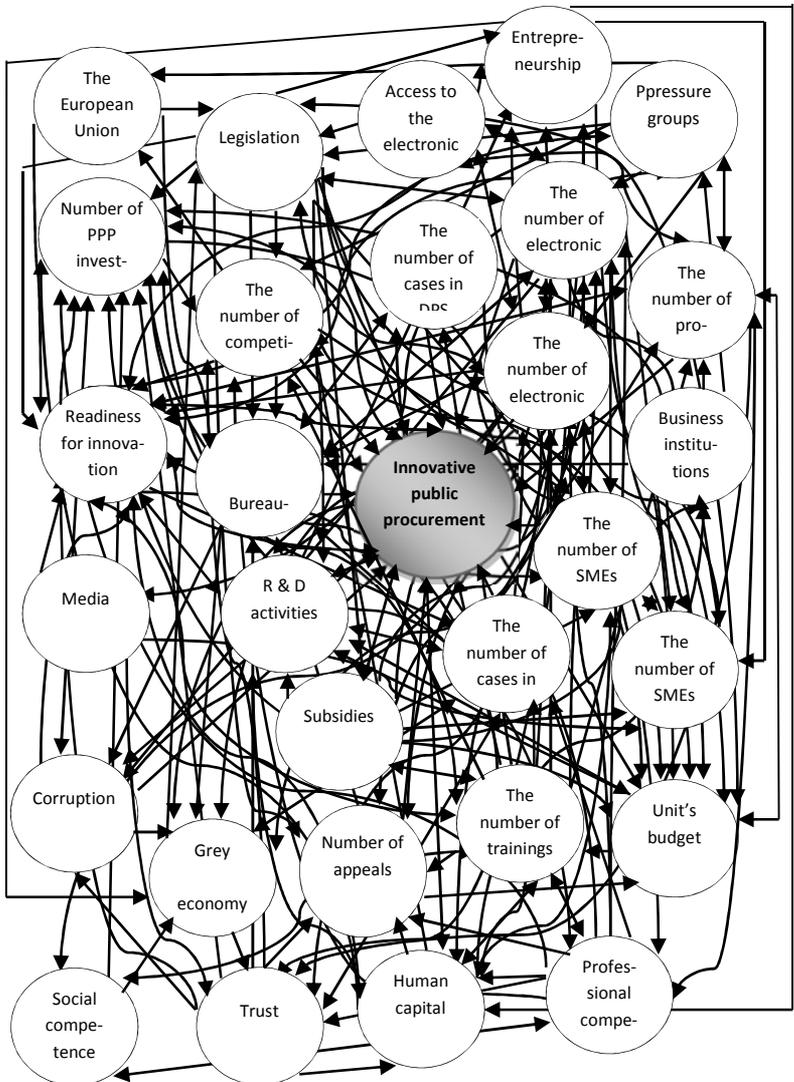
According to the network thinking methodology, it is necessary to illustrate the problematic situation first. For the assessment of entities purchasing innovative products and services, the problematic situation is to identify the elements included in the network of connections formed by the contract with both proximal and distant environments.

Innovative public procurement had to appear in the center of the created network because the objective is to develop a model for assessing the innovativeness of public administration through the prism of public procurement contracts. This type of procurement is created by public institutions, which simultaneously constitute one of the most important stakeholders influencing the launch of the award of these contracts and through this prism it is necessary to assess entities awarding public contracts. The network of connections between the factors influencing the solution to the problem situation is shown in Figure 1.

The next step should be to analyze the interrelationships between the various factors in the network in accordance with the adopted network thinking methodology. From a point of view of impacts, isotropic (prefix +) and opposite (sign \square) interactions have been assumed. These designations, however, have not been provided in the figure due to their low readability.

The next step in the analysis of network thinking is to create an influence matrix (Table 1). For this purpose it is worth using a spreadsheet, where the individual rows and columns are included in the value of the intensity of interactions between factors. Then it is necessary to add up the rows and columns that show activity (sum of A) and reactivity (sum of P).

Figure 1. A network of factors influencing innovative public procurements



Source: own study.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 1. The matrix of influence

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	sum of A
1	x	2	0	0	0	0	0	0	0	0	0	3	0	0	0	2	0	0	2	0	0	0	0	0	0	0	2	0	1	1	13
2	3	x	3	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0	2	0	0	0	0	0	3	0	3	3	0	21
3	3	0	x	0	0	0	0	0	0	0	0	3	0	3	0	0	3	0	0	0	0	0	0	0	0	0	0	0	3	0	15
4	3	0	0	x	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	9
5	3	0	0	0	x	2	0	3	3	0	0	3	0	3	0	0	2	2	0	3	3	1	3	3	0	0	1	0	3	0	38
6	3	0	0	0	0	x	0	3	3	0	0	3	0	3	0	0	0	0	0	2	3	0	3	3	0	0	1	0	3	0	30
7	3	0	0	0	0	0	x	3	0	0	2	2	0	0	0	0	0	0	0	0	0	3	2	0	0	0	0	3	3	0	21
8	2	3	3	0	2	2	2	x	0	1	0	2	0	2	0	2	3	2	3	0	0	0	0	3	0	0	0	0	2	0	34
9	0	0	0	0	3	3	0	1	x	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	9
10	0	0	0	0	0	0	0	0	0	x	0	2	0	0	0	0	2	3	0	0	2	0	0	0	0	0	3	2	2	0	16
11	0	0	1	0	2	1	2	1	0	0	x	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	11
12	2	2	0	0	0	0	3	0	0	3	1	x	0	0	0	3	3	0	0	0	0	0	0	0	3	3	0	0	0	0	23
13	0	0	0	0	0	0	0	0	0	0	2	3	x	0	0	0	0	2	0	0	0	0	2	0	0	0	0	0	0	0	9
14	3	0	0	2	1	2	0	0	0	0	0	2	0	x	0	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0	16
15	0	0	0	0	0	0	1	0	0	1	1	0	0	1	x	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
16	3	0	0	0	0	0	0	0	0	2	0	3	0	0	0	x	0	0	0	0	0	0	0	0	0	2	0	2	0	0	12
17	2	0	0	0	0	0	0	0	0	3	0	0	0	0	3	0	x	2	0	0	3	3	0	0	0	0	2	2	0	0	20
18	0	1	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	x	0	0	0	0	0	0	0	0	0	0	0	0	7
19	2	0	0	0	2	0	0	0	0	1	0	0	0	0	2	3	1	2	x	0	0	0	0	0	0	2	0	0	3	0	18
20	2	3	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	x	3	0	0	0	0	0	0	0	0	0	10
21	0	0	0	0	2	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	x	0	3	0	3	0	0	0	0	0	12
22	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	x	3	0	0	2	0	1	0	0	9
23	0	3	3	0	0	0	0	0	0	0	0	2	0	3	0	0	0	0	0	3	0	0	x	3	3	0	3	0	0	0	23
24	2	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	x	0	0	0	0	3	0	7
25	3	0	0	0	0	0	3	0	0	0	0	0	0	3	0	2	0	0	0	0	2	0	2	0	x	0	0	0	0	0	15
26	3	3	3	3	3	3	3	0	0	0	0	3	0	0	0	0	0	0	2	0	0	2	0	3	2	x	3	3	0	0	39
27	3	3	3	0	2	2	0	0	0	0	3	0	0	2	2	1	0	0	0	0	0	0	3	0	3	x	0	0	0	0	27
28	0	3	3	3	3	3	3	0	0	2	0	0	0	0	0	0	0	0	0	0	0	1	3	3	3	3	x	0	0	0	36
29	0	2	3	2	2	2	3	0	2	0	0	0	0	0	0	2	0	0	3	0	0	0	0	0	3	0	0	X	0	0	24
30	2	0	0	0	0	0	0	3	0	0	0	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	x	11
the sum of P	47	26	22	10	22	22	20	16	8	13	6	39	2	26	10	16	19	16	10	13	21	10	21	16	19	20	14	31	3		

Source: own study.

High values obtained in the "sum A" column mean that the factor has a strong impact on other factors, while low values mean that its influence is small. High values obtained in the line "the sum of P" mean that the factor

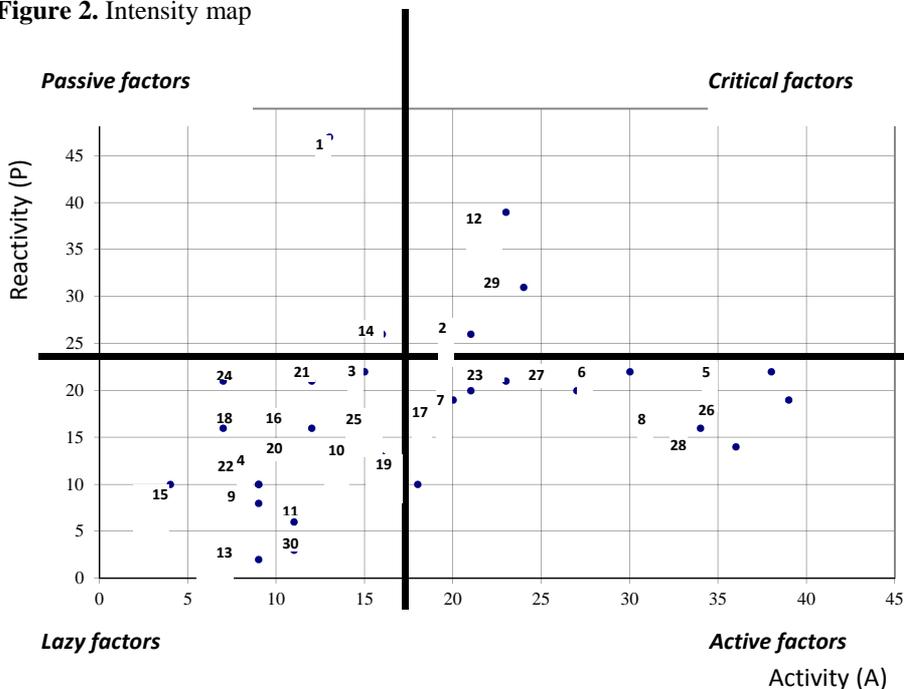
was heavily influenced, and low mean that it is subject to a weak influence of other factors.

The matrix of influence is an indispensable tool for the preparation of the so-called intensity maps. After its creation, it is possible to determine which of the previously separate factors are active, critical, passive or lazy.

From the point of view of the construction of a model (for assessing the innovativeness of public administration awarding public contracts) for further analysis only those factors will be admitted that constitute the two first-mentioned groups.

Intensity maps (Figure 2) is a two-dimensional graph wherein the values for the activity of a factor have been placed on the horizontal axis, while those regarding reactivity - on the vertical axis.

Figure 2. Intensity map



Source: own study.

It is very important to objectively lead the verge of splitting between the categories of factors obtained in the matrix of influence, in order to identify active, critical, passive and lazy factors. It is assumed that the dividing lines

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

will extend in places that are formed by dividing the maximum value of A and P by 2. Thus obtained values are $A = 19.5$ and $P = 23.5$.

On the basis of the intensity maps it is possibly to finally emerge active, critical, passive and lazy factors. Table 2 shows the distribution of these factors along with the values for the activity and reactivity.

Table 2. Summary of factors affecting the implementation of innovative public procurement

No.	Passive factors	(A,P)	No.	Critical factors	(A,P)
[1]	Innovative public procurement Bureaucracy	(13.47)	[2]	Number of PPP invest- ments Readiness for innovation Unit's budget	(21.26)
[14]		(16.26)	[12]		(23.39)
			[29]		(24.31)
No.	Lazy factors	(A,P)	No.	Active factors	(A,P)
[3]	The number of competitions	(15.22)	[5]	The number of electronic biddings	(38.22)
[4]	The number of cases in DPS	(9.10)	[6]		(30.22)
[9]	Access to the electronic plat- form	(9.8)	[7]	The number of electronic auctions	(21.20)
[10]		(16.13)			
[11]	Entrepreneurship	(11.6)	[8]	The number of contracts with the pro- environmental legislation criteria	(34.16)
[13]	Pressure groups	(9.2)	[17]		(20.19)
[15]	Media	(4.10)			
[16]	Business institutions	(12.16)	[23]	The number of SMEs winning tenders	(23.21)
[18]	R & D activities	(7.16)	[26]		(39.19)
[19]	The number of SMEs interest- ed in participating in tenders	(18.10)	[27]	Trust	(27.20)
[20]	Subsidies	(10.13)	[28]	The number of trainings received by authorities	(36.14)
[21]	Corruption	(12.21)			
[22]	The Grey Zone	(9.10)		Human capital	
[24]	Social competence	(7.21)		Professional competence	
[25]	The number of appeals	(15.16)			
[30]	The number of cases in nego- tiation modes	(11.3)			
	The European Union				

Source: own study.

The maps of intensity show that there are three critical factors that strongly influence other elements, but are also heavily influenced themselves. However, it seems that only the first and the last (the number of PPP investments and the unit's budget) may be under the control of public administration. On the other hand, the individual unit's budget depends in its income part on the distribution of funds by the government and the local government and to some extent the contracting authority does not affect it. By using it, this institution can cause considerable changes especially if it allocates an essential part of the funding in innovation. Today the structure of the budget is dominated by expenditure on the wages of employees.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The second group of factors (and the most desirable from the point of view of creating demand for innovative public procurement) is the group of nine active factors. They strongly affect innovative public procurement, and most importantly, they are not subject to strong influences themselves. Among these factors, there was legislation that - like previously the unit's budget - does not depend directly on the actions of the contracting authority, but may, however, play a very important role in creating the demand for modern supplies, services or construction works.

The next step in the deployment of network thinking methodology in the process of creating a model to evaluate the innovativeness of public administration entities that create demand for public procurement should be to determine which critical and active factors are manageable and non-manageable, and which can be measured. Thus, it is necessary to use the following factors: the number of PPP investments, willingness to innovate, the unit's budget, the number of electronic biddings, the number of electronic auctions, the number of orders with the pro-environment criteria, legislation, the number of SMEs winning tenders, confidence, the number of trainings received by authorities, human capital, professional competence.

To objectively assess changes in a public administration unit, and thus in the whole national economy, it is necessary to rely primarily on such factors which are directly influenced by the audited entity. Therefore, the starting point in the selection of the factors used for its evaluation should be an ability to influence them by deliberate actions taken by this entity's management.

Such reasoning results in a situation where it is necessary to use only the manageable factors, separated within the framework of network thinking methodology. They include: the number of PPP investments, unit's budget, the number of electronic biddings, the number of electronic auctions, the number of pro-environmental contracts, the number of trainings received by authorities and professional competence.

Of the seven aforementioned factors two are critical (the number of PPP investments and the unit's budget), while others remain active. Therefore, the critical factors strongly influence other elements, but they are also subject to a strong influence and their weight in the model of innovativeness assessment must be smaller as it is difficult to predict the effects associated with their use. Therefore, one should be very careful in using these factors, which may not necessarily be related to the reluctance of officials to introduce innovative solutions in public procurement.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

In order to select the weight of various factors involved in the model evaluating the innovativeness of public administration entities awarding public contracts, one can use a methodology based on the proprietary model of analytical hierarchy (Borowiec, 2008).

The assessment of the validity of individual factors in this model will be based primarily on the strength of activities they possess, read from the matrix of influence developed in this chapter. Table 3 contains a list of manageable factors with their assignment to a specific group, and an indication of the strength of their influence (activity) regarding the other factors included in the network of public procurement system.

Table 3. Manageable factors in the construction of a model for assessing the innovativeness of Polish public administration entities awarding public contracts

A manageable factor	Group of factors	Factor activity
Number of PPP investments	Critical	21
Unit's budget	Critical	24
The number of electronic biddings	Active	38
The number of electronic auctions	Active	30
The number of pro-environmental contracts	Active	21
The number of trainings received by authorities	Active	39
Professional competence	Active	36

Source: own study.

As it can be seen from Table 3, the most important factors in terms of the impact on other components of the system are: a number of trainings received by authorities and the number of electronic biddings. Most problems arise with the factor related to technical competence. They are understood in the literature in very different ways and exhibit significant difficulties for the process of measurement. For example, A. Poczowski believes that competence is a broader concept of qualification and includes the total assets of human characteristics that make up a causal link with high or above average effects of work, which have a universal dimension (Roszkowski, 2004). In addition to knowledge there are also: loyalty, trustworthiness, honesty, perfectionism and self-improvement. Yet another definition is given by M. Armstrong - according to him competencies include what an employee should know, what he or she should do and how to do it (Whiddett, Hollyford, 2003).

It can be assumed that professional competence is strongly related to knowledge received by employees. Therefore, the model assumes that the analyzed factors: the number of trainings received by authorities and professional competence are highly similar to each other. However, since the first one can be expressed in a very simple manner by means of a measura-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

ble value, in the construction of the model the second one can be skipped. Finally, six variables were incorporated into the analytical hierarchy method used to determine the weights of individual factors included in the model.

To objectify the values resulting from comparisons, it is necessary on the basis of Table 3 to determine the relationships between factors in terms of their activities and bring them down to the values used in the method of analytical hierarchy. Table 4 shows the relationships between the factors, resulting from dividing their activity by itself.

Table 4. Relationships between the factors associated with their activity

	The number of PPP investments	Unit's budget	The number of electronic biddings	The number of electronic auctions	The number of pro-environmental contracts	The number of trainings received by authorities
The number of PPP investments	1	0.87	0.55	0.7	1	0.54
The unit's budget	1.14	1	0.63	0.8	1.14	0.61
The number of electronic biddings	1.81	1.58	1	1.27	1.81	0.97
The number of electronic auctions	1.43	1.25	0.79	1	1.43	0.77
The number of pro-environmental contracts	1	0.87	0.55	0.7	1	0.54
The number of trainings received by authorities	1.86	1.62	1.03	1.3	1.86	1

Source: own study.

As it is apparent from the table, the maximum value obtained in the comparison of the various factors with each other is 1.86. This means that it should correspond to the value of "9", which arises from the comparison of two factors, one of which is predominant over the other. Since the minimum value in the method of analytical hierarchy is the number "1", we should calculate the difference between the maximum value (1.86) and this number and divide the result obtained by 9, assigning consecutive intervals with individual severities. The severities obtained in this way, which correspond to the different intervals, can be found in Table 5.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 5. Intervals corresponding to the degrees of importance (severities) in the method of analytical hierarchy

The obtained range of values	Severity
1.00 - 1.07	1
1.08 - 1.16	2
1.17 - 1.26	3
1.27 - 1.36	4
1.37 - 1.46	5
1.47 - 1.56	6
1.57 - 1.66	7
1.67 - 1.76	8
1.77 - 1.86	9

Source: own study.

Now in place of the values in the various ranges it is necessary to assign the respective values of Table 4 with the corresponding degrees of importance (severities) of Table 5. Apart from values <1 we obtain data summarized in Table 6.

Table 6. Severity levels resulting from the comparison of the activity of factors

	Number of PPP investments	The unit's budget	The number of electronic biddings	The number of electronic auctions	The number of pro-environmental contracts	The number of trainings received by authorities
The number of PPP investments	1				1	
The unit's budget	2	1			2	
The number of electronic biddings	9	7	1	4	9	
The number of electronic auctions	5	3		1	5	
The number of pro-environmental contracts	1				1	
The number of trainings received by authorities	9	7	1	4	9	1

Source: own study.

Since, as noted earlier, the number of PPP investments and the unit's budget both are critical factors, which may involve a high risk of adverse reactions, it is necessary to increase the importance of other factors in rela-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

tion to these criteria. It was assumed, therefore, that each factor in comparison to critical factors will have an extra degree of severity added to it. By adding a severity level in comparing the number of orders and the number of environmentally-friendly PPP investments, the ratio between the number of PPP investments and the number of pro-environmental contracts changed, and it is its inverse. Analogously, the degree of severity resulting from the comparison of the unit's budget to the number of pro-environmental contracts should be reduced by 1, so that these factors become equivalent.

Simultaneously, the missing degrees of severity in Table 6 are the inverse ratio of those degrees that are already in the matrix. For example, the ratio of the number of electronic auctions and the number of trainings received by authorities is the inverse of the degree obtained as the ratio of the number of trainings to the number of auctions. Thus, it amounts to $\frac{1}{4}$. After making the necessary corrections and additions we received the data presented in Table 7.

Table 7. Severity levels resulting from the comparison of the activity of factors

	Number of PPP investments	The unit's budget	The number of electronic biddings	The number of electronic auctions	The number of pro-environmental contracts	The number of trainings received by authorities
The number of PPP investments	1	1/2	1/9	1/6	1/2	1/9
The unit's budget	2	1	1/8	1/4	1	1/8
The number of electronic biddings	9	8	1	4	9	1
The number of electronic auctions	6	4	1/4	1	5	1/4
The number of pro-environmental contracts	2	1	1/9	1/5	1	1/9
The number of trainings received by authorities	9	8	1	4	9	1

Source: own study.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

After filling the matrix, it is necessary to calculate the 6th degree root value of the product of numbers within it. The degree of the root always depends directly on the degree of the matrix. The result is:

- for the number of PPP investments $\sqrt[6]{1 \cdot \frac{1}{2} \cdot \frac{1}{9} \cdot \frac{1}{6} \cdot \frac{1}{2} \cdot \frac{1}{9}} = 0,283$,
- for the unit's budget $\sqrt[6]{2 \cdot 1 \cdot \frac{1}{8} \cdot \frac{1}{4} \cdot 1 \cdot \frac{1}{8}} = 0,445$,
- for the number of electronic bidding $\sqrt[6]{9 \cdot 8 \cdot 1 \cdot 4 \cdot 9 \cdot 1} = 3,706$,
- for the number of electronic auctions $\sqrt[6]{6 \cdot 4 \cdot \frac{1}{4} \cdot 1 \cdot 5 \cdot \frac{1}{4}} = 1,399$,
- for the number of pro-environmental contracts $\sqrt[6]{2 \cdot 1 \cdot \frac{1}{9} \cdot \frac{1}{5} \cdot 1 \cdot \frac{1}{9}} = 0,413$,
- for the number of trainings for authorities $\sqrt[6]{9 \cdot 8 \cdot 1 \cdot 4 \cdot 9 \cdot 1} = 3,706$.

The next step in determining the weights of factors included in the model for the assessment of innovativeness of public administration units awarding public contracts is summing these values:

$$0,283+0,445+3,706+1,399+0,413+3,706 = 9,952$$

Calculating the sum allows for the calculation of optimal percentage weights for the factors included in the model:

- the number of PPP investments: $(0,283 / 9,952) 100\% = 2,84\%$,
- the unit's budget: $(0,445 / 9,952) 100\% = 4,47\%$,
- the number of electronic biddings: $(3,706 / 9,952) 100\% = \mathbf{37,24\%}$,
- the number of electronic auctions: $(1,399 / 9,952) 100\% = 14,06\%$,
- the number of pro-environmental contracts: $(0,413 / 9,952) 100\% = 4,15\%$
- the number of trainings for authorities: $(3,706 / 9,952) 100\% = \mathbf{37,24\%}$.

Having determined the percentage weight of each factor included in the model, we can proceed to its presentation. Its final form has been shown in Table 8.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 8. Model for assessing the innovativeness of Polish public administration entities awarding public contracts

Factor	The method of calculation (a)	Weight (b)	The result (a x b) [%]
The number of PPP investments	the number of orders leading to contracts in the form of PPP / total number of cases	2,84%	___ x 2,84% = ___
The unit's budget	the amount of the expenses associated with the purchase of innovative procurement / total public procurement expenditure	4,47%	___ x 4,47% = ___
The number of electronic biddings	the number of cases in the electronic bidding / total number of cases	37,24%	___ x 37,24% = ___
The number of electronic auctions	the number of cases using electronic auction / total number of cases	14,06%	___ x 14,06% = ___
The number of pro-environmental contracts	the number of cases with pro-environmental criteria / total number of cases	4,15%	___ x 4,15% = ___
The number of trainings received by authorities	the number of trainings related to innovative public procurement / total number of trainings received by employees	37,24%	___ x 37,24% = ___
the sum of innovativeness			

Source: own study.

As regards the interpretation of the results obtained from the use of the model, it looks as follows:

- the results in the range of 100% - 76% - the highest innovativeness,
- the results in a range of 75% - 51% - high innovativeness,
- the results in the range of 50% - 26% - moderate innovativeness,
- the results in the range of 25% - 0% - low level of innovativeness.

Such a division is supported primarily by the European Union guidelines, which (for example in the field of green public procurement) planned to obtain the number of 50% of cases by the end of 2010. It is recommended to carry out the calculations associated with the use of the model on an annual basis by comparing the results with those of the previous year. This will provide an opportunity to indicate the direction of changes in the development of innovativeness in the analyzed entities awarding public contracts.

Since each model should be validated, also in this case the two units of public administration got their innovativeness indicators calculated. These entities were local government bodies performing similar functions in Po-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

land and Germany³. The data were obtained during an interview conducted with the leadership of departments responsible for public procurement and on the basis of data collected by the audited entities. The obtained results are shown in Table 9.

Table 9. The use of the model to assess innovativeness in the selected units of public administration

Factor	Polish Unit			German Unit		
	Ratio	Weight	Result	Ratio	Weight	Result
LIP _{pp}	0	2.84%	0%	0.03	2.84%	0.08%
BJ	0.08	4.47%	0.36%	0.22	4.47%	0.98%
LLE	0.031	37.24%	1.15%	0.23	37.24%	8.56%
LAE	0.076	14.06%	1.07%	0.17	14.06%	2.39%
LZP	0.006	4.15%	0.02%	0.24	4.15%	1.00%
LSZ	0.12	37.24%	4.47%	0.51	37.24%	18.99%
Total Innovativeness	7.07%			32%		

Source: own study based on test results.

As indicated by the data obtained on the basis of the research on public administration in Poland and Germany, the native unit belongs to institutions that create low innovativeness, while the German one to those of moderate innovativeness. In both cases, there is a visible distance that has to be covered to catch up with the guidelines of the European Union. In fact, in the use of all the factors that create innovativeness, the Polish unit is still lagging behind its German counterpart. The largest differences can be seen especially in the use of green public procurement (the Polish unit generates only 0.6% compared to 24% on the German side), the number of electronic auctions (3.1% and 23% of cases respectively), and the number of trainings received by authorities characterized by issues related to the factors included in the model (12% and 51% respectively). The Polish example shows how much still remains to be done in terms of utilization of the factors that create demand for innovative procurement and how big distance separates our country from our western neighbors regarding work on improving the innovativeness of the entire national economy.

Conclusions

The resulting model can play an important role in economic policy-making related to the allocation of state funds to the state administration

³ The validation was conducted during the research internship in Germany.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

entities throughout the country. In such application, it can also act as an incentive function of these units because the results obtained in terms of innovativeness may influence future revenues associated with the development of regions or investment for local communities.

The annual assessment conducted by the entity or by a system that allows the introduction of online data will also allow the determination of the average level of innovativeness in public administration units dealing with procurement in the entire country.

Undoubtedly, it is important in this area to take appropriate legislative action, because as foreign experiences shows, only quick and efficient calculation of the rate of innovativeness allows for an appropriate use of the model. Therefore, its use is simplified to the maximum and does not require multiple procedures.

The model should also be applied to the micro level, because each unit of public administration can use it to monitor their progress in the purchase of more modern supplies, services and construction works. It is also of major importance in the use of electronic tools and the so-called green public procurement, whose weight is not large, but can be decisive in a situation when public entities maximize the number of trainings and the use of electronic tools.

Finally, we should mention the fundamental principle of economics associated with the use of the model. Using it ensures optimal results with the utilization of given resources. For example, it is difficult to imagine that while using the model, the money received by entities would be allocated to the trainings of employees not related to raising awareness on creating demand for innovative public procurement. This solution also seems to be a kind of a remedy for the lack of knowledge of contracting in the area related to negotiating procurement modes and the procedures of public-private partnerships.

The use of public-private partnership forced by the model is linked to another macroeconomic benefit. The use of this tool provides significant relief for the state budget expenditures related to the development of infrastructure and public services by replacing public capital with the private one. The benefits obtained this way can also translate into the desired concentration on the entire lifecycle of a given project, as in the case of proceedings conducted in the PPP efficiency and effectiveness formula, which are not counted for in the individual stages, but in relation to the total integrated cost throughout the lifecycle of the project. Finally, the big advantage associated with the launch of PPP in Poland on a larger scale is the

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

acceleration and improvement of the efficiency of project implementation. This is just an example of the benefits associated with the use of this tool.

The use of the model can also help to change the attitude of authorities in the field of environmental protection. Awarding these contracts and the associated influx of budgetary funds resulting from an increased innovativeness of certain units can successfully compensate for the often higher expenses they incur in connection with the purchase of green products and services.

Ultimately, there is also a chance to change the image of public administration. There is a still lingering notion that it is outdated and does not pass on good practices in the area of creating demand for innovative products and services to the private sector. It is worth mentioning that this change may lead to a greater confidence of citizens in these units as well as the entire economic system of the state.

Analyzing the importance of the manageable factors in the presented model, we can get an impression that only two of them dominate (the number of electronic biddings and the number of trainings received by authorities). In fact, these factors (given the results) seem to be crucial in conjunction with the next phase of network thinking methodology associated with the planning of strategies and actions. They provide the launch of processes associated with the use of electronic tools, which (as indicated by numerous examples) allow for huge savings of budgetary funds (which can be used for the purchase of modern products and services), as well as the efficient use of public funds for training of employees of public administration in Poland. Therefore, they essentially play a huge economic role as they allow obtaining significant savings not only in the administration of public institutions, but also in the entire state budget.

The model also carries certain limitations. Not every tender procedure can be carried out using the formula of public-private partnerships or as electronic bidding. The legislature has imposed limitations and only some of the proceedings can be realized in this way. It is also difficult to expect that the staff of the unit providing public contracts will be trained in the use of only the procedures associated with obtaining innovative products and services in public tenders. There exists a whole range of other activities that require the improvement of knowledge such as formulating the terms of reference, selecting criteria and procedures for evaluating an offer or judicial appeal proceedings that do not involve raising innovative procedures, but are necessary for the smooth functioning of individuals.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Moreover, not all procurements have their ecological equivalents. Also, it is not always possible to analyze the balance of benefits and costs associated with them and maintain their green nature.

A threat to the use of the model can also lie in the so called "rat race" between public authorities striving for the greatest proportion of the budget regarding expenses related to tenders. This may result, among other things, in management trying to enforce participation in trainings on employees - withdrawing them from their daily duties and causing backlogs in the current work.

It is worth mentioning that the created model does not provide guidelines for creating innovations on the supply side of public procurement market. As we know innovation-oriented companies may find the problems that P.M. Simpson divided into four categories: too many changes for the sake of change, market risk, hostile attitude of the staff or an increase in costs (Simpson, Siguaw, Enz, 2006). Innovativeness of companies of different sizes may also be influenced by various factors such as, for example, the structure of the market (Audretsch, 1995), (Malerba, Orsenigo, 1996). These facts mean that in the future, it will be necessary to undertake a study on the construction of a model for assessing the innovativeness of enterprises participating in the public procurement market.

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
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Protecting the Organization Against Risk and the Role of Financial Audit

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Keywords: *risk; risk identification; risk management; financial audit; internal audit*

Abstract: In the contemporary economic reality and organization's activities aiming at effectiveness and efficiency of functioning, a lot of significance is attached to a financial audit as an important instrument for protecting the organization against the risk factors. The aim of this article is to present theoretical and practical (on the basis of the examined example) aspects concerning the (internal) financial audit in the organization within the context of its assessment of the exposure to risk. The applied research methods are based on the method of conceptual analysis of the literature on the examined field, as well as on the case study of the auditing task. The results of the performed analyses and examinations allow to state that the financial audit constitutes an effective tool for protecting the organization against internal, as well as external risks. Each of the co-authors will contribute 50% of work to this article.

Introduction

A professional and unbiased financial audit (especially internal audit) constitutes for the management the main source of information about the organization. The appropriate provisions have introduced the obligation to

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

create the procedures of the internal control system, that is to say the collection of rules and mechanisms intended to assure proper functioning of the organization. The organization's management is also responsible for appointing an internal audit function that is independent from all the other sections of the organization. Information obtained from the auditor enables to assess whether the implemented internal control system fulfils its role. The environment of the examination includes the management style, culture of the institution, professional awareness of the employees and the organization's exposure to risk. The control mechanisms aim at preventing, detecting and repairing irregularities, in order to assure an orderly and effective conducting of the organization's activities, maintain conformity with the applied internal policies, secure the property, detect irregularities and frauds, timely prepare the required information about the financial situation etc. The subject carrying out the internal audit has also the task of identification and assessment of the risk areas, thus deciding about the form (selection) of the auditing tasks. Connecting the internal audit with the risk management results not only from the audit's definition presented by the Institute of Internal Auditors (IIA), but most of all from the increasing awareness of the fact that contemporary enterprises operate in the risk conditions, which are to be diagnosed and the mitigating mechanisms are to be implemented by means of control.

In this study the significance of the financial audit is presented on the example of the internal audit in an organization, focusing on demonstrating the relation between audit and risk. The fundamental aim was to recognize the auditing task in reference to the diagnosed or identified risks, at the same time acknowledging that the risk identification process constitutes a stage of the integrated risk assessment within the risk management process. Firstly, the study identifies the significance of the audit in the organization, taking into consideration the basic characteristics of the internal and external audit, in order to later direct the discussion to the internal audit and its connection with the risk management in the organization. What is then pointed out is the importance of identification of risk, as a stage of integrated risk assessment, for the auditing task concerning the travelling expenses and related costs – on the basis of a risk map of the examined organization. In the first – theoretical – part of the study the method of the conceptual analysis of literature was applied, whereas the second – practical (empirical) – part concerning the presentation of the auditing task was based on a case study.

The nature and objectives of audit versus the context of risk management

The term “audit” comes from the Latin word “audire”, which means to interrogate, examine, listen (Kiziukiewicz, 2009, p. 13). Internal and external audit can be distinguished basing on the criterion of the subject carrying out the audit. The external audit is performed by external institutions independent from the unit’s management, with the intention to examine the financial situation of a particular unit. In the local government administration the audit is carried out by the institutions that are independent from the local government, e.g. Regionalna Izba Obrachunkowa (RIO – Regional Chambers of Accounts), and in the government administration – Najwyższa Izba Kontroli (NIK – Supreme Chamber of Control). The external audit can also be outsourced to an external subject, e.g. an auditing company (as it is the case in the example examined in this study). On the other hand, the internal audit is performed by an own section (a particular position), which is distinguished in the organization’s structure. The auditor is the employee of a given enterprise (Kiziukiewicz, 2009, pp. 13-14).

An external audit is an instrument that in an active, objective and independent way evaluates the efficiency and effectiveness of the internal control system as well as the risk management process, yields an added value by means of revealing the defects, errors and weaknesses and by presenting the possibilities of increasing the quality of work (Saunders, 2002, p. 36). What is understood under the notion of added value is the improvement of the unit’s structure, which would enable generating a higher profit or achieving the same effect with similar expenditure (Kiziukiewicz, 2009, p. 16).

According to the definition of the Institute of Internal Auditors (IIA), “internal audit is an independent, objective assurance and consulting activity designed to add value and improve an organization’s operations” (Pickett, 2005, p. 3). Furthermore, according to IIA’s understanding of the audit, it helps to achieve the outlined objectives of the organization through consistent and systematic actions leading to the improvement of the effectiveness of the risk management, organization or control system (Czerwiński 2005, p. 10). Therefore it can be stated, as it arises from the definition of internal audit given by the IIA, that it is deeply embedded in the risk management, control and governance agenda.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 1. Characteristics of the basic features of external and internal audit

Criterion	External audit	Internal audit
Objective of an audit	It serves the external subjects that want to get to know the financial situation of the unit	Bringing added value to the unit
Scope of an audit	Financial aspects of the activities	Financial, as well as non-financial scopes
The examined period	The events that occurred, especially the evaluation of data in the financial statements	Current state
Frequency of examinations	In most cases, once a year	According to the prepared schedule, during the whole year
Familiarity with the unit	The auditor gets to know the unit before or during the examination	The auditor knows the unit really well
Examining subject	The subject independent from the organization	The auditor employed in the organization

Source: Compilation based on the literature on the subject.

Internal audit is a regular examination of the correctness and effectiveness of the unit's (subject's) activities carried out over a longer period of time by an appropriate specialist – an auditor, in most cases employed in the unit on the full-time basis. Its role is mainly to evaluate and facilitate the functioning of internal control and the process of making management decisions. The developed reports are intended for the bodies managing the organization, including an enterprise. During the evaluation of the internal audit's functions the following areas and issues are taken into consideration (Herden, 2010, p. 105):

- internal audit independence,
- human resource capacity,
- knowledge and scope of internal audit function,
- information access,
- adequate funding and technology,
- existence of audit committees,
- stakeholder support,
- implementation of audit recommendation.

Any activities conducted by a given organization, examination and assessment of the effectiveness of the management control system, quality of the accomplished objectives, following the legal provisions and internal regulations, economy and effectiveness in using the unit's resources, as

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

well as the risk management process can constitute the subject of internal audit. It is assumed that “if internal audit (is to) enhance good corporate governance it should have acceptance and support of major stakeholders of the corporation. This includes shareholders, the board of directors, senior management, the audit committee as well as employees” (Herden, 2010, p. 103). The audit evaluates also the level of adjusting the activities to the previous recommendations and guidelines of an audit or inspection (www.mf.gov.pl., pp. 6-7) The auditing tasks should be the part of the annual audit plan. Therefore, such plan has to be based on the risk analysis carried out at least once a year or at any point when new risks are identified and when the exposure to the previously identified risks changes, as well as on the correlation with the objectives outlined by the unit’s management. It has to be remembered that the risk analysis is the stage of the risk management which is preceded by identification and the whole thing takes place at the stage, also a process, called the risk assessment (Bożek, 2010, pp. 99-100). In the international risk management standards, e.g. COSO II, AS/NZS 4360, FERMA, ISO 31000 the risk analysis constitutes a really significant process within the overall risk management process; it can be considered that it is a part of the enterprise risk management process (COSO II does not clearly divide the risk assessment into stages, however the reference to the risk analysis as the central process in the risk assessment process can be noticed (Zarządzanie Ryzykiem Korporacyjnym – COSO, 2007, pp. 45-55)). Most generally speaking, “risk analysis is performed both at the level of planning and the level of operations. It is an instrument for: facilitated long-term planning; used during drawing up a plan of an auditing task; allowing calculating and control risk of failure occurring in an audit of project; helping to evaluate the effectiveness and adequacy of a system of internal control” (Korombel, 2010, p. 117).

In the end, the auditor should collect information concerning the legal provisions regulating the activities of the organization, and more precisely, of all the significant areas of its activities. In exceptional justified cases there exists a possibility to perform an auditing task even though it was not considered in the plan. However, such procedure is applied occasionally – especially in case of a sudden occurrence of the risk factors and circumstances that may result in incurring significant financial losses, making harmful decisions, exposing to unnecessary expenses. The audit plan has to contain the following elements:

- the results of the conducted risk analysis,
- the results of the conducted human resources analysis,

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

- list of the risk areas, for which the assurance tasks will be performed,
- determining the time (in person-days) intended for the realization of particular assurance, advisory and revision tasks (Sławińska – Tomtała, 2009, pp. 91-109).

However, in order for the auditor to be able to efficiently fulfil the auditor's objectives, he should pay attention to the mission of the examined unit. Determining such mission constitutes an important stage in the unit's strategic planning as it outlines the general direction of activities and facilitates the management and employees to notice the elements responsible for creating advantage over competition in a long-term perspective (Kozmiński, Piotrowski, 2005, pp. 17-18)

Moreover, the auditor has to receive answers to the questions concerning the objectives of the unit's activities – whether they are measurable, if there are financial forecasts connected with their realization, as well as whether appropriate budgets were provided, if responsibility was placed on the people realizing the objectives and if these people are aware of the risks that may occur during the realization, whether the superiors meet the employees in order to discuss the progress and monitor the realization (Knedler, Stasik, 2005, pp. 41-44). The following situations are what should be of special interest to the auditor, focused on the assessment of the functioning mechanisms with respect to their correctness connected with the objectives' realization:

- lack of clearly stated objectives,
- vague organizational structure,
- improper process of planning,
- wasting the resources and lack of precision in communication with the employees (Knedler, Stasik, 2005, pp. 5-6).

Thus, generally speaking, the auditor's actions in the organization concentrate on the systematized activities which include:

- evaluation of risk areas,
- preparation of a plan of an internal audit,
- preparation of a program of an auditing task, performance of an auditing task,
- drawing reports from an audit,
- checking activities (Korombel, 2010, p. 116).

The work performed by the auditor should provide him with the answers to the essential questions:

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

1. whether the operational procedures and their control mechanisms enable the realization of the assumed objectives in an effective, and at the same time, economic and efficient way,
2. whether the assumed objectives are rational,
3. whether all the risks connected with the realization of the objectives have been identified,
4. whether the assumed procedures are followed and compliant with the provisions of law – if they protect against the occurrence of misuse.

Risks identification – significance, auditing objective

Quantification of risk is one of the most difficult parts of the enterprise risk management. (Emerling, 2013, p. 50). As it is emphasized in the literature on the subject, the understanding of the risk can be diverse, depending on the criterion of reference, the research area (on one hand, on the area of science, including social and economic science, on the other hand, for the fields of economic activity, including banking, insurances and finances), therefore there is no one and universal definition or attempt to specify this term (Bożek, 2013, p. 328). “Although is not easy to clearly define risk, it is often defined as uncertainty regarding which outcome will occur” (Seog, 2010, p. 7). Most generally speaking it can be assumed that the risk describes any situation (circumstances) which is an uncertainty as far as the occurrence (achievement) of the expected results is concerned (Harrington, Niehaus, 2004, p. 1). From the organization’s, and more precisely its business objectives’, point of view it is noticed that the risk is the possibility of incurring a loss caused by an event or a series of events that can have an adverse effect on the accomplishment of such objectives (Monahan, 2008, p. 3). Activities of the organization in a changing and unpredictable environment is of particular relevance to the objectives and strategic behaviour (Marzec, 2014, p. 395). And the “businesses too must manage their risks efficiently and effectively if they are to succeed” (Skipper, Kwon 2007, Preface). The implementation of an enterprise risk management system constitutes the most adequate approach to the risk which the organization is exposed to. “In the context of risk management there appear very significant determinants, namely the controls (constraints), which regulate, control or constrain the risk management process in the enterprise. Those are mainly: business risk management culture, resources, study parameters and plan” (Bożek, 2014a, p. 74).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The sources of risk might be as follows:

- direct hazards that result in non-accomplishment of the objectives,
- opportunities, offering the possibility of more effective accomplishment of the objectives (Czerwiński, 2005, pp. 68-70).

The internal auditor, in order to prepare the audit plan, prepares, according to his own professional evaluation, a documented analysis of the risk areas, which has a decisive influence on the selection of the auditing tasks (Sławińska – Tomtała, 2009, pp. 90-93).

The risk identification can constitute a separate process within the risk management process (Harrington, Niehaus, 2004, p.8; Rejda, 2010, p. 45 ff.). or, what is suggested in the enterprise risk management (ERM), it is a stage of the integrated risk assessment process¹. The risk opportunity identification process will be sufficient if at least the following objectives have been realized (Chapman, 2011, p. 160):

- the overall management of the business activity was understood,
- the risk identification process was not commenced before the business objectives were made explicit (without understanding the objectives it is not possible to undertake risk identification),
- risk identification was not commenced prior to a map or flow chart of the business process being prepared,
- department representatives participating in the identification process were senior enough to be knowledgeable in their area of specialization and were aware of both corporate lessons learnt and company risk exposure,
- the interdependencies between the risks were identified.

The following information is in particular used during the risk identification:

- objectives and tasks,
- legal provisions concerning the operation (possible changes in such provisions),
- organizational structure,
- results of the previously performed audits or inspections,
- results of the talks that the auditor conducted with the management and other employees of the organizational units.

The identified risks can be presented in the form of a risk map, where individual kinds of risk are recognized according to the significance / scale of results for the organization and the probability of occurrence. The exam-

¹ Approach visible in the standards of the risk management

ple of application of the map risk during the auditing task is presented in table 2. “To put it simply, the level of risk is obtained through comparison of probability with the effects of occurrence of a particular event” (Božek, 2014b, p. 49).

Example of the audit carried out in the organization for the task of delegating business trips and approving travelling expenses

The examined unit is a large organizational structure. It has within its frames an Audit Function which carried out the audit characterized below. Moreover, the auditing process was outsourced to Deloitte, an external audit institution which during this period carried out an extensive audit, covering also the process of delegating business trips and approving travelling expenses. Thus, one of the numerous auditing tasks in the examined organization was to take a look at the travelling expenses incurred in the organization in the previous year.

The objectives of the auditing task in the organization were to:

- assure that the conducted business trips and related expenses are in compliance with the internal guidelines of the organization,
- assure that the control mechanisms regarding delegating business trips and approving travelling expenses are sufficient and effective.

The organization is exposed to the risks identified in the auditing task according to the following categories:

- Improper issuance and approval of the business trip order,
- Improper settlement of travelling expenses,
- No accounting, formal and substantive control over the settlement of travel expenses.

The following example presents a simplified risk map consisting of four squares, illustrating the level of exposure to risk for the organization’s activities in respect of documenting the settlement of travel expenses. The risk map takes two parameters into consideration: the result (significance) and the probability of the occurrence of risk.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 2. Risk map for the auditing task: Travelling expenses and the related costs in 2010 in the X unit

Name of the auditing task:	Travelling expenses and related costs in 2010.		File reference number 47
RISK MAP			
Significance/Result of risk:			
Probability of the occurrence of risk		Low	High
	low	1. Non-timely settlement of travelling expenses	2. Improper issuance and approval of the business trip order.
	high	3. No formal and procedural control when monitoring the business trip Improper settlement of travelling expenses	4. No accounting control during the settlement of the business trip No settlement of travelling expenses

Source: Drawn up basing on the unit's data.

Square 4 – essential risks, most important, threatening the accomplishment of organization's objectives, significant as far as the consequences and results are concerned, and the probability of their occurrence is considerable. They should be reduced or eliminated by means of applying preventive controls. Such controls should be the subject of assessment and examination.

Square 3 – significant risks, but the probability of their occurrence is lower. They should be cyclically monitored in order to make sure that they are properly managed by the organization and their probability of occurrence remains low. Detective controls should be applied in order to assure that the kinds of risk of high significance are detected before their consequences occur.

Square 2 – the kinds of risk in this square are of smaller significance but the probability of their occurrence is high. They should be monitored in order to assure that they are managed properly and that their significance doesn't increase during the changing operating conditions.

Square 1 – the kinds of risk in this square are not significant and the probability of their occurrence is low. They require minimal monitoring and control, unless the next risk assessment reveals that they have moved to a different category.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The scope of examination included the review of the process from the acceptance of the business trip to the approval of the travelling expenses on the basis of the “Business Trip Order” documents of the examined unit and the expenses connected with the management board’s business trip. Basing on the received “Business Trip Order” documents (47 items) the auditors carried out the review regarding the functioning of the control mechanisms and the quality of the drawn up documents. The conducted examination did not involve the legitimacy and advisability of the business trip. The examination showed that the destinations, purpose of the trip, as well as the kind of transportation were specified in all of the examined documents of the Business Trip Order. The duration of the trip was specified in 45 out of 47 of the examined documents.

On the basis of the examined documents the auditors assessed the control mechanisms in respect of delegating / approving the management board’s business trip to be sufficient, however effective in 89% of all the documents.

The examination confirmed the business trips’ conformity regarding:

- The destination in all of the examined documents,
- The duration of the trip in 43 out of 47 documents,
- The kind of transportation in 42 out of 47 of the examined documents.

The examination showed that during the settlement of the business trip not all of the attached bills were included and accounted for in the Travel Cost Accounting. Those not included were accepted by the management board (except for three invoices attached to the Business Trip Order) on the so called “Document control” form attached to every bill.

On the basis of the performed audit the auditors assessed that the planned control mechanisms regarding the approval of the settlement of the business trips exist, but their appropriate application (signature and date) is insufficient, as it concerns 64% of the examined documents. On the other hand, the acceptance of the invoices attached to the business trip was identified in 96% out of 23 examined Business Trip Orders. Then the auditors assessed the paid allowances and expenses incurred during the business trip. The audit revealed the correctness of calculating the allowances in 21 out of 33 cases which constitutes 64% of all of the examined documents. In the auditors’ assessment the allowances for the time of delegating to the employee’s place of permanent or temporary stay and during the non-working days were calculated incorrectly. The incurred costs of the business trips, except for 7 invoices for the purchase of railway tickets (the invoices attached to the settlement of travel expenses do not contain infor-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

mation about the date and itinerary), were incurred according to the date and destination specified in the Business Trip Order.

The auditors' attention was directed at the questioned invoice for the consumption during the non-working days. Therefore, basing on 47 examined documents the auditors assessed the control mechanisms in respect of carrying out the inspection of the business trips settlements from substantive, formal and accounting perspective to be sufficient, however not completely working. The examination confirmed carrying out substantive control in 13%, whereas formal and accounting control – in 60%. The identified irregularities concerned mainly the lack of approving the performance of substantive, formal and accounting control by signature and date on the Travel Cost Accounting documents, in spite of the requirement to do so.

The Audit Function confirmed that the process of delegating the business trips and approving the travelling expenses is effective, with the included control mechanisms, however not in every point. What constitutes the weakest links are the substantive, formal and accounting approvals, as well as the quality of the process documentation, which is satisfying only at some of the stages of creation. Most of the irregularities were the result of the qualitative non-refinement and lack of developed internal procedures concerning, among others, carrying out the inspection of the proper calculation of the allowances and the correctness of settlement of the travel expenses in the substantive, accounting and legal respect.

The conducted auditing examination confirmed that the internal rules (procedures) of delegating, accepting and accounting for the business trips are in compliance with the policies and the system functioning in the organization. The auditors paid particular attention to the identified invoice for consumption on a non-working day and the business trips that include the weekend stay of the delegated employee in the place of residence.

Recommendations which were issued after the performed audit were as follows:

- To improve the quality of the drawn up documentation,
- To properly and in writing carry out the substantive control of the Travel Cost Accounting,
- To properly and in writing carry out the formal and accounting control of the Travel Cost Accounting.

The information about the implemented recommendations was received by the Internal Audit Office and the management of the examined organization.

Conclusions

The presented discussion certainly does not exhaust the subject matter of the examined issue, it only brings closer – according to the authors' intend – the context of audit's role with reference to risk in the organization. The audit as the control tool constitutes a really significant protective instrument connected in the organization with the risk management process. In particular, the relation of the internal audit with the risk management results not only from the IIA's guidelines to be found in the audit's definition, but also from the increasing awareness that every business activity is exposed to risk. In order to reduce the risk exposure by means of applying a diligent audit, the risks should be first properly diagnosed, that is to say identified, during the integrated risk assessment. In this study the identification of risk was performed for the auditing task concerning the travelling expenses and related costs on the example of the risk map of the examined organization. Most generally speaking, in order to enable the implementation of the risk mitigation methods in the organization, an adequate control system and integrated risk management system have to be established. It is assumed that the internal audit is focused on the assessment of effectiveness of functioning of such risk management system and on the possibility of introducing changes and improvements. The audit begins with becoming familiar with the environment in which the organization operates and the risks connected with its activities, at the same time controlling the way the risk management system is designed and to what extent is it operationally effective.

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18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
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Market or Government – Is There a Third Way?

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Abstract: The paper deals with the discussion on the possible models of economy – market economy, which is usually associated with capitalism, and planned economy, which is usually associated with socialism. The experience of the 20th century has shown that efforts to choose the model of socialism have failed. Is it sufficient to make a conclusion, that capitalism is preferred to socialism not depending on conditions? Even if so, that the events of the 21st century show, that model of capitalism also has faced serious contra versions, and thus should be significantly modified. The great economists from Smith to Keynes have made forecasts about the new model of economy in the future – neither socialism, nor capitalism in a common sense. To solve the global problems, we need to think outside the box, revising critically the conventional wisdoms, thus creating a new model of economy. A possible way in that direction may be the localization of economy in a global scale.

Introduction

The aim of this paper is to discuss the benefits and shortcomings of the two economic systems – capitalism and socialism, and to look for a possible third form of economic model. Certainly market could not be contrasted with socialism and even more government with capitalism. Government is an integral part of any organized society. However the functions of government, at least theoretically, differ in the two discussed models of econ-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

omy. The historical discussion mostly has generally led to conclusions, that any of the two systems has its benefits and shortcomings, and the historical process of development needs to adjust the existing economic model to the actual circumstances, and to look for improvements. The present world situation proves the necessity for that.

The first chapter deals with the historical development of understanding the concepts of capitalism and socialism, the phases of capitalist development, and the forecasts for the future development of the great economic thinkers Walras, Keynes, Schumpeter and others.

The second chapter recalls the historical discussion during the 20th century about the main theoretical problem of socialism – the possibility to set adequate prices for capital goods otherwise than in market.

The third chapter marks a new alternative, that may be considered either as an improvement of the existing capitalist model, or as a new, third economic model – local economies. The huge pressing problems of the present capitalist system in such a model should be several times smaller and therefore it will be much easier to accustom with them.

Methodology of the research

The methodology of the conclusion making is based on qualitative historical analysis and empirical evaluation of the standpoints of the scientific discussion. The paper is mainly library-based. The ideas of world famous economists are taken from their own books in a printed form or that can be found in Internet.

The analysis and conclusions have been approbated in several scientific conferences – annual European Society for the History of Economic Thought conferences in Prague, 2008, Amsterdam, 2010, annual Latvian Economic association conferences in Riga, 2010 and 2013, in the International conference of the Latvian Institute of Social Market Economy in Riga, 2012 and in the 7th International symposium of Warsaw University of Life Sciences in Jachranka, 2014. The main ideas have been discussed in the contents of study courses in BA School of Business and Finance in Riga, and have been developed in some previous publications, mentioned in the References. Author expresses special thanks to Professor Dzintra Atstaja (BA School of Business and Finance) for close and lasting cooperation discussing and developing the ideas and the results.

The Roots and Development of Two Modern Economic Systems

Since the XIX century mankind deals with two alternative models of economy – capitalism and socialism. Both these terms appeared in the middle of the XIX century. The term “capitalism” has its roots in Latin, based on “*caput*” – head, from which the term “*chattel*” was derived in a sense of a movable property. Such economists as David Ricardo and Pierre-Joseph Proudhon used term “*capitalist*” in their works; Karl Marx and Friedrich Engels were using term “*capitalistic system*”. The term “*capitalism*” in a modern sense came into our conversation language in the end of the XIX century, mainly due to German economists Werner Sombart, Max Weber and others.

The term “socialism” also has its roots in Latin – “*sociare*”, which means “*to share*”. The use of the word “socialism” in a modern sense is associated with the French philosophers and economists Pierre Leroux, Henri de Saint-Simon and others.

During the last two centuries there have been different definitions and interpretations of “capitalism” and “socialism”, thus creating the possibility of different interpretations of political and economical systems of various countries. Certainly, the ideological aspects constantly have led to confusion with the definitions of the two systems. In this paper the distinctions between capitalism and socialism are viewed in economic dimension. In that sense the main feature, that distinguish one model from the other is: in capitalism there is a private property on capital goods, in socialism capital goods are public domain. It follows that capital goods are not subject to the market, and thus the adequate price setting problem appears. Therefore it is necessary to have a centralized price setting institution, as well as a centralized institution, which will organize the process of resource distribution. From the point of view of economics, a public property of capital goods and centralized planning are the two main features of the socialism.

The roots of discussion about benefits and shortcomings of the both systems go back to ancient Greeks. Plato’s and Aristotle’s dissonant opinions may be interpreted as early roots of opposing these two systems, contrasting the fairness to utility, usefulness to efficiency, cooperation to competition. An exciting discussion about both systems, is given in the fundamental book of Leon Walras, where author associates these opinions with Plato and Aristotle.

“From the very beginning of human society and from the first appearance of social wealth, the problem of the distribution of this wealth has

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

been subject to debate. ... Of all the systems of distribution which have ever been devised, the two most prominent are communism and individualism, which have had as their respective champions the two greatest minds of antiquity, Plato and Aristotle. ... Communism says, "Goods ought to be appropriated collectively. Nature has given them to all men, not only to men living today but to posterity as well." ... In reply individualism argues. "Goods ought to be appropriated individually. Nature has made men unequal in virtue and talent." ... Which is right, communism or individualism? Are not both of them both right and wrong in the same time?" (Walras, 1874).

Except the fact that Walras uses term "communism" instead of "socialism" and "individualism" instead of "capitalism" the text of Walras seems very live issue in modern world. Indeed, the "communist" ideas, which Walras associates with Plato, are both right and wrong in the same time, as well as ideas of "individualism", which are associated with Aristotle. Walras is not judging who is right and who is wrong, but points out: "the theory of property must be in essence a moral science. ... If, therefore, any science espouses justice as its guiding principle, surely it must be the science of the distribution of social wealth, or, as we shall designate it, *social economics*."(Walras, 1874)

Socialist ideas have been likable to many people at all times and countries. The principle, that a person can acquire wealth not only by work, but also from interest on capital has been considered unjust. From the other hand such a possibility has been acting as powerful motivating factor. The idea that the most talented, clever and diligent members of society should be remunerated for that, also seems to be fair.

Up to the XVIII century the existing economic model was neither capitalistic nor socialistic in a modern sense, as there was private property on capital goods, but as it was mainly physical capital, there did not existed significant flows of capital in a global and even national level. The Industrial revolution with its retinues – capital concentration, financial markets, economic growth and globalization (the latter with a delay of hundred years) created the economic model, which we know as capitalism, and the theoretical basis of which is the fundamental work of Adam Smith "An Inquiry into the Nature and Causes of the Wealth of Nations", published in 1776, and being one of the signals of the new-coming era of capitalism.

The problem of globalization – why it was not a close satellite of development of capitalism in its first phase, but took its place only later - in the second phase, is thoroughly discussed in the paper of the famous Brazilian

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

economist Celso Monteiro Furtado: “It is known that during a first period, enterprises in the nations that headed the Industrial Revolution forced the opening of external markets, which explains the imperialist offensive that occurred throughout the 19th century. Nevertheless, the true motor of that economic growth was not so much the dynamism of exports, but instead the amplification of internal markets, derived from the increased buying power of the wage earning population. ...The explanation for this historical picture is found in the advance of new social forces, which appear at the same time as the process of urbanization generated by industrialization itself. The evolution of the system of power, a consequence of the action of organized workers, carried with it the elevation of real salaries and obliged governments to adopt protectionist policies to defend their respective internal markets. In this fashion, and starting at that moment, the motor for growth was the amplification of the internal market, with a subsidiary contribution from exports.” (Furtado, 1999)

None of the serious thinkers, including Marxians and Marx himself, deny the qualitative changes in the existence of mankind, brought by the new economic system. It created a new basis for human development, scientific discoveries, improvements in people everyday lives, changing the world beyond recognition. Though nothing in this world is only positive and negative, and the new economic system, with all its benefits, brought also new problems, at first increasing social inequality, which encouraged people to seek improvements to the existing system, or a new, better system. Therefore the forward-looking ideas of Walras about social economics as a science, which is investigating the principles of providence and usefulness in distribution of goods, are very up-to-date and will be even more important in the future.

The events of the 20th century seem to have proved the socialist system to be less efficient than the economy driven by the market forces, and put the discussion to an end. But the example of the Soviet Union shows, that capitalism is better than a bad socialism. From this one it cannot be concluded that a good capitalism is certainly better than a good socialism. The events of the 21st century both in a global and local scale show that existing capitalism system has a lot of heavy problems. Cambridge professor Ha-Joon Chang discusses them in his book “23 Things They Don’t Tell You about Capitalism”, among which one can mention the growing inequality both among nations and individuals inside the country, unjust principles of remuneration for different kinds of labor (laborers vs. managers, production vs. services, public sector vs. private sector), the problem of “impatient

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

capital” as a result of too high efficiency of financial markets. (Chang, 2010) This goes hand in hand with the sensational speech of Nicolas Sarkozy in the World Economic Forum, where he mentioned: “The crisis we are experiencing is not a crisis of capitalism. It is a crisis of the denaturing of capitalism – a crisis linked to loss of the values and references that have always been the foundation of capitalism. Capitalism has always been inseparable from a system of values, a conception of civilization, an idea of mankind. Purely financial capitalism is a distortion, and we have seen the risks it involves for the world economy. But anti-capitalism is a dead end that is even worse. We can only save capitalism by rebuilding it, by restoring its moral dimension. I know that this expression will call forth many questions.” (Sarkozy, 2010)

Perhaps, that is the reason for the necessity to reconsider the basic principles of the possible models of economy. Almost of the great economists – Smith, Ricardo, Mill, Walras (previously quoted), Keynes, Schumpeter have pointed the necessity to reconsider the economic paradigm in the future. For our generation it may turn out to be not future, but present. To justify this, let us quote the last public speech of Schumpeter: “Marx was wrong in his diagnosis of the manner in which capitalist society would break down; he was not wrong in the prediction that it would break down eventually. The Stagnationists are wrong in their diagnosis of the reasons why the capitalist process should stagnate; they may still turn out to be right in their prognosis that it will stagnate - with sufficient help from the public sector.”(Schumpeter, 1950)

Keynes is less pessimistic as Schumpeter, when he says: “I see us free, therefore, to return to some of the most sure and certain principles of religion and traditional virtue-that avarice is a vice, that the exaction of usury is a misdemeanour, and the love of money is detestable, that those walk most truly in the paths of virtue and sane wisdom who take least thought for the morrow. We shall once more value ends above means and prefer the good to the useful. We shall honour those who can teach us how to pluck the hour and the day virtuously and well, the delightful people who are capable of taking direct enjoyment in things, the lilies of the field who toil not, neither do they spin. But beware! The time for all this is not yet. For at least another hundred years we must pretend to ourselves and to every one that fair is foul and foul is fair; for foul is useful and fair is not. Avarice and usury and precaution must be our gods for a little longer still.” (Keynes, 1930)

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Anyway one can make a conclusion, that the possible escape route is the restoring of the moral dimension. Is it possible in the global world, and what are the alternatives? These are questions that are waiting for immediate answers.

Socialist Calculation Debate

One of the fundamental discussions about the theoretical possibility of a socialist model of economy is the problem of price setting for capital goods. As calculations in the capitalist system are based on market prices, the impossibility of calculations is not a threat in this case. But what about socialism, where capital goods belong to the society and are not subjected to market? Indeed, is it possible to use successfully in decision making plans, containing measurements in a monetary form, if they are based on prices, that are not set in the market and thus not adequate?

The discussion about the possibilities and efficiency of price setting in capitalism and socialism started in the beginning of the 20th century. The Italian economist, the successor of the school of Lausanne and ideas of Leon Walras – Enrico Barone claimed that the setting of adequate system price in socialism can be done at least as successfully as in capitalism, because prices can be considered as the solution of the equation set of the Walrasian general equilibrium theory. (Barone, 1908)

The discussion was continued by the Austrian economist, a follower of Marxian ideas, Otto Neurath. He mentioned that during the World War I governments of many European countries were carrying out “war economy”, providing high employment and avoiding business cycles. The goal of the governments was not to maximize aggregate monetary indicators of volume, but to satisfy the needs of state and society. Therefore Neurath made a conclusion that such an economy operates more efficiently than a market economy, at least in wartime conditions. Can it be the same in a peace-time? Even before the war Neurath considered possibility to create an economic system, which could successfully function without money. After the war Neurath considered a model of economy, which would provide objective needs of the society according the “war economy” model, but that “additional benefits”, i.e. goods and services, which are outside the necessities, should be produced in another sector of economy, where money will be on the basis of exchange. (Neurath, 1919)

These ideas of Neurath correspond with the approach of the Latvian economist Karl Ballod, mentioned in his „Ein Blick in Der Zukunftsstaat”.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

(Ballod, 1898) Ballod considered that the main goal of economy is to satisfy the basic needs of the people, which can not be identified with people's desires. These needs can be calculated statistically. The economy of the country shall consist of two institutional sectors – public sector, which is not driven by the market forces, but acts as in the planned economy. The other – private sector deals with people's desires, and is driven by the market forces.

The ideas of Neurath were taken with enthusiasm by German socialists Otto Bauer and Emil Lederer, who did not support the opinion of Neurath about getting rid of money, but agreed with Neurath, that the decision making in socialism is more efficient than in capitalism. The discussion was developed by American economists Fred M.Taylor, Abba P.Lerner, Polish economist Oskar Lange and British economists Maurice H.Dobb and Henry Douglas Dickinson.

The most prominent opposite point of view, containing a fundamental criticism of socialism, is expressed by Austrian economist Ludwig von Mises. He attacked the basic concept, arguing, that any indicator, that is measured in monetary terms is baseless, because it is impossible to determine the price of any commodity without the market based price system. "Without calculation, economic activity is impossible. Since under Socialism economic calculation is impossible, under Socialism there can be no economic activity in our sense of the word." (Mises, 1920)

Oscar Lange offered a model for adequate price setting (Lange, 1938), later the model of adequate price setting was developed in the works of Leonid Kantorovich, "father" of Linear Programming, the only one of the Soviet Economists, who has received the Nobel Prize in Economics. The basic concept of Kantorovich was the notion of shadow prices, which show the price of a given resource at given prices of final products, i.e. marginal efficiencies of resources, and allows evaluating the costs of natural resources. In the end of the 30-ies orthodox Marxists considered the ideas of Kantorovich as an attack on the labor theory of value; therefore Kantorovich could publish his ideas only twenty years later, after the end of the Stalinism era. (Kantorovich, 1959) His disciple, Ivan Siroyezhin, developed these ideas. (Siroyezhin, 1980)

The response to the defenders of possibility to calculate adequate prices in socialism was given by the ideological successor of Mises, Friedrich Hayek, who argued, that the economic planner would need a terribly large amount of information to perform adequate calculations. Furthermore, there is no guarantee that individuals, who will take the decisions, will not be

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

influenced by selfish interests, and even if not, their motivation will be less, than it would be if they were making decisions about their own property. This was strengthened by American economist James Buchanan: “The more significant criticism of socialist economic organization lies in the difficulties of choice-making. Even if the socialist state should somehow discover an oracle that would allow all calculations to be made perfectly, even if all preference functions are revealed, and even if all production functions are known with certainty, efficiency in allocation will emerge only if the effective decision-makers are converted into economic eunuchs. Only if such men can be motivated to behave, to make decisions in accordance with cost criteria that are different from *their own*, can this decision-structure become workable.” (Buchanan, 1969)

Still, as one can see from the quote from Buchanan, in principle he does not deny the possibility of such calculations. The two problems, that for Hayek and Buchanan seem to be insolvable, are: 1) the problem of the terribly gigantic size of the model, 2) the problem of “economic eunuchs”, which hardly exist in the modern society. If these problems hypothetically could be solved in the future, there it may turn out a necessity to return to the socialist calculation debate. (Brivers, 2009)

Localization of Economy – is this a Third Way?

In present it becomes obvious, that the forecasts of the great economists are true, and more and more facts indicate the necessity to upgrade the capitalist model significantly or even to search for a new model. Financial innovations have spoiled the market mechanism. The innovative ideas in the speculative economy have destroyed the function of market economy, which equalizes the profitability of different businesses in a long run. Since the collapse of the Bretton Woods system, speculative economy has become more and more profitable, and the innovative ideas there have kept this profitability for more than 30 years, inhibiting investors and entrepreneurs from the real economy. Finally, the profitability of the speculative economy has collapsed with a blast. A possible alternate solution is to consider non-financial and financial capital separately. Non-financial capital is a private property, but financial capital – just the opposite, is only a public property. This item has been discussed in another paper of the author. (Brivers, 2014)

The way to find a new economic model, which is mainly based on a private property, being above all capitalistic, is the way of localization of

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

economy. The basic idea of small economies versus big economies may be based on the concept of Ernest Schumacher. “When we move from small-scale to medium-scale, the connection between ownership and work already becomes attenuated; private enterprise tends to become impersonal and also a significant social factor in the locality; it may even assume more than local significance. ... In small-scale enterprise, private ownership is natural, fruitful, and just. ... In large-scale enterprise, private ownership is a fiction for the purpose of enabling functionless owners to live parasitically on the labor of others. It is not only unjust but also an irrational element which distorts all relationships within the enterprise.” (Schumacher, 1973) In this quotation Schumacher considers mainly the micro level, but the same idea, contained in the title of the book – “Small is beautiful: Economics as if People Mattered”, is applicable to the macro level as well. Indeed, as it has been broadly discussed, the present form of economy is such, that people matter less and less giving preference to figures and money.

Every nation must be able to develop on its own, without help from outside. All vital products must be produced within its own country. Only in this case the state can be truly independent. Any country whose economy is dependent on other countries is not only vulnerable to crises, but also can become a victim of various types of extortion. And vice versa - a truly independent country can build healthy trade relations with other countries by exchanging the surplus of production and specific products, but maintaining economic independence and without being under the yoke of debt.

The main benefit of such independent national states will be the possibility to strengthen the society by re-establishing the virtues, which will be based on true human values.

Localization does not mean elimination of international trade. On no account it means any restrictions for people travelling and cooperation; just the opposite – it requires more and more cooperation in a global scale. In local economics the present problems of capitalistic model will take place, but in a far much lesser extent. As it has been said in the film of the English author – economist Helena Norberg-Hodge “The Economics of Happiness” – there is only one economy that has sense: it is local economy. We should localize our economic activities, our minds, our spirits. Not only “Buy local”, but also “Sell local” and “Act local” should be the basic principles of economy. At first we should stop the discrimination of the producers, who produce for the local market, avoiding direct and hidden subsidies for the exporters.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The decision making in a local level in most cases will be more effective, as it moves closer to the performer. Local food, local energies, local banking – these are the routes for the movement to local economies. These ideas become more and more popular in the world. Perhaps it may be the basis of the new capitalist economic model, where people matter, and money, economic growth, innovations, etc. are means, not the ends.

Conclusions

The discussion about two possible economic models – capitalism, associated mainly with the power of market, and socialism, associated mainly with power of government, has been the item of discussions between philosophers, economists and politicians since ancient times. The events of the 20th century have shown that the capitalistic model of economy has turned out to be victorious over the socialistic model. From the main distinction between the two models - the private or public property of the capital there turns out the problem of adequate price setting for capital goods in socialism. The discussion about possibility to set adequate prices otherwise as in market continued for more than half a century, and came to a conclusion, that it is not realistic. Still from the point of view of future and, if the problem is considered in a small economy, as in local economies, the insurmountable obstacles may turn out to be much smaller, and it may be useful to return to that discussion.

One of the most influential economists of the 19th century Leon Walras, when discussing the shortcomings and benefits of each economic model, did not make a final judgment, which one is the best. His suggestion was to develop the social economics as one of the main branches of economic science. In modern world social economics should take much more important place in economic science, research and study programs in the universities.

The present problems of the capitalism have increased significantly and need an immediate solution. The possible alternative, that may be considered either the way, how to upgrade the existing capitalist model, or the way, how to create a new, third economic model, is localization – creating small, self-sufficient economies, that should widely cooperate, but keep their independence. Local needs should come first, and people activities, minds and spirits should be closer to home. Both in micro and macro levels, and even in a household level, true friendship requires that both sides are not dependant each from other. The best economic model is, where econo-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

my no longer appears as an end itself, but as a means to an end, and the main goal of it is the happiness of the people – the economics of happiness.

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**Proceedings of the 8th International Conference on Applied Economics
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18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
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**The Specific of Economic Competitiveness
Evaluation of Cities from Cross-border
Region Under the Context of Urban Shrinkage**

JEL Classification: *O11; O18; R11; R58*

Keywords: *city; cross-border region; economic competitiveness of cities; shrinking cities*

Abstract: This article analyzes the issues of economic competitiveness evaluation of cross-border cities under the context of urban shrinkage. Currently the "urban shrinkage" issue is on the top of the political agenda in Europe. Under the globalization conditions, especially cities, which suffer from urban shrinkage, have to find new and modern means and attitudes for increasing urban competitiveness. The absence of methodological tools for the evaluation of economic competitiveness of the cities of cross-border regions is becoming one of the obstacles that impede the real identification of the current situation and predicting perspectives of the cross-border urban development and competitiveness. The purpose of the article – to identify the challenges and factors for improvement of economic competitiveness of the cross-border cities under the context of urban shrinkage and to develop methodological guidelines for the evaluation of cross-border regional economic competitiveness based on the findings of analysis performed on Lithuanian-Polish cross-border cities. The article distinguishes basic characteristics of the shrinking cities and related problems that have a direct impact on the improvement of economic competitiveness of the city. The economic competitiveness evaluation methodology on the cross-border cities is developed and its practical applicability is verified, based on the sample of Lithuanian-Polish cities (Alytus, Marijampole

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

(Lithuania) and Elk, Bialystok (Poland). Panevezys and Siauliai are additionally added to the analysis as industrial cities located near Lithuania - Latvia border). Strategic recommendations on improving the economic competitiveness of Lithuanian-Polish cross-border cities are introduced in the context of urban shrinkage.

Introduction

This article analyzes the issues of economic competitiveness evaluation of cross-border cities under the context of urban shrinkage. Many cities, especially from countries of small economies, face with characteristics and consequences of urban shrinkage. The main problem regarding increasing competitiveness of shrinking cities relates to rethinking of their future competitiveness in the context of decline. Competitiveness and economic growth problems are particularly important and relevant to the cross-border cities, mostly because they are remote from the central regions of the country and the capital city (operation of the periphery syndrome), they are often economically 'distant' and having slower development trends. Scientists refer to various causes of such economic-social inequalities, determined by both nationwide and specific. However, the scientific literature and strategic European Union and individual countries' documents support the idea that the economic and social disparities both within the same country and between different countries must be reduced, and indicates that one of the ways to achieve this is to encourage economic co-operation between different cities. Various measures and forms to promote economic co-operation, employed by cities, companies, institutions or organizations of different countries, encourage the development of regular contacts and communication, which gradually evolve from an informal communication into a formal co-operation. In this way, the promotion of economic co-operation allows reducing the spatial isolation, influenced by national borders, and thus improves the economic competitiveness of individual cities. Thus, an active economic co-operation between cities of different countries can be a successful measure which allows to activate the socio-economic life of cities, particularly of those exposed to the population decrease related problems and consequences, successfully employ their development potential and turn them into centers of economic growth.

Both foreign, Lithuanian and Polish authors, very often analyze and evaluate the competitiveness of individual regions and cities, identify the factors that increase competitiveness and seek for ways and create various strategies to increase competitiveness. However, the scientific literature focuses mainly on the problems related to competitiveness of the national

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

towns or regions, without taking into account the specifics of cities of cross-border regions and the shrinking cities. The formation of common methodological framework for assessing the economic competitiveness of different countries' cross-border cities is impeded by the use of two countries' socio-economic development indicators, which in different countries are calculated in different ways and are based on different methodologies. The absence of methodological tools and guidelines for the evaluation of economic competitiveness of the cities of cross-border regions is becoming one of the obstacles that impede the real identification of the current situation and prediction of perspectives of the cross-border urban development, which is a prerequisite for an effective decision-making on the increase in the city's economic competitiveness.

The purpose of the article – identify the challenges and factors for improvement of economic competitiveness of the cross-border cities under the context of urban shrinkage and to develop methodological guidelines for the evaluation of cross-border regional economic competitiveness based on the findings of analysis performed on Lithuanian-Polish cross-border cities.

Methods of the research: systemic, comparative and logical scientific literature analysis; empirical research employing systemic analysis of external secondary data.

In this article an urban economic competitiveness is defined as an ability of a city to use various (economic, social, institutional, infrastructure, nature etc.) factors of competitiveness in order to make a competitive position and maintain it among other cities and be attractive for different urban resources and functions. Such viewpoint allows treating the urban competitiveness as a self reinforcing process, where present factors of competitiveness (inputs) create future factors of competitiveness (outputs) and after that outputs become inputs for a new cycle of competitiveness process. This issue is fundamental for strategic planning, as the process of improving urban competitiveness is a continual and cyclical. The strategic decisions should be based on the up to date results of the measurement of competitive position and potential of a city.

In this article the cross-border region is defined as the administrative territorial unit consisting of two or more neighboring countries' territories, which has its own identity and some common historical, cultural and socio-economic characteristics, but the authorities represent the needs of different countries and political-legal rules. The empirical application of the methodology of urban economic competitiveness evaluation by index is based on the evaluation of the specificity of these regions: Alytus and Marijampolė.

pole counties (Lithuania) and Warmian-Masurian and Podlaskie voivodeships (Poland).

The concept of shrinking cities and it's impact on urban competitiveness

Urban development is an ongoing cyclical process of change. During its history, every city may experience different development stages: growth, stagnation, decline or even death. Both internal and external factors affect the process and results of the development. This research focuses on the phenomenon of urban decline with particular attention to one of its type - urban shrinkage. Currently the "urban shrinkage" issue is on the top of the political agenda in Europe. The European Commission (2011) promotes the creation of diverse, cohesive and attractive cities that should be green and healthy, they should be places for a resilient and inclusive economy, yet the present reality in many European cities, especially in Eastern part of the European Union, shows the opposite situation and calls for immediate attention from local, national and European-level policy makers.

Shrinkage of urban areas is not a new phenomenon; cities underwent shrinkage processes throughout history. However, just around 1950 it became an important focus of concern and debate among policy-makers and researchers in many Western countries, especially in cities – former mining centers. While in the beginning urban shrinkage was mostly discussed within the context of industrial and rural regions, around 1990 decline processes became specific to all types of cities despite their size, status, history, functions or role in national urban systems. According to Oswalt and Rienitz (2006), in the beginning of XXI century, 25 percent of all cities (especially in former East Germany, most states of the former Soviet Union, even in the United Kingdom and France) with more than 100,000 population, were in decline.

Typically used in social and economic contexts, today the concept of 'shrinkage' is widely applied in the urban development context. In academic literature urban shrinkage is discussed using a number of similar terms: decline, decay, contraction, blight, crisis, disurbanization, etc. (Haase et al 2014). A general meaning of the word "to shrink" denotes "to contract", "to become smaller in size"; accordingly, "shrinkage" means "the amount by which anything decreases in size, value, weight, etc." (The Free Dictionary, 2015). Cities are dynamic open social-spatial systems, and the concept of shrinkage can be applied to cities as well. Local economic downturns, out-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

migration (emigration, suburbanization) and demographic imbalances (negative birth rates) are main pre-conditions for decreasing in value, size, density or other physical and mental characteristics of a city. According to Hospers (2014), the development of urban shrinkage has different causes, but similar effects - “deterioration of the city's hardware, software and mindware¹”. However, Maheshwari (2013) pays attention to the opposite perspective towards the phenomenon: “shrinkage may not always be a bad thing. In the words of Aristotle: “A great city should not be confounded with a populous city.”

Salone, Besana (2015) identify urban shrinkage as “a phenomenon characterizing densely populated areas that record a population losing large sections of its extension and, at the same time, undergo a transformation of the economic base, presenting some symptoms of structural crisis”. Maheshwari (2013) provides the following definition: “a densely populated urban area with a minimum population of 10,000 residents that has faced population losses for more than two years and is undergoing economic transformations with some symptoms of a structural crisis.” Population loss is the most important element of both definitions, being both the cause and the result of negative urban transformation.

Researchers (Schlappa, Neill 2013, Martinez-Fernandez et al 2012) stress the role of globalization as a main driver for mobility of people across cities in search for more attractive places to live, work and/or entertain. While some communities are at the sending end (resulting in shrinkage of their population), other areas (e.g. capital cities, regional centres, vocational, academic cities) experience net gains. Shrinking cities typically face declining revenues, rising unemployment, outward migration of economically active population, rapid ageing, surplus buildings and land together with a physical infrastructure, which is oversized for the population it serves. Such cities lose former attractiveness to human (skilled, active labor force, students), capital (private and public sector investments) and other resources and functions (industrial, cultural, administrative, academic or other), necessary for smooth and successful urban functioning. It is important to note that shrinkage may happen at any level of the city: street, neighborhood, or district. Accordingly, the sooner and at the lower level this problem is detected and solved, the better and more sustainable results of the solution can be expected.

¹ According to Wang and Ouyang (2003), urban hardware is „technological innovation and integrative design”, software – „institutional reform and system optimization”, mindware – „behavioral inducement and capacity building”.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

In order to maintain a competitive position, the city should ensure its attractiveness to current and potential users of city's resources and functions (Sinkiene, Kromalcas 2010). Periodic performance of comprehensive diagnosis of the current stage of its development and attractiveness, provides a basis to foresee the trajectory of future development and to form the new strategic options in the context of shrinkage. Often, results of such analysis call for immediate action of city management. However, to know the problem is not enough; city managers must comprehend the causes and possible consequences of the problem. Most importantly, they must be aware of a wide set of strategies and tools to stop the negative development trends before they occur and to solve development problems in the most effective and timely way. A city has to devise policy directions to deal with the problematic situation.

How the process of urban shrinkage can be explained? What challenges does it create for local community? How to deal with urban shrinkage? What strategies and tools can be applied? These are the key questions that managers of cities in decline should raise and answer.

There are different possible solutions for cities, suffering from shrinkage, to adopt in order to stop or revert the negative spiral of development. However, there is no "one fits all" solution. As causes and context for shrinkage in individual cities differ, so are the solutions to tackle the problem. Governments of cities undergoing decline scenario can't simply shut off public services just because they aren't economical; all they can do instead is to target city investments where they will pay the greatest return to the quality of life of local population.

As literature analysis showed, cities across Europe chose different strategies to solve this problem; they range from preservation, greening, redevelopment, demolition, beautification, even neglect.

European Commission (2011) suggests a general direction for action: "Shrinking cities may have to redefine their economic basis and manage transitions towards new forms of economic, social and spatial organization". Strykiewicz (2014) also indicates more generalist strategies to deal with the urban shrinkage: counteracting or alleviating the adverse effects of shrinkage; seeking new sources of growth; promoting positive aspects of shrinkage.

Policies of German city Leipzig adopted around 2000 show the city's efforts to stop shrinkage by three priority areas of action: preservation of urban quality of the city centre; reduction of urban density through the creation of green or free spaces; improvement of competitiveness of the

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

city and its centres (Florentin 2010). The city also implemented the annexation of suburban cities aiming to “preserve the image of growth” and to get access to national funds (cities with a larger population have the right to receive larger funds from national support programmes).

Another example – a U.S. city Youngstown - after three decades of dealing with all typical negative effects of shrinkage, initiated its rebirth in 2010 by developing a new comprehensive plan with the overall vision acknowledging Youngstown's smaller size. This document provided the basis for implementation of different measures to manage the development of the city in a desired way. One of the measures – a special financial aid program - helped the city's government to focus on encouragement of residents to relocate out of neighborhoods that are too far gone to save, at the same time helping to stabilize transitional neighborhoods and keep healthy middle-class neighborhoods from wilting (Swope 2006). Other cities around Europe implement similar interventions – they demolish vacant housing stock and turn the plots into green spaces.

Liege (Belgium) city's strategy proposes to invest and densify around the infrastructural nodes (Dooghe 2005). Arts projects to change the atmosphere of the environment can serve as a useful tool to deal with shrinkage of individual city districts.

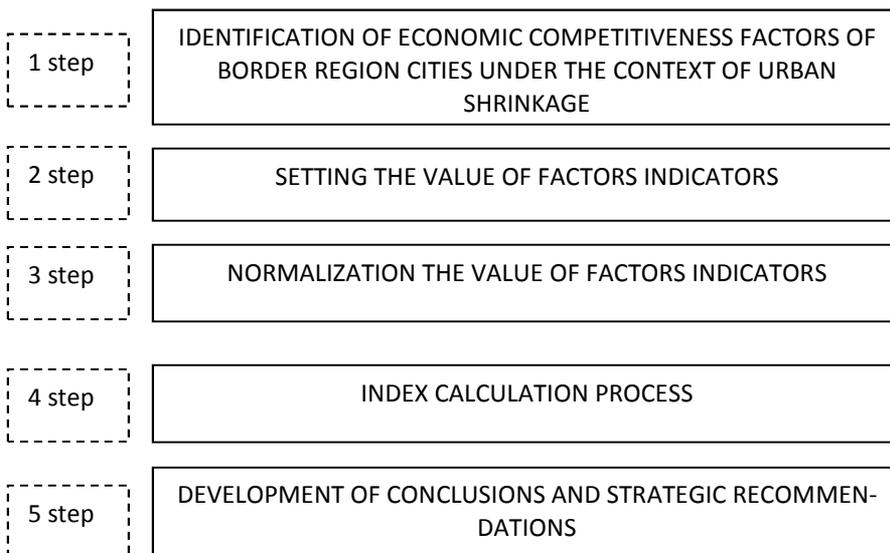
Different researches show that shrinkage is an urgent issue to many border cities. These processes became particularly evident in border cities of post-soviet countries soon after they implemented political, economic and social transformations. Economic restructuring, decentralization of power and responsibilities, free movement of resources created a completely new environment for development of border settlements. Some border cities, close to economically stronger neighboring country, grew; others - in contrast - faced with severe socio-economic and, often, environmental problems. The long-lasting stagnation encourage local population to move out; this is the first step to city's shrinkage. In order to control the development and to strive for growth, the city must periodically perform the analysis of economic competitiveness.

**The methodology of economic competitiveness evaluation by index for
the Lithuanian-Polish border region cities**

The scientific literature (WEF 2015, Ni et al. 2014, Huang, Hergül 2014, Ács et al. 2014, Bruneckienė et al. 2012, Snieška, Bruneckienė 2009) increasingly recommends to analyze a complex issue by index. Economic

competitiveness of the Lithuanian and Polish border region cities can be assessed not only by individual indicators but also by expanding the boundaries of this analysis and calculating the economic competitiveness index of the border region cities (UECI). The following index calculation stages can be distinguished (see Figure 1).

Figure 1. Index calculation stages



Source: own work.

In the first stage, the main economic competitiveness factors of border region cities are identified under the context of urban shrinkage. Implementation of this stage often employs the analysis of various scientific literature references, strategic documents and insights, economic trends and legal documents. During the second stage the values of factor indicators are defined. In the third stage these values are normalized, since various factors are expressed in different units and parameters. Normalization of variable values helps to avoid the predominance of extreme values and contributes to increasing the quality of the data. During the fourth stage the index calculation function is set and the index is calculated. Although the mathematical expression of the index may have an additive or functional expression, it is recommended to express the function in an additive expression. In the fifth stage, based on the calculation results, the conclusions are drawn and

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

policy recommendations for ensuring the increase in the city's economic competitiveness under the context of urban shrinkage are developed.

For the evaluation of economic competitiveness of the border region cities, the following cities of Lithuanian and Polish border region have been selected: Alytus, Marijampolė (Lithuania), Ełk and Białystok (Poland). For comparison, optional cities of Panevėžys and Šiauliai, as industrial cities near Lithuanian and Latvian border, were selected.

For the development of the economic competitiveness evaluation methodology for the Lithuania-Poland border region cities, first of all, a system of economic competitiveness factors was formed, consisting of 4 groups of factors and 13 factors (see Table 1). 19 indicators were selected to describe these factors.

Table 1. Conceptual system of economic competitiveness factors

Group of factors	Factor	Indicator
Competitiveness of companies	Economic activeness of companies	Number of economic entities per 1000 population Number of operating companies with the income of 14480 - 28961 Eur. per 10 000 population Paid and included in municipal budgets taxes
	Efficiency of companies	Value added created by employee, working in manufacture sector The ratio of GDP created by region's enterprises in compare to the country's GDP
	Openness of companies	Revenue from export per capita
Attractiveness of the city	Investment attractiveness	Material investments per capita Foreign direct investment per capita
	Awareness of the city	Accommodated guests in accommodation facilities per 1000 population
	Science infrastructure	The number of college students per 1000 population
Labour market adjustment to the changing conditions	Attractiveness of jobs	The registered unemployed and working-age population ratio The average monthly gross wages
	Population qualification	People with higher education
	Age structure of the population	Proportion of the working-age population
	Migration	Neto migration (internal and international) per 10 000 population
	Curiosity	Households with personal computer

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Purchasing power of the local market	Demand for the local market scale	Population density per 1 km ² , persons Individuals living in households facing economic difficulties
	Level of material well-being	Average disposable income per household member per month

Source: own work.

In order to statistically significantly assess economic competitiveness of different cities, it is important to analyze it by a unified system of indicators. It should be noted that the main problem in selecting the indicators which represent economic competitiveness of the border region cities - limited possibilities to retrieve the same official statistics data from different countries (Lithuania and Poland), (especially at the urban level), as well as differences in methodologies for calculating the same data between the countries. Before selecting a unified system of indicators for the evaluation of competitiveness of the Lithuanian and Polish border region cities, the possibilities of obtaining such indicators in Lithuania and Poland were compared and a reduced unified system of indicators, describing economic competitiveness of the Lithuania and Poland border region cities, was formed, consisting of 4 groups of factors, 7 factors and 8 indicators (See Table 2).

All factors were given the same weight coefficient. The data were normalized by the standard deviation from the average method. The period of 2008-2013 years was selected for analysis. This time is sufficient to fully reflect the dynamics of economic competitiveness and its factors and analyze the reasons for this dynamics.

Table 2. Indicators for the evaluation of economic competitiveness of the Lithuanian and Polish border region cities

Group of factors	Factor	Indicator
Competitiveness of companies	Economic activeness of companies	Number of operating economic entities per 1000 population.
Attractiveness of the city	Investment attractiveness	Material investments per capita
	Awareness of the city	Accommodated guests in accommodation facilities per 1000 population
Labour market adjustment to the changing conditions	Job attractiveness	Number of the registered unemployed and working-age population The average monthly gross

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

		wages, monetary units
	Age structure of the population and migration	Proportion of the working-age population
	Migration	Net migration (internal and international) per 10 000 population
Purchasing power of the local market	Local market demand scale	Population density per 1 km ² , persons.

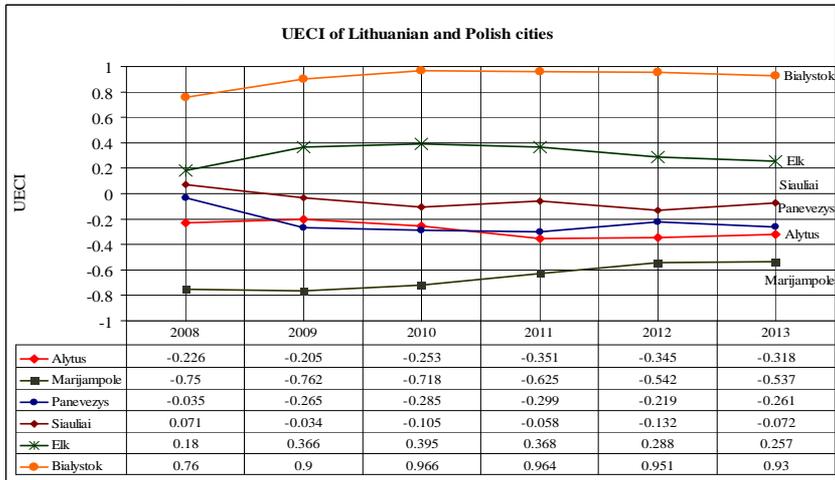
Source: own work.

Some indicators (e.g. direct foreign investment, capital investments, the indicators related to GDP) were only available in 2012; that is why for the assessment of the year 2012 and 2013, the same indicators were used, i.e. for the assessment of the year 2013, the indicators of 2012 were applied.

Results of empirical research

The dynamics of economic competitiveness index of Lithuanian and Polish cities during the period of 2008 – 2013 varied by different cities (see Figure 1). During the whole period of analysis, first places were taken by Polish cities – Bialystok and Ełk, making a large gap from Lithuanian cities by economic competitiveness. In 2008 Ełk UECI slightly exceeded Šiauliai UECI, but in 2009 and 2010 the economic development has gained a strong rate of growth, thus increasing the economic gap from Lithuanian cities. Meanwhile, the global financial crisis has strongly affected Lithuanian cities and their UECI, in contrast to the Polish cities, fell sharply in 2009 – 2010. During the whole period of analysis, the border region cities from the Lithuanian side – Marijampolė and Alytus - took the lowest position among the cities analyzed.

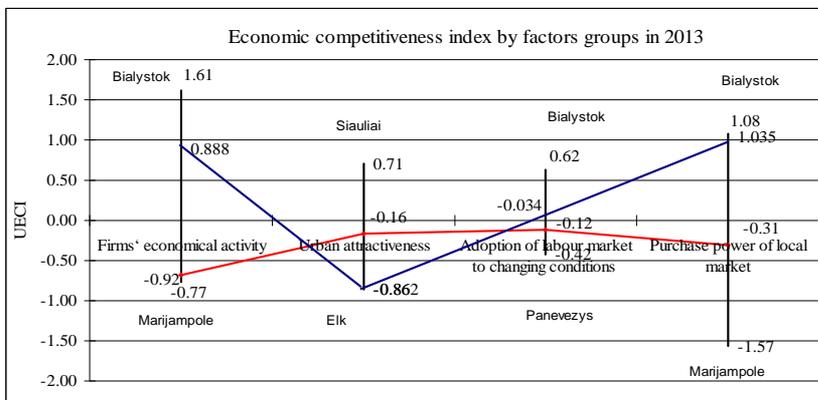
Figure 1. Dynamics of the economic competitiveness index of Lithuanian and Polish cities in the period of 2008 - 2013 years



Source: won work.

Economic competitiveness index by factor groups in compare to most and less competitive cities in 2013 is presented in figure 2. Elk is presented in blue, Alytus - in red.

Figure 2. Economic competitiveness index by factor groups in 2013



Source: own work.

During the whole period of analysis, the economic activeness of Alytus' enterprises was relatively low, ranked in the fifth position, leaving behind

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

only the enterprises of Marijampolė, which in 2008 - 2013 ranked in the sixth position. The most competitive enterprises were in the cities of Poland - Bialystok (first place) and Ełk (second place). Analyzing the attractiveness of the city components, it can be said that the UECI analysis only verifies that border cities are characterized by a low investment attractiveness and awareness. During the whole period under analysis, the awareness of Alytus was the lowest, compared to the other cities, and was positioned in the sixth place, while the investment attractiveness (only with respect to material investments) - the fourth or third place.

Similar problems were encountered by the Polish city of Ełk. The highest population density was noted in the cities of Bialystok and Ełk, ranking in the leading positions according to the local market demand scale during the whole period of analysis. By the population density, Alytus took the fourth position in the period under analysis, leaving behind Marijampolė (sixth place) and Šiauliai (fifth place). This indicator reveals that the Polish urban market is bigger, which suggests the relevance of international economic cooperation, especially from the side of Lithuanian cities. Wide was the range of variation in the position of Alytus by labor market adjustment to the changing conditions: in 2008 it took the first place, in 2009 - 2011 – the third place, and in 2012 - 2013 – taking the fifth position. According to the age structure of population and migration, during the whole period of analysis, Alytus city took the first place (Panevėžys - in the lowest position, while Bialystok and Ełk – respectively in the third and fourth position), whereas by the attractiveness of jobs Alytus ranked in the lowest position (in 2009, 2011 – 2013 - the sixth place), which also led to a low Alytus city's position in labor market adjustment to the changing conditions. Alytus was characterized by the highest levels of unemployment and the average (with respect to all cities analyzed) gross salary paid (by this indicator Alytus ranked in the fourth position). The most attractive jobs were identified in the cities of Bialystok, Šiauliai and Ełk with the highest salaries paid.

The scientific literature (Bruneckienė et. al, 2012) includes indications that in order to assess urban competitiveness, similar cities should be compared. Given the recent methodological recommendation and the data presented in Figure 1 and 2, the following groups of cities – competitors shall be distinguished: group of Bialystok, Šiauliai, Panevėžys and group of Ełk, Alytus and Marijampolė. In order to identify the specificity of economic competitiveness of cities located closest to the Polish - Lithuanian border,

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

the competitive strengths and weaknesses of the latter cities are identified, compared to Białystok, Šiauliai and Panevėžys (see Table 3).

The economic competitiveness research revealed that one of the decisive reasons for a low position of the border region cities among other cities is a low investment attractiveness and insufficient business conditions which facilitate a competitive urban business development, leading to a diminished economic well-being not only for individual residents, but for the whole city as well. Modern companies have realized that their own economic goals and corporate competitiveness is directly related to the city's economic and social well-being and progress. Therefore, business leaders are increasingly developing their competitive market strategies based on the shared value concept, when the company's competitiveness is combined with the city's development. Only the company's strategic actions which are focused not only on improving competitiveness of the company, but also on the development of the city's well-being, in a long term perspective ensure and bring benefit from the city's prosperity to the company itself. Thus, the implementation of the total value principles within the urban economic value creation process would ensure economic competitiveness of both the companies and the city, and this is becoming a mandatory condition for ensuring urban economic growth. Thus, an active cooperation between municipalities, entrepreneurs and young people has become not an issue of fashion, but rather the necessity and an essential condition for maintaining competitiveness and increasing the welfare of the city. Moreover, international economic cooperation undoubtedly benefits to both cities of different countries, therefore the establishment, development and maintenance of economic relations is an important, and for the border region cities – an essential prerequisite for increasing its competitiveness and welfare, especially under the context of urban shrinkage.

Table 3. Strengths and weaknesses of Ełk, Alytus and Marijampolė in 2013, compared to Białystok, Šiauliai and Panevėžys

Strengths	Weaknesses
Created conditions for the education and business partnership: developed science and education infrastructure	Weak and decreasing purchasing power of the local market: a decreasing local market demand (increasing number of people who face economic difficulties) and the level of material well-being.
Sufficient labor supply: a large proportion of the population of working age	Low productivity of companies
Relatively low labor drain, posing no threat to the staff turnover: a relatively small emigration	Insufficient economic relationship with foreign markets

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The city municipality's promotion of investment	Low investment attractiveness and awareness of the city
An operating business support system in the city municipality, promotion of the average and small business	Insufficiently efficiently functioning labor market: too small number of jobs against the city's potential labor force (high unemployment), lack of skilled labor
Promotion of youth employment	Lack of entrepreneurs, enabling to bring economic breakthrough, new approaches and ideas to the city

Source: own work.

Conclusions

Caused by different yet interconnected processes of globalization, demographic change, outmigration, uneven economic development, suburbanization and other, in the decade urban shrinkage has become an unwanted development scenario for a growing number of cities around the world. Shrinkage is a particularly frequent scenario of cities located close to the national border and distant from main national centers of power and economy.

Urban shrinkage can be explained as a manifestation of city's population loss, high unemployment rate, industrial decline, degradation of built environment. The shrinkage processes can and must be managed in order to prevent from occurrence of even more severe social-economic-environmental problems within the area, which in turn may negatively affect the socio-economic development and competitiveness of the surrounding region or even nation.

An active economic and social cooperation between different countries' border regions can be a successful tool to activate the socio-economic life in these regions, successfully exploit the potential of the border region and turn the region into a center of economic growth. This can promote not only regional cohesion, but also contribute to the overall national economic growth.

The selection of economic competitiveness assessment methodology for the border region cities is significantly affected by their availability at the Lithuanian and Polish cities level and the differences of the same data calculation methodologies between countries.

In the economic competitiveness assessment methodology for the Lithuanian and Polish border region cities, introduced by the authors, the factors are grouped into four categories: corporate competitiveness, attractiveness

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

of the city, the labor market adjustment to the changing conditions and the purchasing power of the local market.

The empirical research has proved that the developed economic competitiveness evaluation methodology can be actually used as a tool for economic analysis at the regional level, distinguishing individual cities' competitive strengths and weaknesses, evaluating the dynamics of change in the urban economic competitiveness from the time and competitors perspective, and as a strategic planning tool for justifying and making strategic decisions on the improvement of regional or urban competitiveness. In addition, the methodology can be used as a tool for information and promotion of the city's economic competitiveness, as well as the quality of life, conditions for business and operational efficiency of public authorities.

Under the globalization conditions, especially cities, which suffer from urban shrinkage, have to find new and modern means and attitudes for increasing urban competitiveness. The researches proved, that the increase of economic cooperation among different cities and the incorporation of shared value concept into cities and companies development strategy may increase the economic competitiveness of cities and make it more attractive for different target groups.

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**Proceedings of the 8th International Conference on Applied Economics
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18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
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**The Influence of Clusters on Economic
Development. A Comparative Analysis of
Cluster Policy in the European Union
and Japan***

JEL Classification: *F631; O12; O57*

Keywords: *cluster; effectiveness of clusters; regional development; value of regions*

Abstract: The development of clusters seems to be a natural consequence of the observed trends in the global economy. The increased interest in the creation and development of clusters can also be seen in most of the countries of the European Union, however, the experience of EU countries in this field is different. In addition to strong clusters with a long tradition, new clusters are created with much lower potential. Clusters compatible with the most important EU documents are to play the role of organizations supporting regional development and ensuring the growth of innovation of the European Union in the new programming period. Japanese economy is based on the important role of clusters in this area, which along with the US and the European Union is among the largest economies in the world. The experience of Japan in this area is much longer. A lot of still functioning clusters were created in this country in the XVII and XVIII centuries. The aim of this

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

study is a comparative analysis of the socio-economic situation of the European Union and Japan, with special emphasis on the role, that clusters play in those economies. The result of the analysis is to identify the factors that allow for the effective operation of enterprises within created cluster structures. The analysis of Japan's experience in this area is a valuable source of information for policy guidelines developed to support clusters in the EU.

Introduction

In many countries, both in Europe and on other continents, an increased interest in economic policy has been observed in recent years, based on the concept of creation and development of clusters. In the case of Europe, this is largely due to the effect of Lisbon strategy having been implemented since 2000, whose main goal was to make Europe the most competitive and rapidly evolving, knowledge-based part of the world. Measures, that should lead to the economic growth as a result of the growth of innovation and competitiveness of the regions (thanks to regional specialization) are continued in the next strategic for the European Union document entitled Europe 2020 Strategy. This document implies the need for so-called smart specialization of regions. The strategy of smart specialization (RIS3) is defined as a national or regional innovation strategy, whose main goal is to build a competitive advantage due to the development of research and innovation capacity. This strategy also emphasizes the important role of clusters in the process of defining and developing smart specialization. It also assumed the need to develop significant clusters by exploiting the benefits of agglomeration, the scale and scope of local external benefits resulting from the production and distribution of knowledge (Europa 2020). Clusters also play an important role in the economies outside Europe. Interesting examples are clusters developing in Japan, which is regarded as the third economy in the world (after the United States and the European Union), particularly in the context of the applicability of the methods and techniques of Japanese supply chain management in other countries to which they are transposed (Witkowski, 2010).

The aim of this study is a comparative analysis of the socio-economic situation of the European Union and Japan, with a special emphasis on the role that clusters play in those economies. The analyzes were based on data available from Eurostat, the European Cluster Observatory, public statistical data of Japan and databases JETRO. The result of the analysis is to identify the factors that allow for the effective operation of enterprises in the created cluster structures. The experience of Japan in this area is a valuable source of information for policy guidelines developed to support clusters in the EU.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

This paper is organized as follows: the first part comprises of a general literature review of the concepts and theories on the clustering phenomenon and presents the place of this concept in new theory of value of the region. The paper presents the proposal of the examination procedure concerning the identification of factors determining the effectiveness of the clusters and the possibility to identify interdependencies that occur between these factors. The second part looks at contemporary research work and focuses on some indicators describing clusters. Finally, the relevant conclusions are drawn.

Theoretical background

Considerations for clusters fit in at least some areas of research, such as: economic policy, economic geography and regional economics. Within these areas, in the context of clusters such issues are discussed, e.g.:

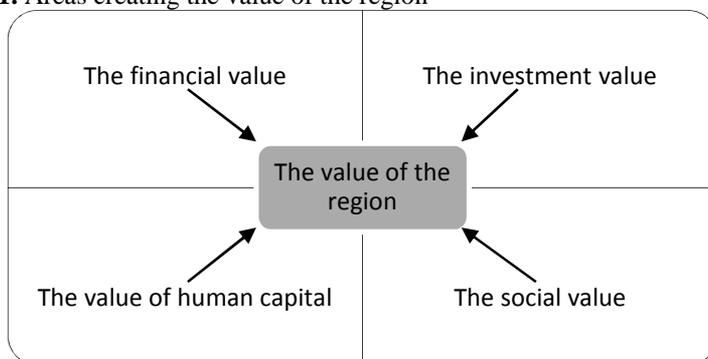
- the impact of clusters on the competitiveness of the economy, the development of regions (local development) and sustainable development (Andersson et al., 2004), (Gugler and Brunner, 2007);
- clusters and innovation and the creation and transfer of new technologies (Eisen et al. 1996), (Final Report, 2003), (Innovating Regions..., 2005);
- the place of clusters in the internationalization and development of entrepreneurship, primarily small and medium-sized enterprises (Frenken et al., 2010);
- the role of clusters in creating knowledge-based economy (Szymoniuk, 2003), (Kuah, 2002);
- the trends of supporting the clusters in cluster-based policy (Pilarska, 2010), (Solvell, 2009).

Relatively new is also a concept: value of the region, in which clusters play an important role. It is based on a new approach proposed by Michael Porter and Mark Kramer in 2006. In this conception, the authors indicated the need of transition from the traditional idea of corporate social responsibility (CSR) to Creating Shared Value (CSV) – a concept geared to attempting to solve a variety of societal issues from a business perspective – and consider what significance efforts by enterprises to implement CSV might have. Creating Shared Value is a management framework meant to reconcile the social value and the enterprise value that are generated from solving societal issues through an enterprise's business activities. The concept of "shared value" in Porter's thinking may be defined as policies and practices meant to improve the local community and economic environment in which an enterprise operates while improving that enterprise's own

competitiveness. Porter advocates an approach in which social value is created by addressing social problems and needs, the result of which will be the creation of economic value. The CSV concept entails three approaches: reconceiving products and markets, redefining productivity in the value chain, and creating industrial clusters to support the region in which the enterprise is located (Porter and Kramer, 2011).

The concept of value of the region was based on that which is „...the sum of the various values produced by the region (including the financial, investment, social and human capital) (...), which created the potential of the region, on which its development may be based on...” (Jabłoński and Jabłoński, 2012).

Figure 1. Areas creating the value of the region



Source: own elaborations based on Jabłoński A., & Jabłoński M. (2012).

The financial value in accordance with this concept, apart from the value of the budget, includes the value of the resources which is equity. The value of an investment, primarily understood as the ability to attract external investors, also takes into account the value of own investment. The social value includes the ability to create relationships and cooperation. The value of human capital in the simplest terms is interpreted as competence potential of residents of the region allowing primarily finding a good job. The value of human capital is also, especially in the western economies, its corresponding structure (described e.g. the number of births, the relation of population in pre-production, production and post-production age etc.). Described in this way the value of the region is a multidimensional concept, with its important ability to create a competitive advantage based on the interacting entities (understood as different groups of stakeholders, e.g., the business sector and the public administration sector). One form of such

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

cooperation, particularly in relation to small and medium-sized enterprises, are clusters.

Although the functioning of enterprises in the form of clusters is not new, in recent years this form of cooperation between enterprises is once again the subject of numerous studies and considerations (Gugler and Brunner, 2007), (McDonald et al. 2007), (Hegedus, 2008), (Porter and Kramer, 2011).

Clusters, usually, are defined as a geographical agglomeration of competing and related industries; and where there is evidence of improved performance such as a growth and profitability arising from the agglomeration of firms in a region (Porter, 2000, p. 248). Entities forming the cluster function in the value chain, which means having a certain specialization by them or business profile associated with the final product or service. The cluster can therefore create an entities representing various sectors, which are interrelated and complementary. According to the concept of EU smart specialization, clusters operating in the areas of smart specialization of regions are factors improving the competitiveness of such regions. External factors are more rarely considered. This could include endogenous potential of the region in which the cluster operates.

However, these factors largely determine the efficiency of the clusters. They should also be considered in the development of guidelines for cluster-based policy, understood as „...a set of different types of policies encouraging the development of regional systems of business organizations in the form of clusters ...”. This concept includes:

- indicated by Ch. Ketels (2004) all the efforts and the efforts taken by the government on its own and in cooperation with companies or e.g. research units focused on the development of clusters and competitiveness;
- proposed by OECD (2002) the definition according to which it is a set of actions taken by public authorities in order to stimulate the links between the companies making up the value chain;
- proposed by the IBnGR (2008) set of activities and instruments used by the authorities at various levels in order to stimulate the economy by creating new clusters.

These factors are also considered separately, while the effectiveness of the clusters is dependent on a set of mutual configured variables describing both factors directly related to the cluster as well as external factors, including the environment in which clusters operate.

Methodology of the research

The research procedure presented below is a proposal for an approach to the problem of identifying the factors determining the effectiveness of the clusters. This procedure refers to the global research, whose objective is to identify factors that improve or determining the effectiveness of the clusters.

The effectiveness is understood here as the ability to create a competitive advantage for companies functioning within the cluster either directly considered in relation to these entities and countries (regions) in which clusters exist. Below the stages of the research procedure proposed are presented in synthetically way. It should be noted that the study focuses on the first three stages of this procedure. Phases IV and V require identifying the factors, that may affect the effectiveness of the clusters. The present study focuses primarily on the identification of areas in which these factors can be identified.

Stage I. The development of methodological foundations of research, including: the identification of the factors determining the effectiveness of the clusters.

STAGE II. The identification based on literature review and own research of possibility to obtain data describing the factors affecting the effectiveness of the clusters.

STAGE III. Statistical analysis of selected factors determining the effectiveness of the clusters.

STAGE IV. The construction of models describing the relationship between the identified groups of factors and the effectiveness of clusters.

The proposed test procedure involves an integrated approach to assess the relationship between the identified groups of factors and the effectiveness of clusters using multivariate methods for classification and data analysis. To identify the factors determining the effectiveness of the clusters and of relations between them the following methods will be used:

- correspondence analysis, as a factor method allows the identification of relationships between variables and objects mainly in a graphical form, (Andersen, 1997), (Panek, 2010).
- factor analysis, which is used to describe variability among observed, correlated variables in terms of a potentially lower number of unobserved variables called factors. The main benefits of factor analysis are that the analyst can focus their attention on the unique core elements instead of

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

the redundant attributes, and as a data pre-processor for regression models (Sagan, 1998), (Bollen et al., 2009).

Recommended methods will make the identification of factors determining the effectiveness of the clusters and the interrelationships between them possible.

Factors determining the effectiveness of the clusters

Clusters are perceived as the source of a lot of advantages for the entities functioning in their structures and the countries in which they are located. Hence their significant impact on the value of region. Considering the direct benefits for enterprises functioning in clusters more and more attention is drawn to the diminishing role of factors such as e.g. an access to cheaper raw materials for the benefit of: the possibility of using a flexible division of work, an access to information and the ability to use scientific achievements and collaboration with research centers (SMEA, 2006).

However, the benefits for the countries in which clusters are located are: the development of innovation and new technology which turns into economic growth and greater competitiveness (Hegedeus, 2008, p. 81), the increase of attractiveness for foreign direct investment (Gugler nad Brunner, 2007), a positive impact on the labor market (Innovation Clusters, 2007, p. 10) and the strengthening of social capital (Boekholt and Thuriaux, 1999).

These benefits, which are part of the main objectives of regional policy concerning the strengthening of the competitiveness of regions cause, that public authorities are more and more interested in getting involved in the creation and development of clusters (Bochańczyk-Kupka, 2014).

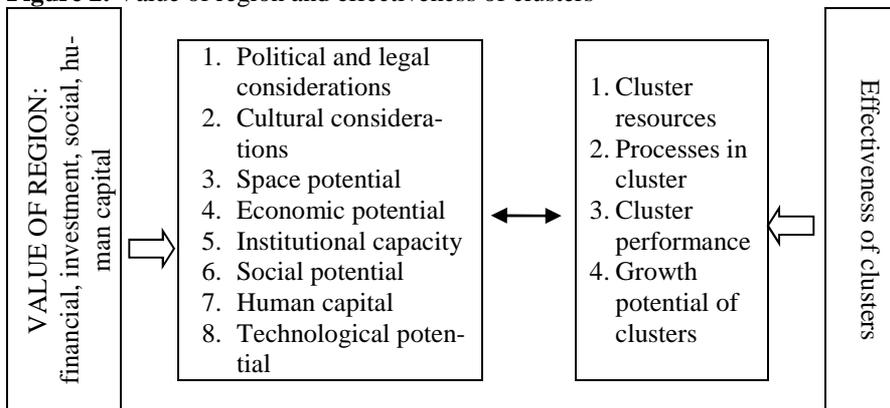
The effectiveness of clusters is conditioned by a number of factors. These factors are both relevant from the point of view of regions in which clusters operate and enterprises operating in clusters.

The value of the region considered from the perspective of financial, investment, social value or human capital includes factors as: political and legal determinants, cultural, its space potential, economic potential or social and technological potential. This value determines directly the potential of clusters operating in the region.

On the other side, clusters due to using the potential of the regions in which they function can maximize this potential, improve it, e.g. thanks to the introduction of new technologies or stimulating the development of human capital. Between these two areas mutual relations take place. The value of region determines the potential of clusters, so it has an impact on re-

sources, processes, results and the growth of potential clusters. However, the processes taking place in clusters affect the value of the region. It can be represented as follows:

Figure 2. Value of region and effectiveness of clusters



Sources: own elaborated.

The collaboration of businesses takes place in more and more turbulent environment around new technologies, whose effects are not known at the time of implementing them on the market. Therefore it is difficult to anticipate the directions of development of this type of markets. In addition, a company needs to cooperate more comprehensively requiring new skills as network management, technology transfer or more importantly the ability of acquisition, processing and exchange of information. In spite of better resource management skills and processes taking place in clusters, changes in circumstances occurring around clusters are in some economies very disturbing and have strong impact on the functioning of the clusters.

A good example of how the changes in the environment of clusters contribute to their operation is e.g. Japan. Changes in the environment of clusters in Japan and in its structure and the organization of clusters show that the factors determining the efficiency of clusters should be considered in a wider context, not only in relation to clusters themselves, but also taking into account the environment in which clusters operate.

**The role of clusters in the development of the Japanese
economy – implications for the European Union**

Although the Japanese economy, characterized by high efficiency, competitiveness and technological advancement, is considered to be the third economy in the world (after the United States and the European Union), for over 20 years has been in a state of economic stagnation. Particularly important in its case are demographic problems associated with an aging population, low rate of female fertility or errors in macroeconomic policy. Changes in this area generally concern all areas forming the value of region and consequently the effectiveness of clusters. From the viewpoint of the European Union they are also very important (Bossak, 2010).

In recent years there have been more and more opinions indicating that the demographic processes in the EU are largely a reflection of changes taking place in Japan. Although the number of people EU-28 has increased for over the last 50 years, particularly worrisome are changes of a structure according to the age of the population of the European Union. According to Eurostat data at the beginning of 2013 the population of the EU-28 was 505,7 million and it was almost 100 million more compared to the aggregate number of the population in the EU-28 in 1960.

In spite of this growth, the increase in a load factor of the population of working age by population in the retirement age is observed, which on 1st January 2013 was 27,5 for the EU-28 and was more than 3% higher compared to 2002. In addition, further aging of the European population is anticipated within next 35 years and the proportion of the population aged at least 65 years of age with 18,22% at the beginning of 2013 to 28,1% by the year 2050 (Eurostat, 2014).

However, in the case of Japan, the load factor of the population in the working age by population in the retirement age was at the beginning of 2013 more than 40,0%, and is foreseen to continue to grow in the coming years. This means progressive aging of the population.

An analysis of the growth rate of the population aged 65 or more and an increase in the share of this group in the total population indicates an intensification of demographic aging in both Japan and the European Union.

In Japan in the official statistical studies it is noted that „... Japan has become the first country to reach the status of “super-aged society...” (White paper, 2014). In addition, since 2011 trends have been observed that are related to the depopulation of the population, resulting in a decrease in both the number of births and the changes associated with migration trends.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 3. The share of the population according to biological age groups in Japan and the EU-28 in the period 2002-2013

Years	People by age group – share of total population (%)					
	0-14		15-64		65 and more	
	Japonia	EU-28	Japonia	EU-28	Japonia	EU-28
2002	14,20	16,8	67,41	67,2	18,39	16,0
2003	14,05	16,6	67,03	67,1	18,92	16,3
2004	13,91	16,4	66,63	67,2	19,46	16,4
2005	13,77	16,2	66,24	67,2	19,98	16,6
2006	13,65	16,0	65,86	67,2	20,50	16,8
2007	13,53	15,8	65,47	67,2	20,99	17,0
2008	13,42	15,7	65,07	67,2	21,50	17,1
2009	13,31	15,7	64,64	67,1	22,05	17,2
2010	13,18	15,7	64,16	66,8	22,66	17,5
2011	13,03	15,6	63,60	66,8	23,37	17,6
2012	12,88	15,6	62,98	66,6	24,15	17,8
2013	12,72	15,6	62,34	66,2	24,94	18,2

Source: own elaborated on the basis of Eurostat data and public statistical data in Japan.

Japan particularly hard was affected by the crisis of the 2011 connected with the earthquake. This was another after the period 2007-2008, a period of decline in GDP growth. As a result of the earthquake and tsunami 656 private enterprises employing 10 757 people announced bankruptcy within one year. Although in the area of the earthquake only 12% of companies were located, the cause of the collapse of the rest were mainly disturbances in the continuity of supply (Ono and Ishiwatari, 2012).

Unfavorable for Japan socio-economic trends in addition to already indicated: population decline, low birth rate and aging population are also:

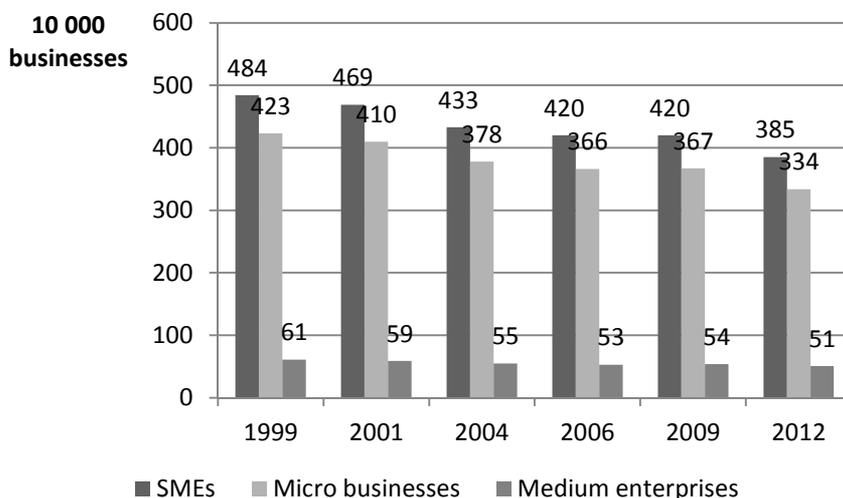
- The low rate of growth of GDP (while in the second half of 2013 there was an increase of 1,5% compared to a decline of 0,4% in the euro area). The main causes of GDP growth compared to the previous year in Japan were: an increase in private consumption and investment expenditure associated with declared changes in fiscal and monetary policy within the new strategy of the government (a program of three arrows). It is predicted, however, that the rate of growth in the coming years may be much lower.
- The withdrawal of investment funds from the Japanese market which shows the decline in the attractiveness of the market for investors.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

- The increase in investment of large Japanese companies in foreign markets causing a decline in orders for small and medium-sized enterprises that are subcontractors of large companies (White paper, 2006).
- The employment growth in the service sector and a decline in the manufacturing sector.
- A very large decrease in the number of micro-enterprises operating in the Japanese market caused both by a decline in demand and the migration of large enterprises beyond Japan.

Japan is going economic and social changes, that are making the management environment more challenging for small and medium enterprises (SMEs) and micro-businesses. The number of SMEs is declining long-term and it could drop further and speed the decline of regional economies.

Figure 3. Trends in number of SMEs in Japan



Sources: Recompiled from MIC, *Establishment and Enterprise Census, 2009 Economic Census for Business Frame*; MIC, METI, *2012 Economic Census for Business Activity*.

Micro businesses are very important to the Japanese economy, as they account for about 87% of all enterprises in the nations well as about 26% of all workers. The number of micro businesses is falling sharply as Japan's economic and social structure changes. Over the three-year period from 2009 to 2012, there was a decline of about 350 000 SMEs, among them about 320 000 micro businesses (of which 250,000 were sole proprietorships). In terms of percentage, there was a 4,8% decline in medium enterprises and

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

8,8% decline in micro businesses. There are now concerns that regional economic vitality will be lost with the market withdrawal of SMEs and micro-businesses, which have been important to regional economic growth.

The reduction in the number of enterprises is also reflected in the efficiency of the clusters. Currently in Japan there are over 2 million of private companies, of which only 5 thousand are large companies such as Sony, Panasonic, Toyota and Mitsubishi. The largest companies generate 50% of GDP and employs 20% of the workforce (White paper, 2012).

Many Japanese companies are operating in so-called a manufacturing vertical system. These companies employ many subcontractors which are often small companies employing housewives. This means that if you need an immediate reduction of production (it is not taken into account as a rule previously agreed terms of the contract), it is followed by a prompt reduction in staff, mainly women. According to experts of the Japanese market it causes a significant underestimation of the level of unemployment.

The current development of Japan is mainly based on innovation and new technologies. An export of goods has been replaced for 10 years with the growth in the export of capital and technology. Japan is ahead in this respect of the leading European countries: Germany, Britain and France, but the export is lower than in the United States.

Another important factor in the performance of clusters is their specialization. According to the Small and Medium Enterprises Agency in Japan in the late 90s of the twentieth century there were more than 530 substantially different clusters representing the following industries: processing (food); textile; clothing; carpentry and furniture; ceramic, stone and glass; machine (Yamawaki, 2001, p. 132).

At present, the main specializations of clusters in Japan are according to the Japan External Trade Organization data's: automobile and transport equipment; electronic components, devices, semiconductors, precision machinery, biotechnology, healthcare and welfare; ICT and cloud computing; environment and energy; food and other industries. These specializations reflect the current stage of development of the Japanese economy based mainly on innovations.

Specializations of regions based on the clusters are also a current direction of supporting clusters in the European Union. Specializations of European clusters are much more varied. For comparison, according to the report „Star Cluster”, which presents the strongest regional clusters in the United Kingdom according to the European Cluster Observatory star rating. In total, there

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

are 182 clusters in the United Kingdom, that have received at least on star. Specializations of clusters whose companies employ the most workers are:

- business services (1 5340 002 employees);
- financial services (760 676 employees);
- education (597 577 employees).

A comparison of Japanese specialization of clusters based primarily on technological processes and clusters in UK, specializing mainly in services indicates differences between the two regions. Currently, the technology and intellectual property rights in Japan is about 5 times higher than their imports. This makes Japan a country with modern technology know-how and global network of linkages controlled by Japanese capital groups and trade. Taking this into consideration the European Union has a considerable distance to catch up.

Conclusions

Despite the old tradition of forming clusters and a lot of experience of Japan in this respect – the cluster policy is still one of the prior directions of encouraging the economic development of Japan. In 2001-2005, METI (Ministry of Economy, Trade and Industry) began implementation of the Industrial Cluster Plan with a budget of 5 million per year and preferential access to the funds of 350 million euros thanks to which 40 000 new companies were created (Tsuji et al., 2005). Between 2006-2011 the creation of further 40 000 new businesses were planned and works to promote foreign activities as well as self-sufficiency and independence of the created clusters (Bochańczyk-Kupka, 2014).

Currently in Japan a program has started based on three pillars, so-called an economic recovery program. ABE program, also known as a three arrows program, whose objective is a long-term growth strategy (Report, 2013). This program is different from the currently implemented in the European Union policy assuming the reduction of expenditure and reducing budgets. Announced in 2014 the last element of the developed program envisages further support of businesses operating within the clusters. Japan, as other countries is planning the creation of special economic zones, the increasing role of public-private partnerships, e.g. in infrastructure investment.

Measures leading to economic growth as a result of the growth of innovation and competitiveness of the regions (thanks to regional specialization), have also been undertaken in Europe. In accordance with the Europe Strategy 2020 document, one of the main priorities of the European Union economic

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

development based on knowledge and innovation and the related concept of smart specialization conducted also on the base of clusters (Europa 2020).

For the past few years many new clusters have been formed in Europe. In a view of the fact that a lot of them are young organizations with a little resources both financial and human infrastructure, it is expected that much of it in the coming years will remain in the initiation phase of development. The aim of the policy conducted in the European Union is to identify clusters of strategic importance. In Poland, for example they are called National Key Clusters (clusters of strategic importance for the country) and the Regional Key Clusters (analogous: the strategic importance of the region/ regions).

Cluster support requires the identification of the determinants of the effectiveness of their operations. An analysis of the interactions that occur between these factors is also necessary (Hassink, 2005).

A good solution is to use for this purpose methods of multidimensional comparative analysis. It is also important to study the relations between cluster environment and factors directly affecting the functioning of the cluster structures.

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Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015
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**The Evaluation of Economic Development
Index: Theory and Research**

JEL Classification: *O10; O11; F63*

Keywords: *Lithuania; Poland; economic development; economic development index; macroeconomic indicators; regional development*

Abstract: The purpose of this research is to characterize and evaluate the results of economic development. In order to analyze the changes of economic development in different countries the index of economic development as share of sustainable development is used. The research characterizes economic development of two neighborhood countries – Lithuania and Poland. Empirical analysis of satisfactory cases of Lithuania and Poland during the period of the years 2005-2012 are examined. The point of this research – to analyze a country's main macroeconomic development indicators and unify them creating an economical development index. The year 2005 was taken as the base year.

Introduction

Lithuania and Poland, as neighboring countries, present satisfactory cases of their economic development. The historical, economical, political and cultural development of Lithuania and Poland shares some similarities, but also is different. When comparing the economical development of these countries and determining the advantages of each country, it would be appropriate to analyze their economical policies. In 2004 Lithuania and Poland joined the European Union (together with other 9 Central and Eastern

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Europe countries). Membership in the EU is an important factor for the cohesion of these countries' economies. Motivation for writing the paper is the situation, that many indicators are used when describing economic development of the individual country. A number of economic researches (Krugman, Wells, 2006, pp. 1-488), (Blanchard, Hoarau, 2011) describe economic development measurement possibilities. Scientific researches show that some indicators which are used seeking to determine the status of the country's development exist. For this reason the most significant economic indicators, such as gross domestic product (GDP), GDP per capita (GDPpc), gross national income (GNI), gross national income per capita (GNIpc), genuine progress indicator (GPI), human development index (HDI), foreign direct investment (FDI), expenditure for research and development (R&D), saving, investment, asset prices, employment, unemployment, inflation interest rate and others indicators or their groups are examined. The position that GDP or GDPpc are incomplete to measure economic performance is broadly characterized by eminent economic scientists Stiglitz, Sen and Fitoussi (Commission on the Measurement of Economic Performance and Social Progress, 2009, pp. 1-292). They conclude, that the committee does not recommend creating a new super-index, which could integrate more economic, social, political, cultural and environmental indicators. The scientists notice that it is best of all to correct shortcomings of GDP, evaluating for example leisure, income inequality.

HDI is created by Sen and Ul-Haq in 1990 and fitted in United Nations Development Programme (Ul-Haq, 1995, pp. 1-288). This determine annually evaluates HDI for each country as members' of the United Nations Organization. The HDI expresses the basic elements of human development (healthy and long life index, adult literacy rate index and standard of living as GDPpc at purchasing power parity (PPP) terms in US dollars), but it does not give full results of economic development (Selim, 2015, p.1-2). The discussions about the possibility to use HDI for the human development comparison between countries enlarges and this indicator was renewed from the year 2010, clarifying firstly, education index and secondly, the standard of living calculating as GNIpc at purchasing power parity (PPP) terms in US dollars. The analysis of scientific literature (Radovanovic, 2011, pp. 193-208) shows, that human development is broader than HDI, due to this reason the level of the country development is described best by the combination of different indicators. Moreover, HDI is criticized for the lack of technological development changes values in it (Wolff et al., 2011, pp.843-870).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Another indicator – Self –Organizing Maps (SOM) is based on the HDI components. Rende & Donduran (2011, p. 989-1003) SOMs characterizes as exclusive type of the countries grouped into the clusters, according to their similarities in their development. SOMs creates favorable conditions to analyze the results of neighbor countries clusters development, its causes and the applied economical policies. In this case human development is based on the precondition of the possibility to chose economic policy from the adopted potential neighborhoods in the same cluster. Such behavior of the government institutions of separate countries can help to improve and to increase the structural elements of the index and the total amount of them, calculating SOM.

In the scientific literature the effects of international trade on quality of life and economical development are discussed. Besides the evaluation that the quality of life is deteriorating due to international trade, some authors (Davies, Quinlivan, 2006, pp. 868-876) positively evaluate the increase of international trade, international competitiveness, economic development, which lead to the increase of employment level and social welfare.

The point of this article is to show the results of economical development in Lithuania and Poland in the period of 2005-2012. The analyzed period includes the period before the 2007-2008 global financial crisis, the period of the crisis. The economical development results are analyzed in the article by comparing main macroeconomic indexes. Judging on these indexes, Lithuania and Poland are given an economic development index. The analysis of paper is based on World Bank data statistics, the Statistical Office of Lithuania and the Central Statistical Office of Poland. The point of this article – to analyze a country's main macroeconomic development indexes, characterizes economic development indexes and unifies them creating an economical development index. The goals of the article: to analyze and compare Lithuania's and Poland's main macroeconomic development indexes; to describe indexes that are used to evaluate a country's economical development and create an economical development index and characterize its change in the period of 2005-2012 in the context of the European Union Member States (EU). The research shows the changes of economic development indicators in Lithuania and Poland, seeking cohesiveness with the EU economic development the level in average and in the perspective – to align to the counties' higher economic development level.

Methodology of the research

A number of economic researches describe different economic development measurement possibilities. Due to this reason it is important to determine and to evaluate the changes of economic development using the index of economic development of Lithuania and to compare it with the economic development index of the neighboring country and international cooperation partner from the West – Poland and the EU-28. It is significant to characterize the similarities and the main diversities of the economic development factors in the years 2005-2013 in Lithuania and Poland.

One of the most commonly used methods for the analysis of economic development is the evaluation of main macroeconomic indicators and their changes. In order to describe the changes of economic development the economic development index as part of sustainable development in these countries was count up, also absolute and relative values are given in parallel. The method of the base indexes comparison is applied, whereas the first year of the analyses period is chosen as base year.

The priorities of economic development in Lithuania and Poland are based on the European Commission Strategy “A Strategy for Smart, Sustainable and Inclusive Growth” is significant important. The priorities of the Strategy are: smart development, related to the development based on knowledge and innovation development; sustainable development – substantiated on economical use of resources and competitiveness; and inclusive growth well-grounded on high level of employment, high level of social cohesion among regions and countries. The coordination of the main economic development indicators leads to higher results of economic development. The scientific literature gives some alternatives for the evaluation of economics aspects of sustainable development.

This article seeks to compare economic development among Lithuania and Poland in the context of the EU-28 data such as: GNIpc, foreign direct investment per capita (FDIpc) and employment (E), using World Bank data is analyzed. Based on the given analysis of main macroeconomic indicators, it is determined what is achieved in economic development in analyzed countries. Year 2005 was chosen as a base year for the evaluation of the economic development index in Lithuania, Poland and the EU-28 in the period of 2005-2012 (the index of economic development in year 2005 is equal to 100.0%). This index of economic development characterizes economic development of country, evaluating the changes of three described macroeconomic indicators: 1) GNIpc based on PPP, 2) FDIpc and 3) E.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Due to lack of information it is problematic to define the share of each economic indicator included in this index so the method of equal base weights is used. While evaluating the economic development, only such indicators are taken into calculation, which increase would have a positive effect on economic development (GNIpc, FDIpc and E).

The economic development index (I_{EDV}) is evaluated according to the (1) formula:

$$I_{EDV} = \sum_{i=1}^n ai \times Ii, \quad (1)$$

where ai – is the weight of separate element of economic development indicator;

Ii – is the separate element, indicator involved into index of economic development.

The sum of all three weight separate elements (formula 2) of the economic development indicators is:

$$\sum_{i=1}^n ai = a_1 + a_2 + a_3 = 1. \quad (2)$$

Three indicators are used: indicator of GNIpc (I_{GNIpc}), indicator of FDIpc (I_{FDIpc}) and indicator of employment (I_E). Three indicators take the weighting expression, described in the (3) formula:

$$I_{EDV} = a_1 \times I_{GNIpc} + a_2 \times I_{FDIpc} + a_3 \times I_E, \quad (3)$$

The increase of these indicators means positive effects of economic development; and the decrease of these indicators means negative changes in the economy, related with recession of the economy described.

The economic development indicators

The growth of real GDPpc or economic growth is the most important indicator of economic development, showing living standards in the country. The analysis of real GDP growth is given in Table 1, shows that real GDP was contracted mostly in the year 2009, accordingly in Lithuania

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

it diminished by 14.7%, in the EU – by 4.3% and in the EU euro area – by 4.4%. Real GDP in Poland, unlike in Lithuania, increased during the years 2005-2012. The key factors of economic development in Lithuania and Poland are based, firstly, on the qualified labour force, which is open to new changes and is learning fast. Secondly, economic development is grounded on the efficiency driven factors (as higher education and training; market efficiency; technological readiness) during the years 2005-2007, and from year 2008 to year 2012 – on the economic development factors based on the transition from the efficiency driven to innovation driven factors. As innovation driven factors are evaluated business sophistication and innovation (Shwab, Porter, 2006, pp. 1-598; Schwab, 2012-2013, pp. 1-569).

The structure of agriculture, which creates added value, in the country is one of the most important factors for economical development. After Lithuania and Poland became members of the EU, the possibility of emigration arose. Due to emigration and low birth rates the number of Lithuanian population decreased during the years 2005-2012 by 9.9% and fell from 3.32 million to 2.99 million. The number of population of Poland, in opposite to Lithuania, has increased by 1.0% and has grown from 38.18 million to 38.54 million (or by 380 thousand population). The changes of the number of population in the EU are positive: the number of population has increased by 1.9% (or by 9.24 million population) in comparison with the base year 2005.

The agriculture value added as per cent of GDP in the years 2005-2012 has decreased in Lithuania and Poland, accordingly by 16.7% and 3.0%. The agriculture value added as per cent of GDP in the EU and the EU euro area was stable enough but it both in the EU and both in the EU euro area it was approximately from 3 to 2.4 times less than it was in Lithuania and about 2 times less than it was in Poland.

Industry is very important in the structure of economic activity. Its growth very much depends on open economy and the amount of direct investments into the country from abroad. The industry value added as per cent of GDP has decreased in the years 2005-2012 in Lithuania – by 5.5%; in the EU – by 5.8%; in the EU euro area – by 6.8%. The industry value added in Poland has increased by 2.5% during all analyzed year.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 1. The main indicators of economy and economic activity in the years 2005-2012

Year	2005	2006	2007	2008	2009	2010	2011	2012
1. Real GDP growth rate (EG), %								
LT	7.8	7.8	9.8	2.9	-14.7	1.3	6.0	3.7
PL	3.5	6.2	7.2	3.9	2.6	3.7	4.8	1.0
EU	2.1	3.3	3.2	0.3	-4.3	2.1	1.8	-0.4
EUea	1.7	3.3	3.0	0.4	-4.4	2.1	1.7	-0.7
2. Agriculture value added, % of GDP								
LT	4.8	4.3	3.9	3.7	3.4	3.5	3.8	4.0
- growth rate, %	100.0	89.6	81.2	77.1	70.8	72.9	79.2	83.3
PL	3.3	3.1	3.4	2.9	2.9	3.0	3.3	3.2
- growth rate, %	100.0	93.4	103.0	95.7	95.7	90.9	100.0	97.0
EU	1.7	1.6	1.6	1.6	1.4	1.6	1.6	1.6
EUea	1.8	1.7	1.7	1.7	1.5	1.6	1.7	1.7
3. Industry value added, % of GDP								
LT	32.9	32.9	32.6	31.6	26.9	28.2	31.2	31.1
- growth rate, %	100.0	100.0	99.1	96.0	81.8	85.7	94.8	94.5
PL	32.1	32.8	32.8	32.9	33.1	32.9	33.7	32.9
- growth rate, %	100.0	102.0	102.2	102.5	103.1	102.5	105.0	102.5
EU	26.3	26.6	26.6	26.1	24.3	25.6	24.8	24.5
EU ea	26.6	26.8	27.0	26.5	24.5	26.3	25.0	24.8
4. Value added in services, % of GDP								
LT	62.3	62.8	63.5	64.7	69.7	68.3	65.0	65.0
- growth rate, %	100.0	100.8	101.9	103.8	111.9	109.6	104.3	104.3
PL	64.6	64.2	63.7	64.2	64.0	64.1	63.0	63.9
- growth rate, %	100.0	99.4	98.6	99.4	99.1	99.2	97.5	98.9
EU	71.9	71.7	71.7	72.2	74.2	72.8	73.6	73.9
EUea	71.5	71.4	71.2	71.8	73.9	72.0	73.3	73.5

Note: LT –Lithuania; PL –Poland; EUea – EU euro area.

Source: author's calculations based on The World Bank Group Data; Statistical Office of Lithuania, 2015; Central Statistical Office of Poland, 2015.

The value added in service sector in the structure of GDP of all analysed countries had the biggest share among other sectors in the countries. The value added in services in Lithuania, calculated as per cent of GDP, has increased mostly, by 4.3%; in the EU – by 2.8%; in the EU euro area – by 2.8%. The service sector value added in Poland, unlike in Lithuania, has slightly decreased year by year, the reduction in compare with the base year 2005 was 1.1%.

Another important indicator – the level of domestic and foreign income, shown as GNIpc indicator is given in PPP (Table 2) terms in US dollars.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The GNIpc in Lithuania and in Poland the year 2005 was less than GNIpc of the EU; and the GNIpc in Lithuania was 53.8 % and in Poland 51.1% from the level of the EU GNIpc. The GNIpc level in Lithuania in the year 2005 was 105.2% from the level of the GNIpc in Poland. The GNIpc in Lithuania has increased faster in comparison with Poland until the year 2008, then the growth was equal until the year 2011. The GNIpc in Lithuania in the year 2012 was 66.5% and in Poland 63.0% from the level of the GNIpc in the EU. It should be noted, that the GNIpc in the EU euro area in the year 2005 was by 8.8% bigger than in the EU and such trend continued until the year 2012.

A significant factor of economic development is the supply side factor, such as FDI. The development of different economic sectors depends from the flows of FDI. The FDIpc in Lithuania in the years 2005-2008 was bigger than in Poland. Economic downfall, which Poland did not experience, was in the year 2009. Poland became more attractive for investments from abroad, this is why FDIpc in the years 2009-2011 significantly increased in Poland in comparison with Lithuania. It is noted that FDIpc before the global financial crisis (in the year 2008) was bigger in the EU than in the EU euro area. The FDIpc in EU euro in the year 2009-2011 was bigger than in the EU. It is necessary to note that the FDIpc in Lithuania and Poland and in the EU and EU euro area in the years 2005-2012 had diminishing tendency.

The next factor of economic development is the level of employment. The number of employed persons in Poland increased by 16%, in the EU – by 2.7 % and in the EU euro area – by 1.7%. The number of employed persons in Lithuania in years 2005-2008 increased by 2.5%, but since the year 2009 it began to decline and in 2012 it did not reach the employment level of year 2009.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 2. The changes of GNIpc and economic development factors in the year 2005-2012

Year	2005	2006	2007	2008	2009	2010	2011	2012
1. GNIpc (PPP), USD								
LT	14440	16430	18350	20010	18540	19470	21590	23080
PL	13720	14930	16390	17930	18600	19910	21290	21830
EU	26844	29096	30669	31908	31269	32001	33343	33376
EUea	30187	32762	34537	35801	35188	36126	37620	37633
2. FDIpc, USD								
LT	358.1	621.8	719.9	596.4	6.0	278.3	476.3	192.0
PL	289.6	564.2	670.9	394.2	377.1	447.2	540.5	173.9
EU	1513.9	1420.7	2097.6	1698.7	719.2	630.8	920.4	548.3
EUea	1342.3	1309.5	1925.5	1308.4	1013.4	1495.0	1234.3	517.9
3. Employed persons, millions								
LT	1.435	1.450	1.472	1.452	1.347	2.690	1.304	1.334
PL	14.362	14.942	15.669	16.338	16.403	16.40	16.625	16.655
EU	215.49	219.44	223.70	226.28	222.07	220.76	221.51	220.04
EUea	140.59	143.09	146.02	147.52	144.70	143.85	144.30	143.02

Note: LT –Lithuania; PL –Poland; EUea – EU euro area.

Source: author's calculations based on The World Bank Group Data; Statistical Office of Lithuania, 2015; Central Statistical Office of Poland, 2015.

Economic development index and its structure

The economic development index, according to the described method is calculated and given in Table 3. The calculation shows that different countries achieved different situations. Economic growth in Lithuania slowed down a bit in year 2008 and the downfall manifested in year 2009. Calculated economic development index in 2010 shows, that Lithuanian economy has recovered, but slightly, after the economic downfall. The economic development index in the year 2012 exceed by 2.2% its level in the base year 2005.

The economic development index of Poland in year 2005-2012 was bigger than in the base year value of economic development index. In 2012 economic development index in Poland decreased to its lowest value – 111.7% during the whole period of 2005-2012.

The EU and the EU euro area in year 2012 did not achieve the economic development level of year 2008, because this index was, accordingly, 88.0% and 88.4%. This process was caused by the contraction of FDIpc in these countries. Lithuania and Poland have increased the level of the index in year 2012 and this index was, accordingly, 102.1% and 111.7%.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The analysis of the changes of economic development index in Lithuania and Poland as neighborhoods countries significantly differs. This difference is due to higher employment level in Poland.

Table 3. The changes of economic development index and its structure

Year	2005	2006	2007	2008	2009	2010	2011	2012
1. GNIpc, %								
LT	33.4	38.0	42.5	46.2	42.6	45.0	49.7	53.3
PL	33.4	36.3	39.9	43.6	45.3	48.5	51.8	53.1
EU	33.4	36.2	38.1	39.6	40.0	39.9	41.6	41.7
EUea	33.4	36.2	38.2	39.6	38.9	40.0	41.6	41.6
2. FDIpc, %								
LT	33.3	57.8	66.9	55.6	0.6	25.9	44.3	17.9
PL	33.3	64.9	77.1	45.3	43.4	51.4	62.2	20.0
EU	33.3	31.2	46.1	37.4	15.8	13.9	20.2	12.1
EUea	33.3	32.5	47.9	32.5	25.2	37.1	30.6	12.9
3. Employment index, %								
LT	33.3	33.6	34.1	33.7	31.2	29.4	30.2	31.0
PL	33.3	34.6	36.4	37.9	38.0	38.0	38.6	38.6
EU	33.3	33.9	34.5	34.9	34.3	34.1	34.2	34.2
EUea	33.3	33.9	34.6	34.9	34.3	34.1	34.2	33.9
4. Index of economic development, %								
LT	100.0	132.1	143.5	135.4	74.4	100.3	124.2	102.2
PL	100.0	135.8	153.3	126.8	126.7	137.9	152.6	111.7
EU	100.0	101.3	118.7	111.9	90.1	87.9	96.0	88.0
EUea	100.0	102.6	120.7	107.0	98.4	111.2	106.4	88.4

Note: LT –Lithuania; PL –Poland; EUea – EU euro area.

Source: author's calculations based on The World Bank Group Data; Statistical Office of Lithuania, 2015; Central Statistical Office of Poland, 2015.

Conclusions

It is significant that the analyzes of structural changes of economic development index allows to characterize main problems of economics policy and shows the most important problems, which are necessary to consider in decision making process and in creating of economic policy. The research listed the neighborhoods countries – Lithuania and Poland – according to used method and determined the level of economic development. According to the used method, Poland is first and Lithuania is second. The analyze shows that the biggest problem of Lithuania economic development is decreased level of employment and diminished level of FDIpc. Due to the

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

same reasons – decline of FDIpc during the analyzed period in comparison with the base year 2005 – the EU and EU euro area economic development index was less than 100%.

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Export Versus FDI in Cournot Duopoly Framework

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Abstract: In this paper we study the choice between exporting and foreign direct investment (FDI) in the Cournot duopoly framework. First, we identify the conditions necessary for exporting and FDI, depending on costs of exporting and the cost of foreign investment. Then, we discuss various proximity-concentration tradeoffs. Finally, we demonstrate that six possible types of equilibriums may emerge depending on various combinations of the key parameters of the model. These equilibriums include: a monopoly FDI equilibrium, a monopoly exporting equilibrium, a domestic monopoly equilibrium, a duopoly FDI equilibrium, a duopoly exporting equilibrium, and no entry equilibrium.

Introduction

There is an extensive literature on the relationship between exporting and FDI. In this literature several strands can be distinguished. According to the earliest strand, based on the neoclassical theory of international capital flows, FDI and trade were seen as substitutes (Mundell, 1957). This approach was, however, criticized because of relying on the set of unrealistic assumptions, such as constant returns to scale (CRS) and perfect compe-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

tion, which were not in line with the key stylized facts on FDI.¹ Another problem was that in the neoclassical approach firms were infinitely small and it was not possible to study directly the investment decisions that took place within the firm.

Therefore, in the 1970s the next strand that attempted to model the firm decision to produce abroad under increasing returns and imperfect competition was initiated. In particular, Copithorne (1971), Horst (1971), and Hirsch (1976) attempted to model an exporting versus FDI decision of a monopolist using a partial equilibrium framework.² In this framework the firm faced a trade-off between proximity to the foreign market obtained by setting up production plants abroad, which allowed to economize on transportation and tariff costs, and concentration of production in the home country and serving foreign markets by exporting, which allowed to save on fixed costs of duplicating production capacity abroad. According to this framework firms invest abroad in those industries in which the gains from avoiding trade costs outweigh the costs of setting up production plants abroad.

In the 1980s the New Theory of Multinational Enterprise (NTME) has been developed. The development of the NTME has been the consequence of the emergence of the New Trade Theory (NTT) in the late 1970s and early 1980s that was based on the tools borrowed from the industrial organization (IO) literature. The NTT models embedded increasing returns to scale and imperfectly competitive market structures such as perfect monopolistic competition or oligopoly. Although particular models differed with respect to assumptions concerning the market structure, their main prediction was very similar: firms are more likely to enter the foreign market via FDI rather than via exporting the higher the trade costs and the lower fixed costs of entry and the size of economies of scale at the plant level compared to the firm level.

Krugman (1983) made one of the earliest attempts to formally integrate MNEs into the NTT. He extended his earlier general equilibrium model of international trade under monopolistic competition (Krugman, 1979, 1980)

¹ See, for example, Markusen (2002), Barba Navaretti and Venables (2004) and Caves (2007). In particular, Markusen (2002, p. 6) noted that: i) "large differences exist across industries in the degree to which production and sales are accounted for by multinational firms", ii) "multinationals tend to be important in industries that a) have high levels of R&D relative to sales, b) employ large number of professional and technical workers as a percentage of their total workforces, c) produce new and/or technologically complex products".

² See chapter 2 in Caves (2007) for a survey of the early literature on the choice between exporting and FDI.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

to introduce the possibility of multinational production. He considered a simple two country framework with labor as the sole factor of production. In addition he assumed that countries were exactly the same in terms of their labor endowments. The symmetry of the model setup implied wage equalization across countries which greatly simplified the analysis.³ However, despite its great analytical convenience, the framework assuming monopolistic competition is not very helpful with regard to studying the strategic interactions between competing firms as in this framework firms simply neglect the actions of their rivals.

Therefore, the alternative approach based on the partial equilibrium model of oligopolistic competition was developed by Markusen (1984). His model assumes the existence of firm-level scale economies as the driving force for FDI. The MNE's headquarter produces a service of a firm-specific asset that can be simultaneously used in multiple plants in a non-rival manner. As a result, two-plant firms have lower fixed costs than those of two single plants and this motivates multinational production.

The original approach proposed by Markusen (1984) was extended in the number of follow-up studies, including Horstmann and Markusen (1987, 1992), Markusen and Venables (1998, 2000) and Markusen (2002, ch. 4) who allowed for endogenous market structures and different forms of imperfect competition. In their models firms had different potential channels of entering a foreign market and each of these channels incurred different costs. A firm faced a choice between concentrating production in the home country and serving foreign markets exporting to achieve scale economies and producing abroad to benefit from proximity to consumers. Their models, however, usually assumed that firm entry decisions were made simultaneously in the first stage of the game.⁴

³ More complex two factor models based on monopolistic competition were proposed by Markusen and Venables (1998) and Markusen (2002, ch.8). However, their models could not be solved analytically and the authors had to rely on numerical methods to study the properties of the equilibrium solutions. Helpman *et al.* (2004) generalized Krugman (1983) model, retaining the assumption of labor as a single factor of production, to study the role of labor productivity in the choice between exporting and FDI. They demonstrated that only firms with highly productive workers can enter foreign markets via FDI, with less productive workers enter via exporting and firms with the least productive workers do not enter foreign markets at all. More recently, Krugman (1983) model has been also extended by Cieřlik (2013) to allow for differences between countries in terms of their size.

⁴ The well-known exception is a two-period duopoly model presented in Chapter 4 of Markusen (2002). This model builds on the earlier framework by Horstmann and Markusen (1987) in which the MNE moves first while the potential entrant can choose to enter at the same time or wait until the next period.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The representative example of this extended approach is the formal model developed by Horstmann and Markusen (1992) in which firms from home and foreign countries simultaneously decided between: not entering; entering with one plant supplying both markets; and entering with two plants, each supplying local customers. In their model three equilibriums were possible: a classical duopoly with two single-plant firms; a monopoly with one plant in each country; and a duopoly where both firms had plants in two countries. The first equilibrium emerged when plant specific costs were large relative to firm specific and trade costs. The second equilibrium emerged when trade and firm-specific costs were so high that two firms could not be profitable. Finally, the third equilibrium emerged with low plant specific costs.

In contrast to the aforementioned approach, Smith (1987) and Motta (1992) provided an alternative framework to study the choice between exporting and FDI in which entry decisions were made sequentially and the game between two competing firms unfolded as follows. In first stage the foreign firm decided whether or not to establish a subsidiary in the foreign country. In the second stage, the indigenous firm from the host country decided whether to enter the market or not, and then firms engaged in Cournot quantity competition. Their models assumed that entry decisions were made taking into account their effects on the subsequent quantity equilibrium.

Despite the fact that the theoretical studies by Smith (1987) and Motta (1992) provided descriptions of particular equilibriums that may emerge in their framework they did not devote much attention to the proximity-concentration tradeoffs the constitute the central plank of the NTME. Therefore, the main goal of the paper is to study the role of the proximity-concentration tradeoffs in the choice between exporting and FDI in the context of the Smith-Motta framework. The contribution of this paper to the literature is purely theoretical. In particular, we provide both formal quantitative and graphical characterization of each proximity concentration tradeoff and the resulting equilibriums. In addition, we also summarize all possible equilibriums that may emerge depending on various participation constraints in a single table. This allows us to identify the necessary conditions for each equilibrium that may emerge as the outcomes of the Smith-Motta model and derive a broader set of conclusions. Therefore, this paper can be seen as an extension of the aforementioned studies.

The organization of this paper is as follows. Section 2 describes the key assumptions of the model. Section 3 discusses payoffs and participation

constraints associated with particular market entry strategies. Section 4 discusses various proximity-concentration tradeoffs facing the foreign firm. Section 5 characterizes six possible types of equilibriums that may emerge. Finally, Section 6 summarizes and provides directions for further research.

Methodology of the research

In this section we describe the methodology of the research and the main assumptions of the model. To study the choice between exporting and FDI we use a simple single-country Cournot oligopoly framework. In particular, we assume that there are only two firms in the domestic country that operate in a single industry: the domestic and foreign firms that are not capacity constrained. For simplicity, it is rather assumed that the good produced by both firms is homogenous and produced under increasing returns to scale. Increasing returns to scale are modeled by assuming that the total cost function is:

$$TC(x) = F + G + cx \tag{1}$$

where: F is the fixed sunk cost of developing the product, G is the fixed sunk investment cost of entering the market (i.e. building a production plant), c is the constant marginal cost of production and x is output. It can be noted that the average cost of production declines with output as the fixed sunk costs are spread over a larger number of units: $AC(x) = (F+G)/x + c$.

It is assumed that the marginal cost of production c is exactly the same for both foreign and domestic firms. In addition, we assume that if the domestic firm decides to enter the market it must incur both the fixed sunk cost of developing the product F and the fixed sunk cost of building the plant G . However, we assume that the fixed sunk cost F does not apply to the foreign firm as it was incurred in the past when the foreign firm entered the market in its home country. Further, the fixed sunk cost G applies to the foreign firm only when it enters the domestic country market via FDI. If the foreign firm decides to export instead of doing FDI it can save the fixed sunk cost but it has to pay a higher marginal cost. Following Smith (1987), we assume that in addition to the per unit cost of production c the foreign firm has to pay the trade costs which consist of two components: transport

cost s and tariff t which increase the marginal cost. The transport cost and the tariff are assumed to be exogenously given.

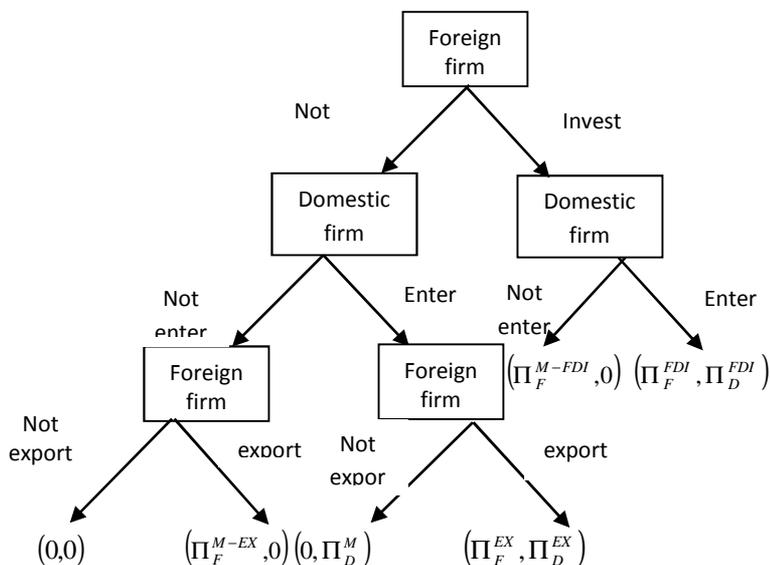
For simplicity, we use an explicit simple linear inverse demand function that relates price P to total output X supplied by both firms to the market:

$$P(X) = a - X, \tag{2}$$

where $a > c$ is the market size in the domestic country. X is the sum of output supplied to the market by both firms: $X = x_F + x_D$, where x_F (x_D) denotes output supplied by the foreign (domestic) firm.

Following Motta (1992) the extensive form of the game between the foreign and domestic firms is illustrated in Figure 1.

Figure 1. The extensive form of the game between the foreign and domestic firms



Source: own elaboration based on Motta (1992).

Figure 1 shows the sequence of all the possible actions and outcomes for domestic and foreign firms.⁵ Each line represents an action, and each box

⁵ It must be noted that the structure of the game proposed by Motta (1992) is different from Smith (1987). In particular, the time structure underlines different degrees of irreversi-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

represents a decision point. The outcomes of actions are shown in parentheses, where the foreign firm's profits are listed first.

In the first stage of the game the foreign firm decides whether to do FDI and incur the fixed sunk cost G of building the plant in the host country or not. Looking at this choice in the second stage of the game the domestic firm decides whether to enter the market and pay the fixed sunk cost $F+G$ or not. If both firms incurred the sunk costs, they play a standard Cournot output game. In this case the foreign firm earns FDI duopoly profit Π_F^{FDI} , while the domestic firm Π_D^{FDI} . If the foreign firm built the production capacity in the host country market while the domestic firm did not enter the market, the foreign firm captures the entire market and makes FDI monopoly profit Π_F^{M-FDI} .

If the foreign firm decided not to do FDI in the first stage of the game and the domestic firm entered the host country market in the second stage of the game, the foreign firm chooses whether to serve it via exporting and pay trade costs $s+t$ per unit of exports or not to sell in that market at all. If the foreign firm decides to export, a third stage of the game comes into play in which the two firms play the standard Cournot game. In this case the foreign firm earns exporting duopoly profit Π_F^{EX} and the domestic firm Π_D^{EX} . However, if the foreign firm decides not to export the domestic firm becomes the monopolist and earns profit Π_D^M .

Finally, if the foreign firm decided not to do FDI in the first stage of the game and the domestic firm decided not to enter the market in the second stage of the game, the foreign firm chooses again whether to export or not to sell in the host country market at all. If it exports, it becomes an exporting monopolist in that market and earns profit Π_F^{M-EX} . If it does not enter then the demand in the host country is left unserved.

bility involved in firms' decisions. A decision to export by the foreign firm or decision not to enter by the home firm is a decision that can be reversed once the rival firm has made its decision whereas the entry and foreign direct investment are the long-run decisions. Also the set of strategies available to the foreign firm is extended to allow for the option of not entering at all the market in the domestic country which was a priori excluded in Smith (1987). Therefore, the approach proposed by Motta (1992) can be treated as a generalization of Smith (1992).

Payoffs and participation constraints

In this section we discuss the payoffs associated with particular entry strategies, and participation constraints that imply non-negative levels of profits for foreign and domestic firms. First, we consider the case when the fixed sunk market entry costs for the domestic firm ($F + G$) are so high that the domestic firm decides not to enter the market in the domestic country and the foreign firm becomes a monopolist in the domestic market and discuss two standard host market entry strategies: FDI and exporting of the foreign firm. Then, we discuss a more complex case when then foreign firm has to compete with the domestic firm in the Cournot manner.

FDI monopoly

If the foreign firm decides to serve the domestic market via FDI it must incur the fixed sunk cost of building the plant G in the domestic country and its profit function can be written as:

$$\Pi_F^{M-FDI} = [a - X_F^{M-FDI}]X_F^{M-FDI} - cX_F^{M-FDI} - G \quad (3)$$

Using the first order condition we can obtain the FDI monopoly equilibrium output:

$$X_F^{M-FDI} = \frac{a - c}{2} \quad (4)$$

The equilibrium monopoly price in the domestic market can be determined by substituting the FDI monopoly equilibrium output of the foreign firm (4) into the inverse demand function (2) which yields:

$$p_F^{M-FDI} = \frac{a + c}{2} \quad (5)$$

Substituting equilibrium solutions for output (4) and price (5) into the profit function (3) yields the equilibrium monopoly profit from FDI for the foreign firm:

$$\Pi_F^{M-FDI} = \left(\frac{a - c}{2}\right)^2 - G = [X_F^{M-FDI}]^2 - G \quad (6)$$

The foreign firm enters the domestic country market via FDI only if its operating profit is bigger than the fixed cost of entry:

$$G < \left(\frac{a-c}{2} \right)^2 \quad (7)$$

Exporting monopoly

If the foreign firm decides to serve the domestic market by exporting its profit function can be written as:

$$\Pi_F^{M-EX} = [a - X_F^{M-EX}] X_F^{M-EX} - (c + s + t) X_F^{M-EX} \quad (8)$$

Using the first order condition, we can obtain the exporting monopoly equilibrium output:

$$X_F^{M-EX} = \frac{a - c - s - t}{2} \quad (9)$$

The equilibrium monopoly price in the domestic market can be determined by substituting the exporting monopoly equilibrium output of the foreign firm (9) into the inverse demand function (2) which yields:

$$p_F^{M-EX} = \frac{a + c + s + t}{2} \quad (10)$$

Substituting equilibrium solutions for output (9) and price (10) into the profit function (8) yields the equilibrium monopoly profit from exporting:

$$\Pi_F^{M-EX} = \left(\frac{a - c - s - t}{2} \right)^2 = [X_F^{M-EX}]^2 \quad (11)$$

The foreign firm enters the market in the domestic country via exporting only if its profit in that market is positive which implies the following participation constraint:

$$s + t < a - c \quad (12)$$

Domestic monopoly

We also consider the autarky case when the domestic market entry costs are so high that the foreign firm cannot enter the market and the domestic firm enjoys a monopoly power. In this case the profit function of the domestic monopolist can be written as:

$$\Pi_D^M = [a - X_D^M]X_D^M - cX_D^M - F - G \quad (13)$$

Using the first order condition we can determine the domestic monopoly equilibrium output:

$$X_D^M = \frac{a - c}{2} \quad (14)$$

The equilibrium monopoly price in the domestic market can be determined by substituting the equilibrium monopoly output (14) into the inverse demand function (2) which yields:

$$p_D^M = \frac{a + c}{2} \quad (15)$$

Substituting equilibrium solutions for output (14) and price (15) into the profit function (13) we obtain the equilibrium monopoly profit for the domestic firm:

$$\Pi_D^M = \left(\frac{a - c}{2} \right)^2 - F - G = [x_D^M]^2 - F - G \quad (16)$$

The domestic monopolist is active in the domestic market if the following market participation constraint is satisfied:

$$F + G < \left(\frac{a - c}{2} \right)^2 \quad (17)$$

FDI Cournot duopoly

If foreign firm decides to enter the domestic market via FDI and the domestic firm decides to compete we have the FDI Cournot duopoly problem. In this case if the foreign firm enters the market in the host country and competes with the domestic firm its profit function can be written as:

$$\Pi_F^{FDI} = [a - (x_F^{FDI} + x_D^{FDI})]x_F^{FDI} - cx_F^{FDI} - G \quad (18)$$

In a similar way we can write down the profit function of the domestic firm:

$$\Pi_D^{FDI} = [a - (x_F^{FDI} + x_D^{FDI})]x_D^{FDI} - cx_D^{FDI} - F - G \quad (19)$$

Using the first order conditions for the domestic and foreign firms the outputs supplied by both firms to the domestic market can be written as, respectively:

$$x_F^{FDI} = \frac{a - c}{3} \quad (20)$$

$$x_D^{FDI} = \frac{a - c}{3} \quad (21)$$

We can note that the volumes of output supplied by the foreign and domestic firms to the host country market when the foreign firm enters via FDI and faces competition from the domestic firm are exactly the same.

The total equilibrium level of output supplied to the host-country market is the sum of outputs (20)-(21) supplied jointly by the foreign and domestic firms which can be written as:

$$X^{FDI} = x_D^{FDI} + x_F^{FDI} = \frac{2(a - c)}{3} > X_F^M = X_D^M \quad (22)$$

It can be easily noted that the total level of output supplied to the market is now bigger compared to the previously discussed monopoly FDI and

domestic firm equilibriums due to competition between firm. As the equilibrium level of output is now bigger the equilibrium price is lower. The equilibrium price in the domestic market can be determined by substituting the sum of output (22) into the inverse demand function (2) to obtain:

$$p^{FDI} = \frac{a+2c}{3} < p_D^M = p_F^{M-FDI} = \frac{a+c}{2} \quad (23)$$

Using our solutions for the equilibrium quantities (20)-(21) and price (23) the total profits for the foreign and domestic firms can be written as, respectively:

$$\Pi_F^{FDI} = \left(\frac{a-c}{3}\right)^2 - G = [x_F^{FDI}]^2 - G \quad (24)$$

$$\Pi_D^{FDI} = \left(\frac{a-c}{3}\right)^2 - F - G = [x_D^{FDI}]^2 - F - G \quad (25)$$

It can be noted that the operating profits of both firms are now lower compared to the FDI and domestic monopoly equilibriums as now firms have to compete with each other. Moreover, the overall profit of the foreign firm is bigger compared to the profit of the domestic firm as it has to pay a fixed market entry cost F in addition to the fixed cost of building the plant G .

To ensure that both firms are active in the host-country market we need to impose the market participation constraints stating that both firms have non-negative levels of equilibrium profits. These conditions require that operating profits in the domestic market must be bigger than the fixed costs. The participation constraint for the foreign firm requires that

$$G < \left(\frac{a-c}{3}\right)^2 \quad (26)$$

The participation constraint for the domestic firm requires that

$$F + G < \left(\frac{a - c}{3} \right)^2 \quad (27)$$

It can be noted that it is easier to satisfy the participation constraint for the foreign firm than for the domestic firm, hence if (27) is satisfied then also (26) is satisfied. If participation constraints are met, then both firms have non-negative profits and supply positive amounts of output to the domestic market.

Exporting Cournot duopoly

If the foreign firm decides to enter the domestic market via exporting and the domestic firm decides to compete we have an exporting Cournot duopoly problem. In this case the profit function of the foreign firm can be written as:

$$\Pi_F^{EX} = [a - (x_F^{EX} + x_D^{EX})]x_F^{EX} - (c + s + t)x_F^{EX} \quad (28)$$

For the foreign firm exporting to the domestic market from the production facility located abroad implies a high marginal cost option due to the existence of transport costs s and tariffs t . However, this strategy allows the foreign firm to save on the fixed cost of investment G .

In this case the profit function for the domestic firm can be written as:

$$\Pi_D^{EX} = [a - (x_F^{EX} + x_D^{EX})]x_D^{EX} - cx_D^{EX} - F - G \quad (29)$$

Using the first order conditions, we can determine the equilibrium levels of output supplied by the foreign and domestic firms to the domestic market, respectively:

$$x_F^{EX} = \frac{a - c - 2(s + t)}{3} \quad (30)$$

$$x_D^{EX} = \frac{a - c + (s + t)}{3} \quad (31)$$

We can note that compared to FDI solutions now the equilibrium levels of output contain the transport cost and the tariff. As a result the domestic

firm's output is higher and the foreign firm's output is lower compared to the earlier case when the foreign firm serves the domestic market via FDI. In the special case when trade is completely free, i.e. $s + t = 0$ the output levels of both firms are the same as in the previous case.

The total equilibrium level of output supplied to the domestic market is the sum of outputs (30)-(31) supplied jointly by the foreign and domestic firms that equals:

$$X^{EX} = x_D^{EX} + x_F^{EX} = \frac{2(a-c) - (s+t)}{3} < X^{FDI} \quad (32)$$

It can be noted that the equilibrium level of total output supplied to the domestic market when the foreign firm enters this market via exporting is smaller compared to compared to the equilibrium level of output in the case when it enters via FDI (18) due to the inefficiencies associated with the existence of the transport cost and the tariff.

The equilibrium price in the domestic market can be determined by substituting the sum of output (32) into the inverse demand function (2) which yields:

$$p^{EX} = \frac{a + 2c + s + t}{3} > p^{FDI} \quad (33)$$

It can be noted that the price in the exporting Cournot equilibrium will always be higher compared to the FDI Cournot equilibrium due to the technical inefficiency associated with the existence of the trade cost.

Using our solutions for the equilibrium quantities (30)-(31) and the equilibrium price (33) we can determine the equilibrium profits for the domestic and foreign firms, respectively:

$$\Pi_F^{EX} = \left(\frac{a - c - 2(s+t)}{3} \right)^2 = [x_F^{EX}]^2 \quad (34)$$

$$\begin{aligned} \Pi_D^{EX} &= \left(\frac{a - c + s + t}{3} \right)^2 - F - G > \Pi_D^{FDI} \\ &= [x_D^{EX}]^2 - F - G \end{aligned} \quad (35)$$

It can be noted that for the domestic firm it is always better if the foreign firm enters the domestic market via exporting rather than via FDI. The domestic firm's profit is higher when the foreign firm exports than when it enters via FDI for two reasons: i) the domestic firm's larger sales, ii) a higher equilibrium price. Hence, for the domestic firm $\Pi_D^{EX} > \Pi_D^{FDI}$ is always satisfied.

However, for the foreign firm such a simple generalization cannot be made. Although the operating profit associated with FDI is higher than the exporting profit, the fixed cost of investment G can make the foreign firm's overall profit of FDI lower than the profit from exporting. Hence, whether the profit from exporting is bigger or smaller compared to the profit from FDI for the foreign firm depends on the interplay between the trade and investment costs ($s + t$ and G). This 'proximity-concentration' tradeoff will be studied in the next section.

To ensure both firms are active in the domestic market we must impose market participation constraints on the domestic and foreign firms stating that they must have non-negative levels of profits. The participation constraint for the foreign firm requires that:

$$2(s + t) < a - c \quad (36)$$

Similarly, the participation constraint for the domestic firm requires that:

$$F + G < \left(\frac{a - c + s + t}{3} \right)^2 \quad (37)$$

It can be noted that now it is easier for the domestic firm to satisfy the participation constraint as it has a higher operating profit compared to the previous case when the foreign firm entered the domestic market via FDI. If both (36) and (37) are satisfied, then both firms have non-negative profits and supply positive amounts of output to the domestic market.

Proximity-concentration tradeoffs

In this section we discuss various proximity-concentration tradeoffs facing the foreign firm. First, we discuss the tradeoff between FDI monopoly and exporting monopoly for the foreign firm, then the tradeoff between FDI

and exporting under duopoly, and finally we discuss the tradeoff between FDI monopoly and exporting duopoly.

Tradeoff between FDI monopoly and exporting monopoly

To study the tradeoff between FDI monopoly and exporting monopoly we compare profits of the foreign firm for FDI monopoly (6) and exporting monopoly (11). The profits of the foreign firm from FDI monopoly and exporting monopoly are equal when:

$$G = \frac{2(a-c)(s+t) - (s+t)^2}{4} \quad (38)$$

If the fixed cost of investment G is bigger (smaller) than the threshold value (38) the foreign firm prefers exporting (FDI) monopoly to FDI (exporting) monopoly.

Tradeoff between FDI duopoly and exporting duopoly

To analyze the tradeoff between FDI duopoly and exporting duopoly we compare profits of the foreign firm from FDI duopoly (24) and exporting duopoly (34). The profits of the foreign firm from exporting duopoly and FDI duopoly are equal when:

$$G = \frac{4(a-c)(s+t) - 4(s+t)^2}{9} \quad (39)$$

If G is bigger (smaller) than the threshold value (39) then exporting (FDI) is the preferred entry strategy for the foreign firm. It can be noted that threshold value of the fixed cost (39) is bigger than (38). This means that increased competition in the domestic market makes the entry of the foreign firm via FDI less likely. Moreover, FDI can always be a preferred to exporting for certain combinations of model parameters such as the high trade cost and the low fixed cost of investment. Similarly, exporting can always be a preferred to FDI for certain combinations of model parameters such as the low trade cost and the high fixed cost of investment.

Tradeoff between FDI monopoly and exporting duopoly

To analyze the tradeoff between FDI monopoly and exporting duopoly we compare profits of foreign firm from FDI monopoly (6) and exporting duopoly (35). The profits of the foreign firm from FDI monopoly and exporting duopoly are equal when:

$$G = \frac{5(a-c)^2}{36} + \frac{4(a-c)(s+t) - 4(s+t)^2}{9} \quad (40)$$

If the fixed cost of investment G is bigger (smaller) than the threshold value (40) then exporting (FDI) is the preferred entry strategy for the foreign firm. In addition, FDI can always be a preferred to exporting for certain combinations of model parameters such as the high trade cost and the low fixed cost of investment. Similarly, exporting can always be a preferred to FDI for certain combinations of model parameters such as the low trade cost and the high fixed cost of investment.

Equilibriums

In this model six possible equilibriums may emerge depending on various combinations of the key parameters of models: a FDI monopoly equilibrium, an exporting monopoly equilibrium, a domestic monopoly equilibrium, a FDI duopoly equilibrium, an exporting duopoly equilibrium, and a no-entry equilibrium.

To identify those equilibriums we distinguish between three types of trade and investment costs for the foreign firm: low (i.e. $2(s+t) < a-c$ and $G < \left(\frac{a-c}{3}\right)^2$, respectively), high (i.e. $a-c < 2(s+t) < 2(a-c)$ and $\left(\frac{a-c}{3}\right)^2 < G < \left(\frac{a-c}{2}\right)^2$, respectively), and prohibitively high (i.e. $(s+t) > a-c$ and $G > \left(\frac{a-c}{2}\right)^2$, respectively). When low costs occur the foreign firm is able to enter the host market and compete with the domestic firm. When high costs occur the foreign firm is able to enter the host market only if the domestic firm does not enter. Finally, when these costs are prohibitively high the foreign firm does not enter at all.

We also distinguish four different ranges of the fixed sunk costs for the domestic firm: low (i.e. $F + G < \left(\frac{a-c}{3}\right)^2$), high (i.e., $\left(\frac{a-c}{3}\right)^2 < F + G < \left(\frac{a-c+s+t}{3}\right)^2$), very high (i.e. $\left(\frac{a-c}{2}\right)^2 > F + G > \left(\frac{a-c+s+t}{3}\right)^2$) and prohibitively high (i.e. $F + G > \left(\frac{a-c}{2}\right)^2$). When the low fixed costs occur

the domestic firm is able to compete with the foreign firm irrespectively of its entry strategy. When the high fixed costs occur then the domestic firm is able to compete with the foreign firm only when it exports. When the fixed costs are very high the domestic firm can enter only when the foreign firm does not enter. Finally, when the costs are prohibitively high the domestic firm does not enter irrespectively of the decision of the foreign firm.

We start with the discussion of the benchmark equilibriums in which the domestic firm decides not to enter the market and the foreign firm becomes a monopolist serving the host country market either via FDI or via exporting. Then, we describe FDI and exporting duopoly equilibriums. Finally, we discuss the domestic monopoly and no entry equilibriums.

The FDI monopoly equilibriums may occur when the domestic firm is unable to compete with the foreign firm irrespectively of its entry strategy (i.e. when the fixed sunk costs are very high), or only when it enters via FDI (i.e. when the fixed sunk costs are high) or when the domestic firm does not enter the market at all (i.e. the fixed sunk costs are prohibitively high).

If the fixed sunk costs are high the domestic firm is unable to compete with the foreign firm only when it enters via FDI and both trade and investment costs are low then there is no tradeoff. This is because the foreign firm always chooses FDI to capture the entire market in the host country instead of having to share the market with the domestic firm when exporting. However, if the trade costs are low while the investment cost is high then the foreign firm faces the tradeoff between becoming a monopolist when it enters via FDI and sharing the market with the local firm when it exports. Hence, it chooses FDI and becomes the monopolist only if the investment cost is below the threshold level (40). Moreover, the foreign firm chooses FDI and becomes the monopolist when: i) the trade costs are high and the investment cost is low, ii) both trade and investment costs are high, iii) the trade costs are prohibitively high and the investment cost is

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

low, and iv) the trade cost are prohibitively high and the investment cost is high.

If the fixed sunk costs are very high the domestic firm is unable to compete with the foreign firm irrespectively of its entry strategy and both trade and investment cost are low then foreign firm faces the tradeoff between FDI and exporting. It chooses FDI only if the investment cost is below the threshold level (38). Similarly, if the trade costs are low and the investment cost is high or when both trade and investment costs are high the foreign firm chooses FDI only if the investment cost is below the threshold level (38). Moreover, the foreign firm chooses FDI and becomes the monopolist when: i) the trade costs are high and the investment cost is low, ii) the trade costs are prohibitively high and the investment cost is low, and iii) the trade cost are prohibitively high and the investment cost is high.

Also, if the fixed sunk costs are prohibitively high the domestic firm is unable to survive in the market even as a monopolist and both trade and investment cost are low then foreign firm faces the tradeoff between FDI and exporting. It chooses FDI only if the investment cost is below the threshold level (38). If the trade costs are low and the investment cost is high or when both trade and investment costs are high the foreign firm chooses FDI only if the investment cost is below the threshold level (38). In addition, the foreign firm chooses FDI and becomes the monopolist when: i) the trade costs are high and the investment cost is low, ii) the trade costs are prohibitively high and the investment cost is low, and iii) the trade cost are prohibitively high and the investment cost is high.

Exporting monopoly equilibriums may occur only when the domestic firm is unable to compete with the foreign firm irrespectively of its entry strategy. This occurs when the fixed sunk costs for the domestic firm are very high or prohibitively high. If both trade and investment cost are low then the foreign firm faces the tradeoff between FDI and exporting. It chooses exporting only if the investment cost is above the threshold level (38). Similarly, if the trade costs are low and the investment cost is high or when both the trade and investment costs are high the foreign firm chooses exporting only if the investment cost is above the threshold level (38). In addition, the foreign firm chooses exporting and becomes the monopolist when: i) the trade costs are low and the investment cost is prohibitively high, and ii) the trade costs are high and the investment cost is prohibitively high.

Next, we discuss the duopoly equilibriums in which the domestic firm decides to enter the market and compete with the foreign firm. The duopoly

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

FDI equilibriums occur only when the the fixed sunk costs are low and domestic firm is able to compete with the foreign firm irrespectively of its entry strategy. If both trade and investment costs are low the foreign firm faces a tradeoff between FDI and exporting. It chooses FDI only if the investment cost is below the threshold level (39). Moreover, the foreign firm always chooses FDI when: i) the trade costs are high and the investment cost is low, and ii) the trade costs are prohibitively high and the investment cost is low.

The duopoly exporting equilibriums occur when the domestic firm is able to compete with the foreign firm irrespectively of its entry strategy, or only when it exports. If the fixed sunk costs are low and the domestic firm is able to compete with the foreign firm irrespectively of its entry strategy and both trade and investment costs are low the foreign firm faces a tradeoff between FDI and exporting. It chooses exporting only if the investment cost is above the threshold level (39). In addition, the foreign firm always chooses exporting when: i) the trade costs are low and the investment cost is high, and ii) the trade costs are low and the investment cost is prohibitively high.

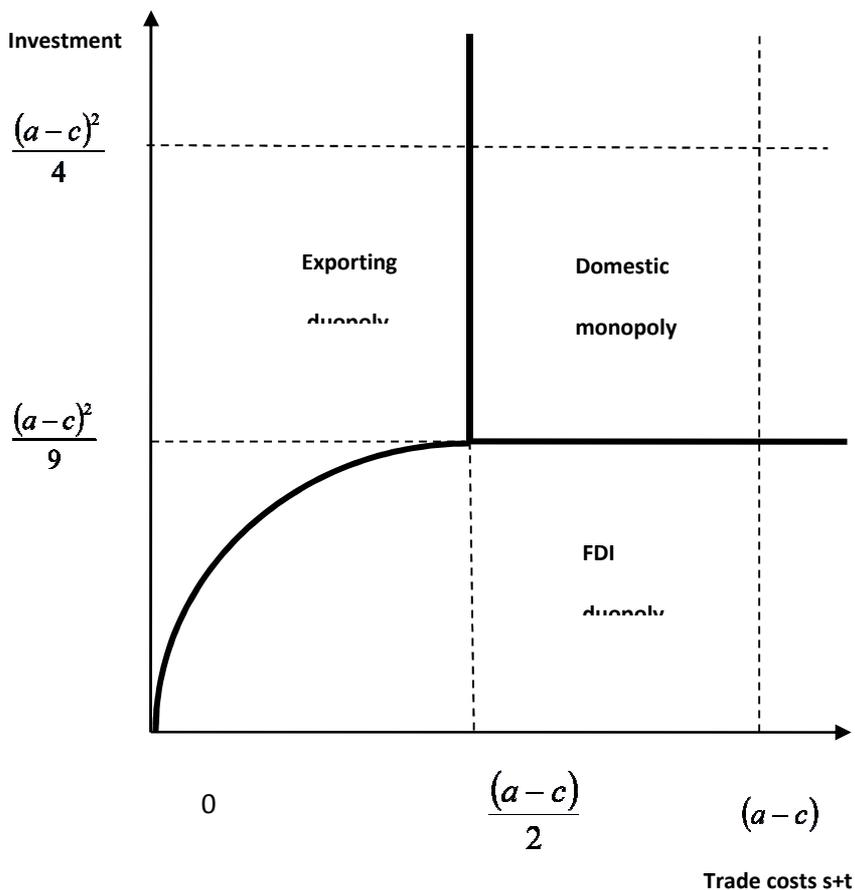
If the fixed sunk costs are high and the domestic firm is able to compete with the foreign firm only when it exports and the trade costs are low while the investment cost is high the foreign firm faces a tradeoff between becoming a monopolist when it enters via FDI and sharing the market with the local firm when it exports. It chooses exporting only if the investment cost is above the threshold level (40). Moreover, the exporting duopoly equilibrium occurs when the trade costs are low and the investment cost is prohibitively high.

Finally, the domestic monopoly equilibrium occurs if the fixed sunk costs are low, and the domestic firm is able to compete with the foreign firm irrespectively of its entry strategy, when: i) both trade and investment costs are high, ii) the trade costs are high and the investment cost is prohibitively high, iii) the trade costs are prohibitively high and the investment cost is high, and iv) both trade and investment costs are prohibitively high. Similarly, the domestic monopoly equilibrium occurs if the fixed sunk costs are high, and the domestic firm is able to compete with the foreign firm irrespectively of its entry strategy, when: i) the trade costs are high and the investment cost is prohibitively high, and ii) both trade and investment costs are prohibitively high. If the fixed sunk costs for the domestic firm are very high the domestic monopoly equilibrium occurs only if both trade and investment costs for the foreign firm are prohibitively high. The no

entry equilibrium occurs only when the fixed sunk costs for the domestic firm are prohibitively high and both trade and investment costs for the foreign firm are prohibitively high.

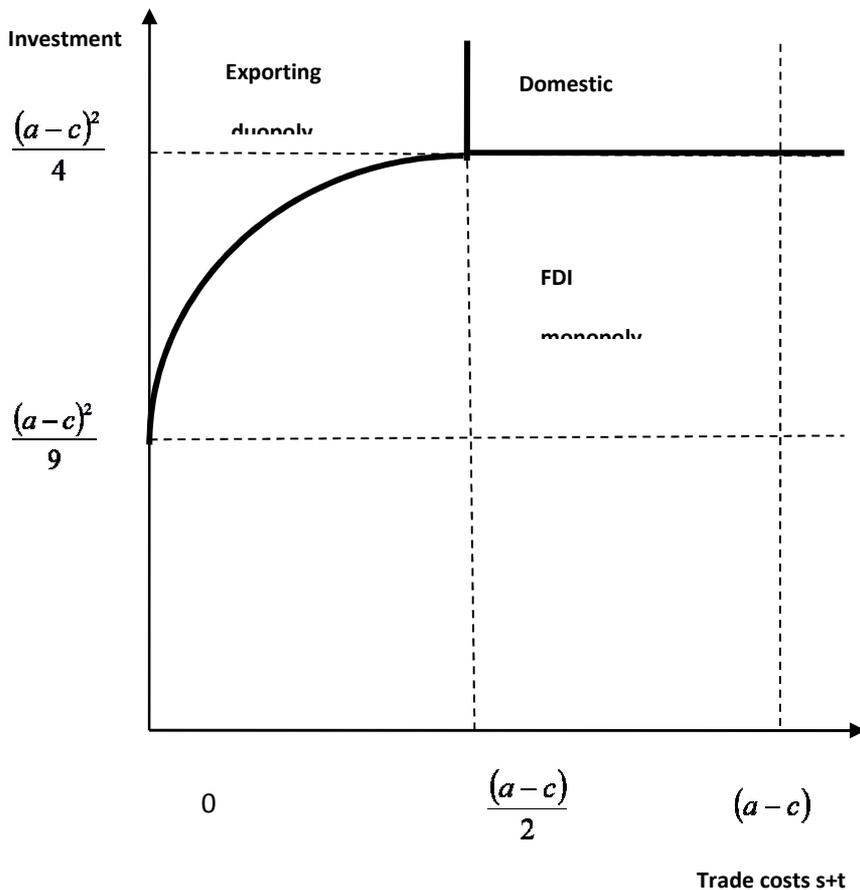
Figures 2-5 and Table 1 provide the summary of the results for different cases of ranges of participation constraints for domestic and foreign firms as well as tradeoffs between FDI and exporting.

Figure 2. Possible equilibria when the fixed costs for the domestic firm are low, (i.e. $F + G < \left(\frac{a-c}{3}\right)^2$).



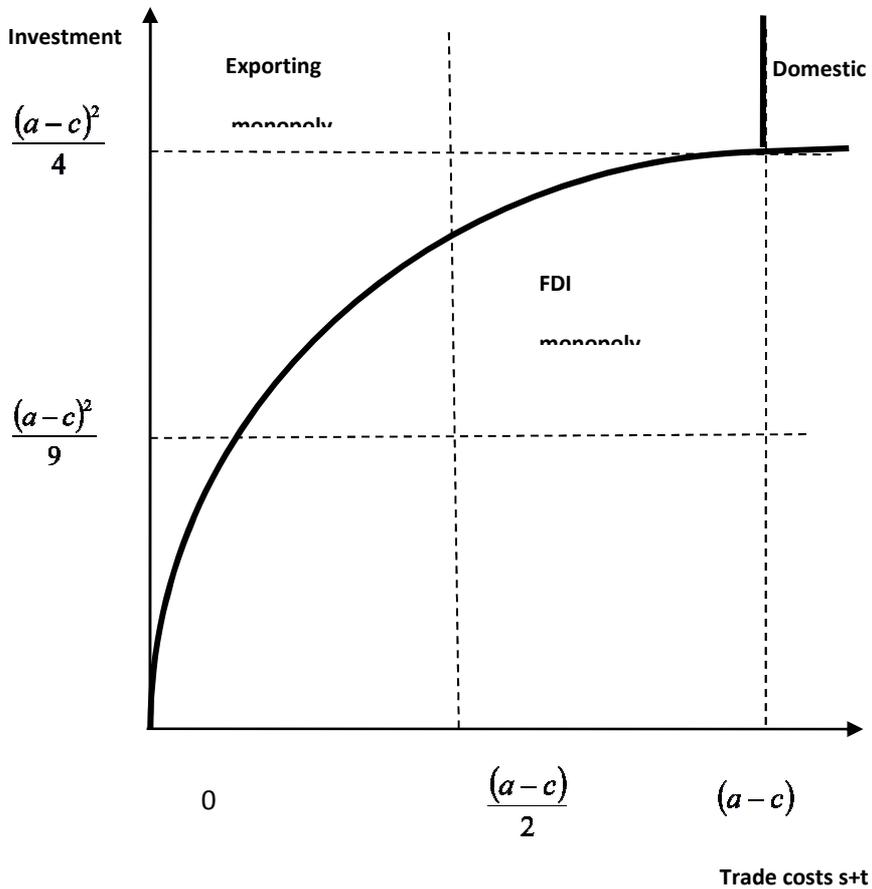
Source: own elaboration.

Figure 3. Possible equilibria when the fixed costs for the domestic firm are high, (i.e., $\left(\frac{a-c}{3}\right)^2 < F+G < \left(\frac{a-c+s+t}{2}\right)^2$).



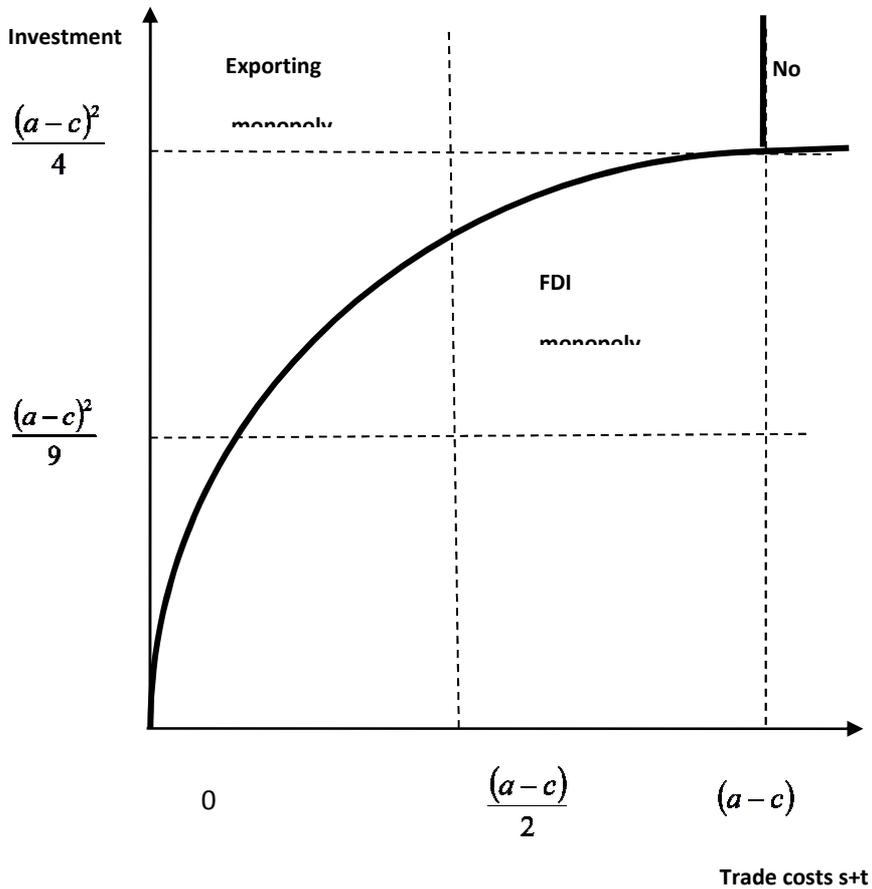
Source: own elaboration.

Figure 4. Possible equilibria when the fixed costs for the domestic firm are very high, (i.e. $\left(\frac{a-c}{2}\right)^2 > F+G > \left(\frac{a-c+s+t}{2}\right)^2$).



Source: own elaboration.

Figure 5. Possible equilibria when the fixed costs for the domestic firm are prohibitive, (i.e. $F + G > \left(\frac{a-c}{2}\right)^2$).



Source: own elaboration.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 1. Monopoly and Cournot Duopoly Equilibriums

Domestic firm Foreign firm	$F + G < \left(\frac{a-c}{3}\right)^2$	$\left(\frac{a-c}{3}\right)^2 < F + G < \left(\frac{a-c+s+t}{3}\right)^2$
$2(s+t) < a-c$ and $G < \left(\frac{a-c}{3}\right)^2$	FDI duopoly if $G < \frac{4(a-c)(s+t) - 4(s+t)^2}{9}$ Exporting duopoly if $G > \frac{4(a-c)(s+t) - 4(s+t)^2}{9}$	FDI monopoly
$2(s+t) < a-c$ and $\left(\frac{a-c}{3}\right)^2 < G < \left(\frac{a-c}{2}\right)^2$	Exporting duopoly	FDI monopoly if $G < \frac{5(a-c)^2}{36} + \frac{4(a-c)(s+t) - 4(s+t)^2}{9}$ Exporting duopoly if $G > \frac{5(a-c)^2}{36} + \frac{4(a-c)(s+t) - 4(s+t)^2}{9}$
$a-c < 2(s+t) < 2(a-c)$ and $G < \left(\frac{a-c}{3}\right)^2$	FDI duopoly	FDI monopoly
$a-c < 2(s+t) < 2(a-c)$ and $\left(\frac{a-c}{3}\right)^2 < G < \left(\frac{a-c}{2}\right)^2$	Domestic monopoly	FDI monopoly
$2(s+t) < a-c$ and $G > \left(\frac{a-c}{2}\right)^2$	Exporting duopoly	Exporting duopoly
$a-c < 2(s+t) < 2(a-c)$ and $G > \left(\frac{a-c}{2}\right)^2$	Domestic monopoly	Domestic monopoly
$(s+t) > a-c$ and $G < \left(\frac{a-c}{3}\right)^2$	FDI duopoly	FDI monopoly
$(s+t) > a-c$ and $\left(\frac{a-c}{3}\right)^2 < G < \left(\frac{a-c}{2}\right)^2$	Domestic monopoly	FDI monopoly
$(s+t) > a-c$ and $G > \left(\frac{a-c}{2}\right)^2$	Domestic monopoly	Domestic monopoly

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Domestic firm Foreign firm	$\left(\frac{a-c+s+t}{3}\right) < F+G < \left(\frac{a-c}{2}\right)^2$	$F+G > \left(\frac{a-c}{2}\right)^2$
$2(s+t) < a-c$ and $G < \left(\frac{a-c}{3}\right)^2$	FDI monopoly if $G < \frac{2(a-c)(s+t) - (s+t)^2}{4}$	FDI monopoly if $G < \frac{2(a-c)(s+t) - (s+t)^2}{4}$
	Exporting monopoly if $G > \frac{2(a-c)(s+t) - (s+t)^2}{4}$	Exporting monopoly if $G > \frac{2(a-c)(s+t) - (s+t)^2}{4}$
$2(s+t) < a-c$ and $\left(\frac{a-c}{3}\right)^2 < G < \left(\frac{a-c}{2}\right)^2$	FDI monopoly if $G < \frac{2(a-c)(s+t) - (s+t)^2}{4}$	FDI monopoly if $G < \frac{2(a-c)(s+t) - (s+t)^2}{4}$
	Exporting monopoly if $G > \frac{2(a-c)(s+t) - (s+t)^2}{4}$	Exporting monopoly if $G > \frac{2(a-c)(s+t) - (s+t)^2}{4}$
$a-c < 2(s+t) < 2(a-c)$ and $G < \left(\frac{a-c}{3}\right)^2$	FDI monopoly	FDI monopoly
$a-c < 2(s+t) < 2(a-c)$ and $\left(\frac{a-c}{3}\right)^2 < G < \left(\frac{a-c}{2}\right)^2$	FDI monopoly if $G < \frac{2(a-c)(s+t) - (s+t)^2}{4}$	FDI monopoly if $G < \frac{2(a-c)(s+t) - (s+t)^2}{4}$
	Exporting monopoly if $G > \frac{2(a-c)(s+t) - (s+t)^2}{4}$	Exporting monopoly if $G > \frac{2(a-c)(s+t) - (s+t)^2}{4}$
$2(s+t) < a-c$ and $G > \left(\frac{a-c}{2}\right)^2$	Exporting monopoly	Exporting monopoly
$a-c < 2(s+t) < 2(a-c)$ and $G > \left(\frac{a-c}{2}\right)^2$	Exporting monopoly	Exporting monopoly
$(s+t) > a-c$ and $G < \left(\frac{a-c}{3}\right)^2$	FDI monopoly	FDI monopoly
$(s+t) > a-c$ and	FDI monopoly	FDI monopoly

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

$\left(\frac{a-c}{3}\right)^2 < G < \left(\frac{a-c}{2}\right)^2$		
$(s+t) > a-c$ and $G > \left(\frac{a-c}{2}\right)^2$	Domestic monopoly	No entry

Source: own elaboration.

Conclusions

In this paper we investigated the role of the proximity-concentration trade-off in the choice between exporting and FDI in the context of the Smith-Motta model. First, we identified the conditions necessary for exporting and FDI, depending on the trade costs and the cost of foreign direct investment. Then, we demonstrated that six types of possible equilibriums might emerge depending on various combinations of the parameters of the model: the monopoly FDI equilibrium, the monopoly exporting equilibrium, the domestic monopoly equilibrium, the FDI duopoly equilibrium, the exporting duopoly equilibrium and no entry equilibrium.

The theoretical framework employed in this paper was, however, based on very specific assumptions. In particular, it was assumed for simplicity that the demand function was linear. Therefore, in future studies it would be useful to investigate whether the theoretical findings reported in this paper generalize to other demand functions, for example such as iso-elastic demand functions derived from CES utility. Moreover, it was assumed that the firms were equally productive and not capacity constrained. Therefore, it would be useful to relax these assumptions in future theoretical studies. Finally, in this paper we did not study the antitrust policy and welfare implications of particular equilibriums that could be potentially considered in future studies.

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18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
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Determinants of Export Performance of Ukrainian Firms

JEL Classification: *F14; P33*

Keywords: *Export activity; firm heterogeneity; Ukraine*

Abstract: Following the new strand in the new trade theory literature that focuses on firm heterogeneity in this paper we investigate determinants of firm export performance in Ukraine. The study is based on the BEEPS firm level data compiled by EBRD and the World Bank. The study covers the period starting in 2005 and ending in 2013. We estimate probit regressions for each year of our sample as well as for the pooled dataset that includes all years. Our pooled estimation results indicate that the probability of exporting is related to the level of productivity, the firm size, R&D expenditure, the share of university graduates in productive employment, as well as the internationalization of firms. The estimation results obtained for particular countries reveal some degree of heterogeneity. In particular, the firm age is significant only in the last years of our sample.

Introduction

After the collapse of the Soviet Union in 1991 Ukraine emerged as an independent country and followed its own way of economic transition from central planning to a market economy. This way was different from the path followed by Central and Eastern European (CEE) countries which radically liberalized their multilateral and regional trade and integrated successfully with the European Union. The scope of economic and trade

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

liberalization in Ukraine was significantly lower and structural and social reforms were less radical. This resulted in relatively poor economic performance compared to the transition countries which became member of the European Union in three waves of the Eastern Enlargement. As a result of increased integration with the EU firms from these countries gained the access to foreign markets and became the leaders in export activity among the post-transition countries. Given the economic success of these countries Ukraine changed its political orientation towards the West and signed the association agreement with the EU.

The main goal of this paper is to verify to which extent the Ukrainian firms are able to operate in the competitive market environment. In particular, we want to analyse whether the determinants of export performance of Ukrainian firms are similar to those of the firms from CEE countries that are the members of the EU. Therefore, in this paper we study empirically the relationship between labor productivity and exporting of Ukrainian firms, having controlled for other firm characteristics.

The majority of previous studies for Ukraine evaluating the effects of trade liberalization were traditionally based on aggregate trade flows data and gravity models (Movchan et al., 2010, Shepotylo, 2008, Nasadiuk, 2012). However, more recently the attention in the empirical trade literature has switched from the country-level to the firm-level determinants of successful export performance. This kind of empirical evidence for Ukraine is still missing.

Up to now the literature on Ukrainian enterprises based on analysis of firm-level data focused on determinants of long-term productivity. For example, Pivovarsky (2003) analyzed the impact of ownership concentration on the firm performance in Ukraine. Earle et al. (2014), using the panel of 7000 manufacturing enterprises, demonstrated that political favoritism, in the context of weak institutions, can have substantial redistributional impact on economic productivity. Kostenko (2014) confirmed that innovation activity had a positive impact on labor productivity of Ukrainian firms. Yemelyanova (2014) analyzed the impact of ownership structure on the effectiveness of Ukrainian enterprises. This paper contributes to the literature by analyzing the determinants of export performance of Ukrainian firms, focusing on the role of labor productivity.

In contrast to the international trade literature which assumed that firms are symmetric the recent strand in the new trade theory stresses the firm heterogeneity and its effect on export performance. This strand was initiated by Melitz (2003) and Helpman et al. (2004) who relaxed the key as-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

sumption of the firm symmetry in the Krugman (1979, 1980) monopolistic competition model and introduced firm heterogeneity in terms of labor productivity. In the Melitz model (2003) model the relationship between the level of labor productivity and exporting was placed in the center of analysis. This model assumes that productivity differences are exogenously given and each firm has to pay fixed costs of entry into domestic and foreign markets. The model predicts that only the most productive firms with lowest marginal costs can cover the fixed cost of entry and become exporters.

A large number of empirical studies based on firm-level data compiled for many countries confirm the key prediction of the Melitz (2003) model, i.e. that more productive firms self-select into foreign markets. The existing empirical evidence shows that only a small fraction of the most productive firms are responsible for the majority of exports and most firms do not export at all concentrating their activities on domestic markets only.

The extensive summary of recent empirical evidence on the relationship between the productivity and export performance is provided by Wagner (2007, 2012). The importance of the firm productivity for exporting has also been emphasized by the EFIGE (2010) report. In this report it has been demonstrated that firm export performance in several EU countries depends on labor productivity and other firm characteristics. Unfortunately, these studies did not include the post-communist countries with the exception of Hungary.

Similar studies for CEE countries were initiated by Cieřlik, Michałek and Michałek (2012, 2013). In their most recent study, Cieřlik, Michałek and Michałek (2014) included in their analysis the Baltic, Caucasus and Visegrad countries. First, they estimated probit regressions for the pooled dataset that included all three groups of countries, and then they disaggregated the sample into particular country groups to study the differences and similarities between these groups of countries.

Their estimation results obtained for the whole sample indicated that the probability of exporting increases with the higher level of productivity and the measures of human capital, including the share of university graduates in total employment and spending on R&D activities. Moreover, the internationalization of the firms, proxied by the use of foreign technology licenses and the foreign ownership, was found to be positively related to the probability of exporting. Finally, they found that firm size was also a significant variable for the probability of exporting. These results were similar

to the results presented in the EFIGE (2010) report obtained for the firms from the large EU countries.

The estimation results obtained separately for specific country groups revealed a similar pattern in the case of the Visegrad countries and the Baltic states, although a smaller number of explanatory variables were statistically significant. However, in the case of the Caucasus countries only two explanatory variables were statistically significant: the firm size and the R&D variable, while the link between the level of productivity and the probability of exporting was not statistically significant. Thus, the firm size was the only explanatory variable which was statistically significant in the case of all groups of countries. This confirmed the importance of economies of scale for exporting.

Our study is based on the BEEPS firm-level data for the post-transition period starting in 2002 and ending in 2013. In our study we devote specific attention to the role of firm productivity as the main determinant of export performance. In addition, we study the role of other firm characteristics such as the role of foreign capital participation and the use of foreign technology.

The structure of this paper is as follows. In the next section we describe the empirical methodology. Subsequently, we discuss the properties of the dataset. Then we present our empirical results. In the final section we summarize and conclude.

Methodology of the research

In this study we analyse empirically the firm-level determinants of export decisions. In particular, we focus on estimating the theoretical relationship between firm-level productivity and exporting postulated by the Melitz (2003) model in Ukraine. This approach is an equivalent of studying the extensive margin effects. In other words, this means a positive effect on trade through an increase in the number of exporting firms or products exported.

In addition, we take into account other firm characteristics that may affect export performance such as the age and the size of the firm, the use of human capital proxied by R&D spending and the share of university graduates in total employment, as well as the role of foreign and state ownership.

To investigate empirically the relationship between labor productivity and exporting, postulated by the theory, we employ the probit regression, having controlled for the additional firm characteristics. We develop the

following empirical model to investigate the impact of individual firm characteristics on firm export performance. Let Y_i^* be our dependent variable indicating the export status of firm i . According to this model the export status of i -th firm can be related to the set of individual firm characteristics X in the following way:

$$Y_i^* = X_i\theta + \varepsilon_i \quad (1)$$

where the error term ε_i is independent of X_i which is a vector containing explanatory variables that affect exports with the first term equal to unity for all i , θ is the vector of parameters on these variables that needs to be estimated and ε_i is assumed to be normally distributed with a zero mean.

However, instead of observing the volume of exports for a particular firm, we observe only its export status described by the binary variable Y_i^* .

$$Y_i = \begin{cases} 1 & \text{if } Y_i^* > 0 \\ 0 & \text{if } Y_i^* = 0 \end{cases} \quad (2)$$

Hence, the probability whether a particular firm exports ($Y_i^* > 0$), expressed as a function of firm characteristics, can be written as follows:

$$\Pr(Y_i = 1 | X_i) = \Phi(X_i\theta) \quad (3)$$

where $\Phi(\cdot)$ denotes the standard normal cumulative distribution function (cdf).

Data Description

Our study is based on "Bank Business Environment and Enterprise Performance Survey (BEEPS)" data. This dataset is collected jointly by the World Bank and the European Bank for Reconstruction and Development. The main objective of the BEEPS survey is to obtain feedback from enterprises on the state of the private sector. The survey examines the quality of the business environment as determined by a wide range of interactions between firms and the state. The surveys cover manufacturing and services sectors and are representative of the variety of firms according to sector and location within each country. They cover the post-communist countries

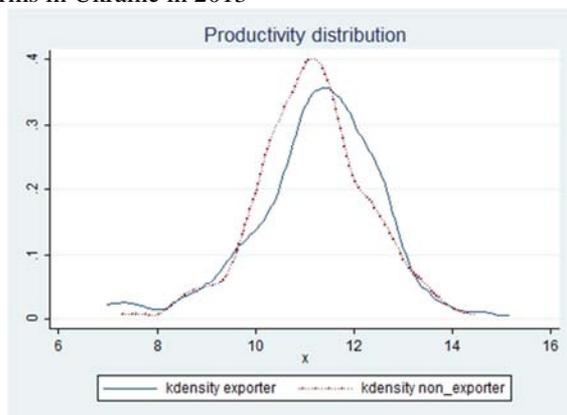
**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

located in Europe and Central Asia (ECA) as well as Turkey. The data were collected for years 2002, 2005, 2009 and 2013.

Our study focuses on Ukraine which along with other Eastern European countries, with the exception of Russia, participates in the Eastern Partnership agreements. The Eastern Partnership works in the framework of the European Neighborhood Policy, which covers the EU's neighbors in the East and South. Moreover, Ukraine has recently signed the association agreement with the EU. This initiatives aim at tightening the relationship between Ukraine and the EU by deepening political co-operation and economic integration.

The export activity is defined as the situation when at least one percent of sales revenue of the firm comes from the sales made abroad. If we apply this benchmark about 20 percent of the analysed Ukrainian enterprises in 2013 were exporting. Data for Ukrainian enterprises for 2005, 2008 and 2013 show that on average exporters have larger productivity compared to non-exporters. On average mean of logarithm of output per full-time worker amounted to 10.11 for exporters and 9.36 for non-exporters in 2005-2013 period. The distribution of productivity in 2013, presented in the Graph 1, shows that the pattern of distribution was similar to that observed in the majority of the EU countries (EFIGE, 2010).

Graph 1. The kernel distribution of logarithms of productivity of exporting and non-exporting firms in Ukraine in 2013



Source: own work.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The key explanatory variables stressed by the Melitz (2003) model – labor productivity is expressed as the total amount of annual sales per full time employee (*productivity*). Other factors that may affect firm export performance include the level of innovation proxied by the R&D spending (*innovation*), the use of license from a foreign firm (*foreign_tech*), the use of imported materials (*import_mat*). We also control for the foreign ownership (*foreign_owned*) and private ownership (*private_owned*), as well as the age of the firm (*firm_age*) and the size of the firm (*firm_size*). In addition, we control for the effects of belonging to particular geographic region in Ukraine (*west, east, north, south and kyiv*) and individual time effects for particular years of our sample.

The detailed descriptions of firm characteristics used in our study are shown in Table 1.

Table 1. Description of variables used in empirical study

Variable Name	BEEP input Name	Description
Export	Based on the sum of d3b (direct exports as the share of total sales) and d3c (indirect exports as the share of total sales)	binary variable, that takes the value 1 if the establishment is exporting and 0 if not
Productivity1	Calculated as $\text{prod}=\log(\text{prod})$ $\text{prod}=\text{d2}/11$	logarithm of productivity expressed as total amount of annual sales per full time employee
Productivity2	Calculated as $\text{prodty2}=\log(\text{prodty2})$ $\text{Prodty2}=(\text{d2}-\text{n2a}-\text{n2e}-\text{n2f}-\text{n2b}-\text{n2ra}-\text{n2rb})/11$	Logarithm of productivity expressed as total amount of value added per full time employee
Firm_size	l1	Logarithm of no. of permanent, full-time employees of this firm at end of last fiscal year
Firm_age	Calculated as difference between the year of survey and year of firm's establishment	Logarithm of number of years since start of operations
Foreign_tech	Based on e6	binary variable, that takes the value 1 if the establishment uses technology licensed from a foreign-owned company and 0 otherwise*
Innovation	Based on h6	Binary variable, that takes the value 1 if the establishment is involved in innovation and 0 otherwise
Private owner-	Based on the sum of b2a	binary variable, that takes the value 1

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

ship	(share of capital owned by private domestic individuals) + b2b (share of capital owned by private foreign individuals)	if the establishment is fully private (both by domestic and foreign individuals) and 0 if the ownership is mixed with the state
Foreign ownership	Based on b2b	binary variable, that takes the value 1 if shares are owned by private foreign individuals, companies or organizations and 0 otherwise
Imp_Mat	Based on d12b	Logarithm of share of foreign material inputs or supplies in all material inputs and supplies

*For 2005 data foreign_tech indicates whether a firm obtained a technology license and for 2008 and 2013 dataset foreign_tech variable denotes whether a company obtained a license from a foreign-owned firm

Source: BEEPS dataset.

Estimation results

In this section we discuss our estimation results for Ukrainian firms. The estimation results obtained from the probit regression are reported in Table 2.

Table 2. Estimation Results for Ukraine (separate years and pooled, logarithm, 1st type of productivity)

VARIABLES	2002	2005	2008	2013	2002-2013 pooled
	(1)	(2)	(3)	(4)	(5)
Productivity1	.1297336 (1.84*)	.1179986 (1.53)	.2263101 (3.49***)	.1321429 (2.12**)	0.139104 (4.74***)
firm_size	.7035328 (4.00***)	.4347147 (2.20**)	.5312628 (7.09***)	4359668 (6.96***)	.4864285 (11.85***)
age	-.0043056 (-0.04)	.091018 (0.53)	.1765472 (1.36)	.1583597 (1.16)	.0959625 (1.63)
foreign_tech	-.3694898 (-1.87*)	-.088718 (-0.42)	.6276513 (2.95***)	.4910174 (2.63***)	.1921729 (2.00**)
innovation	.3915163 (2.49**)	.7003084 (2.46**)	.3626654 (1.56)	.6576011 (2.51**)	.5206947 (4.97***)
Foreign ownership	.1919814 (0.97)	.4867075 (2.11**)	.5592494 (1.84*)	.5166891 (1.82*)	.393798 (3.44***)
Imp_Mat	.0103082 (2.09**)	-.0015799 (-0.32)	.0173807 (2.89***)	.0207036 (3.87***)	.0111286 (4.42***)

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

South			.5148726 (1.67*)	-.1753995 (- 0.69)	
North			.6053601 (2.10**)	.3004525 (1.26)	
East			.3255024 (0.99)	-.2794832 (- 1.23)	
West			.4619815 (1.61)	-.3377126 (- 1.46)	
2002					1.90195 (7.83***)
2005					1.687312 (7.35***)
2008					-.2165268 (-1.85*)
Constant	-1.93362 (-5.44***)	-2.358959 (-3.94***)	-6.096864 (-6.38***)	-3.889579 (-4.86***)	-1.93362 (-5.44***)
Number of Observations	374	439	321	530	1664
Log likelihood	-168.78959	-163.6163	-113.58987	-219.78917	-693.23025
Pseudo R2	0.1866	0.1431	0.4121	0.2469	0.2246

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: own estimations based on the BEEPS data.

In column (1) we display the estimation results for 2002 obtained from the specification that includes the labor productivity variable (*lprod*), having controlled for additional firm-level determinants of export activity mentioned in other studies. These include the size of the firm (*firm_size*), the age of the firm (*firm_age*), imported materials (*Imp_Mat*), the dummy variables for innovation (*innovation*), the use of foreign technology (*foreign_tech*), and the foreign ownership (*foreign_owned*). The dummy variable on private ownership was eliminated from the estimation due to the statistical insignificance of the estimator in various model specifications.

The estimated parameter on the labor productivity variable displays a positive sign but it is statistically significant only at the 10 per cent level. This result weakly confirms the link between the level of productivity and the probability of exporting predicted by the theory in the case of Ukraine. Moreover, the majority of our control variables are statistically significant. The exceptions are foreign ownership and firm age.

In column (2) we show the estimation results for 2005. These results are different from the results reported in column (1) in a number of ways. In

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

particular, the estimated parameter on the labor productivity variable is no longer statistically significant. The same applies to foreign technology and imported materials estimators. Moreover, the estimated parameter on the foreign ownership variable displays the expected positive sign and becomes statistically significant at the 5 per cent level.

In columns (3) and (4) we report the results for the most recent years 2008 and 2013 and in addition we control for the geographical location of firms. It turns out that the geographical location of firms is only weakly statistically significant in the case of 2008 and not significant in 2013. The estimated parameters on the remaining variables are statistically significant in both years with the exception of firm age which is not significant at all and innovation which is significant only in the most recent year 2013.

In column (5) we report estimation results based on the largest number of observations obtained from the pooled regression covering the period 2005-2013 and controlling for individual time effects by including time dummies for specific years. These results show that the productivity variable is statistically significant already at the 1 per cent level. This result confirms the major prediction of the theory regarding the link between firm productivity and exporting. All control variables are statistically significant, at least the 5 per cent of statistical significance, with the exception of the firm age variable. The sensitivity tests of based on the alternative measure of productivity are reported in Table 3 in the Appendix. These results confirm the existence of a positive link between productivity and exporting only for the most recent year of our sample.

Conclusions

In this paper we investigated the determinants of export activity of firms in Ukraine. The study was based on firm level data for the period starting in 2002 and ending in 2013. Our empirical results obtained for particular years revealed significant degree of heterogeneity among them. In particular, the estimation results indicate that the probability of exporting increases with the higher firm productivity, having controlled for other explanatory variables which is in line with predictions of the theory. However, this relationship is more pronounced in more recent years of our sample. This means the Ukrainian firms are becoming similar to the firms operating in Central and Eastern European countries that joined the European Union.

Moreover, the probability of exporting was positively related to a number of firm-level characteristics such as the firm size, foreign ownership,

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

the use of foreign technology, innovation and imported materials. These results allow us to formulate a number of policy recommendations for the development of the export promotion strategy for the Ukrainian authorities. In particular, the export competitiveness of Ukrainian firms can be improved by further liberalization and internationalization of the Ukrainian economy within the framework of the EU Association Agreement. In particular, this can be achieved by attracting more foreign direct investment, more intensive use of foreign technology and imported materials. Foreign direct investment can not only directly affect export performance of firms with the participation of foreign capital but can also generate the whole range of positive spillovers onto domestically-owned firms.

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Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

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Appendix

Table 3. Estimation Results for Ukraine (separate years and pooled, logarithm, 2nd type of productivity)

VARIABLES	2008	2013	2008-2013 pooled
productivity	.0782875 (1.49)	.1058661 (2.25**)	0922169 (2.56*)
firm_size	.5196913 (7.05***)	.4190063 (6.22***)	.4491626 (9.06***)
Age	.0918765 (0.72)	.1535283 (1.08)	.1228141 (1.29)
foreign_tech	.5927411 (2.72***)	.5463049 (2.61***)	.5721563 (3.82***)
innovation	.4415263 (1.84*)	.8433279 (3.09***)	.571874 (3.18***)

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

foreign	.4637448	.4536422	.5598686
	(1.56)	(1.44)	(2.58*)
Imported Materials	.016788	.0238208	.0212988
	(2.74***)	(4.24***)	(5.08***)
South			.111315 (0.51)
North			.4909383 (2.49**)
East			.0337709 (0.17)
West			.0120383 (0.06)
2005			-.2484382 (-1.78*)
Constant	-3.763467	-3.525463	-3.546842
	(-5.28***)	(-5.69***)	(-7.33***)
Number of Observations	278	468	746
Log likelihood	-105.85922	-190.76226	-293.42599
Pseudo R2	0.3815	0.2418	0.3103

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: own estimations based on the BEEPS data.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
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Mezzanine as an Alternative Form of Corporate Financing

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Keywords: *Corporate Finance; Mezzanine Financing*

Abstract: The main goal of the article is the assessment of mezzanine financing as an innovative form in Poland, which might play a significant role in the dynamically developing companies which can't obtain sufficient capital from traditional sources in the form of bank credits. Mezzanine may be applied to: financing investment projects, increasing the value of the company, the expansion of businesses through mergers and acquisitions, redemption of shares or the financing of leveraged buyouts. The main methodology used in this article is explanatory research and comparative analysis. The hypothesis assumes that mezzanine financing may become an important alternative source of funding for medium and large sized enterprises in Poland.

This article presents the idea of mezzanine financing, its mechanism, structures and comparison to alternative funding, examples of such transactions costs. An important part is indication of types of mezzanine capital and applications in the USA, the UE including Poland as well as comparative analysis of advantages and disadvantages of mezzanine.

Introduction

Mezzanine financing can be a good and alternative form of effective financing of medium and big companies in Poland. It is a new form in our country and is worth popularizing. Financial sponsors will seek to use mezzanine capital in a leveraged buyout. Using mezzanine capital can potentially enhance the private equity of firm's investment returns. Especially, medium-sized companies may need a flexible, private mezzanine capital.

Mezzanine financing allows a company to raise money without selling more common stock and without issuing more corporate debt. This is done by combining the two in financial instruments which can be converted into corporate equity if the debt is not paid back within the specified period of time. This type of debt is also subordinated to the debt provided by senior lenders such as banks and venture capitalists (*Mezzanine Financing Example*, 2014). Mezzanine can be a flexible, effective form of corporate financing. However, it is usually more expensive than bank credits, but cheaper than other sources of capital, eg. the investor's own resources.

Methodology of the research

The methodology used in this article is the systematic, theoretical analysis of mezzanine financing and deductive method. First of all, it is explanatory research, which elaborates the relationships between study variables without knowing their final applications. It is conducted to show possible applications, costs and mechanisms. Moreover, it is comparative analysis of advantages and disadvantages of mezzanine financing.

The idea of mezzanine

Mezzanine financing is a hybrid between debt and equity financing. For instance, in the case of multi-tiered financing of an operation the sources of money will be senior debt, senior subordinated debt, subordinated debt, *mezzanine debt*, and finally the owner's own equity (*Mezzanine financing*, Encyclopedia, 2014). It is a type of debt financing whereby a company issues debt that the holders may convert into equity if the debt is not repaid in due course (*Mezzanine Financing*, Farlex Financial Dictionary, 2012).

Mezzanine financing is basically debt capital that gives the lender the rights to convert to an ownership or equity interest in the company if the loan is not paid back in time and in full. It is generally subordinated to debt

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

provided by senior lenders such as banks and venture capital companies. Since mezzanine financing is usually provided to the borrower very quickly with little due diligence on the part of the lender and little or no collateral on the part of the borrower, this type of financing is aggressively priced with the lender seeking a return in the 20-30% range (*Mezzanine Financing*, Investopedia US, 2014). This debt carries a high interest rate, as there is little or no collateral, but it is low-risk compared to other forms of debt financing because of its convertibility (*Mezzanine Financing*, Farlex Financial Dictionary, 2012).

Mezzanine financing is listed on a company's balance sheet as an asset; some companies use mezzanine financing because it makes it easier for them to obtain financing from other sources (*Mezzanine Financing*, Farlex Financial Dictionary, 2012). Mezzanine financing is advantageous because it is treated like equity on a company's balance sheet and may make it easier to obtain standard bank financing. To attract mezzanine financing, a company usually must demonstrate a track record in the industry with an established reputation and product, a history of profitability and a viable expansion plan for the business (*Mezzanine Financing*, Investopedia US, 2014). Mezzanine financings can be structured either as debt (typically an unsecured and subordinated note) or preferred stock.

Mezzanine financing is a loan to the owner with terms that subordinate the loan both to different levels of senior debt as well as to secured junior debt. But the mezzanine lender typically has a warrant (meaning a legal right fixed in writing) enabling them to convert the security into equity at a predetermined price per share if the loan is not paid on time or in full. Many variants exist, obviously, the most common is that some money is paid back as equity. Being unsecured and highly subordinated, mezzanine financing is very expensive, with lenders looking for 20% returns and up. Major sources of mezzanine financing include private investors, insurance companies, mutual funds, pension funds, and banks (*Mezzanine financing*, Encyclopedia, 2014).

The mezzanine mechanism

Financing programs or acquisitions by this mechanism typically involve some combination of lending by the source of money and provision of equity by the borrower. The special case is one in which the lender lends cash and gets a warrant to convert the loan, or a part of it, to stock either any time at the lender's option or in the case of partial or complete default.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Chiefly, the following conditions prevail: a sum of money changes hands. Most of it is lent to the borrower at an interest rate but some of it is in the form of a favorable sale of equity. In addition, there may also be a warrant for the lender and restrictive covenants under which the lender is further protected. The loan will typically ensure an interest rate well above the prime rate and will be for a period of four to eight years (*Mezzanine financing*, Encyclopedia, 2014).

In the ideal case, the mezzanine financier anticipates earning a high interest on the loan and rapid appreciation of the equity they have acquired (or can acquire at a low price with the warrant). Mezzanine financing is typically used in acquisitions based on leveraged buyouts in which all of the investors, not least the mezzanine financier, anticipate cashing out by taking the business public again and refinancing it after the acquisition. Thus, the equity can be turned into cash with a substantial gain on the capital. In case of a failure, the mezzanine lender has little recourse except to influence the company's turnaround by using its stock acquired by means of the warrant. The borrower turns to mezzanine lenders because they cannot acquire capital by other means for lack of collateral or because their finances cannot attract less expensive lending. The price of the money, naturally, is high due to high rates of interest, but the owner is betting on being able to repay the loan without yielding too much control (*Mezzanine financing*, Encyclopedia, 2014).

Structures of mezzanine financing

Mezzanine financing can be completed through a variety of different structures based on the specific objectives of the transaction and the existing capital structure at the company. The basic forms used in most mezzanine financings are subordinated notes and preferred stock. Mezzanine lenders, typically a specialist of mezzanine investment funds, look for a certain rate of return they can receive.

Mezzanine contains characteristics of both debt and equity. As a loan instrument, mezzanine capital is ranked behind senior debt in terms of security and cash payments, both interest and principal. As a result, it will demand a higher return than senior debt (*Mezzanine capital*, Mezzanine Management Central Europe, 2008). Table 1. summarizes the basic characteristics of the three main types of financing.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 1. Main characteristics of major types financing compared to the mezzanine in Poland

Description	Credit	Mezzanine	Own resources
In the economic sense	capital	debt	capital
In the legal sense	debt	capital	debt
Acceptable risk	low medium	high	very high
The expected return on capital	5%-11%	14%-21%	25%-35%
The term return on capital	over the funding	at the end of the funding (fixed term)	at the end of funding (term is not fixed)
Tax implications	interests are expense	interests are deductible tax cost	no tax shield
The ability to customize	small (rigid standards)	high	high

Source: (*Mezzanine – co to jest?* 2013).

Mezzanine is form between equity capital and external capital, although it is a debt. Table 2. presents the internal and external financing, which the company can use.

Table 2. Mezzanine compared to other forms of company's financing

Types of funding			
Internal financing		External financing	
<i>Funds from the company</i>	<i>Means of equity release</i>	<i>Equity</i>	<i>Foreign capital</i>
<ul style="list-style-type: none"> • retained earnings, creating long-term reserves, the acceleration of capital turnover • amortization • reimbursement of advances 	<ul style="list-style-type: none"> • sale of redundant assets • the intentional use of a margin pricing 	<ul style="list-style-type: none"> • capital of the original owners (shares, stocks, equity contributions), subsidiaries shareholders, partners, investors • capital of the new owners - share issue • share premium - capital raised from the sale of shares above the nominal value • grants, subsidies • owners' loans • buying out of debt, factoring, forfeiting • venture capital • private equity • public issue (first & secondary offering) 	<ul style="list-style-type: none"> • credits and loans • issuance of debt securities • leasing • franchising • trade credits (suppliers, customers -advance payment for deliveries) • financing by creditors • issuance? of bonds • hybrid financing - equity financing by donors on behalf of owners and creditors
		Mezzanine financing, including: <ul style="list-style-type: none"> • subordinated loans with warrants to purchase shares • convertible bonds 	

Source: own study based on: (Ickiewicz J. 2004, 30; Trocki M. 2007, 22; Panfil M. 2008).

The costs of mezzanine

To provide a mezzanine security, the company and lender work together to avoid burdening the borrower with the full interest cost of such a loan. Because mezzanine lenders will seek a return of 14% to 20%, this return must be achieved by means of the other than simple cash interest¹ payments. As a result, by using equity ownership² and PIK interest³, the mezzanine lender effectively defers its compensation until the due date of the security or a change in the company control. Mezzanine lenders will also often charge an arrangement fee.

In addition to high interest rates, mezzanine lenders can convert their loan to equity or ownership if the company defaults on the loan. (*The Private Equity Book*, 2014, 69).

Although mezzanine financing costs are higher than bank credits, it may not largely burden the company. The part of the cost is paid by the company in the form of interest paid periodically or at the end of the funding period, whereas the rest - may be covered by the owners through the issuance of stock options or shares of the company (such as warrants) or other release to participate in profits of the company.

Applications and types of mezzanine capital

In leveraged buyouts, mezzanine capital is used in conjunction with other securities to fund the purchase price of the company being acquired. Usually, mezzanine capital is used to fill a financing gap between less expensive forms of financing (e.g. senior loans, second lien loan, high yield financings) and equity.

¹ *Cash interest* - a periodic payment of cash based on a percentage of the outstanding balance of the mezzanine financing. The interest rate can be either fixed throughout the term of the loan or can fluctuate (i.e. float) along with LIBOR or other base rates.

² *Equity Ownership* - along with the typical interest payment associated with debt, mezzanine capital will often include an equity stake in the form of attached warrants or a conversion feature similar to that of a convertible bond. The ownership component in mezzanine securities is almost always accompanied by either cash interest or PIK interest, and, in many cases, by both.

³ *PIK interest* - Payable in kind interest is a periodic form of payment in which the interest payment is not paid in cash but rather by increasing the principal amount by the amount of the interest (e.g., a \$100 million bond with an 8% PIK interest rate will have a balance of \$108 million at the end of the period, but will not pay any cash interest).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Mezzanine loans have three typical uses, according to a real estate attorney George Blackburne III (Baker M., 2014):

- The first one is to finance new construction projects, in the case of which the mezzanine loan supplements the loan from the commercial construction lender to lower the amount of money the developer must put up.
- The second use is for business owners with mortgage debt to gain access to capital when the terms or penalty of their mortgage prevents refinancing.
- The third use is a value-added deal, what means that investors can use mezzanine loans for property improvements, and because such improvements immediately increase a property's value, mezzanine lenders are willing to offer loans with a high loan-to-value ratio.

Mezzanine successfully are also used to (*Mezzanine – szansą dla przedsiębiorstwa*, mBank, 2013):

- support the expansion of the company through mergers and acquisitions,
- increasing the company's value before selling its shares on the stock exchange (IPO - Initial Public Offering or SPO - Secondary Public Offering),
- financing investments, which significantly affect the company's potential,
- repurchase shares from a shareholder who has decided to leave the company,
- financing leveraged buyouts (LBOs), including the company's buyout by managers (MBO - management buyout or MBI - management buy-in).

Mezzanine financing is used by business operators in both fast-growing and stable sectors, working in the markets of developing countries and developed countries. It is used by medium-sized companies, reaching revenues of tens of millions of PLN, as well as transnational giants, whose turnover is measured in billions of USD (*Mezzanine – szansą dla przedsiębiorstwa*, mBank, 2013). Mezzanine financing with loans are often used by private equity funds. They use debt instruments to significantly increase their return on investment and optimize investment risk. Entities that can receive mezzanine financing can be divided into two groups (*Komu mezzanine a komu nie...*, mBank, 2013):

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

- medium and big companies with a good financial standing, credit capacity which is not sufficient for the implementation of all investment plans,
- entities that intend to acquire companies in a good financial situation.

Mezzanine lending is a popular option for landlords, gas station owners, and virtually any other type of commercial property owner (Smith E., 2011). In real estate finance, mezzanine loans are often used by developers to secure supplementary financing for development projects (*Mezzanine Finance*, 2011).

The provider loans money on a second or even third mortgage basis and may either take an ownership interest in addition or may reserve the right to take over an ownership interest if the loan is not paid on time and in full. Because of the subordinate nature of the debt, the risky nature of the activities being funded by the money, and the lack of time to perform due diligence, mezz lenders usually want a high return on their money, in the 20 to 30 percent range (Evans D. L., Evans JD & O. W., JD, 2007).

Mezzanine lending dates back to the 1980s, when most providers were savings and loan associations and insurance companies, according to Bond Capital. Since then, many other types of players have entered the arena: limited partnerships, hedge funds, pension funds and leveraged public funds. Some banks also have established mezzanine lending practices (Baker M., 2014).

Originally developed in the North American market, mezzanine capital is an established finance instrument in the European capital markets. In Central and Eastern Europe, mezzanine capital has emerged from being a niche financing tool used in a limited number of deals to a mainstream, widely used form of leveraged finance and growth capital. In recent years the demand for mezzanine capital has seen a constant increase. Given its advantages as a financing tool including smaller size, lower structuring costs and higher flexibility, mezzanine has become a favourite subordinated debt instrument in Central and Eastern Europe (*Mezzanine capital*, Mezzanine Management Central Europe, 2008).

Mezzanine loans are complex, requiring heavy lifting by lenders who must sort through relevant property and entity documents. As such, lenders usually require mezzanine loans to have a principal of at least \$2 million, according to Katharine Noble of the law firm Jones, Waldo, Holbrook&McDonough. Lenders will also consider mezzanine loans only for large projects, usually at least \$10 million, according to Blackburne. About 150

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

mezzanine lenders operate in the United States alone as of 2010 (Baker M., 2014).

Typically, mezzanine financing is used for buyouts, recapitalizations, or acquisitions, and the amount of the debt often ranges from about \$5 million to \$25 million. Mezzanine debt also may incorporate stock warrants. Mezzanine financing may be used in the venture capital industry to describe a funding for a company that is beyond the start-up stage but is not yet ready for an initial public offering (*Mezzanine - Investment & Finance Definition*, 2010).

In 2008 mezzanine financing became an attractive alternative solution in the banking crisis as credit froze and obtaining loans became increasingly difficult. That largely explains why mezzanine debt was so popular over the last few years. (*The Private Equity Book*, p. 78).

In Poland, an international corporation Mezzanine Management (Poland) Sp. z o.o is specialized in these services. The examples of portfolio companies in Poland are: Lux-Med Sp. z o.o. - Warsaw (medical services), Solaris Bus and Coach S.A. - Bolechowo (production of buses), Zaberda S.A. - Wrocław (horizontal and vertical road signs) (*Mezzanine Management Poland Sp. z o.o.*, 2014). Moreover, mezzanine lending is mainly engaged in private equity funds (eg. Accession Mezzanine Capital - mezzanine fund⁴, Intermediate Capital Group). Banks such as mBank S.A. are beginning to come out with this offer.

The typical transactions, where mezzanine is used, financed by mBank include: transactions of mergers or acquisition, platform financing, replacement of the investor, recapitalization. mBank provides mezzanine for a period of 1 year to 7 years, and the amount of available financing in this form should be not less than PLN 5 million and not more than PLN 90 million (*Oferta mezzanine mBanku*, mBank, 2013).

⁴ AMC provided the loan with warrants of direct purchase shares or stocks in the following companies: Zaberda S.A., Lux-Med Sp. z o.o., Solaris Bus & Coach S.A.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 3. The pros and cons of mezzanine

Advantages	Disadvantages
<ul style="list-style-type: none"> • The owner rarely loses outright control of the company or its direction. Provided the company continues to grow and prosper, its owners are unlikely to encounter any interference from the mezzanine lender. • The method offers a lot of flexibility in shaping amortization schedules and the rules of borrowing on one's own, not least specifying special conditions for repayment. • Lenders willing to enter the world of mezzanine financing tend to be long-term investors rather than people expecting to make a fortune in a fast way. • Mezzanine lenders can provide valuable strategic assistance. • Mezzanine financing increases the value of stock held by existing shareholders although mezzanine equity will dilute the value of the stock. • Mezzanine financing provides business owners with the capital they need to acquire another business or expand into another production or market area. • Partner negotiations between the company and the financial institution can take a few weeks to finalize the financing transaction. • Mezzanine financing is cheaper than funding by the stock exchange. There are incurred advertising costs associated with the public distribution of shares, printing and publication of the prospectus, public charges, charging exchange fees, deposit and subsequent disclosure obligations. • In contrast to the funds acquired through the public market, there is no publicity obligations, detailed financial statements or the need to inform the public about the plans, events or prognoses of the company. The company can therefore pursue selected investment project, lead and implement the results of its own research and development activities or growth strategy without the need to inform about all other market participants including competition. 	<ul style="list-style-type: none"> • Mezzanine financing may involve loss of control over the business particularly if projections do not work out as envisioned or if the equity part of the borrowing is high enough to give the mezzanine lender a larger share. • Subordinated debt agreements may include restrictive covenants; which may include requirements that the borrower is not to borrow more money, refinance senior debt from traditional loans, or create additional security interests in the company's assets; covenants may also force the borrower to meet certain financial ratios - e.g. cash flow to equity. • Similarly, business owners who agree to mezzanine financing may be forced to accept restrictions in how they spend their money in certain areas, such as compensation of important personnel (in such instances, a business owner may not be able to offer above-market packages to current or prospective employees). In some cases, business owners have even been asked to take pay cuts themselves and/or limit dividend payouts. • Mezzanine financing is more expensive than traditional or senior debt arrangements. • Arranging for mezzanine financing can be an arduous, lengthy process. Most mezzanine deals will take at least three months to arrange, and many will take twice that long to complete. • Mezzanine capital is often a more expensive financing source for a company than secured debt or senior debt. The higher cost of capital associated with mezzanine financings is the result of it being an unsecured, subordinated (or junior) obligation in a company's capital structure (i.e., in the case of default, the mezzanine financing is only repaid after all senior obligations have been satisfied). • Mezzanine financings, which are usually private placements, are often used by smaller companies and may involve greater overall levels of leverage than issues in the high-yield market; as such, they involve additional risk. In compensation for the increased risk, mezzanine debt holders require a higher return for their investment than secured or more senior lenders.

Sources: own study based on: (*Are Hedge Funds Squeezing Out the Mezzanines?*, 2005; Boadmer D. 2006; De Brauwere D. 2006; Hoogesterger J. 2000; *Leverage Buyout* 2006; *Mezzanine a giełda* 2013; *Mezzanine capital* 2014; *Mezzanine Financing* 2006; Miller A. 2006; Sinnenberg J. 2005).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

In countries with developed capital market instruments, mezzanine diversity is the greatest (e.g. the United States, the United Kingdom, Germany). The most popular instrument of the mezzanine are subordinated loans (called junior debts), which are different from the usual loans (called senior debts) that the amounts of due are met in the final order in case of liquidation or bankruptcy of the debtor. These loans can also give the right (warrant) to purchase new shares or stocks. Another instrument for mezzanine are convertible bonds and bonds with warrants. In return for lower operating costs of the current bonds (lower the coupon or interest) the issuer allows to participate in equity, at the convertible bonds - conversion of bonds into shares - while the bonds with warrants - purchase of shares at a given price (Panfil M., 2008). In table 3. advantages and disadvantages are presented.

Conclusions

Mezzanine financings is the next stage of financing that follows venture capital financing, which can be completed through a variety of different structures based on the specific objectives of the transaction and the existing capital structure in place at the company. Mezzanine financing is advantageous, because on the balance sheet of a company it is treated like equity and may make it easier to obtain standard bank financing. It is typically used to finance the expansion of existing companies.

Additionally, mezzanine financings, which are usually private placements, are often used by medium companies and may involve greater overall levels of leverage than issues in the high-yield market; as such, they involve additional risk. Mezzanine financing is sometimes associated with leveraged buyouts.

Mezzanine loans are a risky but potentially high-yield way for lenders to provide established developers and business owners with capital. For borrowers, the loans provide a source of capital for new projects or expansions. They are a relatively new but quickly growing form of debt.

Mezzanine financing usually gives the lender the right to either ownership of the company or an equity interest in the company if the loan is not repaid. It is typically used by expanding companies that need money but don't want to go public and risk losing ownership of the company.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

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18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
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**World Trade and Regional Trade Orientation
in the Context of Forthcoming Transatlantic
Trade and Investment Partnership**

JEL Classification: *F14; F15*

Keywords: *international trade; the European Union; the United States; TTIP*

Abstract: We analyse potential consequences of the forthcoming Trade and Investment Partnership between the European Union and the United States (TTIP) for trade orientation of both partners. We do it with the short analysis of the characteristics of the third wave of regionalism and the TTIP position in this process as well as the dominant role of the EU and the U.S. in the world economy – especially – in the world trade. Next we study trade orientation of the hypothetical region created in result of TTIP. We use regional trade introversion index (RTII) to analyze trade between the EU and the U.S. that has taken place until now to get familiar with the potential changes caused by liberalization of trade between both partners. We analyze RTII for mutual trade of the EU and the U.S. than we apply disaggregated data to analyze and compare selected partial RTII (e.g. for trade in final and intermediate goods as well as goods produced in the main sectors of economy like agriculture or manufacturing).

Introduction

We analyse¹ potential consequences of the forthcoming Trade and Investment Partnership between the European Union and the United States (TTIP) for trade orientation of the region containing both partners. On one hand, we treat TTIP as a typical regional trading agreement (RTA) representing the third wave of regionalism (two geographically distant parties located on the different continents, the expected scope of the agreement going far beyond liberalisation of trade in goods). On the other hand, we acknowledge the parties' particular characteristics (both are among the strongest actors in the world economy and politics; both are centers). We see TTIP as the first approach of leading developed countries to cope with the growing economic and political power of developing countries (especially China, in this paper presented via APTA as China belongs to this RTA). We see TTIP as well as an initial agreement on the way of constructing RTA connecting the EU and NAFTA.

In this paper we analyse all RTAs with the constant number of members (number for year 2012). Consequently, we treat APTA as containing China over all analysed period. Moreover, we analyse the EU with 27 Member States. We name it without giving the number of participants and we are aware of the fact that the EU did not consist of members over the whole period of the analysis². However, 1999 (the starting year of this analysis and the year of the Euro Zone (EZ) establishment) all 27 states were tied at least with free trade area agreements (FTA). In some cases trade liberalization didn't cover "substantially all trade" as GATT/WTO stipulated. For example, in many cases agricultural products and other sensitive goods (such as textiles, chemicals) were at least partly excluded from free trade. Even if we take these facts into account, these 27 states started process of institutionalized integration long before they became members of the EU. It justifies the beginning of the empirical analysis in the time before their EU-membership.

The aim of this paper is to analyse the TTIP impact on international trade in the whole world as well as in both trading partners. We do it with

¹ Elzbieta Czarny's participation in this project is funded by National Science Centre of Poland on the basis of the decision No. DEC-2013/09/B/HS4/01488.

² In the first years of analysis the EU consisted in 15 Member States. The next 10 states (Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia and Slovenia) accessed the EU in May 2004. Bulgaria and Romania followed in 2007 completing the EU-27.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

the short analysis of the dominant role of both partners in the world economics and politics as well as of the characteristics of the third wave of regionalism and TTIP position in this process. We implement openness indexes of both trading partners to prove their involvement in international trade. Then we study trade orientation of the hypothetical region created in the result of TTIP. We use regional trade introversion index (RTII) to describe trade between the EU and the U.S. that has taken place until now and to get familiar with the potential changes caused by liberalization of trade between both partners in bilateral as well as in global trade streams. We analyze RTII for the whole mutual trade between the EU and the U.S. and we also apply disaggregated data to analyze and compare selected partial RTII (e.g. for trade in final and intermediate goods as in the BEC classification as well as in agricultural, manufactured and mineral products according to the SIC nomenclature). Our empirical analysis covers the period 1999–2012. For all analyses we apply the current prices. We point out that TTIP will be important not only for its participants but for the whole world economy.

Apart from methodological paragraph, the rest of the paper is organized as follows. Firstly, we analyse TTIP in the world economy as a part of the current (third) wave of regionalism. Secondly, we study economic potential and wealth of the EU, and – for comparison reason – of NAFTA and the selected other RTAs as well as of the U.S. to prove impact of TTIP on the further international economic co-operation. Thirdly, we analyze openness of both TTIP participants and regional trade orientation of the region created by the EU and the U.S. Conclusions complete our study.

Methodology of the research

In paper we use simple analysis of statistics and indexes concerning openness and regional trade orientation. Firstly, sum of export and import divided by GDP and is trade openness index. Secondly, we use the regional trade introversion index (RTII) first proposed by Iapadre (2006). This index allows measuring the relative intensity of regional trading versus trading with the outsiders. The RTII can range from –1 to 1 and is independent of the region's size as it applies relative values. Moreover, RTII is sensitive on the differences among the partners in one RTA. The relatively high values of this index are expected in the RTAs containing countries with the similar economic potential. If potential of the member states differs, the small partners can't reach trade intensity expected for the big ones and pull the index

down. The index rises (or falls) only if the intensity of intraregional trade grows more (or less) rapidly than that of extraregional trade. If the index is equal to zero, then the region's trade is geographically neutral (it grows similarly in the intraregional as well as in extraregional terms). If the index is a positive number, the region's trade has an intraregional bias (if $RTII = 1$, all region's trade is intraregional). If $RTII$ is less than zero, then the region's trade has an extraregional bias (if $RTII = -1$, all trade of the analyzed region is extraregional). The formula for the regional trade introversion index is:

$$RTII_i = (HI_i - HE_i) / (HI_i + HE_i)$$

$$HI_i = (T_{ii}/T_i) / (T_{oi}/T_o)$$

$$HE_i = (1 - (T_{ii}/T_i)) / (1 - (T_{oi}/T_o))$$

where:

T_{ii} = exports of region i to region i plus imports of region i from region i ,

T_i = total exports of region i to the world plus total imports of region i from the world,

T_{oi} = exports of region i to outsiders plus imports of region i from outsiders,

T_o = total exports of outsiders plus total imports of outsiders.

TTIP in the third wave of regionalism

TTIP is to be seen against the background of the progress of discriminatory liberalization of economic cooperation and the deadlock in the non-discriminatory negotiations within the World Trade Organization (WTO). Nowadays multilateral negotiations under auspices of WTO are more complex than in the past. The reason is growing number of the negotiations' participants. Moreover, the negotiations cover a broad range of subjects, including not only trade liberalization but also issues such as environment and intellectual property protection. They are accompanied by the conviction that, because of the expected benefits, the developed countries are predominantly interested in the adoption of further agreements, while the developing ones will suffer losses after their conclusion, at least in the form of the lack of potential profits. These objections became particularly loud after the successful conclusion of the Uruguay Round of GATT in 1995.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

As the prospects for global cooperation and success of the following round of multilateral negotiations are unclear, many countries and groups of countries are looking for alternative forms of international cooperation. The result is enhancement of regional integration allowing its participants to strengthen ties with their closest economic partners and to benefit without bearing costs of multicultural worldwide cooperation. Homogeneity of collective subjects of international relations (e.g. EU or NAFTA) helps to reduce internal transaction costs. Regional economic integration begins often in form of preferential (discriminatory) trade agreements concluded by the countries and groups of countries (more see Czarny et. al., 2010, pp. 126-128). All gains of economic integration are expected after the conclusion of TTIP as well.

The process of regional integration is called regionalism. It is defined as a process of uniting economic potentials of at least two countries/regions in order to maximise intensity of economic cooperation. The main symptom of regionalism is establishing regional groups of states and international organizations (within their competences). Members of these groups enjoy free internal trade as well as – eventually – free internal movement of production factors and economic policy coordination.

Of special interest are regional groups with participation of the WTO members. WTO member states are obliged to obey Organization's *acquis* (primary and secondary laws), including prohibition of discrimination as the foundation of multilateral trade system specified by the Most Favored Nation (MFN) and National Treatment (NT) clauses³. Basic rules of regional trading agreements are not compatible to the MFN and NT clauses. Preferences granted to the RTA's members are different from those enjoyed by the third parties⁴.

The first modern regional agreements were established within the normative scope of GATT Article XXIV already in the 1940's. RTAs have

³ Rules regarding MFN (for trade in goods as well as in services and copyrights) are covered by GATT Article I, GATS Article II and TRIPS Article IV. NT clause is regulated by GATT Article III, GATS Article XVII and TRIPS Article III.

⁴ Deviation from WTO general rules is permitted by GATT Article XXIV, agreements on interpretation of GATT Article XXIV, Enabling clause and GATS Article V. Article XXIV of GATT provides for free trade area (FTA) and customs union (CU) principles and regulates discriminatory liberalization of trade in goods. GATS Article V regulates international trade in services. The Enabling clause allows developed countries to enter RTAs and confer preferences in trade with developing countries. This clause makes it possible for developing countries to conclude agreements for intensification of their mutual trade.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

been booming during the current wave of regionalism started in 1995⁵ and lasting till today. Nowadays there are valid hundreds of binding bi- and multi-lateral RTAs⁶. As of 15 June 2014, some 585 notifications of RTAs (counting goods, services and accessions separately) had been received by the GATT/WTO. Of these, 379 were in force (see WTO, www.wto.org/english/tratop_e/region_e/region_e.htm accessed on 03.08.2014).

Initially regional agreements were of multilateral character. Currently bilateral agreements gain importance. They accounted for the majority all RTAs notified, in force and under negotiations (for the historical data see: Fiorentino et. al., 2009). In 2010 more than a half of RTAs in force (about 160 out of ca. 290) were bilateral (World Trade Report, 2011, p. 60). The basic reasons for the smaller popularity of the multilateral agreements are difficulties with their implementation arising from earlier political obligations of potential members who already accessed one or more RTAs.

In the past, mainly countries of the same geographical region (neighbouring countries) were those cooperating the most intensely, what was sanctioned in MFN clause. Gradually regional agreements have become the

⁵ Regional integration process taking place since the GATT establishment is referred to as the first wave of regionalism. In the second half of the 1980's started the second wave of regionalism (one of its main characteristics is participation of the U.S. in the process). The starting point of the third wave is the end of the Uruguay Round of GATT and the creation of the World Trade Organization in 1995.

⁶ In the real world RTAs have different forms. They vary from the least integrated PSAs to economic union. PSA (*Partial Scope Agreement*) can be concluded only by the developing countries. It provides only a partial elimination or decrease of tariffs, without obligation to full liberalization of trade in goods. FTA (*Free Trade Area*) consists in elimination of tariffs in trade with goods among the RTA members and keeping national tariffs of the member states against the third countries intact. In the framework of CU (*Customs Union*) tariffs among the members are eliminated as in a FTA and – additionally – a common tariff in trade with the third countries is introduced. In the WTO framework international trade in services is called “economic integration” (and this aspect of regional agreement is called *Economic Integration Agreement* – EIA). This name is justified with necessity of deeper integration in case of trade with services than of trade with goods. E.g. trade with services enforces presence of the foreign providers in the country and incorporates elements of international movement of production factors. Nevertheless the WTO meaning of “economic integration” is not a synonym of the full economic integration in the economic theory (see Balassa, 1961). EIA always accompanies FTA or CU. The next form of a RTA is *Common Market* (CM, the form of RTA not notified by the WTO). A CM has features of a CU supplemented by a free movement of production factors. More integrated economic union is a CM containing a harmonization and coordination of economic policies of the member states (if capital markets are liberalized, currencies of the member states are convertible and their exchange rates are fixed, there are conditions fulfilled for a monetary union, MU).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

most important deviation from MFN. However, due to the exhaustion of the further possibility of the establishment of RTAs, during the first decade of XXI c. interregional forms of trade liberalization start to dominate. In 2010 about one half of RTAs in force (about 145 out of ca. 290) were not strictly “regional” and include countries from outside of the regions compatible with the geographical definitions commonly employed in the WTO context (World Trade Report, 2011, p. 60). Technological progress (especially in information transfer and exchange) supports the process of economic integration. Interregional groups help to further relax trade barriers and intensify international trade. Interregional agreements change the world trade pattern, which in the recent decades were primarily determined by intraregional exchange.

Transatlantic Trade and Investment Partnership is for some reasons a typical RTA of the third wave of regionalism. It will be concluded by two geographically distant parties located on different continents (one of them – the EU – is a collective entity). As in case of other RTAs, there are many economic and non-economic reasons of negotiating this agreement. The expected scope of this agreement will be going far beyond liberalisation of trade in goods. It will probably cover as well trade in services, movements of production factors (especially rules regulating flows of foreign investments and migrations), as well as environment and intellectual property protection.

Aware of typical characteristics of TTIP in the current wave of regionalism, we acknowledge its specificity derived from the parties’ particular characteristics. The EU as well as the U.S. are namely among the strongest actors in the world economy and politics. Both can be seen as the centers (and not – as very often in RTAs - one as a centre and another as a periphery). This is why, in case of TTIP conclusion, the standard Viner’s trade creation and trade diversion effects are expected as well as the terms of trade effect.

TTIP is aimed at deepening the economic ties between the EU and the U.S. It is an agreement that will significantly change the global balance of power. This agreement is seen to go far beyond a free trade area, which is most probably going to come into being by its notification by WTO. It will include free trade in services (EIA). Since it requires i.e. the presence of the service provider on the partner’s market and free movement of purchasers and producers of services, implementation of EIA entails deeper connections of partners’ economies than in the case of a FTA.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The working name for the forthcoming EU – U.S. agreement, Transatlantic Trade and Investment Partnership is indicating its broader range than this of a FTA as well. Moreover, judging by already finished negotiations on the RTAs created by the EU and Canada, as well as by other selected RTAs concluded by the EU and the U.S. (particularly those with developed countries), one can assume that TTIP will cover not only principles of liberalization of trade with goods. In addition to the reduction of tariffs the TTIP will regulate: elimination of non-tariff barriers to trade, free trade in services and rules for foreign investment regime, public procurement, protection of intellectual property rights, and ways of dispute settlement. TTIP will presumably be a model for subsequent RTAs. It is especially feasible in the area of technical standards applying to products. It can also significantly affect the fate of multilateral liberalization negotiations under WTO bringing about either some ready-made solutions or at least an incentive for discussion.

TTIP negotiations are underway⁷. The first round was concluded in July 2013. It was aimed at defining the full range of topics that EU and the U.S. intend to cover in the TTIP. In November 2013 during the second round of negotiations liberalization of trade in services, energy and natural resources, and protection of foreign investments were discussed⁸.

On 20th December 2013 the third round of TTIP negotiations in Washington has been finished. The talks concerning parties' expectations as to the access to services markets and systems of mutual protection of foreign investments were continued. An American model of a bilateral agreement on mutual protection of investments (BIT, *Bilateral Investment Treaty*)⁹ was analyzed which was applied in the agreement constituting the NAFTA, as well as the experience pertaining to the mechanism of dispute settlement

⁷ For details, see Czarny et. al., 2014.

⁸ The second round of negotiations took place with a delay due to the fiscal paralysis the U.S. administration. This demonstrates the sensitivity of the negotiations to the internal problems of the parties. At the same time, the deterioration of the U.S.-Germany (and partly even U.S.-the rest of Europe) relations as the consequence of the phone hacking scandal didn't change the negotiations agenda.

⁹ In view of the absence of more universal regulations, the protection of foreign investments is regulated by bilateral agreements (BITs). There are usually two model solutions accepted, which originate from different principles, although they bring forth identical practice. In the first case, the state authorities of a country concluding a BIT commit themselves to promote the tendency of investors from the partner country to invest in its territory. In the second model, the state authorities leave the contracting parties the right to specify the terms of the contract, unless they violate the law. For more information see Czarny& Menkes, 2008.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

within it (though as to the questions concerning the ISDS (*Investor-State Dispute Settlement*) the EU position is constantly changing). There had been also regulatory problems studied, including the EU model of technical barriers to trade. Progress in talks on the automotive sector was achieved. Contentious issues were: equal access of European firms to public procurement in various states in the U.S., and regulations on agriculture in the part of the U.S. In this latter case the disparities arise mainly from the different nature of agricultural production in the EU and the U.S., as well as from different approaches to genetically modified products (GMO, *Genetically Modified Organisms*). During the fourth round taking place in March 2014 negotiations concerning three main issues (market access, regulations and rules) were continued. The fifth round of negotiations (May 2014) focused mainly on technical barriers of trade, access to the market for agricultural products and rules of origin. During the sixth round of negotiations (July 2014) the U.S. and the EU leaders have set a timetable for completing an agreement for TTIP by late 2014 (what seems not to be realistic).

**Economic potential and wealth of the EU, the U.S., NAFTA
and other selected RTAs**

The empirical analysis on TTIP is started by comparing GDP and GDP *per capita* (GDP *pc*) of the EU and the U.S. as well as NAFTA and two other RTAs selected as the best in the year 2012 among the multilateral RTAs (the sample excludes the EU and NAFTA)¹⁰ - Tables 1 and 2 (the same criterion is applied in Table 3).

Among all RTAs NAFTA and the EU have the biggest economic potential, although they experienced relatively low growth rates of GDP (ca. 1.8 times during the period 1999-2012). NAFTA's economy is bigger than the EU economy in all analyzed years apart from the years 2007-2009 (the last economic crisis)¹¹. Till 2003 even the U.S. economy was bigger than the

¹⁰ The RTAs analyzed in tables 1-3 names are (if the name does not reveal the location of the RTA or gives it not precisely we add this information – according to WTO – in brackets): AFTA (ASEAN Free Trade Area located in East Asia), ANZCERTA (Australia New Zealand Closer Economic Relations Trade Agreement), APTA (Asia-Pacific Trade Agreement, East and West Asia), EFTA (European Free Trade Association), EU (European Union), GCC (Gulf Cooperation Council, Middle East), LAIA (Latin American Integration Association, Nord and South America, The Caribbean), NAFTA (North American Free Trade Agreement)

¹¹ The economic crisis becoming global in the autumn 2008 has started in the U.S. economy earlier, what had considerably affected the NAFTA's economy.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

economy of the EU as a sum of 27 Member States. Since then both economies have had a similar size with a small prevalence of the EU.

Table 1. Gross Domestic Product of the EU, NAFTA, the U.S, APTA and LAIA in the years 1999-2012 (current prices and exchange rates, trillions USD)

Year	EU	NAFTA	US	APTA	LAIA	World
1999	9.15	10.55	9.37	2.08	1.82	31.95
2000	8.48	11.33	9.97	2.26	2.01	32.86
2001	8.58	11.70	10.31	2.37	1.95	32.67
2002	9.36	12.11	10.67	2.60	1.73	33.99
2003	11.41	12.73	11.17	2.96	1.80	38.16
2004	13.17	13.63	11.88	3.46	2.09	42.95
2005	13.77	14.63	12.65	4.05	2.54	46.51
2006	14.68	15.63	13.40	4.78	3.00	50.38
2007	16.99	16.51	14.06	5.85	3.55	56.67
2008	18.27	16.91	14.31	6.88	4.14	62.10
2009	16.33	16.21	14.00	7.37	3.88	58.94
2010	16.28	17.13	14.52	8.80	4.82	64.40
2011	17.60	17.98	15.10	10.39	5.42	71.21
2012	16.57	18.65	15.70	11.29	5.40	72.68

Source: Own study based on UNCTAD database, <http://unctadstat.unctad.org/> accessed on 03.08.2014.

The dominant position of the EU and the U.S. economy is shown by comparison with two RTAs positioned in the ranking just behind the leaders (APTA and LAIA). In 1999 APTA's GDP was ca. 5.1 times smaller than NAFTA's GDP and 4.4 times smaller than GDP of the EU. In 2012 this difference was equal – respectively – 1.65 and ca. 1.5 times. These figures are an appropriate measure of the progress made by the APTA's economy. For LAIA the respective figures are ca. 5.8 and 5 times in 1999, and 3.45 and 3.1 in 2012.

Despite the rapid increase in GDP of APTA (more than 5.4 times during 14 analyzed years) its huge population makes it still poor. Because of the relatively low GDP *pc* it is similar rather to the RTAs containing developing countries (for example the other Asian or African RTAs) than to any developed group. In 1999 the richest among RTAs was the population of

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

EFTA with GDP *pc* almost 2 times higher than the EU (the 3. position in the ranking) and 1.5 times higher than the 2. in the ranking NAFTA (Table 2).

Table 2. Gross Domestic Product *per capita* of the EU, NAFTA, the U.S, EFTA and ANZCERTA in the years 1999-2012 (current prices and exchange rates, thousands USD)

Year	EU	NAFTA	U.S.	EFTA	ANZCERTA	World
1999	18.98	25.60	33.06	37.27	21.29	5.28
2000	17.55	27.17	34.80	36.37	20.05	5.36
2001	17.70	27.75	35.60	36.88	18.98	5.27
2002	19.24	28.41	36.48	40.47	20.99	5.41
2003	23.36	29.57	37.83	47.05	26.72	6.00
2004	26.86	31.33	39.87	53.03	32.05	6.68
2005	27.96	33.29	42.07	57.30	35.43	7.14
2006	29.69	35.21	44.17	61.40	36.95	7.64
2007	34.20	36.83	45.91	69.06	43.93	8.50
2008	36.63	37.34	46.35	78.76	45.55	9.20
2009	32.63	35.46	44.92	70.34	42.77	8.63
2010	32.40	37.10	46.20	76.40	53.28	9.31
2011	34.92	38.59	47.62	89.81	61.80	10.18
2012	32.81	39.63	49.11	87.97	63.11	10.27

Source: Own study based on UNCTAD database, <http://unctadstat.unctad.org/> accessed on 03.08.2014.

In 2012 NAFTA became the third richest RTA after the ANZCERTA's GDP *pc* jumped to the level 1.6 times higher than this of NAFTA. In the period 1999-2012 ANZCERTA experienced increase of GDP *pc* ca. 3 times. During the analyzed period the U.S. population is richer than the people in the EU (as well as in NAFTA).

Analysis of GDP and GDP *pc* revealed that the EU and NAFTA dominate among the RTAs as well as in the world economy. The same can be said about the U.S. being the leading economy in NAFTA (in 1999 the U.S. economy produced almost 90% of the NAFTA's GDP; in 2012 it was still

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

equal to ca. 84%). RTA containing the EU and the U.S.¹² will create a new superpower in the world economy. In 1999, the U.S. and the EU joint production was equal to almost 60% of the world GDP. Their export exceed 53% of the global export. At the beginning of the second decade of the XXI c., the position of both partners in the global economy is worse than at the end of the XX c. In 2012, the common share of the EU and the U.S. in the world GDP amounted to 44.5%, whereas the export of both partners does not exceed 40% of the world export¹³ (see UNCTAD, <http://unctadstat.unctad.org/> accessed on 03.08.2014).

Openness and trade orientation

Both TTIP partners differ in intensity of their trade with the outside world as well as with the member countries of the RTAs they belong to (intra EU-trade and intra-NAFTA trade). We measure intensity of trade as a sum of export and import divided by GDP and treat the calculated numbers as trade openness index (Table 3).

During 1999-2012 an increase in openness of all analyzed RTAs but AFTA is noticeable. Two Asian blocs (AFTA and GCC) have an openness index bigger than 1. It means that their shares in the world trade are bigger than their shares in the global GDP. In case of AFTA trade has outstripped its GDP nonstop since 1998 (see Czarny & Folfas, 2014). For GCC it holds in the last two years and in 2008. The EU achieved considerably higher values of the trade openness indexes than NAFTA: in 2012 – respectively – 0.7 and 0.3 (the difference between both indexes is increasing in time), though we can observe increasing openness of both of them. The relatively low openness indexes of NAFTA are understandable as this RTA contains two big economies concentrating on supplying their own internal markets (we can see this comparing the NAFTA openness index with the one of the U.S.).

¹² In the further part of this paper we refer to the hypothetical region created after the conclusion of the TTIP and containing the EU and the U.S. as to „the TTIP region”.

¹³ If TTIP was introduction to FTA between the EU and NAFTA, the new bloc EU plus NAFTA would account for 48.5% of global GDP (2012) and for 44.5% of world exports (2012).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 3. Trade openness indexes of the EU, NAFTA and the U.S. as well as of selected other RTAs in the years 1999-2012

Year	EU	NAFTA	U.S.	AFTA	GCC
1999	0.50	0.24	0.19	1.15	0.63
2000	0.57	0.26	0.20	1.31	0.69
2001	0.56	0.23	0.19	1.23	0.68
2002	0.55	0.22	0.18	1.16	0.69
2003	0.54	0.23	0.18	1.19	0.76
2004	0.56	0.24	0.20	1.30	0.83
2005	0.59	0.26	0.21	1.35	0.87
2006	0.64	0.27	0.22	1.31	0.88
2007	0.64	0.27	0.23	1.23	0.94
2008	0.66	0.29	0.24	1.25	1.03
2009	0.56	0.23	0.19	1.01	0.93
2010	0.64	0.27	0.22	1.05	0.94
2011	0.69	0.30	0.25	1.09	1.00
2012	0.70	0.30	0.25	1.06	1.05

Source: Own study based on UNCTAD database, <http://unctadstat.unctad.org/> accessed on 03.08.2014

In this paper we compare RTII indexes of the region created by the EU and the U.S. after conclusion of the TTIP agreement (TTIP region) with the respective indexes of the EU (containing 27 Member States) and NAFTA. This analysis covers the years 1999-2012. Firstly, we analyze regional trade introversion index for trade in all commodities (Table 4). Secondly, we discuss RTIIs calculated for the disaggregated groups of goods. We start with the division into the final (Table 5) and the intermediate goods (Table 6) compatible with the BEC nomenclature. Further we proceed to RTII calculation for the main sectors of the economy (SIC nomenclature¹⁴). We

¹⁴ According to SIC nomenclature the economies are divided into:

- agriculture, forestry and fishery products,
- mineral commodities (metallic ores and concentrates, coal and lignite, crude petroleum and natural gas, nonmetallic minerals, except fuels),
- manufactured commodities (food and kindred products, tobacco manufactures, textile mill products, apparel and related products, lumber and wood products, except furniture,

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

begin with the RTII for trade in agriculture, forestry and fishery products (Table 7), because the first part of this category is important for export of the TTIP partners and is heavily protected by both of them. Then we analyze RTII of the manufactured goods, which are very important in trade between developed countries. This sector is divided into two subsectors: the first one consists in defined manufactures (Table 8) and the second one in manufactures not defined by a kind (Table 9). We continue analyzing RTII in trade with mineral products (Table 10). For sake of completeness of the analysis we add (though not extensively comment) data on the RTII for trade in other commodities (Table 11). We use data extracted from WITS-COMTRADE database.

Table 4. Regional trade introversion index for trade in all commodities in the years 1999-2012

Year	EU	NAFTA	TTIP region*	TTIP region **
1999	0.71	0.65	0.10	-0.28
2000	0.72	0.64	0.13	-0.28
2001	0.70	0.65	0.13	-0.26
2002	0.71	0.66	0.18	-0.25
2003	0.72	0.68	0.25	-0.23
2004	0.71	0.68	0.26	-0.26
2005	0.71	0.67	0.25	-0.29
2006	0.71	0.67	0.27	-0.29
2007	0.70	0.68	0.30	-0.29
2008	0.69	0.68	0.31	-0.32
2009	0.70	0.67	0.34	-0.28
2010	0.71	0.68	0.34	-0.32
2011	0.70	0.69	0.35	-0.33
2012	0.69	0.68	0.31	-0.35

* including intra-EU27 trade

** excluding intra-EU27 trade

Source: own calculations based on WITS-COMTRADE database, <http://witsworldbank.org> accessed on 4.07. 2014

furniture and fixtures, paper and allied products, printing, publishing and allied products, chemicals and allied products, petroleum refining and allied products),

-manufactured commodities not specified by kind (rubber and miscellaneous plastics products, leather and leather products, stone, clay, glass and concrete products, fabricated metal products, except machinery, machinery, except electrical, electrical machinery, equipment and supplies, transportation equipment, scientific and professional instruments, photographic and optical goods, watches and clocks, miscellaneous manufactured products),

-other commodities (scrap and waste, used or second hand merchandise).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 5. Regional trade introversion index for trade in final goods in the years 1999-2012

Year	EU	NAFTA	TTIP region*	TTIP region**
1999	0.74	0.62	-0.09	-0.36
2000	0.74	0.58	-0.11	-0.41
2001	0.73	0.57	-0.09	-0.36
2002	0.72	0.56	-0.06	-0.31
2003	0.70	0.56	-0.01	-0.27
2004	0.69	0.59	0.01	-0.28
2005	0.70	0.58	0.05	-0.31
2006	0.69	0.57	0.04	-0.33
2007	0.68	0.59	0.10	-0.32
2008	0.67	0.59	0.13	-0.34
2009	0.68	0.59	0.15	-0.35
2010	0.68	0.60	0.16	-0.37
2011	0.67	0.62	0.20	-0.36
2012	0.67	0.59	0.18	-0.36

* including intra-EU27 trade

** excluding intra-EU27 trade

Source: own calculations based on WITS-COMTRADE database, <http://witsworldbank.org> accessed on 4.07. 2014

The EU's and NAFTA's trade has similar, relatively high intraregional orientation, though in the EU it is decreasing whereas in NAFTA increasing. This result is opposite to the one achieved in the analysis of the TTIP region. Calculating RTII for this region including intra-EU trade we get positive and increasing though relatively low values of the index. They have been permanently lower than 50% of the respective RTIIs for NAFTA and the EU (except for 2011, when it was slightly higher than 50% of NAFTA's RTII). If, however, we take into account that this result is heavily biased because of a very intensive trade among the EU-members, it means, if we acknowledge that the intra-EU trade no longer can be seen as international trade because of the depth of the partners' economic integration, we get strong and growing (in absolute value) extraregional trade (since 2003 the numbers are almost the same as for the TTIP region with intra-EU trade but have opposite sign). For the first glance this result can be seen as a proof of economic incompatibility of the EU and the U.S. However, it is not surprising and can be seen as a confirmation of effectiveness of the trade barriers discouraging UE-U.S. trade. One can expect a considerable intensification of the turnover between TTIP-partners resulting from liberalization of their mutual trade. This analysis confirms rather necessity

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

to work on trade liberalization, if these partners intend to intensify their trade (it is especially visible in the further part of this analysis concerning trade in agricultural products in Table 7).

More precise approach to trade orientation of the TTIP region we provide with the analysis of partial RTIIs calculated for groups of commodities. In trade with final goods the EU is permanently more intraregional oriented than NAFTA. In the first years of the analysis (till 2002) EU-RTII for trade in final goods was even more intraregional oriented than trade in all commodities. Such high values of the EU-RTII can be explained with the similarity of countries constituting the European Union. They have similar GDP *pc* as well as similar culture, tastes and – to some extent – even climate. In effect, the EU-population has similar consumption pattern, what means that the firms are producing similar goods and demanding similar equipment. As these countries are the developed ones, they produce similar goods (e.g. manufactures) as well. It means, that in both consumption and production goods there is a big potential for the mutual trade among the Member States (this is visible by studying EU-RTII for manufactured goods in Table 8 as well). This result is confirmed, when we compare the EU-RTIIs with the respective RTIIs of NAFTA consisting in very differentiated members and having lower RTIIs. In this context the TTIP region (in all analyzed years for mutual trade without the intra-EU trade and in the years 1999-2003 even for the EU-U.S. trade including the intra-EU trade streams) appears even more extraregionally oriented than in case of trade with all goods. This region has the negative RTII in the years 1999-2003 even if we include intra-EU trade. However, tendency to its growth is noticeable. Moreover, the absolute values of the index for the TTIP region without intra-EU trade are bigger than of the RTIIs for all commodities. In this case intensification of intra-industry trade¹⁵ can be expected. This is the best chance for the competitors from the EU and the U.S. producing similar (especially technologically advanced) products to find segments of markets to be supplied with their products.

¹⁵ Intra-industry trade is a simultaneous export and import of similar goods produced in the same industry in bilateral turnover.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 6. Regional trade introversion index for trade in intermediate goods in the years 1999-2012

Year	EU	NAFTA	TTIP region*	TTIP region**
1999	0.72	0.66	0.19	-0.18
2000	0.72	0.65	0.20	-0.20
2001	0.72	0.66	0.25	-0.15
2002	0.73	0.68	0.29	-0.15
2003	0.73	0.70	0.34	-0.15
2004	0.73	0.69	0.36	-0.17
2005	0.73	0.68	0.37	-0.17
2006	0.73	0.67	0.38	-0.18
2007	0.72	0.68	0.40	-0.19
2008	0.72	0.68	0.43	-0.19
2009	0.73	0.68	0.44	-0.19
2010	0.74	0.69	0.44	-0.23
2011	0.74	0.69	0.45	-0.22
2012	0.74	0.68	0.43	-0.23

* including intra-EU27 trade

** excluding intra-EU27 trade

Source: own calculations based on WITS-COMTRADE database, <http://witsworldbank.org> accessed on 4.07.2014

The RTII for trade in the final goods had tendency to fall in both the EU and NAFTA, whereas in the TTIP region with the intra-EU trade these RTIIs were rising (till 2011), though in the first years of the analysis (till 2003) they were extraregionally biased with the weaker and weaker bias. In this case of importance is production of multinational enterprises (MNEs) located by both TTIP parties as well as – more general international production fragmentation. This time as well the TTIP region was strongly influenced by the internal EU-trade. If we exclude the intra-EU trade and calculate the RTII only for the EU-trade with the rest of the world, this orientation stays extraregional and relatively stable.

Impact of MNE's, production fragmentation and supply chains is even more visible if we analyze regional orientation of intra-TTIP region's trade though regional trade introversion indexes for trade in intermediaries as well as the concrete figures show the tendency different than these for the final goods. RTII for the intermediaries is higher in the case of the EU than in the case of NAFTA, because the EU participates in more production nets, whereas NAFTA's international production is mainly concentrated on two of three member states (the U.S. and Mexico). The TTIP region with intra-EU trade has relatively high and growing positive values of RTII (ex-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

actly as the one of the EU), what proves its intra-regional orientation. The values of RTII for trade in intermediaries doubled in the analyzed period though even in 1999 this index was almost two times higher than the RTII for all commodities. For the TTIP region without intra-EU trade RTII was relatively low in absolute terms. This confirms relatively poor protection of intermediaries applied by both TTIP-partners and is compatible with general observation that production of intermediaries is usually less protected than the average of the economy (with the aim of development of the local production of the final goods with the use of imported intermediaries).

Table 7. Regional trade introversion index for trade in agriculture, forestry and fishery products in the years 1999-2012

Year	EU	NAFTA	TTIP region*	TTIP region**
1999	0.72	0.57	0.04	-0.61
2000	0.74	0.57	0.06	-0.61
2001	0.74	0.60	0.05	-0.62
2002	0.75	0.62	0.08	-0.61
2003	0.74	0.59	0.08	-0.64
2004	0.76	0.59	0.14	-0.65
2005	0.76	0.62	0.16	-0.66
2006	0.76	0.61	0.14	-0.69
2007	0.75	0.59	0.13	-0.68
2008	0.74	0.58	0.12	-0.70
2009	0.78	0.58	0.18	-0.73
2010	0.79	0.57	0.21	-0.72
2011	0.79	0.58	0.24	-0.72
2012	0.81	0.57	0.26	-0.72

* including intra-EU27 trade

** excluding intra-EU27 trade

Source: own calculations based on WITS-COMTRADE database, <http://witsworldbank.org> accessed on 4.07.2014

The RTII values for the single groups of products differ between sectors. The effects of protection are especially visible if we analyze trade in agricultural products, which is the most protected part of the EU economy and is strongly protected by the U.S. too (Table 7). The EU, as expected, has much higher RTIIs than NAFTA and the EU's RTII for agricultural products is the highest one in our analysis. In this case relatively low NAFTA's RTII values result from the different economic potentials of the U.S. and the other members of this RTA. The huge U.S. production can

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

hardly be absorbed by the smaller market of Canada and the poorer population of Mexico, which develops its own agricultural production.

As far as TTIP region is concerned, especially without the intra-EU trade, the figures are very high and negative. Trade of the TTIP region appears very extra-regionally oriented. This is mainly the result of the EU-common agricultural policy as well as of the U.S. protection. In this case, however, one cannot expect a very quick and large change even after the signing of the TTIP agreement as some exceptions will surely remain.

Table 8. Regional trade introversion index for trade in manufactured commodities in the years 1999-2012

Year	EU	NAFTA	TTIP region*	TTIP region**
1999	0.74	0.72	0.25	-0.17
2000	0.75	0.69	0.26	-0.16
2001	0.74	0.68	0.27	-0.13
2002	0.73	0.68	0.30	-0.09
2003	0.73	0.68	0.33	-0.06
2004	0.73	0.69	0.35	-0.07
2005	0.73	0.69	0.37	-0.08
2006	0.72	0.68	0.37	-0.09
2007	0.71	0.67	0.39	-0.09
2008	0.72	0.67	0.41	-0.11
2009	0.71	0.65	0.42	-0.07
2010	0.73	0.64	0.44	-0.11
2011	0.74	0.67	0.47	-0.12
2012	0.73	0.66	0.44	-0.14

* including intra-EU27 trade

** excluding intra-EU27 trade

Source: own calculations based on WITS-COMTRADE database, <http://witsworldbank.org> accessed on 4.07.2014

RTII in trade with manufactured goods (Table 8) in the TTIP region with intra-EU trade has high and growing values. In 2012 it made up 0.6 of the EU's RTII and 0.67 of the NAFTA's RTII. In the TTIP region without intra-EU trade, RTII still had negative values, though they are low in absolute terms. This is the result of a poor protection of these goods. It is not only the effect of the EU or the U.S. economic policies, but mainly of the non-discriminatory trade liberalization in the framework of GATT/WTO.

For manufactured goods not identified by kind the RTII figures are lower than in manufactured goods presented in the Table 8 for the EU and the TTIP region with intra-EU trade and higher. It was increasing till 2011 in

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

case of NAFTA (Table 9). For the TTIP region without intra-EU trade the figures are as usually negative and higher (in absolute value) than for the identified manufactures.

Table 9. Regional trade introversion index for trade in manufactured commodities not identified by kind in the years 1999-2012

Year	EU	NAFTA	TTIP region*	TTIP region**
1999	0.71	0.62	0.04	-0.25
2000	0.71	0.61	0.05	-0.27
2001	0.71	0.61	0.10	-0.22
2002	0.72	0.63	0.14	-0.23
2003	0.71	0.66	0.20	-0.23
2004	0.71	0.66	0.23	-0.25
2005	0.71	0.65	0.24	-0.26
2006	0.71	0.64	0.25	-0.27
2007	0.71	0.66	0.29	-0.27
2008	0.70	0.66	0.31	-0.28
2009	0.70	0.68	0.34	-0.29
2010	0.70	0.69	0.33	-0.33
2011	0.70	0.69	0.35	-0.32
2012	0.71	0.67	0.32	-0.32

* including intra-EU27 trade

** excluding intra-EU27 trade

Source: own calculations based on WITS-COMTRADE database, <http://witsworldbank.org> accessed on 4.07.2014

Analysis of RTII for trade with mineral products reveals the next difference between the TTIP partners (Table 10). The EU is poor in raw materials' poor, what results in the lowest among all RTIIs calculated for the EU and NAFTA. On the contrary NAFTA (and its dominant member the U.S.) is abundant in these products. This justifies the fact that the EU is trading with mineral products much more intensively with the rest of the world than NAFTA and is trading less intensively intra-regionally. NAFTA's RTII values for trade in these products are almost two times higher than these of the EU. The raw materials scarcity of the EU decides also about the negative signs of the TTIP's RTIIs (even in the version with intra-EU trade). We cannot expect intensification of mutual trade with these goods as the EU is set to import mineral products. The U.S. in turn is a good candidate for the supplier of raw materials, however it surely exports rather processed intermediaries (what was visible by the analysis of the TTIP's trade in the intermediaries).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 10. Regional trade introversion index for trade in mineral commodities in the years 1999-2012

Year	EU	NAFTA	TTIP region*	TTIP region**
1999	0.24	0.76	-0.34	-0.82
2000	0.45	0.73	-0.18	-0.75
2001	0.43	0.75	-0.21	-0.77
2002	0.43	0.78	-0.15	-0.74
2003	0.44	0.78	-0.19	-0.76
2004	0.43	0.75	-0.18	-0.75
2005	0.44	0.74	-0.16	-0.74
2006	0.43	0.74	-0.14	-0.73
2007	0.45	0.74	-0.11	-0.73
2008	0.45	0.76	-0.08	-0.70
2009	0.41	0.78	-0.08	-0.70
2010	0.45	0.79	-0.05	-0.70
2011	0.46	0.79	-0.02	-0.68
2012	0.42	0.79	-0.04	-0.69

* including intra-EU27 trade

** excluding intra-EU27 trade

Source: own calculations based on WITS-COMTRADE database, <http://witsworldbank.org>; accessed on 4.07.2014

Table 11. Regional trade introversion index for trade in other commodities in the years 1999-2012

Year	EU	NAFTA	TTIP region*	TTIP region**
1999	0.36	0.63	-0.06	0.01
2000	0.50	0.66	-0.02	-0.02
2001	0.51	0.68	-0.05	-0.05
2002	0.43	0.65	0.08	0.01
2003	0.53	0.73	0.20	0.03
2004	0.58	0.75	0.29	0.04
2005	0.62	0.76	0.25	-0.06
2006	0.58	0.67	0.09	-0.17
2007	0.55	0.55	0.06	-0.19
2008	0.61	0.58	0.03	-0.28
2009	0.64	0.48	0.00	-0.37
2010	0.66	0.51	0.11	-0.31
2011	0.68	0.45	0.12	-0.33
2012	0.65	0.52	0.25	-0.20

* including intra-EU27 trade

** excluding intra-EU27 trade

Source: own calculations based on WITS-COMTRADE database, <http://witsworldbank.org>; accessed on 4.07.2014

Conclusions

We prove that TTIP will be a typical RTA compatible with the standard of the third wave of regionalism as it will connect two geographically distant parties located on different continents and its expected scope will go far beyond liberalisation of trade with goods. Simultaneously we acknowledge the particular characteristics of TTIP parties what makes TTIP a very special RTA. The EU and the U.S. are among the strongest actors in the world economy and politics. Both are centers. The result is an importance of the TTIP for the whole global economy.

Analysing the characteristics of both TTIP partners we stated that the EU is much more open than the U.S. It is understandable as the EU is a collective entity consisting of relatively small but rich national economies forced to import for ensuring themselves foreign goods (e.g. raw materials) and to export goods produced with technologies characterized by increasing returns to scale (e.g. manufactures). On the contrary, the U.S. is a large economy concentrated on supplying domestic market.

The analysis of the TTIP region's orientation of trade based on the historical data from the period 1999-2012 revealed several conclusions. Nowadays trade between the EU and the U.S. is constrained by the protection applied by both partners. Trade liberalization constituting one necessary part of TTIP will surely help to intensify this trade. Of special concern is trade with agricultural products which is most constrained and hardly will be fully liberalized even in a framework of TTIP. Simultaneously, both parties are even now trading relatively intensively with intermediaries, which are often less protected than the average of the economy for the sake of development of final goods' production. The manufactured goods are as well relatively often traded, mainly in consequence of their poor protection after many successful liberalization steps in the framework of GATT/WTO.

The creation of the TTIP region will certainly intensify mutual trade of the EU and the U.S. both inter-industry (e.g. mineral products for manufactures) and intra-industry one (e.g. with manufactures). Consequently, we point out that in many respects the TTIP will be important not only for its participants but for the whole world economy as well. TTIP appears to be an economic and political project with serious consequences for the world economy and politics.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015
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Choice Overload Paradox and Public Policy Design. The Case of Swedish Pension System

JEL Classification: *D19, H44, H55*

Keywords: *extensive choice; cognitive limitations; market failure; choice architecture; funded pensions*

Abstract: In this paper we focus on an adverse effect of extensive choice widely known as ‘choice overload’. We draw on the case of Swedish funded pensions for illustration and analyze consequences of the design that allowed for maximizing the choice set. The analysis shows limitations of employing the rational choice approach to the real choice decisions biased with common psychological factors and demonstrates that government’s responsibility for the privatized pension system does not end with the design. We also emphasize the need for a decent default option, which would mitigate socially harmful results of adverse behavior effects like procrastination, status quo bias or abstaining from choice. After all, privatized pension systems still belong to a sphere of public policy.

Introduction

Decisions of choice are one of the key issues of economics. Sound choices contribute to increased welfare of groups and individuals, determine efficiency of economic endeavors and are essential for society’s long-term economic development. In psychological terms enjoying the possibility of choice provides a sense of personal control over one’s life and fuels intrinsic motivation for purposeful actions leading to increased task enjoy-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

ment and performance. The choice itself reassures our perception of environment control and self-efficacy stemming from our very biological condition (Leotti et al. 2010). Many choice options are thus usually presumed to be desirable and beneficial. Yet as recent literature suggests, this belief has serious limitations. An overabundance of choice possibilities can lead to adverse effects both in consumption decisions and life satisfaction (Schwartz 2004). In contrast, constraints imposed on choice sets facilitate the process of decision making and increase subsequent satisfaction.

This choice dialectics had seemed so far rather detached from public sphere as the state usually provided beneficiaries of public policies with very limited choice compared to the amount of goods and services offered by markets. However, the recent turn in welfare policies assumed that they should become more choice oriented just like critics of public monopolies and standardization demanded. This way what seemed to be an exclusive issue of consumer choice and marketing strategies entered the arena of public policy (see Lynch and Zauberman 2006). As a result the questions of 'choice architecture' have become increasingly important as well as the need of rethinking government's role and responsibility when it comes to designing public policies of marketized welfare state (Thaler and Sunstein 2009).

This paper aims at broadening our understanding of the choice overload phenomenon by examining the case of Swedish pension system. It illustrates the fact that privatization of public sphere brings not only benefits, but also market failures that used to be addressed by traditional welfare states. We also show the shortcomings of employing the principles of rational choice into real world situations like the choice architecture of pension savings system. On this background we point to the consequences of this phenomenon being cast on government's role and responsibility in a democratic state.

The paper is organized as follows. Second section provides brief information on the methodology of research. Third section reviews the latest literature on choice overload sketching the current state of the art. Third section discusses the question of choice in modern welfare state policies focusing on pension systems. Fourth section presents shortly the general design of the Swedish pension reform. Fifth section scrutinizes on the Swedish premium pension system and observed overload effect. Final section concludes.

The methodology of the research

The methodology of this research draws both on literature study and data analysis which is reflected in the paper's structure. Theoretical sections review the latest literature on the choice overload effect published mainly in journals committed to consumer research and psychology of economic agents. This way the model of *homo economicus*, which is usually employed in economics, can be contrasted with empirical research coming from outside pure economics. The subsequent discussion on introducing choice into public policies is based on this approach as well.

The sections devoted to the Swedish case of premium pensions draw on empirical material. We use the latest data published by the Swedish Pension Authority which include data statistics to be found on Authority's webpage (www.pensionsmyndigheten.se) and official publications on pensions (inter alia annual pension reports named *Premiepensionen – Pensionsspararna och pensionärerna*). Unfortunately since 2012 the annual reports are published in shorter form and thus some data is missing. We also make use of official government reports and directives evaluating the performance of the pension system and recommending desirable changes therein.

Choice overload and the limits of *homo economicus*

The standard economic model of rational choice is based on a number of simplifying assumptions (see for example Schotter 2009). Economic agent is, for example, aware of all of the choice options that are available to him and displays no cognitive limitations in processing and ordering them. Driven by expected utility maximization he takes decision that are *always* optimal given existing constraints. His preferences are stable and do not depend on context. Being a self-oriented actor, he does not take into consideration utility of others nor existing social structures. However, this view of an economic agent, a fictional character usually referred to as the model of *homo economicus*, is an abstract construction designed for a specific kind of scientific reasoning, preferably to be employed in formal modeling, and modern economics is rather well aware of this caveat (O'Boyle 2007; Thaler 2000). As a matter of fact, a whole branch of economic science – behavioral economics – has been developed in order to trace the inconsistencies of this model with respect to reality searching why people behave differently from what the model predicts and what it means for economic

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

theory and praxis (see Wilkinson 2008 for a comprehensive introductory text). So even though some scholars argue that models of rational choice are nowadays flexible enough to incorporate the critical insights and still prove to be useful in explaining economic phenomena (Gilboa 2010), one has to be aware of their limitations for they were not designed to reflect the reality of human nature, but for the sake of particular scientific cognition.

An example of phenomenon that the theory of rational choice fails to explain is the situation in which an agent faces excessive choice options which actually deter him from making an informed and rewarding choice. In effect, he does not maximize his utility, because he falls short of being a perfect calculating machine. This stands in opposition to the claim that a large number of options to choose from contributes to an increased welfare of individuals. Following the logic of standard economic model, for a numerous population of individuals holding various preferences, the greater set of choice, the better. In this situation each and every individual has the possibility to examine the choice set for himself and choose an option that fits him best leading in aggregate terms to the lowest general welfare loss possible. Preferences of most people are met and thus the highest utility for all is achieved. The relation between preferences, choices and individual welfare is, however, not so straightforward. First, satisfaction of interests does not have to imply increased welfare (Hausman 2012). And second, individuals facing extensive number of options have lowered motivation to choose and achieve lower level of contentment than previously expected. More choice does not have to automatically imply that people will be better-off with it (Botti and Iyengar 2006).

Recent literature has grouped negative effects of choosing from an extensive number of options under term 'choice overload'. These effects usually include abstaining from making a choice decision, lower satisfaction derived from one's choice and feeling of regret after making a choice. The choice overload paradox has originally derived from consumer research. In a seminal paper Iyengar and Lepper (2000) reported findings of three experimental studies in which participants made choices from a differentiated sets of choice options. They found that too much choice was a negative factor in choosing and buying products. While at first vast array of choice seemed attractive and desirable, it turned detrimental for actual behavior and decision making. Participants made more confident decisions when their choice was limited: they felt more inclined to purchase items, reported higher satisfaction from the decision made, and performed better with tasks chosen from a limited set of possibilities. Too much choice, on the other

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

hand, caused decision paralysis, poor decision quality and feelings of regret due to rising opportunity costs and escalation of expectations. The feelings of regret were confirmed in the studies of Sagi and Friedland (2007) who found that regret is positively related with rising number of alternatives and their diversity and of Haynes (2009) who observed that larger set of alternatives led to decreasing satisfaction from the choices made. A number of adverse effects of choice overload was also found by Vohs et al. (2008) who demonstrated that choosing among many alternatives is effortful and depletes cognitive resources leading to deterioration in self-control, stamina and pain tolerance, persistence in the face of failure, and performance in numerical calculations.

A number of earlier studies was also very critical of the rationality assumption employed by conventional models of choice, because people's ability to process information is limited and results either in third party influenced choice or in abstaining from choice. Tversky and Shafir (1992) challenged the idea that each alternative is assigned a value so that individual can choose the one with the highest rating. In the situation of conflict among the alternatives, one rather tends to defer decision, search for new alternatives, or choose the default option. Dhar (1997) confirmed these findings stressing the fact that small differences in alternatives between options increase the preference for a no-choice option. Timmermans (1993) found that when faced with increasing number of alternatives, people tend to assimilate less information on the attributes of offered options and to adopt absolute rather than relative comparisons due to the inability to process such an amount of information¹. It has also been convincingly argued on philosophical grounds that rational choice theory works best when choice is seriously constrained (Satz and Ferejohn 1994). Agents' preferences are not a matter of individual psychology and cognition, but they rather stem from social structures and interests.

When faced with overwhelming choice people tend to defer choice explicitly. Dhar (1997) for example found that expansion of the choice set even by adding more attractive alternatives actually drove people into the no-choice option. Also, when asked to point to the features of alternatives that appeared attractive to choice makers, participants felt discouraged from committing to a firm decision. However, the possibility to choose more than one option increasingly mitigated the effect. A study by Jessup et al. (2009) identified two factors that fostered no-choice decisions. First, people

¹ However, when it comes to comparing interpersonal well-being, it is the relative standing that counts, not the absolute one (Solnick and Hemenway 1998).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

avoid choice when their preferred option changes too often. And second, when time runs out. However, as Anderson (2003) points out, no-choice decision is not a homogenous concept, but may include procrastination, preference for status quo, or trade-off between effort to make a choice and expected benefits. One can also consciously wait for better options to emerge in the future. No-choice can be thus a deliberate – and rational – decision.

The decision to abstain from making a choice may involve staying at the status quo position (Samuelson and Zeckhauser 1988; Masatlioglu and Ok 2005), which stems either from a direct preference for the status quo or from being overwhelmed by choice options. This bias increases with the number of choice alternatives, which may be perceived as a rational response due to transition costs and uncertain outcomes. Samuelson and Zeckhauser (1998) argue, however, that it is rather psychological factors that discourage people from transition to better allocative positions and we should turn to loss aversion, endowment effect and psychological commitments in explaining this phenomenon.

The choice overload effect can, however, be moderated in certain circumstances and not all experiments were satisfactorily replicated when it came to report negative feelings. Scheibehenne et al. (2009) claim that the effect depends on multiple boundary conditions and interaction between several factors, so even if the choice overload effect exists it is not as robust as previously thought. The moderators of the effect can be grouped into three categories (Scheibehenne et al. 2010): assortment structure, decision strategies of individuals, and the perception of options' quality. For example specific arrangement and categorization of options, mindful decision strategies and choosers' heuristics can facilitate the process of choosing. Also Inbar et al. (2011) found evidence that regret from choosing even from a large set of option is eliminated if people have enough time to consider their choice. All this implies that there exist important preconditions for the choice overload effect to occur, but there is still no comprehensive study incorporating these factors into more general theory.

Other studies show that people actually experience the greatest satisfaction when choosing from intermediate set of choices, not too small and not too big. Reutskaja and Hogarth (2009) suggested that with increasing number of alternatives both costs and benefits rise. The difference is, however, that costs tend to escalate, whereas benefits satiate. The discrepancy between them rises leaving people less satisfied. Also, the change in perceived costs and benefits will affect the satisfaction function – the framing

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

of options and decision does matter. Similar results were obtained by Reed et al. (2011) who linked the dissatisfaction from extensive choice with effort needed to evaluate options.

Welcoming choice into pension policy schemes

For the last three decades policies of welfare state and social security have undergone extensive transformations in many advanced countries. According to the retrenchment slogan, the state was supposed to gradually back off from providing social benefits, because the market-based alternative promised delivery of the same services, only in a cheaper and more effective manner with greater respect to citizens' preferences². The state was thus supposed to guarantee that everybody, who was eligible, would be provided with social benefits or social assistance, but there was apparently no reason for the state to be the only supplier of such goods and services. It was widely believed that the previous system with public monopolies and uniformed service was inefficient, expensive and of poor quality. In effect, it was not matching the expectations of beneficiaries and offered very limited rewards for professionals employed in welfare services. Introduction of new policies was also expected to lessen the burden for public finances, reduce unnecessary administration and bureaucracy, and eliminate inefficiencies that tend to appear in the public sector.

The policy shift entailed a turn toward more individual approach to recipients; it encouraged private initiative and above all allowed for more personalized choice. However, introducing more choice into welfare policy raised a number of important issues. In principle, the expansion of choice should increase opportunities and enhance equity if we still assume that public policy should increase welfare of citizens (Le Grand 2007, Greve 2009). From this standpoint more choice can actually be largely useless if it is not possible to use it or only some recipients are able to take advantage of it. Traditional policies of welfare state utilized standardized measures for a reason. They were expected to eliminate market failures by exercising public intervention where there was no well-functioning market and by doing so reduce inequalities for the sake of public good. However, current trends of reintroducing choice can restore previous concerns if done without thoughtful reflection on how to deal with market failures that can aggravate social divisions in the long-term. One can name several conditions

² See Winston et al. (2002) or Pierson (2006, ch. 6) for a brief survey of arguments in favor of retrenchment.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

that should be fulfilled to minimize this risk, like wide information access, low transaction costs, right incentive structure, sound design of competition, and social trust (Greve 2003, 2009), but virtually none of them can be accomplished by mere market forces. They all require the state to take responsibility for institutional design and continuous monitoring of relevant developments in the new public-private sphere of economic activity. Yet even then there is no guarantee that these market failures will be eradicated successfully.

The changes in welfare policies took place in many areas: health care, elderly care and primary to tertiary public education (see Blomqvist 2004 for developments in Sweden). However, one of the most far-reaching privatization reforms occurred within pension systems bringing up issues of institutional design and on-going governance (see Ebbinghaus 2011). Many countries adopted notional defined contribution scheme complemented with fully or partially funded individual accounts administered by private companies. As a result large streams of publicly collected funds were directed into private sector for long-term management. Reasons for reforms were numerous and its advantages highly praised. The former usually included society aging (increasing life expectancy combined with declining fertility), fiscal issues (budget deficits and rising public debt), transformations of labor markets (declining employment rates, growth of non-standard employment contracts and low-paid jobs, persistent unemployment), falling productivity of postindustrial economies, and finally changes in social life (earlier retirement, one-child family, raise of individualistic philosophy of life). New rules were expected to address at least some of these issues thanks to their impact on public finances, financial markets and microeconomic incentives³. For example the adoption of defined contribution principle assumed that annuities could be adjusted to the existing demographic and economic conditions so that public finances would be more sustainable facing adverse shocks. The new system would also contribute to higher economic growth through increased savings and development of capital markets.

Expected benefits concerned not only the macro level, but individuals were supposed to be better-off as well. With respect to funded accounts pension savers were granted choice that they did not have in the PAYG system. Now they could decide on their own on the allocation of a part of their savings and were granted influence on portfolio structure both in

³ Many of those beliefs seem, however, mistaken or exaggerated. See Barr and Diamond (2010, 2009) and Barr (2002) for more detailed elaboration and critical discussion.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

terms of bonds/stocks ratio and dispersion of risk granted by access to foreign markets. Individuals would also have stronger incentives for continuous participation in the labor market and for investments in skills and education, because the relation between contributions and benefits would be now more direct. Old-age consumption smoothing became thus more personalized and a matter of own foresight weakening its link with societal developments and inter-generational redistribution.

The expansion of choice had its limits though. Despite the fact that the system of individual capital accounts glorified personal responsibility and initiative, it remained mandatory in virtually all cases of reforming national pension systems. Pension savers were not allowed to opt-out in order to adopt their own saving schemes or to refrain from saving at all thus taking full responsibility for their future. Leaving reasons for this coercive aspect aside, it should be emphasized that this solution implied that the state took the responsibility for designing the institutional framework of saving schemes and still bears, at least partially, responsibility for functioning and social results of the new system. The main underlying reason is that a market for pension funds is not a straightforward, competitive market like one for simple consumption goods. This is a market established and designed by government presumably with the intention to construct healthy micro-economic incentives for competition between funds, which should depend rather on price and quality of products than on exercise of market power or successful marketing measures, so that certain socially desired goals can be achieved like old-age consumption smoothing or relatively secure pension saving. Yet even with successful design, markets for pension funds have features of their own which differentiate them from other, more simple markets of choice and competition. For instance, as we could see in the previous paragraph, the participation on this market is mandatory for all the wage-earners and individual entrepreneurs and as such they cannot abstain from pension saving within this particular framework. Demand for the product is guaranteed by the government, which makes it easier for the suppliers to sell, yet at the same time may induce reluctance or ignorance of buyers toward evaluation of offered options, even if their future incomes depend on it. These specific features of pension fund markets call then both for cautious design and continuous monitoring of developments.

The situation of individuals coerced to participate in the pension funds market is extraordinary as well. Most of all, an extensive choice invariably implies a trade-off: more choice equals more costs in terms of choosers' time, psychics and risk borne (Loewenstein 1999). Even a partial shift from

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

PAYG system to individual capital accounts involves increased dependency on financial markets, which display inherent uncertainty. This means that there is no safe investment strategy and even seemingly similar strategies may bring mixed results depending on stock/bond portfolio or developments of particular markets. In effect savers with the same history of contributions may receive very differentiated pension benefits. An obligatory system relying on choice imposes its adverse effects even on individuals that consciously abstain from making decisions: such savers are unintentionally drawn into comparisons and may experience feelings of anxiety caused by the fact that even no-choice implies an actual choice.

Moreover, when it comes to finances, people face a number of cognitive limitations as summarized by Barr and Diamond (2009), which add up to the limitations briefly described in the previous section. Individuals, for instance, tend to misunderstand uncertainties they face and options they are offered, they do not understand basic concepts of finance and complex systems of saving (like pension plans), they have difficulties with processing information of pension products even if they are provided with it (see also Lusardi and Mitchell 2011). In effect, the rising complexity of financial schemes and operations at the individual level has detrimental effects on personal involvement and results in disinterest, biased decisions and withdrawal from informed participation in saving programs. These psychological and cognitive factors of 'irrational' behavior are surprisingly common as reported by Fear (2008) in his study on Australia. Besides, it would be also very optimistic to assume that all citizens care about their pensions or that they do have preferences for saving schemes. Limited interest in pension saving may also be amplified by the fact that rewards of current foresight are usually located far in the future, which implies high uncertainty of the actual size of annuities and at the same time fuels procrastination and negative perception of future consumption capacity.

Empirical investigations on pension systems that allow for extensive choice have confirmed many of the above reservations. Most of the literature refers to the case of 401(k) pension system in the United States which features high degree of voluntariness, but the results are nevertheless meaningful. Iyengar et al. (2004) found that the increasing number of options offered to pension savers leads to falling participation in these programs. For every ten funds added to the choice set, the number of participants fell by 1,5-2%. In another study Iyengar and Kamenica (2010) observed that when faced with a large number of options, people not only refrain from participation, but also tend to choose simple, easy-to-understand options

even if these are more risky or inferior to other alternatives. Surprisingly, better options could have been chosen from a limited set of choice indicating that the search for simplicity impairs our abilities to process data. Beshears et al. (2006) and Madrian and Shea (2001) reported significant inertia of sticking to the default saving scheme in terms of contribution rate, fund allocation, and post-saving distribution. This bias for status quo accentuates the procrastination issue and emphasizes the need for sound default schemes in saving programs, which have substantial impact on long-term saving outcomes. The importance of the default option design has also been confirmed by the comparative study of pension systems from ten countries differentiated by economic development level and cultural and historical background (Tapia and Yermo 2007).

An overview of the Swedish pension reform

The new pension system was introduced in Sweden in 1999 as the previous defined-benefit system was found to be unsustainable in the long term for financial and demographical reasons. It also had structural flaws inter alia in being tied to the development of prices instead of the real economic growth or penalizing long working career and flat earnings profile over life time. The reform was expected to address these shortcomings and meet other goals, which can roughly be reduced to three basic premises that led the reform (Barr 2013):

- the need to introduce a clear link between contributions and benefits with respect to fairness across generations,
- financial sustainability of the system should be achieved by tying it to economic growth and demographic change,
- individuals should be granted more choice in investing part of their savings.

Essentially all these assumptions were met, at least in the pure design. The new rules for pensions have eliminated the regressive redistribution patterns of the old system. A brake mechanism was introduced in order to sustain the self-financing of the system, though at the cost of shifting the costs of adjustment on pensioners and pension savers. And finally introduction of fully funded premium pension system allowed individuals to make their own choice in funds' allocation, even though in relatively limited scope. This paper focuses on the third aspect of the reform that is on the institutional arrangements of the choice given to pension savers and on the adverse effects of extensive choice possibilities. Yet before we proceed

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

with the analysis, it is worthwhile to briefly sketch the concept of the whole reform so that the premium pensions can be viewed in a proper context⁴.

The previous pension system based on the pay-as-you-go principle provided a full pension after 30 years of contributions based on worker's 15 best years. Its introduction in 1960 was perceived as a capstone of socialdemocratic welfare policies. The need for reform was realized already in 1980s., but it was only in 1990s. that political circumstances were favorable enough to pursue necessary changes. The new system was designed in a cooperative manner by a parliamentary Pension Group consisting of the representatives of five parties representing ca. 85% of votes. The very essence of the reform was a change from defined-benefit principle into defined-contribution scheme. Final legislation was passed in 1998 and since 1999 the new system has been in power. It consists of three fundamental components:

- partially-funded notional defined contribution (NDC) pension scheme administered by the state (*inkomstpension*),
- fully-funded individual accounts in which a pension saver is allowed to choose up to five privately managed funds to administer his savings (*premiépension*),
- the guaranteed pension providing poverty relief for those with insufficient history of contributions (*garantipension*).

The system is complemented with occupational and voluntary pension schemes, which however lie beyond the scope of state's direct responsibility. One ought to realize though that occupational pensions provide significant incomes for many workers, especially those with the history of high earnings (even up to 25% of future pensions).

The basic logic of the reformed pension system is following. Every month 18,5% of worker's earnings is transferred into the pension system. 16% goes to the NDC scheme forming the basic income pension and 2,5% goes to individual accounts generating fully funded benefits. Both contributions are compulsory and collected by tax authorities. In order to receive full pension a contribution history of 40 years is required. The pension is calculated on the whole history of earnings and one cannot retire earlier than at 61 years of age. There is no fixed retirement age, but one is no longer protected by the Employment Protection Act after turning 67. A pensioner is also allowed to withdraw his funds from individual capital

⁴ For more detailed elaboration on the Swedish pension reform see Barr (2013), Palmer (2004), Palme (2005), Anderson (2006) or simply refer to the Pension Authority webpage www.pensionsmyndigheten.se.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

account flexibly both in terms of timing and percentage of funds (25%, 50%, 75% or 100%). This way capital left within funds still brings interests, but is exposed to market risk, whereas after withdrawal the funds are transferred into Pension Authority fund which provides a fixed interest of 2,2% per year, yet with minimal risk. The new system also contains several microeconomic incentives for the development of labor market as its performance was considered crucial for the future of the system. One thus gets credits for rearing children and having tertiary education, whereas staying outside the labor market (for instance due to unemployment or sickness) or working part-time results in lower pension. Persons with insufficient contributions history are guaranteed a basic pension or a supplement to the income pension, though one is eligible for full size basic pension only if one lived in Sweden for at least 40 years and has turned 65⁵.

Although the income pension has lost its fully redistributive character and the benefits are now more directly related to contributions, it is still based on a pay-as-you-go principle and cross-generational redistribution. However, the most progressive and far-reaching solutions concerned the premium pension system. This was largely a response to the critique of the previous system that was perceived as a vehicle for pensions' standardization and detrimental paternalism that deprived an individual of any influence on pension savings' management. Thus the center-right parties insisted on giving it more individual tint that would allow pension savers to make their own decisions and take more responsibility for their life as pensioners. It was also argued that individuals have the best knowledge of their own living and financial situation and thus are capable of making allocative decisions suited best to their preferences with respect to risk and potential profits. In effect the official aims of introducing the system were threefold (Socialdepartamentet 2013, p. 13-14):

- workers should be given opportunity to invest in the capital market in order to gain higher profits than an exclusively NDC system could provide. This way their future pension would not be limited only to the PAYG system which depends largely on GDP per capita growth,
- investments on the capital market would diversify the risk of receiving the pension solely from the PAYG system. This way pensions would be less dependent on the developments in Swedish economy and demography as well as in the sector of domestic economy one used to work in.

⁵ In 2015 the guaranteed pension was 7046 SEK per month for a married person and 7899 SEK per month for a single person (ca. 30% of average salary).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The risk of Swedish economy would be minimized mostly by promoting investments on foreign capital markets,

- the freedom of choice would offer pension savers individualized risk and profit schemes. By making individual decisions concerning investments one would adjust the expected profit to the bearable risk according to age, risk aversion, specific life situation etc.

As a result pension funds market was created that offered pension savers the possibility to manage a part of their savings in line with their own preferences of risk, level of management fees and potential profits. One was allowed to choose up to five funds at the same time for the allocation of premium pension's contributions. It was expected that a reasonable individual would now follow the developments on his savings account and react accordingly so as to maximize future benefits and reduce the risk. Who would perform it better than the pension saver himself? The adverse effects of pay-as-you-go system and state's inefficiency would now be at least in part eliminated especially that the design of the system was also supposed to reduce some of commonly known market failures.

**The choice architecture of Swedish premium pension system
and its results**

The pension funds market was worth almost 615 bln SEK in the end of 2013 and was still growing. It grouped 6,7 mln pension savers and pensioners and is eventually expected to grow to 7 mln participants. As a result of the new legislation, in the fall of 2000 70 financial companies offered 4,4 mln Swedes 465 funds to choose from. The number of funds was growing steadily until 2006, when it stabilized at just below 800. However, in January 2015 there was already 843 funds offered to pension savers administered by 102 companies. Most of the funds invested in stocks (566), much less in bonds (145), and some had mixed stock and bond portfolios (98). In addition there were 34 funds with generational design.

Such a large number of funds was expected to match best the differentiated preferences of cohorts joining the system every year, just as theory suggested. It was realized however that such an extensive choice set could produce significant transaction costs of information gathering and processing as well as a risk of being exposed to asymmetry of information and power between pension saver and fund managing companies. It was thus up to the 'choice architecture' whether these effects would actually appear or how strong they would be. A careful design of the premium pension system

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

could eliminate or at least mitigate some of the factors causing the choice overload phenomenon.

There are at least four features worth mentioning in this context. First and foremost, Pension Authority (*Pensionsmyndigheten*) was established to act like a clearinghouse and a middleman between pension savers and managing companies. It groups together all the requests to join particular funds, withdraw capital, change the investment fund etc. and executes them jointly. This means that it is Pension Authority that is allocating capital into pension funds, not individual pension savers. This has several important consequences (see Palmer 2004), but relevant to our study is that savers' legal and institutional position against the pension fund is significantly strengthened and thus countervails a potential asymmetry of power. Savers are also anonymous to managing companies and hence free of being subject to adverse selection practices or various marketing-related pressures. All pensions are also paid out by Pension Authority, not by private sector funds. Second, all relevant information concerning funds (portfolio structure, history of results, costs of management etc.) has been available since the beginning of the system at any time at the Pension Authority webpage contributing to the creation of extensive and reliable access to information, favoring high transparency and offering a possibility of making unproblematic comparisons between funds. This way an important step towards reducing transaction costs of information gathering and processing has been made. Third, a pension saver is allowed to change funds every day at no charge. One thus allowed to allocate one's pension capital freely with no fees or legal limitations put against him by managing companies. The factor of time is also made insignificant as one has as much time as one wishes to make a firm decision and execute it instantly. Thanks to the possibility of choosing up to five funds at once one does not have to commit to one fund only. And fourth, because the Pension Authority acts as a clearinghouse and pools all individual allocation decisions, it demands significant rebates from pension funds for managing pension capital compared to the fees charged on voluntary transactions. Pension system is thus cost-competitive toward traditional capital market and cannot differentiate between pension savers.

At the beginning effects were promising. In fall of 2000, when pension savers were first offered choice, 67% of individuals made one. Those that did not were transferred into state's administered fund AP7 S fa. However, 67% was the best result the system ever achieved (see table 1) as the percentage of newcomers that committed a deliberate choice began to fall

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

steeply and since 2007 holds at 1,6% level. In 2000 it was a breath of novelty: after a long political struggle for introducing choice into pension systems individuals were granted one and so many committed to making a deliberate choice. It was also a time of massive media campaign encouraging pension savers to choose for themselves and stressing that a proper choice will make a decent pension. Later the campaign faded away as much less persons was joining the system, usually at the beginning of their careers and so with very small capital to administer. The falling involvement in making a thoughtful choice contrasts with rising number of investment funds (figure 1). Between 2000 and 2006 the number of funds rose to almost 800, but this rather discouraged than stimulated potential choice makers. Recent rise to 850 funds probably did not help either.

Table 1. Percentage of newcomers making an active choice

Year	Total (%)	Women (%)	Men (%)	New savers (thousands)
2000	67,0	68,0	66,0	4420
2001	18,0	18,2	16,8	493
2002	14,0	14,0	14,3	196
2003	8,4	8,4	8,3	150
2004	9,4	9,3	9,5	129
2005	8,0	8,3	7,7	117
2006	7,4	7,4	7,5	115
2007	1,6	1,6	1,7	133
2008	1,6	1,4	1,8	163
2009	1,6	1,5	1,8	183
2010	1,6	1,4	1,7	178
2011	1,5	1,4	1,7	129
2012	<2			172
2013	<1			175

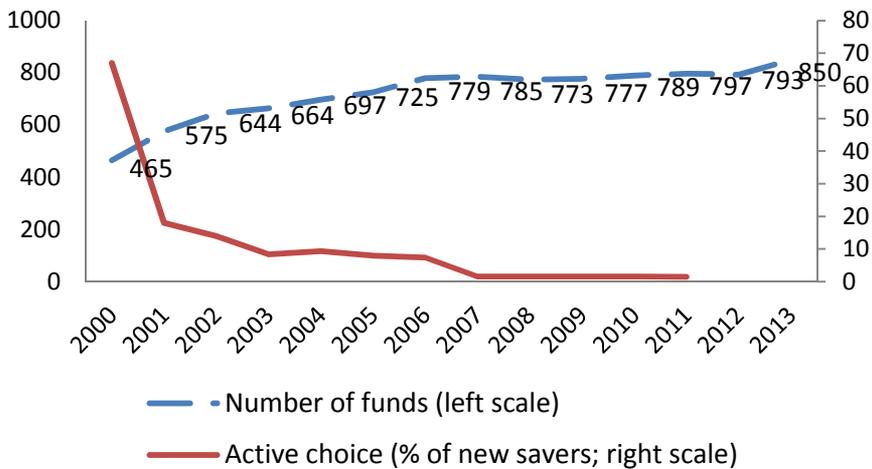
Source: Socialdepartamentet 2013, p. 28; Pensionsmyndigheten 2013, 2014.

Another factor that may have contributed to the falling number of active choice makers was that the rate of return on capital was highly negative (see figure 2). 100 SEK put into the system in 2000 was worth on average less than 60 SEK two years later. Even though market recovered during following years, it plummeted again in 2008-2009 – the same 100 SEK was now worth below 80 SEK. This situation showed that individual choice in fact did not matter against overwhelming market forces, so why bother with time-consuming and stressful choice if the result was negative anyway? On

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

top of all, even if the rate of return was generally positive at the end of 2000-2013 period, it was still below the accumulated growth rate of the income pension based on PAYG principle. The notional defined contribution system generated thus higher returns for individuals than stock and bond markets during 13-years' period. In 2014 the situation finally reversed, but no one can guarantee that there will be no downturn again. This explicitly highlights the risk involved in retiring at the wrong moment when markets are contracting and accumulated savings are thawing.

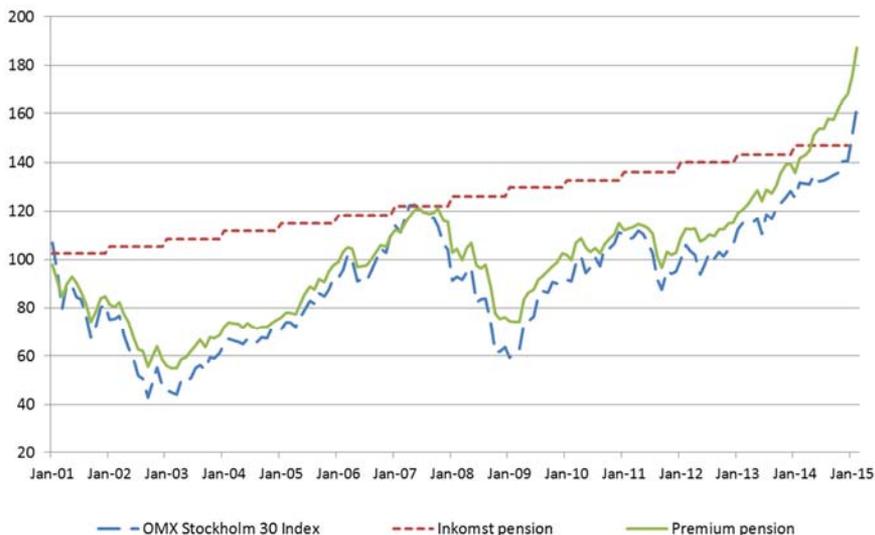
Figure 1. Number of funds and active choice



Source: own.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Figure 2. Value of 100 SEK paid into income and premium pension systems compared to the developments on Stockholm Stock Exchange



Source: own calculations based on Pension Authority statistics, OMX Stockholm 30 Index and Pensionsmyndigheten 2014a, p. 45.

Statistical data confirms that most pension savers are not interested in managing their accounts (see table 2). No more than 7% of savers made at least one change per year in their portfolios under 2000-2011 period. 51% of savers have never bothered to choose managing fund and were automatically transferred into AP7 Såfa fund. 20% of savers made an active choice once, but have been passive since that time, and 22% made less than one change per year. There is a possibility to deliberately choose AP7 Såfa or one of its subfunds (cautious, balanced or aggressive) which could explain the high participation rate in the state administered fund, but out of 3,1 mln participants only 142 thousands made intentionally such a decision until the end of 2013 (Pensionsmyndigheten 2014). 2,76 mln savers were transferred there because they have withdrawn from making any choice and 174 thousands due to inaction when their preferred fund was terminated.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 2. Average yearly activity of pension savers until 31.12.2011

Activity	Choice/No. of changes per year	Pension savers (thousands)	Percentage
Inactive	AP7 Såfa	2664	51
Low activity	Chosen once, never changed	1082	20
	Less than 1 change	1156	22
Active	1-2	195	4
	2-3	105	2
	3-4	49	1
	4-5	18	0
	5-6	10	0
	6-7	6,7	0
	7-8	3,9	0
	+8	10,4	0
Altogether		5300	100

Source: Socialdepartamentet 2013, p. 58.

Weaver (2004) reported results of polls which tried to find out rationale behind this kind of adverse behavior when the system took off. The most popular answers in 2004 were as follows. 28% of non-choosers claimed that they had no time or energy to make a choice; 18% were simply not interested in making any choice; 13% did not have sufficient knowledge to make an active choice; 14% believed that they still got much time until retiring and 10% felt that they had too little money to make any difference. Similar answers were noticed within the group that deliberately chose AP7 fund. 24% did not have the energy or want to choose; 24% wanted to be spared choice for now; 21% felt that they had too little information to make a choice; 17% had too little money; 13% felt that AP7 is safe and secure and only 6% thought that the results of the fund were good. A study by Palme and Sunden (2004) confirmed that the broad choice offered was rather pacifying, not stimulating, and that many individuals misunderstood or did not wish to take advantage of the features offered by the new system. Pension savers hardly diversified the risk; they tended to invest in home economy or even in a particular branch of economy, possibly the one they worked in. Many have also decided to make choice 'once and forever'.

Recent research have largely confirmed that Swedes do not feel comfortable in this particular field of decision making. Report by Social Insurance Inspectorate (Inspektionen 2013) showed that individuals in Sweden

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

have very limited knowledge on pensions and pension saving system even though they are provided with extensive information by authorities. It turns out that information campaigns performed by the Pension Authority have had very limited effect on increasing this knowledge in the long-run. This knowledge is, however, positively related with age, incomes, and education. Almenberg (2011) has reported on deficiencies in financial literacy in Sweden. Even if simple calculations gave satisfactory results, more complicated ones (like understanding compound interest) caused much more trouble. Many Swedes also have poor understanding of basic financial instruments. It is thus little wonder that a significant percentage of Swedes do not feel competent to make decisions that will determine their old-age economic security and so prefer to rely on the state or simply postpone the decision into future. Not everybody wishes to be a financial expert anyway – one could also doubt if it would be socially profitable. Was it not a principle of specialization and a division of labor that spurred economic success of the West?

The Swedish case described above indicates two important points so far. First is that the Swedish premium pension system *is* burdened with choice overload paradox even though many measures have been taken to at least partly mitigate this effect. *Homo economicus* turned out to be human again, with all the consequences involved. His cognitive abilities proved to be very limited and he acted according to his temporary feelings and changing preferences as well as biases towards status quo or procrastination.

The second point is that having a decent default option is of key importance when so many individuals abstain from making a deliberate choice. There is of course possibility to randomly distribute those pension savers among the existing funds forcing them to join private-sector administration (that kind of policy works for example in Poland), but it seems rather unjust and unethical. Pension funds have various rates of return and therefore two persons with equal contributions' history could end up with different pension benefits although *none* had made any active choice. Understandably, this caveat does not apply to voluntary participation in premium pension. Very similar case has actually been touched upon by recent government report indicating that the premium pension system will probably produce higher pension inequalities than expected (Socialdepartamentet 2013). An extreme example shows that for a very small number of individuals there is a difference of 25 percentage points in the average rate of return since the introduction of the system: 0,01% of pension savers got annual rate of -8% and 0,02% of +17%. If this trend continues, the first group

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

is expected to receive 1000 SEK of premium pension per month and the second group up to 200 000 SEK per month when retired. However, 95% of pension savers had the rate of return within -1% and +6% brackets. But even here the difference can be substantial: 3000 versus 10 000 SEK per month. Apart from rising inequality this situation also increases the risk of old-age poverty for a number of pension savers and can even be amplified by an unfortunate moment of retiring when markets contract.

The Swedish default pension fund AP7 S fa seems to be a very reasonable alternative to staying at private sector pension funds. It produced an average yield of 6,2% for 1995-2013 period, whereas an average pension fund only 4,8%. In 2013 the difference was exceptionally huge: 26,6% in AP7 compared to 16,7% in privately managed funds (Pensionsmyndigheten 2014). Such a favorable outcome for the state-administered fund can be attributed to the fact that as much as 90% of its assets consists of stock holdings (of which only 10% of Swedish shares), whereas in private funds less than 80%. AP7 S fa is therefore more profitable, yet burdened with higher risk at the same time. An important feature is that in 2013 the public fund enjoyed management cost of 0,12% of accumulated capital every year compared to an average of 0,39% in privately managed funds. The costs of state's management are thus much lower than in private sector even after the negotiated rebates. One has to remember though that even the state administered fund is vulnerable to markets' instability and it produced negative results in the same years as private pension funds did. It confirms, however, that the state is able to provide a decent substitute to private sector even within the exiting paradigm of fully funded individual capital accounts. Such common default fund is also a more ethical solution which can minimize pension inequalities and the risk of old-age poverty if carefully designed.

It is worth mentioning before concluding that the shortcomings of the existing choice architecture have not gone unnoticed and Swedish government is preparing a reform. The recent report (Socialdepartamentet 2013) indicated that there is a serious threat of arriving at socially unacceptable inequalities of pensions coming from the premium system and that too many individuals feel overwhelmed with choice options. The report points to the very limited knowledge on pensions among pension savers and an extensive number of funds as underlying causes of these developments. It also sketches two possible scenarios for the government to follow. First assumes staying within the same paradigm of choice leaving the huge number of options available. It will, however, overtly promote the default solu-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

tion for those that not wish to make a choice as well as impose cost and risk limits on private funds so as to lessen the issue of future annuities' inequality. The second scenario breaks off with the extensive choice and assumes introduction of a limited number of funds (possibly ten). The default alternative will stay in power. These proposals are currently under detailed investigation by the parliamentary Pension Group and a final report is expected to be presented in September 2015 (Finansdepartamentet 2014). Interestingly, the report openly admits that scenario analyses are essentially questions of values that constitute government's priorities and expectations of specific results. Efficiency of institutional solutions are here of secondary meaning as it is largely easy to estimate costs and benefits of the changes. Here it is rather a trade-off between broad old-age security and current freedom of choice. It is government's task and responsibility to decide which one to choose.

Concludions

The case of Swedish premium pension system confirms that an extensive choice leads to choice deferral and a preference for staying at status quo even in situation of paramount importance for one's future economic security. These findings are hardly new in the light of choice overload literature. However, the occurrence of choice overload in the field of public policy is a rather new phenomenon and implicates new issues to reflect on. A democratic public policy ought to ensure – at least in principle – that more choice should bring about more efficient delivery of welfare and should not foster increase of inequalities. And therefore even the privatized system of public policy should be under constant observation of democratic government and adjusted in line with the adopted values and principles of social life.

Government's responsibility invokes the question of choice architecture: who it was designed for and what principles it was based on. Both in theory and in praxis, as the Swedish case shows. The premium system has been designed with rationally perceived interest of a pension saver in mind. It does the utmost to equip him with plenty of relevant information, allows for frequent and costless change of funds, aims at far-reaching reduction of administrative costs and protects his identity. And in doing so it mitigates the acknowledged effects of market failure and choice overload. Alas, flaws in this careful construction appeared when pension savers turned out not to be perfectly rational agents and the measures that were supposed to

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

facilitate the choice decision process proved pretty useless. This brings a lesson that a design based on rational choice is not everything. Policymakers should rely more on findings in psychology than mainstream economic theory to design tools efficient enough to remedy market failures. As Madrian (2014) recently argued, it is very often not about the inefficiencies of market structure or wrong incentives that make certain solutions fail – it could well be about human nature. Effective public policy should take this into account, even if it could be politically incorrect.

The Swedish case illustrates one more unintended effect of a theoretically well-designed public policy. It could happen that the falling number of active choosers, if not countervailed, will end up in a situation that the premium pension system was introduced only to benefit a small number of pension savers at the expense of majority. For the sake of giving the former freedom of choice and flexibility of allocation, the security of savings for all population has dropped. In turn, this can result in erosion of social solidarity and increased risk of old-age poverty. Current attempts to reform the system prove that government wants to resolve this problem before it gets too far. The forthcoming public discussion will show, however, if those that benefit on the new system are already strong enough to kill the reforming efforts.

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015
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**General Equilibrium Theory – Walras Versus
Post-Walras Economists: “Finding
Equilibrium” – Losing Economics**

JEL Classification: *A1; B2; D5; E4*

Keywords: *Walras; post-Walras; General Equilibrium Theory; Modern Theory; Unrealistic Assumptions*

Abstract: This paper shows that the post-Walras general equilibrium theory is irrelevant to real contemporary economic life. The main achievement of modern General Equilibrium Theory is the proof of equilibrium's existence. It might be that the proof of the equilibrium existence is a mathematical achievement, but the question is whether these proofs are harmonious with the economic situation in reality. This paper traces concisely how Walras's theory has been became causing economic science to deviate in an erroneous direction and reaching a deep crisis; because post-Walras's economists, since Pareto, have misunderstood and misinterpreted Walras's economic theory. This group of Post-Walras authors (Pareto, Cassel, Schlesinger, Wald, and von-Neumann, Hicks, Keynes, Lange, and Patinkin) then recast Walras's theory into incorrect and wrong form; their error further compounded when a later group of economist-mathematicians (Arrow, Debreu, Friedman, Samuelson, Solow and others) accepted their interpretation without reservation. Post-Walras's economists ignore Walras's less known assumptions and blame him for disregarding the problem of equilibrium existence, uniqueness and stability and comparative-static. Therefore, their main objective since the beginning of the 20th century was the rigorous proof of equilibrium existence. However, this proof was based on unrealistic assumptions and along the road *the goal of economics was*

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

lost. The nine crucial, unrealistic assumptions will be considered and will illustrate that modern general equilibrium theory is irrelevant to real economics and is also far removed from Walras's general equilibrium theory.

Introduction

One of the main causes of the current financial -economic crisis is a crisis of economic science, which has been occurring from the beginning of the last century, namely, after the Neoclassical Economic School (Walras, Marshall). Despite the fact that the real economic life over the past century has greatly improved, state of economic science is deteriorated. Almost all of the topics of economic theory or degraded, or are at the beginning of the last century. Nevertheless, it is very difficult to call a new paradigm-rich modern economic theory to replace it classical or neoclassical paradigm. This statement may seem very strange, considering the "revolution in economics" (Keynesian, monetarist and rational expectations) and the fact that every year there is new Nobel Prize in Economic Sciences. This statement seems even more strange in light of the emergence of useful tools such as mathematical (linear) programming and other areas of operations research (especially game theory), econometrics, and, of course, powerful and "smart" computers.

The debate on the methodology of economics between theorists, economists, philosophers and historians of economics economic thought suggests that there is still no consensus on the methodology of economics. One group of authors argues that the theory should be close to the economic reality as possible. At the same time, another group of authors suggests that unrealistic assumptions character determines the measure of the significance of the theory. We support the first approach.

There are the following three statements: first, to be an inverse relationship between theory and reality; Second, the abstract theory means simplification of the real economy by assumptions; and third, the main objective of such a theory should be its practical implementation. The last statement is closely related to the previous as if the abstract theory distorts reality its use is not possible. In other words, there must be an interconnection between abstract theory and reality. Moreover, the relationship between theory and reality should serve as a criterion whether there is progress (development) or regression (degradation) in economic science. Classics (Smith, Ricardo, Marx) and Walras, Marshall suggested that the theory should be as close as possible to the economic reality.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The "abstract method" means that the theory reproduces the real economic life only in a simplified form, so that the theory should not contradict reality, and directed it. It is clear that the abstract theory can never reproduce reality exactly, but should be as close as possible to it (Marshall, p.1).

For example, Walras's theory is characterized by free competition, uniform prices, but does not address the public sector (taxation) and international trade. At the same time, in Walras's approach in equilibrium voluntary unemployment may exist with a positive price. In the post-Walras approach (including the present), this price is zero, which contradicts the reality (Arrow and Hahn; Debreu, 1959; Mas-Colell and et. Al). As a result, we are not "abstract method" and absurd situation.

The scientific method is also characterized by an evolutionary approach, which means compatibility between the progress of human society and economic theory; therefore, the paradigm should be changed in accordance with the development of the real economy in such a way as to ensure compatibility between them.

Thus, in order to establish whether there is either degradation or progress of economic science for a specific period of time, it is necessary to compare the mathematical model and assumptions of the beginning and end of the period that allows you to see whether there is a new paradigm.

Those who argue that there is a significant improvement in the general equilibrium theory (Negishi, 1989; Weintraub, 1985 and 2002) and those who are skeptical about the theory of general equilibrium (Rosenberg, 1983) are wrong. Namely, they have misinterpreted and misunderstood Walrasian general equilibrium theory (Davar, 1994, 2012 and 2014b). Recent publications in the economic literature regarding the Walrasian general equilibrium theory (Bridel, 1997; Van Daal and Jolink, 1993; Walker, 1996 and 2006) do not shed light on the true interpretation of the Walrasian approach. As a result, all statements about the progress or regression of economic theory are questionable.

The paper consists of this introduction, three sections and a conclusion. The second section, Walras's method of general equilibrium theory is briefly is discussed. The third section, concise story how Walras's theory became irrelevant to reality is considered. The fourth section deals with unrealistic assumptions of modern general equilibrium theory. Finally, conclusion is presented.

Walras's Method of General Equilibrium Theory

Let's discuss very briefly Walras's method of establishment and re-establishment of equilibrium. Walras used the common method of equilibrium establishment and re-establishment (variation of prices) in the four types of economies (Davar, 1994 and 2014b).

The first economy, the Exchange Economy, deals with the problems of the exchange of consumptions' goods, namely the problems encountered when determining the equilibrium prices of consumable goods. Walras formulated a law to establish equilibrium prices for the exchange economy.

The second, Production Economy, is an enlarged version of the exchange economy. Namely, productive services (labor, fixed capital and land) are combined to produce consumers' goods. Therefore the problem of establishing the equilibrium price of services is discussed together with the price of goods for consumption. Furthermore the conditions of the law of equilibrium for the production economy, combines the law of the exchange economy (equilibrium prices of consumption's goods) with the law whereby the services' equilibrium prices are established.

Walras formulated the third type of economy, Capital Formation and Credit, by enlarging the production economy by adding the production of new capital goods (investment) and saving. This means that at this step in his theory the problems of new capital goods production and their subsequent demand in parallel with the problems of creating saving are additional issues of capital formation. The general law of equilibrium of capital formation formulated by the law of capital formation and combined with the law of production.

The fourth type of economy, Circulation and Money, is enlarged by the problems of Capital formation and credit. Here Walras added the problems of the determination of prices and quantities for raw materials, circulation capital goods and money for circulation. For this purpose Walras considered problems of determination of the demand for money for circulation for both consumption and production, and of supply of money for the production. So, the law of circulation and money is obtained by combining the law of capital formation and credit with the law of circulation and money. *Therefore, this law includes the laws of all types of economies.*

It could be said that the term "money" makes an illusion that in Walras's previous economies money is absent. However this is incorrect, because a *numéraire* fulfills all the three main functions of money (standard of measure, tool of exchange, and store of value), which might be ex-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

pressed by means of any good (from goods for consumption), and is attributed to all the various types of economies of Walras (Walras, 1954, p.189). Therefore, in the fourth type of economy (circulation and money) together with the *numéraire* Walras used fiat money, as a specific character of the last economy and employing it as money for circulation. So, in the last type of economy Walras considered two kind of money: money commodity (*numéraire*) and fiat money.

Walras first considered the problem of establishing equilibrium for given basic data for the economy of individual (utility functions for each commodity and services separately, and available quantities of goods and services). Determination of the supply and demand for goods and services for each individual economy is the first step for the random price system. Yet, either the offer of or demand for a commodity used as the *numéraire* depends on the balance between the total value of demand (expenditure) and the total value of offer (income) of the commodities not used as the *numéraire*. The total supply and demand of goods and services may be calculated from the results of models of individuals' economies.

At this stage, for the entire economy, Walras formulated two models (equation system) for the equilibrium state and the disequilibrium state, and described the process of establishment of equilibrium by means of the *tâtonnement* algorithm (Davar, 1994, 2002, 2005, 2014b; Negishi, 1985, pp.170-3; Van Daal and Jolink). Namely, Walras shows how this iterative process transforms any initial disequilibrium situation to the equilibrium situation if it is possible, and by this, guarantee its solvability. The each isolated iteration of *tâtonnement* is divided into two stages: firstly, equilibrium establishment for a certain good (or service) – *partial equilibrium*; and secondly, general equilibrium establishment for all categories simultaneously – *general equilibrium*. Walras asserted that the partial equilibrium of a certain category would be exist if the essential assumptions plus the additional requirement, that is, the total (aggregate) demand curve and the total offer curve have *at least one intersections point* (Walras, 1954, pp.108 and 171). It must be stressed that there are economists who has been claiming that Walras's *tâtonnement* is the process of adjustment only of prices without of quantities (Leijonhufvud, p. 99). Yet, in Walras's approach, *there might be voluntary unemployment; moreover, according to Walras's approach also might be considered "forced unemployment"*.

Walras concentrated throughout on the *Law of Equilibrium State*, which is different from the well-known "Walras' law" formulated by his followers (Morishima; Davar, 1994 and 2012). While the Law for more advanced

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

economies only applies to new markets entering the system, it automatically includes the law relating to earlier types of the economy. For example, the Law of Capital Formation and Credit only relates to new capital goods, saving, investment and rate of income. Thus the equilibrium law for consumer goods and services for earlier types of economy (exchange and production economies) is integrated into the law for the economy in question (capital formation and credit).

Moreover, Walras discussed the variation of prices, or re-establishing the equilibrium following changes in the given basic data for an individual or group. This means that if any individual discovers that in the equilibrium state his services (or goods) are not traded, he might change his basic data according to the results of the obtained equilibrium state (Ingrao and Israel). Then, the new process of equilibrium establishment is required.

When Walras's approach is discussed in the post-Walrasian literature, unfortunately, the both models of individual's (micro) and entire (macro) economy is presented either through the exchange economy (in general), or through the production economy¹. Moreover, this representation of Walras's model differs from his original model and is incomplete.

Finally, Walras, as well as Marx, stated repeatedly that in reality equilibrium never achieved. At the same time, Walras asserted that study of equilibrium achievement it is necessary to managing real economics, by revealing the nature of distortion of equilibrium state and treatment them. Walras stated that:

Such is continues market, which is perpetually tending towards equilibrium without ever actually attaining it, because the market has no other way of approaching equilibrium except by groping , and before the goal is reached, it has to renew its efforts and start over again , all the basic data of the problem, e.g. the initial quantities possessed, the utilities of goods and services, the technical coefficients, the excess of income over consumption, the working capital requirements, etc., having changed in the meantime. Viewed in this way, the market is like agitated by the wind, where the water is incessantly seeking its level without ever reaching it (Walras, 1954, p.380).

¹ 'What 'cutes' "know" about Walras amounts to the following caricature. Walras developed the general economic equilibrium model, but did not care about uniqueness and stability of an equilibrium' (Backhaus and Maks).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

And

The state of equilibrium, to which real markets always tend without ever attaining it, would be situation in which both supply of and demand for each service or product, and the cost of and selling price of each product, were equal (Walras, 2005, p. 365).

Walras asserted that applied theory deals with a situation when conditions of equilibrium are permanently destroyed. In the world of Pure Theory, where the regime of free competition prevails, such distortions will automatically be transformed to new equilibrium. But in the real world there are other market types (monopoly, oligopoly, unions, and so on) as well as free competition, and therefore such a distortion would be persistent. In order to minimize the damage yielding from distortion of equilibrium, both Marx and Walras asserted that the State's intervention is required.

Concise story how Walras's theory became irrelevant to reality;

Selecting economic theories (authors) to be compared with basic (Walras's theory) is very difficult and responsible task because there are a lot of theories (authors) that deserving to be choose and hence there is a permanent risk of making a mistake and choosing the "wrong" author at the expense of the "right" one.

Pareto's General Equilibrium Theory

It is well known that Pareto is considered as Walras's partner in the foundation of the Lausanne School of General equilibrium theory (Ingrao & Israel; Menard; Weintraub, 1985). It is implied that in principle, Pareto's approach is generally similar with Walras's one and these authors sometimes replaced each other; i.e. until today Pareto's and Walras's approaches are even mixed. Pareto, however, who was Walras's direct successor, criticized Walras's theory and tried to create his own general equilibrium theory. Therefore, it is very important to understand the relationship between these theories: Are they identical (similar)? If they differ, then what theory is more relevant to real economic life? In my book (Davar, 1994) Pareto's approach was not discussed at all. Pareto was quoted only once to stress that in consequence of Walras, who assumed positiveness of prices, he also recommended positiveness of prices. So, I have proposed, as many other

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

economists have that such authors either did not read Pareto's original works or read but did not understand them, that Pareto's approach is not similar with Walras' one.

Pareto has four main claiming against Walras' general equilibrium *theory*. First, Pareto stated that in Walras' approach prices are constant, while he assumes that prices might be also variable (Pareto, ME, p. 80). This means that Pareto considered two types of variability of prices: first, price of product varies in the macro (whole) economics level, but for individuals price is a uniform. But, this is exactly the case of Walras's approach – prices of commodities are varied in according to change of quantities. Therefore, in order to establish equilibrium Walras used his famous algorithm *tâtonnement*, by means of which passing from one price system to another is occurred until either equilibrium stated, is established or it will be clear that equilibrium does not exist. Nevertheless, Pareto stressed repeatedly that Walras discussed only the case with constant prices (ME pages 61, 83, 94; M p. 448). And it is not accidental that Pareto, our best knowledge, no one reminded the term "*tâtonnement*". This statement, that Walras considered only constant prices, is one of the important flaws of Pareto's understanding and interpretation of Walras' theory. Second form of prices variation, Pareto assumes that prices might vary even for each individual, which is connected with Pareto's fourth claiming (vide infra). It is necessary to point out that Walras did not included prices discrimination in his general equilibrium system, but he discussed such possibility since this derived from the real economic activity. Hence, Pareto had considered theory where prices are variable and at the same time discussed "Walras' theory" with constant prices (Pareto, M, p.155).

Second claiming, Pareto believed that measurability of utility is unnecessary for the consumers' choice and of course for equilibrium establishment (Pareto, ME p.68). Therefore, instead Walras', cardinal utility Pareto used ordinal utility (*ophelimity*).

Third, Pareto criticized Walras' assumption – constancy of production coefficients (Pareto, ME, p.94 and M, 448). Hence, Pareto tried to consider both variable and constant coefficients of production.

Finally, fourth claiming, Pareto stated that Walras considered only economy with free competition. It is necessary to stress here also that Walras really confined himself in his general equilibrium theory by free competition. But, Walras stressed that real economic life is characterized by number of different types of market and discussed them (vide supra).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Hence Pareto tried to consider equilibrium theory together with free competition also economy with monopoly (Pareto, ME, p.81).

The central flaw of Pareto's approach is that the direct relationship between prices and quantities for both goods and services (The Law of Demand and Supply) is ignored, instead of that Pareto discussed about it repeatedly and widely. This conclusion derived from the fact that in Pareto's approach prices are unknowns that might be either constants or variables. This means that in Pareto's approach prices are obtained by the solution of the system of equations together with quantities. By this Pareto thought that he "realized" Walras approach that prices are determined by the process of equilibrium establishment. But, the point is that Walras in his approach assumed existence of the total direct demand functions (curves) for the goods and the total direct supply functions (curves) for services. The latter means that albeit prices describing equilibrium state are unknowns the framework where they might vary is given in advance. This is the reason why Walras used *tâtonnement* for the transition from one given system of prices to their other system obtained in according of the law demand and supply for the given framework.

There are eight significant differences between Walras's and Pareto's General Equilibrium Theories:

- According to Walras's approach the individual economy and the entire economy are separated for all four of economy: exchange, production, capital formation and money. Pareto combined them within one model and considered only the exchange and the production economies. Therefore, Walras's economy is a *decentralized economy*, while Pareto's economy is a *centralized*; yet, even if there is a theoretical solution to Pareto's model, it is impossible to realize practically, as Pareto frankly confessed;
- Walras has used cardinal measure of utility; while Pareto from the very beginning has used ordinal measure of *ophemility*, but later has passed to cardinal measure;
- Walras has used separable utility functions; whilst Pareto has used the utility function included all goods and services together in one function, which from the practical point of view is problematic, if not impossible;
- According to Walras's approach, the demand and supply of goods and services are obtained directly from the solution of models. The offer quantity of a certain good (service) must be less or equal to its available quantity. In the Pareto's approach the final endowment is directly determined for all commodities and their sum is equal to the sum of their

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

- initial endowment; which prevent discussing employment-unemployment problem in the macro level;
- Walras first formulated a macro model, a simultaneous equation system, for the equilibrium state. He then formulated the disequilibrium (working) model, where the number of unknowns is larger than the number of equations and described the process of equilibrium establishment by means of his well-known algorithm – *tâtonnement*, which transforms the initial disequilibrium model into a final equilibrium model. Pareto did not use *tâtonnement*;
 - According to Walras’s approach all prices are unknown for the macro model, but they are known for the micro model; yet, they are strictly positive. In Pareto’s model all prices are unknown and some of them might be equal zero;
 - Walras had a certain success in showing that general equilibrium exists. Pareto, however, ignored the issue of whether equilibrium exists, and reduced it to comparing the number of independent equations and unknowns;
 - Walras used two categories of money: (1) money (money commodity-*numéraire*) serves as the functions of money, and its price is one; (2) money (money commodity-*numéraire* or fiat money) is used for circulation, and its price is the rate of interest. Pareto ignored money issue.

Hicks’s Value and Capital

In the 30-40th previous century, parallel to the proving the equilibrium existence (Wald; Von Neumann) two works were published influence of which have been continuing until today. First work, *Value and Capital* of Hicks, have been serving as the source of stimulation of development of the economic theory after the Second World War. Hicks had a very significant influence on such eminent authors as Arrow, Samuelson, and Morishima by their own confession. It is convenient that Hicks is generally considered to be the “discoverer” of Walras’s General equilibrium theory for readers of English. From the very beginning Hicks held twofold opposing views on Walras’ theory. On the one hand Hicks rated Walras’s theory very highly and on the other hand he claimed that Walras’s theory might be incorrect. Hicks also noted erroneously that Walras’s books except *Pure Elements* were not interesting (Hicks, 1934). It is also necessary to stress that Hicks played a leading part with Keynes in the splintering of the General Equilibrium Theory into two separate theories – Microeconomics and Macroeconomics.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

nomics. Consequently, he played a crucial role in *directing economic science towards an erroneous direction*.

So, Hicks misinterpreted and misunderstood Walras's general equilibrium theory and in the following, the crucial differences between Walras's and Hicks's approaches are listed:

- According to Walras's approach the demand and the supply of each commodity is directly determined simultaneously together with the final endowment on the basis of a given initial endowment for each individual by the solution of a micro model. According to Hicks's approach however, only the final endowment is determined.
- There are *two macro models* for the adjustment between individuals according to Walras's approach: a) A model of an equilibrium state – simultaneous equation system; b) A model of disequilibrium state – where the number of unknowns is larger than the number of equations. Hicks considered *only one macro model*, namely the model of an equilibrium state.
- According to Walras's approach an equilibrium state is determined to exist when the total effective demand is equal to the total effective supply for every commodity. Additionally the equilibrium quantity ought to be either less or equal to the total available quantity. Hence, according to Walras's approach *there might be unsold goods in an Exchange Economy, with positive prices for the sold goods*. According to Hicks's approach however equilibrium state is determined when the final endowment is equal to the initial endowment for every commodity. Hence, here it seems as if *whole available quantities participate in the exchange (trade) process*.
- According to Walras's approach the equilibrium state is established by *tâtonnement* (iterative process), which *transforms the initial disequilibrium model into a final equilibrium model*. Hicks considered *only a solution of the equilibrium model*.
- *Prices, according to Walras's approach are positive*, not only in an equilibrium state but also at each stage of iteration and adjustment. This is because prices are determined and varied in the given framework of the total demand function of goods and the total supply function of services. According to Hicks's approach, however, *equilibrium prices may be either positive, equal to zero, or even negative*.
- According to Walras's approach the initial endowment (quantities and utility functions) is not changed during the whole process of equilibrium establishment. After that any individual or group of individuals may

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

change it. It is then *required that equilibrium has to be reestablished*. Hicks also considered the problem of stability but importantly *only for price and income adjustments*.

- According to Walras's approach the production economy in an equilibrium state might be characterized as a situation in which *there is a voluntary unemployment of services with a positive price for its employed segment*. However the production economy of Hicks uses only the categories of final and initial endowments and therefore, Hicks *did not discuss at all the problems of unemployment (voluntary-involuntary) in the equilibrium state, i.e., full employment is assumed*. The same is also true for the *IS-LM* model.
- In the capital formation and credit economy of Walras *the equilibrium magnitude of the rate of income* is obtained by a comparison between total saving (net income) and total investment (the total value of new capital goods). Hicks though, only discussed the problems of saving and investment in the text of *Value and Capital* without according them a model in the appendix. In the *IS-LM* model Hicks *assumed that saving always is equal to Investment, which is correct only for an equilibrium state*.
- Finally, according to Walras's approach, in a Circulation and Money economy *the equilibrium rate of interest of money is determined by a comparison between the total offer (given) of money and the total demand for it*. Hicks, however only mentioned the problems of money in the text of *Value and Capital* without including a model in the appendix of his book. Moreover in the *IS-LL* model, *an equilibrium magnitude of the rate of interest is established by the relation between the rate of interest and Income*, namely, between the curve (*LL*) and the curve (*IS*). *It is however worth stressing that is very uncertain whether these curves can be drawn*.

The results are: *first, GET has become irrelevant to real economic life; second, Microeconomics has not developed since Walras (Clower); and third, Macroeconomics has never achieved maturity*.

Lange's "Walras' law"

Second work, Lange's well-known paper "Say's Law: A Restatement and Criticism", where he firstly used the term "Walras' law" in economic literature which essentially differs from Walras's original law and which has been, unfortunately, playing crucial role in the modern GET in the

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

proof of the existence of equilibrium state. There is the system of laws, which Walras formulated and used throughout his theory for each type of economy, which are not mentioned anywhere - from Pareto until the modern authors. However, Pareto's optimum which is incomplete expression of Walras's law of Demand and Supply is the cornerstone of the modern economic theory. Lange, unfortunately, did not take into account the system of laws formulated by Walras himself and even he did not mention them.

"Walras' Law", which is one of the crucial foundations of modern economic theory as formulated by Lange, and modified by the modern authors, differs essentially from Walras's original laws. Moreover, it is an intermediate stage of Walras's own Laws, and there is a significant difference also between Lange's and modern authors' versions of "Walras' Law" (Davar, 2012).

First, Walras formulated two systems of law for the framework of the system of assumptions: (1) the law of equilibrium establishment for each type of economy for the initial given data, so that the law for the economy in question related only to the new markets that entered in this level of economy, and laws of the previous level of the economy are automatically included; (2) the law of variation of prices, or the law of the re-establishment of equilibrium, as a result of changes in the given date for any individual or any group of individuals for each type of economy. In contrast to this Lange formulated one "Walras' Law" which is common for all types of economy.

Second, in Walras's approach equilibrium is achieved for each commodity separately connected to equilibrium for other commodities when effective demand is equal to effective supply which is less or equal to available quantities. Therefore, in equilibrium state there might be unutilized quantity for some commodities. In Lange's approach, however where there is equilibrium the excess supply of commodities is compensated by the excess demand for the money commodity, which is in a state of disequilibrium from the perspective of Walras's approach.

Third, in Walras's approach equilibrium for the money commodity is derived from equilibrium for other commodities for the exchange economy, i.e., equilibrium for the money commodity is guaranteed when equilibrium is established for all other commodities separately. Lange however stated the opposite situation, i.e., equilibrium of the money commodity guarantees equilibrium for other commodities.

Finally, in Walras's approach, all prices must be strongly positive and their equilibrium magnitude obtained from the framework of the primary

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

demand curves (functions) for goods and the supply curves (functions) for services. Whereas according to Lange's approach, as well as the post-Walras economists' approach, the number of prices, but not all prices, might be equal to zero, and might even be negative, because they are only obtained by the technological conditions of the model (Jaffé).

In addition, the interpretation of "Walras' Law" by modern authors is formally identical to Lange's one, but there is a significant difference. In the modern general equilibrium theory's approach the excess demand (supply) function is determined as the difference between demand and new produced quantities together with available quantities, while in Walras's approach excess demand is determined as the difference between effective demand and effective supply.

Consequently, in a modern GET determination of excess demand (supply) functions, two possibilities arise: 1) If there is a situation when excess demand for a certain commodity is less than zero (i.e., it is negative) price must be zero accordingly. But this contradicts reality. 2) If all prices are strongly positive then all excess demand functions must be equal to zero, which also contradicts the real economics. While, in Lange's approach, if there is excess demand for a certain good there is excess supply for another good. Therefore, the modern authors' version of "Walras' Law" and its function in proving of the equilibrium existence differs with Lange's one (Arrow and Hahn; Morishima).

These two versions of "Walras Law" not only are disconnected from real economics, but also are incompatible even with a hypothetical economics; and differ from the Walras's own system of laws, which are compatible with 'a hypothetical regime of perfectly free competition'. Finally and perhaps most importantly, "*Walras' Law*" replaced Walras's original laws not only in the textbooks but essentially in professional literature and has caused them to become unknown and abandoned and therefore, caused huge damage to economic science. The thought of an "alternate" to Newton's laws coexisting with the original is ludicrous, yet in economics such anomalies are common place.

Leontief's Input-Output Analysis

Leontief, in his famous 1936 paper, founded this new branch of economic analysis, both empirical and theoretical, and introduced the word "Input-Output", without which it is difficult to imagine the economics literature of the 20th century. From 1936 until today there has been considerable

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

improvement in the process of compilation of empirical input-output data tables and in the use of input-output for economic analysis. He stated (as did the Classics (Smith; Marx) and Walras) that the main object of input-output is to describe economic reality as closely as possible. Leontief also claimed that this goal might be reached if there is a reciprocal connection between the theoretical conception of input-output and its empirical treatment. Walras formulated the first mathematical model of general equilibrium theory without an empirical background. On the other hand, Leontief compiled the first empirical input-output, which was a natural expression of real economic life. Walras's model was used as the basis for the theoretical scheme of input-output by Leontief.

Leontief's input-output analysis are characterized some essential attributes. First, consumption (final uses) is divided into several categories: private and public (government) consumption, investment, changes in the stocks and export, and value added is divided into the several items: wages, profits and other value added, taxes, subsidies and imports for production. Second, the data, in general, were in monetary terms, that mean prices and quantities were not separated. Before describing Leontief's theoretical input-output model it is necessary to stress that from the very beginning Leontief gave importance and significance to presenting prices and quantities separately; however, because of that the practical economic activity has been an occurring in money (value) terms he also considered quantity in monetary terms. Therefore, Leontief presented two different versions of input-output systems. First, in general, one where quantities (physical) and prices (absolute-money) are separated (Leontief 1960, 1965 & 1974), and second, according to empirical input-output, where quantities are monetary terms and prices are in relative terms (Leontief, 1960 (1941) & 1986).

Naturally, there are some differences between these two systems. Leontief enriched Walras's system in accordance with the changes in real economic life. From that moment forward, and during his long life, Leontief applied input-output to different economic topics: dynamic aspect of economic, the choice of technology, trade in the world economy, environmental pollution and so on. At the same time, Leontief's theoretical scheme differs from Walras's system and it does not completely describe reality.

First difference, Walras used, in production part, circulating capital goods from the previous time-period, and which price is equal to price of good multiply by the rate of interest. While, Leontief used the total output (or input) of goods, produced in time-period in question, and its price equal to price of good. This is very significant difference, because it influences

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

on the results of the solution of the input-output model in two directions: (1) in the direction of quantity of good; it is clear that the current economics is characterized by using capital goods from the previous time-period and also by using of goods produced in the time-period in question. So, neither Walras's approach not Leontief's approach is compatible to the today reality; (2) in the direction of prices; prices of goods obtained by the solution of Walras's model might be significantly less than prices obtained by the solution of Leontief's model.

Second difference, according to Walras's approach, in equilibrium state, there might be voluntary unemployment magnitude of primary factors in the framework of his system assumptions, despite of that it is convenient that Walras's theory is characterized by full employment. Changing Walras's assumptions according to Keynes's approach there might be involuntary unemployment either with or without voluntary unemployment in equilibrium state. While, Leontief's input-output model did not discuss problems of unemployment at all, especially in the beginning of it appear. However, if we take into account the fact that in the modern economics it is difficult to find one country that not enduring by hard unemployment, this difference is vary actually.

Third difference, despite of that Walras's general equilibrium theory is static, there is equation discussing the relationship between saving and investment (the new capital goods), by means of the rate of interest. While, despite of that Leontief considered "dynamic model" of input-output, the relationship between saving and investment does not discuss at all. In addition, the dynamic model of Leontief, similar with his static model, did not consider problem of unemployment. Therefore, Leontief's dynamic model is incomplete and in such form it is irrelevant to today economics.

Finally, fourth difference, Walras's succeed to integrate money theory in his general equilibrium theory. As it was mentioned above, according to Walras's approach there are two different types of money. The first type of money for accomplishing the functions of money, and its price is one. The second type of money is used as its service for circulation, and its price is the rate of interest. Therefore, there is equation which discussed the relationship between the supply of money for circulation and its demand (required) quantity by means of its price (the rate of interest). While, Leontief's input-output model did not consider any problem of money at all. However, abandoning of money theory in the input-output analysis is crucial and is one of the central reasons that input-output is not using for the remedy of the contemporary financial-economic crisis.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The modern general equilibrium theory-Arrow-Debreu

The Arrow-Debreu general equilibrium model is characterized by the strong proof of equilibrium existence, stability analysis and the problem of unique of solution. All these, however, are based on the free goods rule (non-Classical), which together with other flaws make Arrow-Debreu theory doubtful from the point of reality². These claims stay correct even after tremendous attempt to “alive” the theory by introducing economic problems such as imperfect competition, international trade, taxes, and so on. We mean so-called Applicable (Computable) general equilibrium theory (Makarov, Levin, and Rubinov; Shoven and Whalley).

The Arrow-Debreu model is closer to Pareto’s version of GE than Walras. This follows from the fact that the problem of the establishment of equilibrium is solved in one stage. In other words, all consumers and all producers are concentrated in one model. However, if there is a strong theoretical solution to the Arrow-Debreu model, it is impossible to realize practically even for a small country, as Pareto frankly confessed. In addition, in the Arrow-Debreu case, the adjustment process between supply and demand is superfluous. Another difference is that prices are obtained by the model’s solution directly, and not determined by means of the *given framework* of demand function for goods and supply functions of services. Hence, prices might reach any magnitude, and some prices might be zero. Therefore, prices in the Arrow-Debreu model do not have any connection to current prices. A final difference is that the utility function for each household is described as a function of all goods and all services in one function simultaneously which is practically unrealizable. Also, problems of unemployment, saving, investment, interest rate and money, and other economic problems are not discussed in this model.

² Allais claimed the same but by another reason: ‘Any theory whatever, if it is not verified by empirical evidence, has no scientific value and should be rejected. This is true, for example, of the contemporary theories of general equilibrium which are based on the hypothesis of general convexity of the fields of production, a hypothesis that is disproved by all the empirical data and leads to absurd consequences (1992,p.26)’ and ‘For almost forty-five years contemporary economic literature has developed too often in a totally erroneous direction with the construction of completely artificial mathematical models detached from reality (ibid. p.27)’

Unrealistic Assumptions of Modern General Equilibrium Theory

The nine crucial unrealistic assumptions observed during the process of "development" of Walras's GET will be considered and will illustrate that not only is modern general equilibrium theory irrelevant to real economics, but that it is also far removed from Walras's general equilibrium theory:

(1) *Price of several goods and services might be equal to zero and even might be negative.*

Post-Walras authors misunderstood Walras's method of equilibrium establishment, namely, that Walras used two macro model (equilibrium and disequilibrium) and demonstrated how disequilibrium model is transformed into equilibrium model by iterative process (*tâtonnement*) if it exists and by this achieve the solution; blamed him as if he considered only equilibrium model, characterized by equations system with equality (Cassel, Schlesinger, Wald, Zeuthen, von Newman). Therefore, they substituted the effective supply of factors by their available quantities and the cost of production by the given selling prices of commodities in the Walras's equations of quantities of services and of prices of commodities, respectively. Then, the demand quantities for services by sectors of production and prices of services are became unknowns.

Yet, the proofing of equilibrium existence is based on two unrealistic assumptions: first, *free good conception (non-Classical)*.

This assumption says us that when there is an excess supply of a service (a product), i.e., an unused part of the service (the good) it is called "free good" (mockery to the Classical free goods conception) and its price equals zero. In other words, in equilibrium, if a certain service is not fully employed, then its price is zero. For example, if unemployment exists, then wages should be equal to zero (Davar, 2011, 2012 and 2014b). But in this case, such a theory contradicts reality (*vide infra*).

Free goods rule (conception) (non-classical) is based on the replacement of the cause (good is being in abundance without any expenditures – like the goods of Nature) by the effect (its price is equal to zero). According to this conception, together with other assumptions, the equilibrium price of some goods and services, specifically when these are in excess supply, is equal to zero. For example, in an equilibrium situation, with high unemployment, wages have to be equal to zero. However, such wages contradict the real facts of economics. Therefore, the modern general equilibrium

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

theory is inapplicable to the real world, and its main achievement of proving the equilibrium existence, once it is based on these assumptions, becomes completely not useful and meaningless.

It must be stressed that the same situation is observed to Keynes's investment multiplier. The Keynesian multiplier is based on the substitution of the cause (the national income) by the effect (investment). By Keynes's definition, the multiplier must mean that an increment of the investment in a certain time would yield an increasing income by the multiple it of multiplier, in the future. Yet, the rate of the multiplier depends on the marginal propensity to invest (or the marginal propensity to consume) and the lower (or higher) the latter, the higher the multiplier. Consequently, in order to increase income, it is better to consume than to save. So individuals were encouraged to spend on consumption and not save. Therefore, for the last twenty years, the average propensity to invest in the United States was decreased and reached 0.04, which means that the multiplier have to be equal to 25. *This is unreal (!)*; and this is one of crucial reasons of the contemporary financial-economic crisis (Davar, 2014a).

Second, "Walras' Law", formulated by post-Walras economists, is one of the crucial assumptions of the MGET and differs essentially from Walras's original laws (Davar, 2012). Moreover, it is an intermediate stage of Walras's own laws. The "Walras' Law", unfortunately, has replaced Walras's original laws, subsequently; the latter have become relatively unknown and abandoned. *The thought of an "alternate" to Newton's laws coexisting with the original is ludicrous, yet in economics such anomalies are common place.*

The results of the solution of such equations system by the tools of mathematics are that some prices of services might be zero and even negative (Dorfman, Samuelson, & Solow). Some economists accepted that prices might be zero but disagreed that the price might be negative. Therefore, in order to eliminate such possibilities the equality was replaced by inequality. Unfortunately, this replacement caused another difficulty, and it yields the following unrealistic assumption. Whilst, according to Walras's approach all prices are strictly positive (Ingrao and Israel; Ginsburgh, and Keyzer).

(2) *Measurement of prices*

In modern GET measurement of prices is unclear, because those prices are obtained by the model's solution directly, and not determined by means

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

of the *given framework* of demand function for goods and supply functions of services where prices are measured in *numéraire* (money commodity) as in Walras's Theory. Moreover, prices might reach any magnitude, and some prices might be zero. Therefore, prices in the Arrow-Debreu model do not have any connection to current prices. Moreover, it was recently suggested that shadow prices (Lagrange multipliers) have been using as a prices even for practical applications of input-output analysis (Thijs ten Raa, p.15). Such statements mean a regression of economic science at least on fifty years.

(3) *All economic agents (consumers and producers) are concentrated in one whole model.*

This type of model, when all economical agents are included (comprised) in one model, differs from Walras's model where each economic agent (consumers and producers) solves his economic problems individually (separately) depending only on his personal goals (maximum utility, or maximum profits, and so on) by micro model; afterward, the adjustment between these individual solutions occurs by the macro model. In other words the process is divided into two stages: individual activities and the adjustment between them, i.e., establishment of equilibrium. It must be stressing that this approach is based on real economics and therefore, there is a natural integration between microeconomics and macroeconomics. In the case when all agents included in one model, the solution of individuals' economic problems and their adjustment (equilibrium establishment) has simultaneously occurred. This approach has two problematic issues: firstly, since models of all individuals are solved together, it is natural that an interpersonal comparison of their goals (utilities) occurs; secondly, and most important, such model has huge dimensions, which makes impossible its practical realization (solution) even by means of the modern superpower computer.

(4) *Unemployment*

The modern general equilibrium theory do not able to discuss problems of employment-unemployment, because that the excess demand (supply) for goods and services is determined as a difference between the final endowment and the initial (available) endowment.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Such determination of the excess demand (supply) has some negative consequences from the point of economics. First, the demand and supply are not directly determined; therefore there is illusion that as if the whole available quantity of commodities and services are traded. Consequently, second, it is not clear what part of commodities and services is actually traded and what part is not traded, that is, what part is unemployed (unsold). Finally, despite of that the excess demand is sometimes determined as a function of prices the original linkage between prices and quantities is destroyed.

While, in Walras's approach, *there might be voluntary unemployment; moreover, according to Walras's approach also might be considered "forced unemployment"*.

(5) *There is only one type of money – fiat money.*

In the modern general equilibrium theory money either disappeared or is considered in very simplified form and with unrealistic assumptions.

Classics, who considered money theory as essential to and inseparable from economic theory, have discussed their reciprocal influence. One of Walras's major and unique contributions is the integration of his money theory into his general equilibrium theory which enabled him to consider the real economic and financial sector as one integrated system (Schumpeter p.1082; Marget, 1931 and 1935).

Majority of economists since Pareto, unfortunately, misunderstood and misinterpreted Walras's general equilibrium theory, especially, theory of money, and have been claiming that Walras's theory is both incomplete and even wrong (Hicks, 1934; Clower), or that the problem of money is not discussed by him at all. Economists, who realized that Walras discussed the problem of money in his theory, are claiming that he failed in the integration of money in his general equilibrium theory. Therefore, they have been attempting to reconstruct and rewrite it. Moreover, from the very beginning, Walras's money theory is simply ignored.

Crucial attribute of Walras's money theory, which was completely misunderstood and was absolutely given up, yields serious confusion: is the fact that Walras as well as Smith considered two types of money: money as a medium of exchange, a measure of value and store of value where the money commodity (*numéraire*) has to be served and money for circulation where either the money commodity (*numéraire*) or fiat money might be served. Thus, there are two different prices for the money commodity: (a)

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

when money commodity is used as a measure of value its price equal to one; (b) when money commodity is used in circulation its price equal to the rate of interest.

In contrast, in the works of most post-Walras economists, the economic and financial sectors are separated, and their authors have been claiming that money commodity (*numéraire*) is not money (Hicks, 1967, p.3).

Therefore, is not accidental that post-Walras's money theory is generally considered one type of money - fiat money (Kiyotaki, and Wright; Magill and Quinzii). So, from the seventies, the majority of countries of the world used a fiat money as standard money; fiat money replaced the money commodity and had to fulfill all four functions of money. But this is opposite with the principal statement of classical money theory, that only money commodity have to serve as a measure of value, and fiat money has to be only used in circulation. Moreover, the quantity of fiat money must be regularized by the quantity of the money commodity (Davar, 2013, 2014b).

The replacement of the money commodity by the fiat money has yielded several undesirable phenomena, predecessors of the financial bubbles. First, because the fiat money has no objective value, economics is managed without valuating of goods and services. Second, because there is only one type of money, namely fiat money, there is only one price – the rate of interest and the price of the money commodity is absent. Therefore, this is another reason why fiat money cannot be served as a measure of value. Third, there are no obstacles and no limit to printing paper money (Davar, 2011, 2013 and 2014a).

Walras emphasized the specific role of money in distortion of general equilibrium because that changing of price of money impacts directly on prices of almost all products and services. Hence, changing price of money yields changing prices of products and the result is a disorder of equilibrium, i.e., economic crisis. In the case of deep crises Walras *recommended that the State should intervene and regulate the quantity of money* (Walras, 2005).

(6) *Saving and Investment*

Modern GET does not discuss the issue of saving and investment at all, while Walras discussed this issue in detail in his third economy, “Capital Formation and Credit”.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

(7) Cost of production

One of central conditions of equilibrium, equality between the selling prices of goods and its cost of production (supply price) in the Arrow-Debreu approach cannot be kept, because the cost of the production of goods is directly not determined; because of this it is important that not only the price of some goods might be equal to zero, but also the price of some services might be zero. While, according to Walras's approach this condition of equilibrium is established by iterative (*tâtonnement*) process between cost of production and selling prices of goods.

(8) Utility function

The utility function for each household is described as a function of all goods and all services in one function simultaneously, which is problematic if not impossible from the point of real economics. This is opposite to Walras's approach where utility function is described for each good separately.

(9) Circulation capital, products and money

The problems of circulation capital, products and money are not discussed by the modern GET; while, Walras realized the property of money, as a service, entirely in the last economy, Circulation and Money, where money is also used as a service of circulation. This means that in the calculation in the equation of the cost of production of the produced goods the price of a certain product used as a circulation capital is determined as a price of product in question multiple a price of money's service, the rate of interest.

The modern economic theory, based even if on one of above mentioned unrealistic assumptions, is incompatible with reality; hence its applicability is doubtful, though from the point of view of used mathematics it might be indeed remarkable achievement. In practice, several unrealistic assumptions are simultaneously used by the modern economic theory for the serious issues.

Therefore, we can conclude that the Arrow-Debreu general equilibrium model is irrelevant to real contemporary economic life.

Conclusions

In this paper was shown that the post-Walras general equilibrium theory (included Arrow-Debreu model) is irrelevant to real contemporary economic life. The main achievement of modern General Equilibrium Theory (GET) is the proof of equilibrium's existence 'The proof of general equilibrium is the crowning achievement of mathematical economics' (Rosenberg; Arrow, 1989). It might be that the proof of the equilibrium existence is a mathematical achievement, but the question is whether these proofs are harmonious with the economic situation in reality.

In this paper was concisely traced how Walras's theory has been became causing economic science to deviate in an erroneous direction and reaching a deep crisis; because post-Walras's economists, since Pareto, have misunderstood and misinterpreted Walras's economic theory. The group of Post-Walras authors (Pareto, Wald, and von-Neumann, Hicks, Lange, and Leontief) then recast Walras's theory into incorrect and wrong form; their error further compounded when a later group of economist-mathematicians (Arrow, Debreu, Dorfman, Samuelson, Solow and others) accepted their interpretation without reservation. In fact, each of them, when carefully examined, was trying to create his own general equilibrium theory -- which formally resembles Walras's approach -- but actually is no more than a distortion of Walras's theory.

Modern mathematical models of economics and financial sectors are generally separated and are very complicate but majority of them are weakly connected with reality especially modern general equilibrium theory (Debreu; Arrow and Starrett; Arrow & Hahn; McKenzie; Mas-Colell, Whinston and Green; Shoven and Whalley). Instead of gradually updating some of the Walrasian old-fashion assumptions by new ones that are compatible with contemporary economics modern general equilibrium theory has been rediscovering and using almost all of Walras's assumptions; moreover, new, unrealistic assumptions were introduced, making modern economic theory incompatible to reality. Post-Walras's economists ignore Walras's less known assumptions and blame him for disregarding the problem of equilibrium existence, uniqueness and stability and comparative-static. Therefore, their main objective since the beginning of the 20th century was the rigorous proof of equilibrium existence. However, this proof was based on unrealistic assumptions and along the road *the goal of economics was lost*.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The nine crucial, unrealistic assumptions were considered and illustrated that not only is modern general equilibrium theory irrelevant to real economics, but that it is also far removed from Walras's general equilibrium theory.

Finally, tremendous intellects sources of several generations of economists with enormous financial outlay have been wasted for more than 100 years on the subject that is not useful and meaningless for practical recommendations.

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**Proceedings of the 8th International Conference on Applied Economics
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**Proceedings of the 8th International Conference on Applied Economics
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**Fertility Rebound and Economic Growth. New
Evidence for 18 Countries Over the Period
1970-2011**

JEL Classification: *J11; O10; C23*

Keywords: *fertility rate; fertility rebound; economic growth; panel data analysis*

Abstract: Long-run impact of economic growth on fertility trends is ambiguous and sensitive for in-time variations. Noticeably, over last decades, economic growth has led in many countries to significant falls in total fertility rates. However, recently, in high-income economies a kind of ‘fertility rebound’ emerged (Goldstein, 2009; Luci and Thevenon, 2011; Day, 2012), which supports the hypothesis that reversal trends in total fertility rates are mainly attributed to economic growth.

The paper unveils the relationship between total fertility rate changes and economic growth in 18 selected countries with fertility rebound observed, over the period 1970-2011, and detects the GDP-threshold at which the fertility rebound emerged. To report on the relationship we deploy longitudinal data analysis assuming non-linearity between examined variables. Data applied are exclusive derived from World Development Indicators 2013. Our main findings support the hypothesis on U-shaped relationship between total fertility rate and economic growth in analyzed countries in 1970-2011. Along with the previous we project the minimum level of GDP per capita (GDP-threshold) when the fertility rebound takes place.

Introduction

In 1994, Hirschman (1994) concluded that the picture arising from empirical evidence on changing fertility (measured, by convention, as period total fertility rate – TFR) is ambiguous and does not provide clear justification about its determinants. After twenty years of further studies, our knowledge about factors influencing fertility is much broader however; we still lack hegemonic theory on that field. Contemporary societies are highly heterogeneous, and the relationship between changing fertility rates and economic development is affected by multitude of quantifiable and unquantifiable factors; still, the negative relationship between fertility and socio-economic development is recognized as one of the best-established and consolidated regularities in social sciences. The cited regularity was empirically confirmed in prominent works of, *inter alia*, Becker (1960), Heer (1966), Easterline (1975), Van de Kaa (1987), Witte and Wagner (1995), Becker et al. (1999), Lee (2003), Myrskylä et al. (2009), Luci and Thévenon (2011) or Bacci (2013). The economic reasoning behind the negative relationship between fertility and economic development is following. As mortality and fertility rates decline¹, it allows for reductions in amounts of energy and resources necessary for childbearing (Kalemli-Ozcan et al., 2000; Orsal and Goldstein, 2011; Livi-Bacci, 2012 and 2013), resulting in higher women's engagement in market activities instead, potentially generating shifts in productivity. Weil (2013) also claims that as countries get richer, there reveal two specific effects, namely 'income effect' and 'substitution effect', which allow explaining why people tend to have less children as their income grows. Economically speaking, people value children as 'normal goods' on which they need to spend money. As people earn more, they – theoretically – can afford more children, but the previous is usually not true, as the relative *price* of rising children also rises. Childbearing requires time, which expresses the opportunity cost of not earning money from regular work; hence, the 'substitution effect' emerges, hence if the 'substitution effect' is stronger than the 'income effect' then the country's fertility falls. Weil (2013) additionally explains that lowering fertility may be determined by emerging 'quality-quantity trade-off' effect. In high-developed countries, children need to get good education, which is costly. Thus, people decide to have fewer, but better educated children, hoping for payoffs in the future and children's support in as parents get older in age.

¹ Note that in demographic perspective, the lowering fertility rates are a consequence of both declined in mortality and increases of life expectancy.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Alternatively, they decide to have more children, but at the cost of their worse education. Whether people decide one or another, depends predominantly how they value children, what are the well-established social norms and attitudes, and individual preferences. But, as it is claimed by some scholars, see i.e. Galor and Weil (1996, 1999), Kohler et al. (2002a, 2002b), Deopke (2004), Caldwell and Schindlmayr (2003), Butler (2004), Morgan and Taylor (2006), Klasen and Lamanna (2009), Mills et al. (2011), the total fertility rate and economic development are rather linked by two-way, than one-way, relationship. The reverse causality between TFR and economic development is possible, but also heavily preconditioned by broad array of economic and demographic factors. However, most recent estimates provide solid background to claim a reversal of the previous negative associations between TFR and economic growth and development (i.e. Gubhaju and Moriki-Durand, 2003; Bongaarts and Sobotka, 2012). To support the previous, it is worth underlying that in Europe, the period 1998-2008 was marked by significant changes on the ground of total fertility rates (Bongaarts and Sobotka, 2012; Sobotka, 2012). In many European countries, TFR began to grow, after having fallen until unprecedentedly low levels in early 2000s (in 19 European countries, the TFR fell below 2.0). The evidence on a trial of escaping the 'low fertility trap'² in European countries, is reported in works of, *inter alia*, Prioux (2007), Goldstein et al. (2009) or Bongaarts and Sobotka (2012). Over the period 2000-2011, similar reverse trends in total fertility rate are observable in more than 60 high-developed and economically backward countries (to compare see World Development Indicators 2013). Surprisingly, Myrskylä et al. (2009), Day (2012, 2013) and Varvarigos (2013) find that the well-

² The concept of 'low fertility' is to a point ambiguous. As Bacci (2013) argues, in its simplest form, the low fertility occurs when it falls below 1. In such sense, the fertility rate is totally conditioned by level of mortality ('one for one'). However, in modern societies, where the life expectancy is high and mortality in reproductive years is close to zero, the replacement of populations is strictly depended on total fertility. Societies, where the total fertility rates oscillate around two children per women in her reproductive life cycle are labeled as low fertility societies (Bacci, 2012 and 2013). If the total fertility declines until around 1 or less child per women thus is named as 'ultra-low fertility' or 'lowest-low fertility'. The low fertility can be also subjectively perceived. To a point, fertility rates rely on individual expectations or preferences, social norms or ideals, religious attitudes, or finally state strategic targets. In such case, rigid notion of low fertility remains fuzzy and undefined. In general, from purely demographic perspective the concept of low fertility relates exclusively to population replacement, while incorporating the low fertility notion into social or economic ground, allows its perception in context of meeting broadly agreed social, economic or political targets (like i.e. in China 'one child' policy).

established negative relationship between fertility rate and economic growth turns to be rather positive, especially, at higher stages of economic development. Hence, the emergence on new regularities between TFR and economic growth is witnessed. The hypothesis on potential positive relationship between fertility trends and economic development – labelled as ‘U-shaped fertility dynamics’ (Day, 2013; Luci-Greulich and Thévenon, 2013), is supported by evidence on growing total fertility rates mainly in high-income economies (Myrskylä et al., 2011; Myrskylä et al., 2013). The changing trends in fertility rates are recognized as *fertility rebound*, defined as reversal of fertility decline accompanied by economic development.

The aim of the paper is to provide new evidence on relationship between fertility and economic development and estimate the GDP-threshold at which the fertility rebound emerged in analyzed countries. To meet the main targets of the paper, we re-examine the hypothesis on a U-shaped relationship, for 18 high-income countries over the period 1970-201, between total fertility rate (TFR) and GDP per capita. Our study consists of six parts, whereby the introductory part is followed by section two explaining theoretical background and literature review. Section 3 presents data rationale, whereas section four sets the main goals of the paper and adopted empirical strategy. The subsequent section five illustrates empirical analysis results and the final part refers to substantial conclusions in this respect.

Conceptual background

Recent empirical studies (see i.e. works of Goldstein et al., 2009; Bongaarts and Sobotka, 2012; Luci-Greulich and Thevenon, 2013; Day, 2013) provide well-documented evidence on the relationship between TFR and GDP per capita or – alternatively – socio-economic development approximated by Human Development Index. Although the evidence is relatively broad, the main conclusions they allow for, vary significantly showing complexity of the problem and multitude of factors, which potentially affect the two-way relationship between fertility and economic growth and development. Both in theoretical and empirical works where main emphasis is put on aspects combining fertility trends and economic development³,

³ Along with growing literature on the relationships between total fertility rates and economic development, there is broad empirical evidence providing demographic explanations to reversal fertility trends. Such evidence can be traced in works of, *inter alia*, Bongaarts and Sobotka (2012), Bongaarts and Feeney (1998), Bongaarts (2002), Sobotka (2004), Gold-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

three seminal research streams are easily distinguishable, since each one offer different perspectives for the analysis. The first stream combines issues of changing fertility with economic development, the second – changing fertility trends with economic growth exclusively, while the third one confronts changing fertility trends with business cycles. The first and second one perspective are mostly long-term in nature, while the third one combined short-, and long-run approach. Myrskylä et al. (2009), in their prominent work, apply panel data for 37 high developed countries over the period 1975 to 2005, to examine the relation between the Human Development Index (HDI) and the total fertility rates. They suggest that HDI-TFR relationship tends to reverse from negative to positive, as countries pass *critical* level of HDI. Their findings show that, at low and medium level of human development index (HDI), decreases in fertility rate coincide with continuously progressing economic growth. The situation changes diametrically at higher HDI levels. Further development, upon reaching a particular threshold, may lead to a reversal in fertility declining trend. The level of HDI, which turns the correlation between human development and fertility from negative to positive, is at about 0.9. Following the above, they predict that, in long-run perspective, advanced in human development shall impact positively fertility rates; however changes in fertility are not exclusively attributed to economic effect solely. Changing relationship – from negative to positive – between two covariates like total fertility rates and economic development, can be graphically approximated by U-shaped pattern. Luci and Thévenon (2010) also report on U-shaped relationship between TFR and GDP per capita. Unlike Myrskylä et al. (2009) do, they analyse the impact of GDP per capita on fertility rates, to isolate the pure economic impact on total fertility rates. To test the hypothesis of a convex impact of GDP per capita on TFR, Luci and Thévenon (2010) use a panel data set of 30 OECD countries over the time span 1960-2007. Applying one step-estimator, they designate turning point in the relationship between economic growth and fertility, at which further growth may lead to a reversal of fertility decline trend. The minimum of the curve is located at specific GDP per capita that corresponds to approximately 32,600 (in constant 2005 US\$) and total fertility rate at 1.51 children per woman. Separately they identify country-specific factors, which intend to explain why countries at comparable level of GDP per capita levels experience different fertility rates. A general conclusion of the study is that economic develop-

stein et al. (2009), Frejka (2010), Sobotka et al. (2011), or Neels and de Wachter (2010a, 2010b).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

ment is likely to induce the fertility rebound; however, the evidence is not robust and case-sensitive. The evidence provided by Myrskylä et al. (2009) clearly claims that advances in development path, in some cases are accompanied by reverses of declining fertility rate, but, by contrast, such conclusion is questioned by Furuoka (2009). Furuoka applies a threshold regression to examine the existence of the U-shaped fertility-development curve proposed by Myrskylä et al. (2009). He uses threshold HDI (indicated as 0.777) to divide the sample into two subsamples – countries with HDI level equal to or lower than the threshold value and those that exceed the threshold. Thus, the negative relationship between HDI and fertility rate was revealed both in the countries with HDI below and above the threshold, although in countries with high HDI, the negative relationship between covariates was relatively weak. It supports the supposition that countries placed in earlier phases on economic development are more likely to experience declining fertility rates, likewise, in high-developed countries it is just the opposite. The aforementioned evidence provided by Myrskylä et al. (2009) is additionally supported by Goldstein et al. (2010). They verify the importance of economic conditions for fertility trends, using data on unemployment rates and GDP growth in 27 OECD countries (regardless total fertility rates levels), over the period 1995 to 2008. However, they do not claim direct influence of unemployment on fertility, rather emphasising importance of current economic conditions on individual decisions on childbearing. Goldstein et al. (2009) find both unemployment and economic growth rates to be statistically significant predictors of prospected TFR. Another stream, both in theoretical and empirical research highlights the importance of distinguishing between short and long-run perspectives when analyzing TFR and GDP per capita relationship. Long-term analysis mainly focuses on macro-factors (on aggregate level) that determine observed changes in fertility, and such approach was presented in aforementioned studies. While short-term analysis – concentrate on examining the impact of business cycles (especially recession) on the period TFR, and refer to individual decisions that may influence changes in TFR (Sobotka et al., 2011). The majority of short-term analysis shows pro-cyclical relationship between fertility and GDP per capita. During recessions (approximated by GDP per capita declines, growth of unemployment rates etc.) fertility tends to decrease. Such evidence is presented, *inter alia*, in works of Lee (1990), Bengtsson et al. (2004), Martin (2004) or Adsera and Menendez (2009). Sobotka, et al. (2011) confirmed the pro-cyclical relationship between GDP per capita and fertility. They used changes in GDP per capita as a proxy

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

explaining recession and the period TFR as an indicator of fertility (they imposed 1-year lag in GDP per capita impact on TFR changes). Their study (Sobotka et al., 2011) covered 26 low fertility developed countries over the period 1980-2008, and results obtained seem to support the hypothesis that fertility and economic growth are positively correlated along business cycles, which was already concluded from previous works (see i.e. Lee, 1990; Bengtsson et al., 2004). However, detecting rigid regularities in behavior of TFR versus GDP per capita if business cycles are considered, huge uncertainties emerge which makes the relationship even fuzzier. The previous was clearly stated in works of i.e. Kohler et al. (2002a, 2002b), Santow and Bracher (2001), Mills and Blossfeld (2005), Kreyenfeld (2010), Neels (2010) or Sobotka (2010). Circumstance that today's recessions (i.e. that which started in 2008) take place under, differ significantly from those in the past. This is mainly due to huge increases in women's active participation in labor market, which is partly determined by their growing access to education, contraceptives, and changing social norms. In effect, the previous may precondition the strength of influence of short-term recessions on changing fertility trends. The counter-cyclical relationship was only mentioned in few studies – i.e. Butz and Ward (1979a, 1979b) or Macukovich (1996). Recent decades are featured by relatively short recessions, thus their real impact on fertility was temporary. The fall of fertility during recessions was followed by its rise (or slower decline) during recoveries. When analyzing trends in fertility in short time perspective, there might arise, some difficulties with clear distinguish between fertility changes and fertility timing (postponement of the birth). Only in few studies, we observe a trial to tackle the problem just mentioned. Formal analysis trying to combine short and long run perspective in detecting relationships between economic development and fertility, are found i.e. in works of i.e. Ogawa (2003) or Rindfuss et al. (1988). Empirical evidence linking fertility changes with GDP per capita is even rarer than the previous. Our empirical analysis, presented in following sections of the paper, predominantly concentrates on detecting long-term relationships between changing total fertility rates and GDP per capita.

Data

Intentionally, our analysis is limited to two variables. Firstly, we account for Total Fertility Rate (TFR_{it}) which refers to number of children that a woman would give birth to, in accordance with current age-specific

fertility rates (see WDI 2013). Secondly, to approximate level of economic development of countries, we consider gross domestic product per capita ($GDP_{pc_{it}}$). We take natural logarithms of national GDP per capita in constant 2005 US\$. All data are exclusively derived from World Development Indicators database 2013. To complete our empirical analysis we construct strongly balanced cross-country long panel including 18 high-income economies that satisfy two prerequisites: over the period 1970-2011 Total Fertility Rate has dropped below 2.1 (replacement rate) which was followed by 'fertility rebound', and – according to World Bank – are classified⁴ as high-income countries. Finally, the empirical sample covers Australia, Belgium, Barbados, Canada, Switzerland, Germany, Denmark, Spain, Finland, France, United Kingdom, Greece, Japan, Italy, Netherlands, Norway, Sweden and the United States.

Methodological settings and empirical targets

The aim of the paper is twofold. Preliminary, using panel data of 18 countries over the period 1970-2011 we are to confirm the hypothesis on U-shaped relationship between Total Fertility Rate and economic growth approximated by GDP per capita. Following the above, we estimate threshold level of GDP-threshold when the fertility rebound effect is revealed. To test the hypothesized relationship, we perform panel regressions analysis, which allow capturing variation in behavior across time and entities (countries), if countries tend to be highly heterogeneous. Firstly we confirm the U-shaped relationship between variables: Total Fertility Rate (TFR_{it}) – response variable; and economic growth ($\ln GDP_{pc_{it}}$) – explanatory variable. For this, adopting pooled OLS, we examine linear model versus 2-degree polynomial (quadratic equation) and 3-degree polynomial (cubic equation). To formalize the above, we specify:

$$TFR_{it} = \beta_0 + \beta_1 \ln GDP_{pc_{it}} + \varepsilon_{it}, \quad (1)$$

$$TFR_{it} = \beta_0 + \beta_1 \ln GDP_{pc_{it}} + \beta_2 (\ln GDP_{pc_{it}})^2 + \varepsilon_{it}, \quad (2)$$

$$TFR_{it} = \beta_0 + \beta_1 \ln GDP_{pc_{it}} + \beta_2 (\ln GDP_{pc_{it}})^2 + \beta_3 (\ln GDP_{pc_{it}})^3 + \varepsilon_{it}, \quad (3)$$

⁴ According to formal World Bank country classification (see: <http://data.worldbank.org/about/country-classifications>, accessed: Feb 2014)

where i denotes country, t – period (year) and ε_{it} – an error term. If U-shaped relationship between TFR_{it} and $\ln GDP_{pc_{it}}$ is confirmed, afterwards we exclusively concentrate on quadratic longitudinal models. Using yearly observations, we test convex shape of the curve explaining cross-country relationship between TFR_i and $\ln GDP_{pc_{it}}$ and its square term. To capture time-invariant countries' specific effects, we propose country-fixed effects regression, defined as:

$$TFR_{it} = \alpha_i + \delta_1 \ln GDP_{pc_{it}} + \delta_2 (\ln GDP_{pc_{it}})^2 + \varepsilon_{it}, \quad (4)$$

which can be rewritten (if country-dummies included):

$$TFR_{it} = \alpha_i + \delta_1 \ln GDP_{pc_{it}} + \delta_2 (\ln GDP_{pc_{it}})^2 + \gamma_2 C_2 + \dots + \gamma_n C_n + \varepsilon_{it}. \quad (5)$$

In Eq.(4)-(5), α_i denotes unobserved, time-invariant fixed effect, γ is coefficient for binary-country regressors, C – is country-dummy, n accounts for number of countries in the sample, and α_i and $(\ln GDP_{pc_{it}})$ are arbitrary correlated. For Eqs.(4)-(5), to satisfy the exogeneity assumption, we assume that $E(\varepsilon_{it} / X_i, \alpha_i) = 0$, if X_i represents $(\ln GDP_{pc_{it}})$. In specified model, the TFR_i concisely expresses the vector of country's individual results determined by changes in *per capita* income, across all periods. To examine time-fixed effects we additionally estimate:

$$TFR_{it} = \alpha_i + \delta_1 \ln GDP_{pc_{it}} + \delta_2 (\ln GDP_{pc_{it}})^2 + \gamma_2 C_2 + \dots + \gamma_n C_n + \lambda_2 Y_2 + \dots + \lambda_n Y_n + \varepsilon_{it}, \quad (6)$$

where Y is year-dummy and λ stands for its coefficient. Hence regression Eq.(6) is estimated for $n - 1$ countries and $y - 1$ years. In Eq.(6) we relax the assumption on unobserved effects which vary across countries but are constant over time. Thus we control for time effects supposing that unexpected variation potentially influence explanatory variable.

To confirm results generated from Eqs.(5)-(6), along with within estimator we introduce instrumental variables (IV) estimator, which cuts potential correlation between error term and explanatory variables. To formalize the above, let us give: $y_i = \beta x_i + \varepsilon_i$, but $E(x_i, \varepsilon_i) \neq 0$, despite the exogeneity assumption requires $E(x_i, \varepsilon_i) = 0$. Hence, to "omit" the endogeneity, we define z_i as instrument which satisfies $E(z_i, \varepsilon_i) \neq 0$ and $E(z_i, x_i) = 0$. To obtain unbiased β , we adopt 2SLS method where: $y_i = \beta x_i + \varepsilon_i$ and $x_i = \varphi z_i + \mu_i$, if $\varphi \neq 0$ ($\Leftrightarrow E(z_i, \varepsilon_i) \neq 0$). We also

deploy lagged $\ln GDPpc_{it}$ and $(\ln GDPpc_{it})^2$ ($\ln GDPpc_{it}$ – 1-year lag), $(\ln GDPpc_{it})^2$ – 1-year lag) as instruments, which are sufficiently correlated with $\ln GDPpc_{it}$ and $(\ln GDPpc_{it})^2$ respectively, but uncorrelated with ε_{it} , which allows producing unbiased δ_1 and δ_2 . To get rid of the unobserved heterogeneity in models, first differences estimators (FDE) are often applied. However, we decide not to follow this approach. First differencing of data implies that all estimates are generated for relative changes instead of levels, which brings risk of obtaining misleading results due to convergence process that characterizes analyzed countries. Convergence hypothesis support the logic that relatively poor economies experience higher rates of i.e. GDP per capita growth, if compared to rich ones. In our case, as total fertility rate are expected to decrease along with economic growth, which results in positive correlation between variables expressed as relative changes of both $\ln GDPpc_{it}$ and TFR_{it} . If we assume the previous, concluding on the role economic growth in total fertility rate in-time variability might be confusing and leading to incorrect conclusions. Luci and Thévenon (2011), they also refer to the problem and indicate that using FD estimator in this case might not allow for clear statement about the ‘role of economic development for the fertility rebound in highly developed countries’ (see Luci and Thévenon, 2011).

To accomplish second goal of the paper we calculate the vertex (turning point) of the parabola defined as in Eq.(2), which corresponds to averaged level of GDP per capita at which the fertility rebound takes place. If we assume that Eq.(2) is a 2-order polynomial, then its general form follows:

$$f(x) = ax^2 + bx + c , \tag{7}$$

where $x \in (-\infty; +\infty)$ and at least $a \neq 0$.

Thus the vertex (turning point) of the Eq.(7) is defined as:

$$\left(-\frac{b}{2a}, f\left(-\frac{b}{2a}\right) \right). \tag{8}$$

Alternatively the (8) can be calculated by use of first derivative of (7):

$$f'(x) = 2ax + b , \tag{9}$$

and solving the equation:

$$f'(x) = 2ax + b = 0 . \quad (10)$$

The solution of Eq.(10), returns estimates level of GDP per capita corresponding to the threshold at which the relationship between TFR and GDPpc turns to be positive instead of negative.

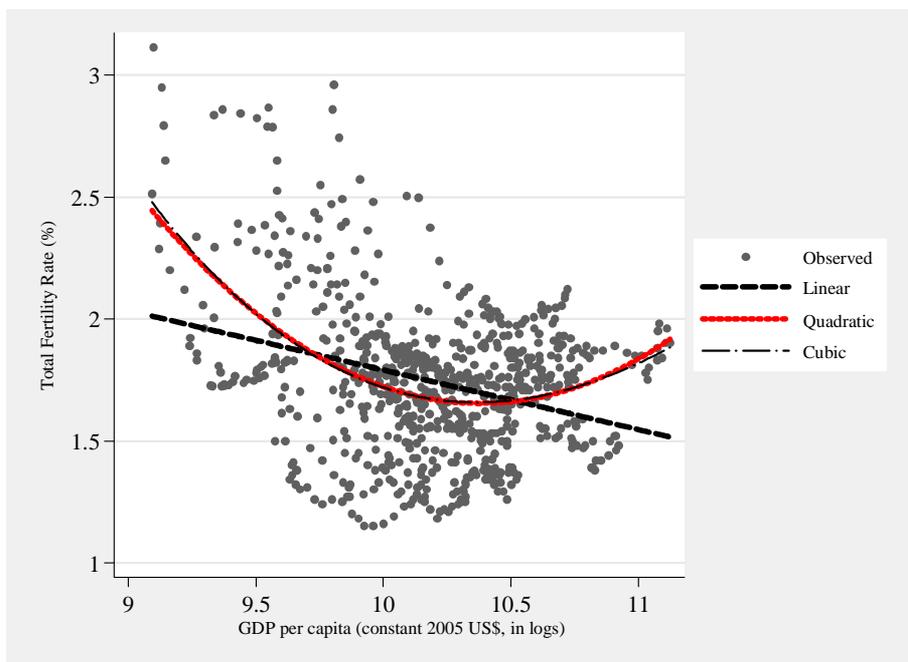
Results

As it was explained, our empirical analysis is limited to countries where the fertility rebound was detected over the period 1970-2011. Finally have concentrated on 18 high-income economies, where total fertility rate fell below 2.1 – replacement rate, and after reaching the low point it was steadily increasing. Although growing trends in total fertility rates were to a point disrupted by short “ups” and “downs”, the positive direction was maintained. Looking backwards, the reversal trends in TFR were preceded by long run and substantial falls in fertility rates. In 1970 the average total fertility rate was approximately 2.36⁵, then in 1980 – 1.77, 1990 – 1.69, 2000 – 1.60 and finally in 2011 – 1.70. Then the absolute change in average TFR between 1970 and 2000 was 0.76. Basing on the previous, we conclude that sharpest declines in total fertility rate were noted in decade 1970-1980, when the TFR fell below the threshold (2.1) required to replace country's population. Countries that experienced most significant declines in TFR over the period 1970-1980 were Barbados (-1.1), Netherlands (-.98), Australia (-.96), Italy and Norway (-.78 for both). Reversely, we note that in 2011, the average TFR was slightly higher than in 2000 (+0.1), thus over this decade the fertility rebound is revealed. Countries with greatest intensity of growing TFR over the period 2000-2011, were Sweden (+.36), United Kingdom (+.34), Belgium and Greece (+.13 for both) and Italy (+.15). Observed, over last decade, positive changes in fertility rates probably are becoming a permanent feature rather than mere cyclical change. However, the 41-year changes in total fertility rate do not resemble a smooth trend, but they are rather often interrupted by temporarily upward and downward trends. Furthermore, we confront total fertility rates versus economic growth. Our panel encompasses 18 countries covering long period, which constitutes a promise for accurate estimates. Adopted empirical procedures

⁵ Own estimates for the 18 selected countries.

allow controlling for both unobserved country and time specific effects. Relying on pooled OLS we detect the best-fitting curve demonstrating changes of TFR_{it} versus $GDPpc_{it}$. Additionally we plot our panel to control for graphical specification of examined relationship. Figure 1 preliminarily confirms that analyzed countries follow the U pattern over the period 1970-2011, if TFR_{it} versus $GDPpc_{it}$ relationship is examined. Solid black line (Chart 1 and 2) approximates theoretical pattern between TFR_{it} and $GDPpc_{it}$. For relatively low $GDPpc_{it}$ the TFR_{it} is high, but along with the process of economic growth it continuously declines, finally reaching the low point of the U-shaped curve (the parabola opens downward). Then having passed the vertex, moderate increases in TFR_{it} are revealed and the parabola opens upward. It supports the idea that the fertility rebound is accompanied by certain threshold level of $GDPpc_{it}$.

Figure 1. Total Fertility Rate versus GDP per capita. 18 countries. Period 1970-2011.



Source: own elaboration based on data derived from World Development Indicators 2013.

Table 1 presents results of linear, quadratic and cubic predictions for TFR_{it} versus $GDPpc_{it}$. Quadratic model reveals the best fit to empirical

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

data, as $R^2=.196$ and all coefficients are statistically significant. Thus we conclude that quadratic model, better than linear or cubic, predicts relationship between TFR_{it} and $LnGDPpc_{it}$.

Table 1. Total Fertility Rate versus GDP per capita. Linear, quadratic and cubic predictions. 18 countries. Period 1970-2011.

	Linear prediction	Quadratic prediction	Cubic prediction
	Pooled OLS		
$LnGDPpc_{it}$	-.25 (-8.85)	-10.09 (-9.87)	-18.33 (-.66)
$(LnGDPpc_{it})^2$		0.48 (9.65)	1.30 (.47)
$(LnGDPpc_{it})^3$			-.02 (-.30)
_cons	4.2 (14.88)	54.06 (10.47)	81.79 (.87)
R^2 of the model	.095	.196	.196
adjusted – R^2	.094	.193	.192
# of countries	18	18	18
# of observations	746	746	746

Source: own estimates based on data derived from World Development Indicators 2013.

Note: in parenthesis *t*-statistics at 5% significance level.

Table 2 summarizes full specification of estimation results based on multiple periods in 18 selected countries. The analysis is based on panel data; hence the evidence demonstrates evolution of changing total fertility rates which are attributed to economic growth. Displayed outcomes suggest that TRF_{it} and $GDPpc_{it}$ are negatively correlated for lower per capita income (*ante* vertex of the curve), and the relationship turns to be positive for higher $GDPpc_{it}$, thus the U-shaped trajectory is generated. Estimates obtained from quadratic panel regressions of total fertility rates against economic growth; show that regressor ($lnGDPpc_{it}$) always holds negative sign, and $(lnGDPpc_{it})^2$ – positive. In all cases estimated coefficients are statistically significant at 5% level. In columns (1) and (2) results of simple OLS are reported. Model with $(lnGDPpc_{it})$ - 2-year lag variable added, shows slightly higher R-square, which might suggest that level of total fertility rate in period (t) is to some extent pre-conditioned by GDP per capita in period (t-2). Estimates were also performed with $(lnGDPpc_{it})$ - 1-year lag included, they were significantly weaker than for 2-year lag. This also sup-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

ports the hypothesis that positive effects of economic growth on total fertility rates are revealed with significant time lags.

Table 2. Total Fertility Rate versus GDP per capita. Quadratic estimates. 18 countries. Period 1970-2011.

	Pooled OLS		FE (I)		FE (II)		FE (III)	FE (IV)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
LnGDPpc _{it}	-10.09 (1.01)	-9.19 (.88)	-21.54 (5.15)	-18.30 (5.26)	-14.56 (5.79)	-14.61 (5.88)	-21.48 (6.02) ^(a)	-14.65 (7.09) ^(a)
(LnGDPpc _{it}) ²	0.48 (.049)	.422 (.044)	1.02 (.25)	.862 (.26)	.724 (.28)	.721 (.28)	1.02 (.29) ^(a)	.727 (.35) ^(a)
LnGDPpc _{it} - 2-year lag		.434 (.061)		.267 (.09)		.064 (.13)		
_cons	54.06 (5.1)	46.99 (4.6)	114.22 (26.1)	95.78 (27.3)	75.46 (29.9)	75.49 (30.6)	113.87 (30.55) ^(a)	75.9 (35.9) ^(a)
R ² of the model	.196	.259	.466 (within)	.487 (within)	.590 (within)	.582 (within)	.466 (within)	.586 (within)
Year-fixed	No	No	No	No	Yes	Yes	No	Yes
Country-fixed	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Instruments	No	No	No	No	No	No	Yes	Yes
# of countries	18	18	18	18	18	18	18	18
# of observation	746	744	746	744	746	744	744	744

Source: own estimates based on data derived from World Development Indicators 2013. Note: below coefficients – robust SE. Also tested for (LnGDPpc_{it} - 1-year lag) – results less significant than for (LnGDPpc_{it} - 2-year lag). All estimates for significance level at 5%. ^(a) – bootstrap SE (1000 replications). Lagged explanatory variable used as instruments. (I) – country-fixed effect. (II) – time-fixed effects. (III) – instrumented country-fixed effects regression. (IV) – instrumented time-fixed effects regression.

Estimates of coefficients δ_1 and δ_2 resulted from within-estimator (FE(I)), explaining mediated effects of $\ln GDPpc_{it}$ on TFR_{it} due to cross-country differences, are statistically significant however – in each case – δ_1 tends to be higher than δ_2 . It suggests that, over the period 1970-2011, the “negative” relationship between TFR_{it} and $GDPpc_{it}$ was strongly dominant. As in case of OLS estimates, inclusion of lagged $GDPpc_{it}$, resulted on slightly higher R² of the model (.487), which again confirms lagged impact of economic growth on changes in total fertility rates. Analyzing relationship between total fertility rate and economic growth, we suppose that the impact of $GDPpc_{it}$ on TFR_{it} may be additionally determined by factors varying across time. Hence, to check for unexpected in-time variation, which potentially affects influence of GDP per capita on (TFR_{it}), we control for time-fixed effects. Results obtained from FE(II) suggest that, after ‘absorbing’ the unobserved effects that vary across time and potentially determines the impact of $GDPpc_{it}$ on TFR_{it} , the strength and direction of the relationship remains at comparable level to estimates generated by FE(I). The R-square (within) of the model FE(II) is at 0.59, thus we may conclude that

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

the FE(II) regression – with time-fixed effects included – relatively better explains relationship between total fertility rate and economic growth, than the FE(I) model. In FE(II) with lagged $GDPpc_{it}$ included, estimated coefficients, also confirm previous results and proof that relationship between total fertility changes and economic growth in examined panel, is *not* specifically featured by country and/or time fixed effects, but rather is *inter-temporal* in its nature. However, to confirm the previous, we additionally run random-effects regression (results not reported in Table 2) and perform Hausman test, which resulted in obtaining $Prob > \chi^2 = .000$, however the $V_b - V_B$ matrix is not positive definite. It suggests that relationship between total fertility rate and economic growth, to some extent, might be additionally affected by omitted variables relatively constant over time, but varying across countries, and – some other variable relatively constant (fixed) for countries but varying over time. To control for potential endogeneity in models, in columns (7) and (8) we present results of instrumental variables estimator. All coefficients are reported under assumption that lagged $(\ln GDPpc_{it})$ and $(\ln GDPpc_{it})^2$ are treated as instruments, and IV-regression was performed using 2SLS. Obtained outcome are highly similar to those resulted from estimates with no instruments used, thus are not discussed in particular. Presence of time-invariant country specific effects, like i.e. culture, institutions etc., surely influence relationship between TFR_{it} and economic growth, but their impact is not strength enough to eliminate average response of TFR_{it} if GDP per capita changes in analyzed countries over the period 1970-2011. Hence the ‘panel effect’ is not interrupted by occasional incidents. However to some extent, our results seem to be, additionally conditioned by unobserved effects that tend to vary in-time (not only across countries). The later justifies why variations in GDP per capita influence differently total fertility rate (determined by people’s behavior) at different points of time; and explains changes in patterns of total fertility rate over the period 1970-2011, as its significant falls are followed by moderate increases. Similar conclusions are presented in works of Luci and Thévenon (2011), Myrskylä et al. (2009) and Furuoka (2009). As the demonstrated in Figure 1, the relationship between total fertility rate and economic growth follows the U-shaped pattern, which is well described by quadratic models (confirmed by results presented in Table 2 above). The U-shaped patter approximated by quadratic function, yields existence of specific minimum (convex of the parabola), which depicts the threshold level of GDP per capita at which total fertility rate starts to rise and the downward trend is halted. Following previous estimates, the low peak of

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

the curve (using OLS) corresponds to approximately $\ln \text{GDPpc}_{it} = 10.38$ which is equivalent to 32 208 of GDP per capita (in 2005 constant US\$). Thus, when considering total fertility rate that changes as countries advance in economic growth, rising fertility trends tend to be revealed once a country achieves the threshold level of GDP per capita 32 208 (in 2005 constant US\$). The examined effects of economic growth on changing total fertility rates explain the *averaged* response of falling/rising TFR_{it} as GDPpc_{it} grows in *hypothetical* country. It shows that economic growth might be one of the channels inducing increases in total fertility rates. However it shall be bearded in mind that the study predominantly unveils the statistical relationships between TFR and GDP per capita.

The conclusions from the study are intentionally kept on general level; hence provide only a partial answer to the fertility rebound determinants. Keeping the rigid supposition that detected fertility rebound was exclusively driven by growth of national output, is based on weak foundations. The empirically based evidence shows that certain high-developed countries reached the turning point in total fertility (once have decrease below replacement rate, the TFR increases), which hopefully designates structural shifts both in terms of economic and social conditions (Barlow 1994, Brander and Dorwick 1994, Galor and Zang 1997, Dahan and Tsiddon 1998). However, country's specific effects and patterns explaining behavior of total fertility rate versus economic growth may differ significantly (Thevenon 2009, Goldstein et al. 2013), as being affected wide array of factors. The root causes of emerging positive relationship between TFR and economic growth may be traced in technological progress and women's better access to mass education (Becker et al., 1994; Frejka, 2012; Ní Bhrolcháin and Beaujouan, 2012), which allows for increasing number of people engaged in formal market activities and multiplying returns from labour (Bacci, 2013). Structural reorientations, like i.e. shifts from agricultural to industrial economy, or emergence in service-based economy and labour force feminization (Schaller, 2012), are other recognized determinants of fertility declines. As number of women involved in labour force grows, they are less determined to bear children. Intensity of changes in social attitudes, religion, income inequalities (Repetto, 2013), or state policies designed toward fertility increases (Alesina and Rodrick, 1994; Parr and Guest, 2011), may potentially affect social norms or individual fertility choices (Barro and Becker, 1989; Wang et al., 1994; Hin et al., 2011; Orsal and Goldstein, 2011; Neels et al., 2013a; Neels et al., 2013b). The later, may induce trends reversals in countries' fertility rates. Additionally, there

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

also raises a question whether the observed growth in TFR is permanent or rather temporal. The uncertainty in the case is huge. Possibly the temporal increases in fertility rates are a direct consequence of demographic trends and the new 'fertility transition' might be the case. Or, alternatively, modest increases in TFR which are observed in different countries are the positive 'response' to pro-natal state policies, which are broadly incorporated in countries affected by low fertility. The later, probably, is rather to be answered in long-term horizon, as a 'combined response' of demographic and socio-economic changes (Galor and Zang, 1997; Schultz 2001; Bloom and Finlay, 2009; Cervellati and Sunde, 2011).

Conclusions

The paper was designed to uncover the relationship between changing total fertility rates and economic growth in 18 high-income economies over the period 1970-2011, and to depict the GDP-threshold at which the fertility rebound emerged. We have examined the relationship adopting longitudinal analysis, which allowed obtaining averaged response of total fertility rates as countries advance in economic development pattern. Additionally, it was hypothesized the U-shaped trajectory explains changes in long-run total fertility trends determined by economic growth, and the supposition was confirmed. Our estimates lead to general conclusion that TFR_{it} and $GDP_{pc_{it}}$ are closely interrelated, and uncovered quantitative relationship that supports the hypothesis on inter-temporal nature of the links. Hence, the relationship between total fertility rate and economic growth is relatively robust to time and country specific effects. We have also discovered that the fertility rebound is especially to be revealed as countries achieve the threshold level of economic development approximated by GDP per capita 32 208 (in 2005 constant US\$). Designating the turning point at U-shaped curve would imply that economic growth to a certain point constitutes a channel of reversing paths with regard to total fertility rates in high-income countries. The last supports more general idea that countries at higher stages of development tend to experience fertility rebound as per capita income is sufficient to provide decent life and education for more children (Varvarigos, 2013). It may also suggest that some of developed countries are now entering new phase of development significantly marked by demographic change determined by reversals in fertility rates, which starts to recover and grow slightly above pure replacement rate. Although discovering such quantitative links between TFR and GDP per capita, we do not

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

claim that achieving the threshold GDP per capita shall automatically induce increases in total fertility rates. Surely, not all countries will follow analogous paths of growing fertility, regardless they perform well or not in terms of economic growth. Additionally, the positive impact on growing income on fertility may finally be to be temporal and short-term. Still many developed countries do not experience the fertility rebound, which suggests that economic growth does not drive exclusively demographic changes, and fertility rebounds across countries are only partly explained by growth in living standards, while the rest of it is hugely attributed to institutional, social and state policy context.

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**Proceedings of the 8th International Conference on Applied Economics
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18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
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How to Effectively Support Export Activity

JEL Classification: *F10; F23; F40*

Keywords: *exporter; export activity; support; heterogeneous firms*

Abstract: Exports is crucial for every economy. It influences the level of economic growth, balance of payment and social welfare among many others. Therefore increase in exports becomes one of the main objectives of each government. This raises the question of how to support export activity in order to ensure the expected increase in exports. The aim of this paper is to investigate whether to support export activity at all and if so, how to do it effectively. To achieve the aim of the article the author analyzed both Polish and foreign literature, with special emphasis on the newest trade theories. Author analyzes secondary data describing factors that determine export activity, describe profile of a company becoming an exporter and investigate actual connection between offered support and increase in export activity.

Introduction

Export is of great importance for the economic development of the country and thus to the welfare of the society. It not only allows countries to exploit their comparative advantage and but also ensures greater variety of goods and competition and allows to benefit from scale economies. It influences the level of economic growth and balance of payment among many others. Exporters are believed to be more competitive and more productive, to generate more profit and to provide more employment than non-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

exporters. That is why exporters are perceived as especially important for the economy. It therefore seems a justified desire to create government programs to support and advance the growth of exports. Increase in export becomes one of the main objectives of each government, despite the fact that gains from trade are rather unevenly distributed both within and between the countries. This results in various attempts to encourage companies to export by offering both direct and indirect support. The desire to promote and encourage export is an universal goal but achieved differently depending on the country. Government may support export directly with lending schemes for exporters¹, direct export subsidies or estimating offices assisting exporters in selling abroad. Bernard and Jensen (2004) noted that all fifty US states have such offices. Support might also take an indirect form of supporting productivity through various research & development programmes, training or consulting services. But in order to successfully support export it must be clear who the exporter is and what the reasons for exporting are. Numerous theories of trade are meant to answer these questions.

The aim of the following paper is to investigate whether to support export activity at all and if so how to do it effectively. In order to achieve this aim both Polish and foreign literature was analyzed, with special emphasis put on the newest trade theories including the model by Melitz (2003). Secondary data describing factors that determine export activity, describe profile of a company becoming an exporter and investigate actual connection between offered support and increase in export activity were analyzed.

The first part of this paper reviews the main international theories explaining trade and the exporters' role in the economy to then specify an exporter's profile which is needed to realize who the potential recipient of export support is. It then analyses the studies attempting to evaluate programs enhancing export activity. The paper finishes with an answer to the question: how to successfully support exports? Although there has been many studies on export promotion there is little empirical evidence proving its effectiveness.

¹ Direct Lending Scheme developed by UK Export Finance (the UK's official Export Credit Agency) is one of the examples. It was announced by the Chancellor of the Exchequer in the 2012 Autumn Statement and is available till March 2016. Up to £1.5 billion funding is provided. See: <https://www.gov.uk/government/news/direct-lending-scheme-launched-to-support-uk-exporters>

Theoretical basis for international trade

There are three main purposes of trade theories. First would be to explain the observed trade based on information about the characteristic of countries that trade. The second is to investigate the effects of trade on the economy and the third one to provide knowledge needed to evaluate a proper trade policy. It must be underlined that although substantial developments concerning trade theory have been made, they are not that substantially reflected in modern trade policy.

There has been a significant shift in attitude towards theories of trade. Macroeconomic approach has been complemented with a microeconomic one. There are three main groups of trade theories: traditional, New Trade Theories and so called New New Trade Theories. Traditional trade theories discussed trade between countries, new trade theories concentrated on trade between sectors whereas new new trade theories consider trade on a micro level between companies. Traditional theories concerned trade between countries in terms of comparative advantage. The leading ones are two models, one by David Ricardo and the second one by Eli Heckscher and Bertil Ohlin. Ricardian comparative advantage arises from productivity differences whereas Heckscher – Ohlin's from differences in abundance of production factors. In Ricardian model there are only two countries and two products and each of the countries possesses different technology. It is assumed that there is only one factor of production – labor (fully employed) and workers might migrate between the sectors but not between the countries. There are no trade barriers or costs of transports. In Heckscher – Ohlin model there are two countries and two products but two factors of production (labor and capital). Again no trade barriers and costs of transports were assumed.

Assumptions made in both theories, that is: perfect competition and constant scale returns allowed to ignore the importance of companies in the international trade. What was strongly objected by researchers was that trade structure is often far from perfect competition. Moreover, although traditional theories explained interindustry trade they did not explain trade between developed countries and intraindustry trade, which was observed. Only in late 1970's so called New Trade Theories based on monopolistic competition were developed. Lancaster (1975), Spence (1976), Dixit and Stiglitz (1977) provided some insight into the behavior of companies in imperfect competition by creating models of intraindustry trade in differentiated goods. The essence of the New Trade model by Krugman (1980) are

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

the preferences for variety between and within countries, economies of scale and products that are differentiated. New Trade Theories presented trade in terms of sectors which helped to explain the observed intraindustry trade.

Despite the substantial evolution of trade theories, both “old” and “new” assumed a representative company. This approach ignored behavior of companies within the sector and their role in international trade. It seemed insufficient taking into account the variety of productivity, capital and skill intensity across companies. As a consequence so called New New Trade models were developed, emphasizing the importance of heterogeneity of companies for analyzing international trade. Two leading models emerged. First one – the BEJK model, was introduced by Bernard, Eaton, Jensen and Kortum (2003). They used random productivity of companies in multicountry extension of Ricardian model by Eaton and Kortum (2002). The second one, which now seems fundamental, was developed by Melitz (2003). He introduced the heterogeneity of companies into Krugman’s (1980) model describing intraindustry trade. Melitz’s model describes the demand similarly to Krugman’s and consumers’ preferences are consistent with the CES function (Hagemeyer, 2006). According to this model the company draws its productivity from a random *distribution* but only after paying the fixed market entry cost. This cost is thereafter sunk. There is an assumed level of productivity allowing a company to remain on the market, drawing productivity from below this threshold means being forced to exit. According to Melitz (2003, 2008) companies differ significantly, especially in terms of above mentioned productivity which is a key factor in internationalization of firms. Export turns profitable for the most productive companies only. For those in the middle local market would be the target, the least productive fall out of the market entirely.

In order to know who to support, potential exporters must be identified using the theoretical background provided. It is important to decide whether everyone interested in or engaged in foreign trade should be a recipient of government export-related support. It might also be helpful to differentiate help being effective in case of exporters from assistance positively influencing the nonexporters only.

The exporter's profile

As already mentioned export plays an important role in every economy due to enhancing employment or generating economies of scale, but it is relatively rare as an activity (Bernard, Jensen, Redding & Schott, 2007). There were 5 726 160 firms in United States in 2012 (according to United States Census Bureau) of which 221 067 exported and 83 800 both exported and imported (report U.S. Trading Companies, 2012). Majority of exporting companies belonged to the SMEs. In comparison in Poland out of 1 762 321 companies 110 424 export.

Table 1. Micro, small, medium and large companies in Poland and their export activity.

	Number of enterprises	%	Exporting	% of Micro/S/M/L
Micro*	1 710 598	97,1%	94 083	5,5%
Small	32 728	1,9%	7 272	22,2%
Medium	15 841	0,9%	7 075	44,7%
Large	3 154	0,2%	1 994	63,2%
Total	1 762 321	100,0%	110 424	6,3%

* Data for 2011

Source: Wołodkiewicz-Donimirski, Z. (2014), *Eksport małych i średnich przedsiębiorstw w 2012 r.*, Analizy BAS nr 1 (105), 2014 and Statistical Information and Elaborations, Financial Results of Economic Entities in I-XII 2013, Central Statistical Office, 2014.

This data proves how important small and medium enterprises are in terms of export, therefore their specificity should be taken into consideration when delivering export promotion programs. There has been many studies investigating the link between characteristic of companies and probability of becoming an exporting company. Size of the company was one of the analyzed factors. Studies proved that only some companies have necessary characteristics to become exporters.

Bernard and Jensen (1995) studied the relationship between exporting and the performance of plants. They used data from the Census Bureau's Annual Survey of Manufactures (ASM) for the years 1976-1987 and they found significant differences between exporters and nonexporters across the analyzed companies. According to them exporters performed much better than nonexporters in every investigated dimension. They were not only larger, but also more productive and more capital intensive. It was also

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

noted that wages in exporting companies were more than 14% higher. According to their research exporters have more employees, higher productivity and greater capital and technology intensity (Bernard & Jensen, 1995). Past success increases the probability of future exporting. Bernard and Jensen (1999) estimated that exporting today increases the probability of exporting tomorrow by 39% (Bernard & Jensen, 1999)

Roberts and Tybout (1997) noticed a positive correlation between propensity to export and plant size, age and structure of ownership. They notice that the size determinant may reflect Krugman's (1984) economy of scale in exports. Supporting the assumption that market forces select out the least efficient producers it is probable that the older the company is the more time it had to learn and gain cost advantages (Roberts & Tybout, 1997).

While investigating reasons for exporting it is important to remember that exporters might exit and nonexporters might enter exporting at any given time so the set of exporting companies undergoes continuous changes and is therefore more problematic to study. Bernard and Jensen (1999) state that there is a high degree of reentering by former exporters, so past performance and experience influence positively propensity to export. In another of their studies Bernard and Jensen (2004) examine characteristics of companies, their size, labor force, entry costs, past performance in exports, effect of spillovers and efficacy of government interventions.

Government support in studies

Potential benefits from international trade, such as boosting growth and employment, explain the desire to build export promotion and assistance programs. It also justifies covering the expenditure mainly from public funds (Cansino, Lopez-Melendo, Pablo-Romero & Sanchez Braza 2013). It is however expected that public funds are always spent effectively and cautiously. This raises the question of how to evaluate the effectiveness of such support. There is a set of empirical studies investigating the possible ways of doing so. One of the most popular methods of assessing support programs is using a survey addressed to the recipients of such assistance, but usefulness and reliability of this method have been widely questioned. In their work, Cansino, Lopez-Melendo, Pablo-Romero & Sanchez Braza (2013) reported numerous objections to surveys, reflected in the literature. They are as follows:

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

- respondents might be reluctant to evaluate the program negatively, since many of them got in without any cost (Brewer, 2009),
- lack of understanding between government and SME concerning the role of support programs increases dissatisfaction reflected in the survey (Albaum, 1983),
- respondent's opinions are often to varied (Crick & Czinkota, 1995),
- subjectivity of the given answers making it impossible to draw balanced conclusions (Francis & Collins – Dodd, 2004).

Another approach reflected in research was to compare the expenditure on export promotion to export performance (both values aggregated). It was done by Armah & Epperson (1997), Richards et al. (1997) (Cansino, Lopez-Melendo, Pablo-Romero & Sanchez Braza, 2013). It was widely criticised mainly because it is not possible to indicate the share of export increase resulting from export promotion programs. Many other factors influence the volume of export and it is difficult to separate them from the influence of export assistance programs.

Cansino, Lopez-Melendo, Pablo-Romero & Sanchez Braza (2013) examine the possibilities of using statistical casual interference methods to perform an economic evaluation of increase in export directly attributed to export promotion programs. They suggest the use of Neymann-Rubin Causal Model (RCM) that allows to compare participants to non-participants in a public program, using a treatment indicator and a variable that will measure the effect of analysed policy (See also: Cadot, Fernandes, Gourdon, & Mattoo, 2012).

Bernard and Jensen (2004) name potential benefits of supporting and promoting exports. Reducing the market entry cost by helping to gather information on foreign markets could encourage export activity. Alternatively helping potential or current exporters to coordinate their actions could decrease the exporting cost and therefore result in increased volume of exports or increased number of exporters. The authors however found no significant impact of grants or subsidies on market entry. They suspect that the analyzed sample (large plants) might not be adequate to investigate, since most of the support is addressed to small and medium enterprises (Bernard & Jensen, 2004).

According to Francis and Collins-Dood (2004) programs enhancing export influence companies differently depending on the stage of export involvement. They concluded that in terms of short-time effects such support is of greater importance for beginners rather than for experienced exporters or nonexporters.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Görg, Henry and Strobl (2005) investigated whether government support can cause an increase in export activity. Their main conclusion was that depending on the size of grant support it can intensify exports of companies being already exporters, however they found no evidence supporting the assumption that it can encourage non-exporters to become exporters. Not the very fact of receiving a grant is important, it is its size that really matters. The main problem indicated in the study is how to estimate the effect of government support since it would demand knowing what export would have been without this support. Using non-recipients as a comparison group would help if grants were given randomly which they are obviously not. Recipients are always chosen according to specific selection criteria that might additionally cause some companies to self-reject from the application process (Görg, Henry & Strobl, 2005). Brewer (2009) states that lack of consensus concerning evaluating export support among the researchers might have caused the decrease in number of studies on the subject.

Creusen and Lejour (2013) analysed the influence of economic diplomacy in the form of trade posts and trade missions on market entry. They noticed the impact of such support in case of middle-income countries, whereas no impact was found regarding higher-income countries. The study suggests that this type of support should focus on countries with high market entry barriers like developing countries regardless and not on the type of firm applying for assistance.

There is a long list of activities that might be implemented by governments in order to promote export. They range from providing publications concerning export and potential foreign markets, organizing workshops, assistance in trade exhibitions, help in organizing business visits overseas, enabling contact with potential business partners to offering subsidized loans (Brewer, 2009). Wide range of export – related support tools that is available, might reflect varying needs of companies depending on a stage of internationalization they are in, taking into account that each stage means different obstacles (Kotabe & Czinkota 1992, Brewer, 2009).

Conclusions

The very idea of supporting export seems indisputable. Majority of researchers and politicians would answer positively to the question whether to support export or not. They would also agree that support should be granted to a cautiously chosen group of companies. What turns out to be

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

problematic is what criteria to apply and how to evaluate the effectiveness of programs used. There is no consensus so far regarding those issues.

New New Trade Theories would suggest that government support should be addressed to companies that could be described by a set of characteristics, with a special emphasis on their productivity. According to Görg, Henry and Strobl (2005) supporting productivity may prove to be more effective than traditional export promotion programs. It would be advised to take a closer look at determinants of export activity in order to offer a purposeful export assistance.

It is also worth stressing that majority of statistical data is aggregated and according to New New Trade Theories international trade should be evaluated using panel data on companies, which is much more difficult to obtain.

The most problematic however, is measuring the effectiveness of the support provided. Apart from choosing the most adequate method it would be helpful to divide recipients into the groups according to the: size, level of internationalization and productivity and assess the results accordingly.

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18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
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Determining Social Capital by Social Accounting

JEL Classification: *D1; D6; D61; M41; O15; Z130*

Keywords: *Social capital; Social success; Social accounting; Ex-post Analysis*

Abstract: Although social capital has been often debated in the last 20 years, there is a widely accepted definition missing and the approaches to measure its size are not very developed. Therefore, the definitions of social capital are stated and analysed, whether they are appropriately designed also for measurement purposes. We end up with a division between capital consisting of real capital as fixed and working capital and financial capital on the one hand and capitals, which are referring to human capital and social capital in a narrow sense on the other hand. The last two are named here as social capital. The stock of the first kind of capital can be expressed as net capital when the liabilities are deducted is booked to the final social balance as well as the remainder of the stock accounts. The stock of the second one can be identified as social assets reduced by social liabilities. Non-commercial values of economic activities are gathered in social accounting. With social accounting exist several approaches, however most of them are not developed to such an extent that the social capital can be determined through an adequate ex-post analysis. A welfare economic oriented approach comprising a bookkeeping system helps to determine social capital. Based on the willingness to pay approach a commercial bookkeeping system and an additional social bookkeeping were designed where the respective “private” and additional social capital were verified. Both together show the total social capital related to an economic subject. The result is illustrated by such a social accounting for the Faculty

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

of Economics and Business Administration of the University of Tartu for 2006. The author discusses the limits and possibilities of this kind of social capital determination.

Introduction

In many publications on development social capital is discussed as a development factor (OECD 2001). However, it is a rather vague concept (Bichmeier, 2002; Robinson, Schmidt, Siles 2002; Parts, 2009; Dill 2014) stemming from various sciences (Westlund, 2006; Parts, 2009), e.g. sociology, political science and economics, which implies extraordinary measurement problems (Franzen & Pointner 2007). Many measurement approaches are directed to measure social networks by network size indicators (Fukuyama, 1997; Parts, 2009), but they are not very useful for economic analysis, because of aggregation problems and missing economic evaluation (Dasgupta, 2002).

Therefore, the following questions are tackled:

- Which definitions of social capital make sense for economic analysis?
- How can they be measured?
- How to measure social capital in the framework of social accounting?
- Which bookkeeping system of social accounting leads us to measured social capital?

The first section of the article turns to the definitions and types of social capital. The second one deals with the difficulties of measurement. The third section tackles the possibilities of measurement by social accounting. A fourth section shows the measurement of social capital of a university faculty within a welfare oriented social accounting bookkeeping approach. A discussion of the possibilities and limits of this measurement approach brings our investigation to an end.

Methodology of the Research

The article is based on a literature review of definitions of social capital and attempts of its measurement. The literature on social accounting is examined in order to detect whether a welfare oriented social accounting approach exists, which allows a measurement of social capital to be developed. Recently, such a welfare oriented social accounting approach was developed that comprises an ex-post analysis, an appropriate accounting and bookkeeping system (Schmitz, 1980; Tsimopoulos, 1989; Friedrich

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

1991, 2010; Eerma & Friedrich, 2012; Eerma, 2014). This approach was developed by the author and his fellow researchers. An ex-post analysis was formulated, the charts of accounts were defined, and evaluation methods for social benefits and social goods were determined and bookkeeping procedures elaborated. The approach was applied to the Faculty of Management and Economics of the University of Tartu to identify social success of the faculty for 2006. The reader is introduced into this approach and the measurement techniques to determine social capital.

The limits of this kind of social accounting to determine social capital – in particular related to the welfare theoretical basis - are mentioned and discussed. The author indicates further developments of this social capital measurement approach.

Problems of applying this approach as a management tool, the ways how it could influence the management decisions in a university, CGE-impact models etc. are not tackled in the framework of this article.

Definitions of Social Capital

The definitions of social capital are manifold. Westlund (Westlund, 2006, p.8) defines social capital as “social, non-formalized networks that are created, maintained and used by the networks’ nodes/ actors to distribute norms, values, preferences and other social attributes, and characteristics, but which also emerge as a result of actors sharing some of these attributes”. Therefore, social capital constitutes of a network with links and nodes. It is like an infrastructure (Westlund, p.8). Information, goods, etc. (flows) are transmitted and the nodes can represent actors (Westlund, 2006; Grüb, 2007). In economic terms they may consist of economic units (households, private or public firms, public offices) or groups of economic units as the household sector, firms sector, state sector, etc. or groups defined according to other criteria. It also may refer to the whole economy. Alternatively it might be examined more generally through individuals in society, groups of them, organisations or the civic society or the society as a whole. One of the problems is that some authors concentrate on non-formalised networks. However, most important networks are formalised ones reflected in private and public law. On the one hand they are not totally open and accessible to everyone because one needs knowledge and education to cope with them, there are preconditions to use them and on the other hand they are path dependent and in steady development. At the very least the part of them in change should be included. There are similar defi-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

nitions like culture concentrating on shared values and beliefs (Casson & Goodley, 2000; Kaasa, 2013; Kaasa & Parts 2010) or by North (1990) on institutions reflecting the rules of social cooperation and organisations the players, without emphasising networks. Other authors include both and call them institutional capital (Hardin, 1999; Krishna, 2000). However, these attempts to define social capital are even vaguer. A special approach not often mentioned in literature was developed by Walter Isard and his fellow researchers (Isard et al., 1969). They defined a good more generally as a social good and transmitted microeconomics to social and political phenomena showing supply and demand for social goods such as votes, values, information, etc. thus including social capital as well. In the literature different kinds of social capital are mentioned as well such as human capital, social capital of different economic units, internal social capital of economic units and external ones, which are in special sectors like the public sector, civic society, and different spheres like political, social, and physical sphere (Westlund, 2006, p.39; Kaasa & Parts, 2010; Kaasa, 2013). With respect to the social sphere, social capital is interpreted as access to network based resources, generalized trust, or norms and values (Franzen & Pointner, 2007). Social capital has also a regional dimension which is institutionally related to and reflected in industrial districts (Paniccia, 2002), cluster (Steiner, 1998; Porter, 2000), regional information systems (Asheim & Gertler 2005), and triple helix (university-industry-government relations) (Etzkowitz, 2002). Social capital shows many effects on: the mentioned regions, civic society, markets, economic growth (Parts, 2009), groups, and single economic units, their establishment and development (Grüb, 2007; Tödting & Trippel 2012) on sectors, the public sector, shadow sector, resources like venture capital, environment, etc.

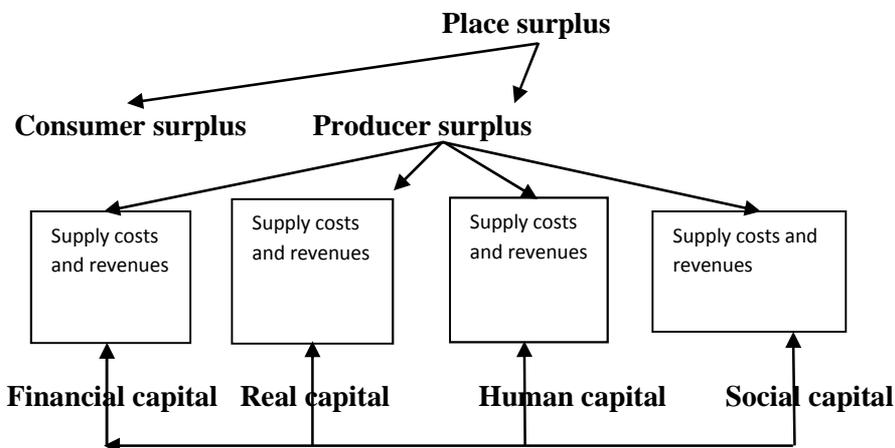
Social capital can appear in all parts of society such as civic society, governments, firms, households and it can be treated as a stock such as an investment. (Westlund, 2006, p.4).As mentioned above it causes many difficulties if it should be treated as a capital stock. Networks are difficult to measure and to add them up in total or in parts. There are inhomogeneous factors in links and nodes such as beliefs, values, etc. (Dasgupta, 2002) and there seem to be no prices to make the items to be aggregated comparable. Aggregation (Dasgupta, 2002) is mentioned as one of the main problems with social capital. Moreover, there are vertical networks between actors of higher and lower order such as EU, EU-member state, regional state, municipality, firm, or horizontal networks between actors of the same decision level (Westlund, 2006, pp 33), which greatly hamper aggregation

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

of social capital. On the other hand social capital has some features, which allows speaking about social capital. It shows vintages, it has to be maintained (Prusak & Cohen 2001), and it enables positive or negative impacts (Grüb, 2007) on economic units and change of social capital (Riemer 2005) and rewards (Glaesner, et al., 2002). At least time has to be allocated to maintain or establish social capital. These time expenses (Friedrich, 1978) lead to utilities from social capital and its use and to disutility because of opportunity utility losses.

These expenses can be also expressed in monetary form. As basis can serve the willingness to pay approach used in welfare theory can serve as a basis to express the advantages and disadvantages of a measure considering surpluses, external effects, distortions, etc. This is applied to identify the net-benefit of a measure or project, according to the Kaldor-Hicks test. According to such an evaluation of the advantages and disadvantages the rewards from social capital can be identified. Therefore, social capital shows also features of capital in an economic sense. This approach is similar to that of Bolton (2002) who defined a place surplus comprising a consumer surplus and a producer surplus concentrating on a firm. Westlund (2006) highlighted the influence of social capital on producer surplus through supply costs and revenues shown in Figure 1. The social capital influences human capital and both the real capital and human capital and the financial capital as well in such a way that supply costs and revenues change and producer surplus varies. Behind this is also the idea that the willingness to pay is expressed in the surpluses that reflect a welfare change.

Figure 1. Place surplus according to Westlund (2006)



Source: Westlund (2007)

However, it is not clear whose willingness to pay is measured, e.g. consumers inside and outside the place, how externalities related to social capital are expressed in revenues and cost especially those who occur outside the firm etc. and how this place surplus is separated from other place surpluses. Although the willingness to pay approach deals with total welfare in a national economy it is not shown how this place surplus is separated from those resulting from other firms or public offices the firm is cooperating with or linked in production. To differentiate between human capital and social capital is not easy. As far as human capital comprises the ability to know about and practice networks to gather information, to make decisions and communicate they are nearly not too separate. Moreover, one must exactly determine whether social capital welfare in the sense of the welfare of inhabitants of a country, region or municipality, of civic society of those jurisdictions should be identified. Social capital might also refer to the welfare of those economic units assigned to a sector such as public, private or a branch of industry, a group of firms, a group of households, to single firms, households, public offices, etc. Some times the authors distinguish between firm internal social capital, production-related social capital of the firm, environment-related social capital and market related social capital (Burt, 1992; Westlund, 2006). The place surplus concept tries to measure all of those.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The most serious problem is that there are various and different attempts of measurement of social capital. Sociologists try to measure the network-based social capital with a name generator (Fisher, 1977; Bidart & Charbonneau, 2011). This instrument tries to measure the contacts to other persons. A position generator (Lin & Dumin, 1986) measures the contacts to persons who possess an important professional position for the questioned person. A resource generator (Van der Gaag & Snijders 2004) should serve to determine from which people he knows a person might receive resources. There are attempts to identify access to a network, to which individuals and actors pose as the function of a broker (Burt, 1984) and to which sub-groups exist (Grüb, 2007). The density of networks is also measured (Schenk, 1984). The density shows a relation between actual contacts and possible contacts (Haug, 1997). Moreover, attempts exist to measure trust (Schumacher, 2006) in other persons (Halpern, 2005) and in institutions (Paxton, 1999) by interviews or questionings. Measurement of norms, values and reciprocity happen by investigating the behaviour of players in experimental games (Diekmann, 2004). These sociological measurement procedures are mostly designed to describe social capital partly with respect to individuals.

Economists try to describe social capital by cases such as describing clusters, regression analysis with respect to the effects of social capital, and some impact analysis (Westlund, 2007) and policy investigations. Further literature exists on the wealth originating form social capital (Scrivens & Smith, 2013, Siegler, 2014) and on how technical knowledge is influenced by social capital (Gu, et al., 2013) and how networks change through economic behaviour (Jacson, 2009). An ex-post analysis including a welfare-oriented evaluation is missing.

Social Accounting as Tool to Measure Social Capital

Although since the last 40 years (Erma, 2014) there exist approaches to identify the contributions of single economic units to the success of society, the attempts to apply these instruments to measure and determine social capital are virtually non-existent. In particular, social capital as defined above has not been identified. There are social accountings for evaluations of projects using a welfare function, utility analysis or benefit-cost analysis implicitly considering the effects of social capital at present and in future (Erma, Friedrich, 2010, 2012, 2012a). Such social accountings are performed in particular for identifications of social success in environmental

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

accounting, health accounting and educational accounting. A comprehensive analysis of social capital is not involved. Social accountings concentrate especially on a statement of favourable and unfavourable social effects such as social audits (Schmitz, 1980). Some of them focus on special aspects of social life or factors of production such as human resource accounting in the sixties (Hermanson, 1964; Brummert, 1969; Flamholtz, 1971; Neubauer, 1974; Conrads, 1976). Other social accountings concentrate on contributions of a firm to social success such as corporate social accounting (Linowes, 1968; Abt, 1972; Monsen, 1972; Elliott-Jones, 1973, Eichhorn, 1974, Mühlenkamp, 2007). Some escape to a social indicator analysis, where the indicators signify social relevance and value (Dierkes, 1974; Mintrop, 1976; Fischer-Winkelmann, 1980; v. Wysocki, 1981; Schmitz, 1980; Friedrich, 1991; Schauer, 2007). Social capital is not explicitly detected. The human resource accounting directs the attention to human capital. However, social capital in the sense of networks is only evaluated indirectly, e.g. as special value of knowledge on social relations leading to higher human capital. Networks are considered in terms of social benefits transmitted to business partners and stakeholders, public jurisdictions, charity organisations, etc. However there is no identification of an item symbolising social capital. Mostly a welfare economic orientation is missing. Moreover, these approaches do not provide an ex-post analysis and a bookkeeping system necessary to identify the social success in a past period (Eerma, Friedrich 2010, 2012, 2012a; Eerma 2014). The link between social accounting and the determination of social capital does not exist.

Recently, have been some contributions which were not to identify social capital, but which enable to develop an ex-post analysis and bookkeeping system, thus providing a basis for a more comprehensive assessment of social impacts and values. This development started with Schmitz 1980, and developed through applications and extensions (Tsimopoulos 1989; Friedrich 1991; Friedrich, et al., 1993; Eerma & Friedrich 2010, 2012, 2012a; Eerma 2014) for public utilities, convention halls, university faculties, and other institutions like colleges and ecological banks. Moreover the bookkeeping system is welfare-oriented and a bookkeeping chart and bookkeeping and balancing rules have been developed. Therefore, we name it economic welfare-oriented social accounting

Therefore it should be discussed whether this bookkeeping assists to identify social capital. The basic features of this social accounting approach

have to be mentioned to show how the social capital is going to be identified.

Social Capital Assessed by Economic Welfare Oriented Social Accounting

The economic welfare called net-benefit is measured on the basis of the following evaluation in terms of willingness to pay^[1] in favour or against the impacts of activities of an economic unit (Friedrich, 1991; Eerma & Friedrich 2010, 2012, 2012a; Eerma, 2014)

Net benefit = consumer surplus +turnover + value positive external effects –producer surplus as distortion on factor markets- costs – value of negative external effects

The willingness to pay can be rearranged to

Net benefit = turnover - costs
(Commercial accounting)
+consumer surplus + value positive external effects – producer surplus as distortion on factor markets – value of negative external effects
(Additional social accounting)

A net-benefit increase means payments “social benefits” in favour of a measure show the + sign, whereas the willingness against “social costs” payments are marked by a minus sign. If the difference net benefit is positive a measure results as welfare increasing.

This shows that the willingness to pay can be detected by commercial accounting and by a supplementary social accounting. By aggregating the two parts of accounting one gains the total willingness to pay.

Direct social benefits and costs are measured directly by market-related items such as consumer surplus, turnover and costs related to the economic unit operations. Some social benefits and social costs are measured indirectly. Income increases, money value of time savings, decrease of costs, e.g. of self instruction, less compensation from insurance companies, reductions in contributions of other institutions, or higher values of shadow prices, higher values based on hypothetical demand functions (Dasgup-

¹ See the debate on willingness to pay evaluations in the debates on welfare theory (Graaff, 1963; Sen, 1982; Samuelson, 1983; Flores, 2003; Adler, Posner 2006).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

ta *et al.*, 1972; Flores, 2003). Increases in property values and higher leases express higher ability to pay for external effects of economic unit operations because of improved services. Social costs incurred by the economic unit are determined by costs and input-oriented producer surpluses. Methods used to identify external social benefits serve to measure external social costs as well (Friedrich, 1991; Eerma & Friedrich 2010, 2012, 2012a; Eerma, 2014).

Social benefits existing in more than one period are stocks (social assets) and social costs existing in more than one period are stocks in the form of social liabilities. Those occurring in the period under consideration are current social benefits and current social costs (Friedrich, 1991; Eerma & Friedrich 2010, 2012, 2012a; Eerma, 2014). An adaptation of the chart of commercial accounts (revenues and expenses) serves for the commercial accounting to identify profit and stocks assets, liabilities - serves - and to gather social benefits and social costs reflected there.

Table 1. Accounting Groups

Group	Classification
Assets	0: material social assets, human social assets
	1: social cash
	2: social claims
Liabilities	3: social equity, adjustments
	4: social liabilities and social net benefit
Social benefits	5: social benefits
Social costs	6: social material and staff costs
Technical accounts	7: opening social balance, final social balance, social success operating statement
	8: deferral stocks
	9: deferral successes

Source: Eerma & Friedrich (2010, 2012, 2012a)

For the additional social accounts a chart has to show the current social benefits and current social costs and social benefits as stocks (social assets) and social costs as stocks (social liabilities). They are shown in Table 1. The additional social accounting also applies to double entry bookkeeping. Therefore there is a social cash account that assembles all the counter entries. Special deferral accounts are necessary to defer the social benefits and social costs that are caused by other economic units involved in transactions that mean the part of willingness to pay which is not due to the economic unit under investigation. In the chart appear social assets, social liabilities, cur-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

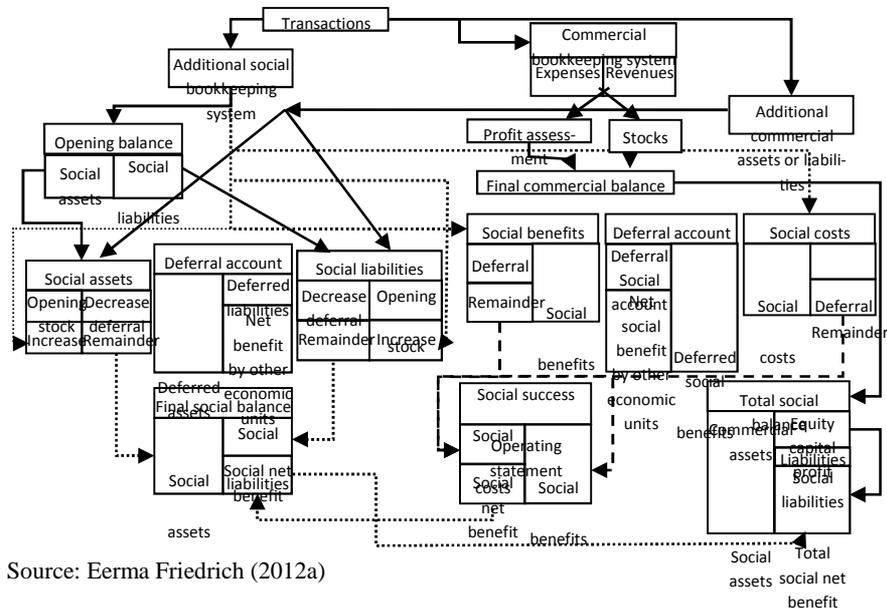
rent social benefits and current social costs. Moreover, there are technical accounts comprising opening balances, final social balance, final total social balance, the social success operating statement, and the deferral accounts for stocks and current social benefits and current social costs. The individual accounts show equations showing the remainder of an account or variable value at the end of a period, which is equal to the initial stock plus increases minus decreases (for details see Eerma, 2014). All individual accounts reflect a whole set of equations that are the basis for the ex-post analysis of the economic unit.

The stock accounts (respective equations are defined) according to types of long-lasting benefits (e.g. social assets). The current social benefits and current social costs are defined according to the operations of the economic unit.

Figure 2 shows the additional social bookkeeping and partly the commercial bookkeeping. In both parts an opening balance starts with the final stocks of the past period. With respect to the commercial part the revenues and expenses are entered in stock and current accounts. The remainder of the current accounts end up in the profit assessment account the resulting profit is transferred to the final commercial balance. There end up also the remainder of the stock accounts. In the additional social part some commercial stocks which are not considered in commercial accounting might be added. Then the transactions with respect to stocks are entered as well and deferrals take place. The entry of the transactions implying current benefits and current accounts follow. Deferrals are made. The remainders of the current social benefits and current social costs become collected within the social success operating statement and the current social net benefit determined. The latter is entered to the final social balance as well as the remainder of the stock accounts.

In a last step the final social balance and the commercial balance are aggregated to a total social balance. There we find the commercial assets and the social assets as well as equity capital, commercial liabilities, social liabilities, net social capital and current social success.

Figure 2. Economic Welfare Oriented Social Accounting



Source: Eerma Friedrich (2012a)

Therefore, this economic welfare oriented social accounting provides us with information about social capital. At first we receive information about the social capital related to the economic unit we are considering. When investigating the commercial part of the bookkeeping approach then we receive the private capital in the form of a net private capital. The real capital (fixed and working) and the financial capital are shown in the commercial balance. We also learn the net private capital, which is the former one reduced by the liabilities ending up as equity capital, reserves and profit – the profit would then be used for investments.

Social capital of the economic unit can be detected similarly. It results from the additional willingness to pay, which is not demonstrated in commercial bookkeeping. Therefore, it is related to all additional social entries of transactions connected to rents and the indirect evaluation methods. They include on the one hand internal social capital and the willingness to pay for it and partly the external social capital. However, an explicit division between human capital and other forms of social capital is not made. Here, the distinguishing mark is the kind of evaluation method to determine the willingness to pay. In practice human capital and other sorts of social capital are also difficult to separate. Knowledge about and integration into a

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

network can on the one hand reflect human capital but at the same time a network oriented social capital. Therefore, it seems wise to differentiate on one hand between the capital forms that are private ones just stated before and on the other hand social capital as the rest category that comprises the other forms as mentioned in chapter II. The economic welfare oriented approach allows detecting social capital of the economic unit. Net social capital results as the difference between social assets and social liabilities leading to the remainder of the social cash account representing net social capital plus the current social net-benefit. The willingness to pay approach is used to aggregate the different forms of social capital. These different forms of social capital vary from type to type of economic units according to the willingness to pay identification method applied.

Economic welfare oriented social accounting also enables to gather information about the social capital through the deferral accounts, which is due to the other economic units in an economy and also split into a stock component and a current component. However, it reflects social capital of total society, civic society, and of other sectors of economic units and the rest of the sector to which economic unit belong. The approach allows determining absolute levels but also changes of social capital. Through depreciation and acceleration and value adjustments it shows vintages of social capital. This approach also assists in specifying social capital by deciding on accounting needs to determine the period of ex-post analysis and by fixing the group of citizens whose welfare and social capital should be detected. Social capital also depends on the generations to consider, the region the analysis is concentrating on, the transactions and extension of networks considered, and the effects included. Social capital differs according to the evaluation methods of willingness to pay applied and to which kind of social capital is paid attention to. Moreover, the handling of alternative situations (with and without principle with respect to the economic unit), and the delineation of the economic unit (Erma & Friedrich, 2012a) influences the size of social capital.

**Social Capital of a University Faculty – The Example of the Faculty of
Economics and Business Administration of the University of Tartu**

Economic welfare oriented social accounting was applied to the Faculty of Economics and Business Administration of the University of Tartu (Erma & Friedrich, 2010, 2012, 2012a), and the Faculty of Mathematics and Computer Science of the University of Tartu (Erma, 2014). This so-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

cial accounting was also performed in the European Colleges at Tartu, and the colleges at Pärnu /Estonia and Narva/Estonia related to the University of Tartu (Eerma & Friedrich, 2014). The approach described above was developed. From the year 2009 onwards the verification of the bookkeeping approach took place. The year 2006 was chosen for the empiric application for all faculties and colleges. One the one hand, that year was relatively stable with respect to the departments considered and on the other hand to gather objective data the information was not biased by ongoing managerial conflicts.

The competences, tasks, activities in teaching, research, consulting, etc. and their embeddings in networks within the university and with economic units outside the faculties and colleges were detected to delineate the basis to group the long-lasting social benefits and costs and to elaborate the current social benefit and current social cost account for the additional social accounting. The University of Tartu possesses a commercial bookkeeping system which is partly disaggregated to the faculty level and partly aggregated solely to the university level. Therefore, the commercial accounting has to be disaggregated – especially some stocks - and adapted to the faculties. A respective chart of accounts was assigned^{2[2]}. Thereafter, revenues, expenses, stocks, etc. were entered. The profits and losses were determined as remainder in the profit assessment account and a final commercial balance was provided (see also Figure 2 and Table 2). Here, we can learn about the “social capital“reflected as net assets (see Table 2).

The additional social accounting had to be developed totally from the scratch. The definition of social stocks leads to the stock accounts, which are listed in Table 2. The current social benefits and current social costs are shown in Table 3. The accounts follow the activities of the faculty. After entering the transactions and fixing the deferrals the values in table Table 3 derive. The additional social net-benefit appears as a remainder, which is transferred to the final social balance and from there to the total final balance (see Table.2). The stocks result, e.g. additional social assets and their value adjustments. Moreover, one finds the additional social liabilities and their adjustments too. The social capital in stock appears as a remainder of the social cash account. 42.387 EEK. However, social liabilities 0.0730 EEK are to be deducted. The additional social net-benefit shows social capital 25.084 EEK due to the activities of the faculty during 2006. It is an increase in social capital.

² For details see Eerma & Friedrich (2010, 2012, 2012a, 2014); Eerma (2014)

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 2. Total social balance (commercial and additional social balance), (in thousand EEK)

IIFT7401		Total Social Balance			
IIFT711		Commercial Balance			
IFT711	Commercial Assets	IFT711	Commercial Liabilities		
1.	Non-current assets	71.515	1.	Net assets, capital	72.714
2.	Financial assets	0	2.	Liabilities	3.023
3.	Current assets	3.222			
4.	Accrued income	1.0			
IIFT7301		Additional Social Balance			
IIFT7301	Additional Social Assets	0	IIFT7301	Additional Social Liabilities	0
IIFA0101	Value of buildings	0	IIFL4001	Stock of previous net benefits	0
IIFA0111	Value of assets not entered	36.328	IIFL4011	Accidents	0
IIFA0201	Knowledge of baccalaureate	3.238	IIFL4021	Emissions, etc.	0.710
IIFA0211	Knowledge of master	1.093	IIFL4101	Future financial obligations	0
IIFA0222	Knowledge of doctor	0.544	IIFL4201	Closing down consultancy	0
IIFA0231	Knowledge Open University	6.615	IIFL4301	Loss of staff	0
IIFA0242	Knowledge vocational training	0.354	IIFL4401	Loss of res. by political act.	0.020
IIFA0251	Knowledge teaching staff	0.031	IIFL4501	Employment losses	0
IIFA0261	Knowledge of Scientists	0.030	IIFL4511	Reduced infrastructure	0
IIFA0301	Lasting research results	11.400	IIFL1001	Soc. cash (add. Soc. capital)	42.387
IIFA0312	Incr. intern. cooperation: capacity	0.603	IIFV3101-3612	Value adjustment:	10.170
IIFA0321	Incr. research capacities: staff	1.426			
IIFA0331	Incr. research capacity: equipment	0.160			
IIFA0341	Incr. research capacities: buildings	0			
IIFA0351	Incr. research capacities: library	0.094			
IIFA0361	Contribution to research centres	0			

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

IIFA0401	Capacity to consult firms	1.060		
IIFA0411	Capacity to consult government	0.901		
IIFA0421	European funds	0.060		
IIFA0501	Dev. Estonian language	1.915		
IIFA0511	Increased Em-employment	2.724		
IIFA0521	Increased infra-structure	3.500		
IIFA0601	Changes of profits of other firms	1.554		
IIFA0612	Increase of tax receipts	4.594		
IIFW3001-3511	Value adjustment:	0.147		
			IIFB4871	Additional net benefit
	154.108			25.084
				154.108

Source: Eerma & Friedrich (2012).

Table 3. Additional operating social success statement of the faculty (in thousand EEK)³

IIFT7201	Social Costs from		Social Benefits from		
Teaching (1)					
sC6101	Baccalaureate studies	1.822	B5101	Baccalaureate studies	4.858
sC6111	Master studies	0.018	B5111	Master studies	2.418
sC6122	Doctoral studies	0.183	B5122	Doctoral studies	5.547
sC6132	Promotion of skills	0.324	B5132	Vocational training	0.513
sC6141	Open University	0.928	B5141	Open University	11.775
sC6152	Publ. teaching materials	0.048	B5152	Publ. teaching materials	0.924
Research (2)					
sC6202	Publ. research results	0.004	B5202	Publ. research results	0.008
sC6212	Rising funds	0.298	B5212	Rising funds	0.658
sC6222	Writing proposals	0.365	B5222	Writing proposals	0.609
sC6231	Writing, articles, books	0.496	B5231	Writing articles, books	1.548
sC6242	Organising conferences	0.139	B5242	Organising conferences	0.148
Consulting (3)					
sC6301	To firms	0.636	B5301	To firms	1.060
sC6311	To public institutions	0.541	B5311	To public institutions	1.351
sC6321	To parliament	0.030	B5321	To parliament	0.360
sC6331	To EU	0.019	B5331	To EU	0.060

³ The values in the tables are determined by methods stated mentioned in the 4th section according to appropriateness and availability of data. The numbers in the first and fourth column show codes of the accounts in the chart.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

sC5341	To scientific bodies	0.023	B5341	To scientific bodies	0.046
Management activities (4)					
sC6401	Monitoring	0.015	B5401	Monitoring, control	0.231
sC6411	Financial management	0.015	B5411	Financial management	0.219
sC6421	Staff management	0.024	B5421	Staff management	0.285
sC6431	Faculty decision making	0.043	B5431	Faculty decision making	0.642
sC6441	Management of labs	0.003	B5441	Management of labs	0.041
sC6452	Contacts to other faculties	0.002	B5452	Contacts other faculties	0.027
sC6461	Support of Colleges	0.076	B5461	Support of Colleges	0
sC6471	Representation	0.012	B5471	Representation	0.024
Other faculty activities (5)					
sC6501	Contact to schools	0.002	B5501	Contact to schools	0.003
sC6512	Attraction of visitors	0.154	B5512	Attraction of visitors	0.456
sC6522	Public relations	0.001	B5522	Public Relations	0.840
sC6532	Advertisement	0.004	B5532	Advertisement	0.108
sC5542	Fiscal social costs	0	B5542	Fiscal social benefits	6.773
sC6552	Other social costs	0.200	B5552	Other social benefits	0
sC6701	Depreciation	10.170	B5801	Appreciation	0.147
B4871	Add. social net benefit	25.084			
		41.679			41.679

Source: Eerma & Friedrich (2012).

The social capital due to the involvement of other economic units can be learned from the deferral to the assets of additional social benefits amount to 2.875 thousand EEK. The difference between the referred current social net benefit due to the referred current social benefits and the referred current social costs amounts to 10.870 thousand EEK.

Chances and Limits to Detect Social Capital by the Economic Welfare Oriented Social Accounting

The Economic Welfare Oriented Social Accounting offers many chances to detect social capital. It combines and shows many aspects of social capital discussed in literature on social capital such as a stock, vintages, and maintenance activities. It comprises all specifications of social capital like networks, trust, values, norms, at least if there exists a willingness to pay for it. Therefore, it can be also aggregated. There is as well the possibility to identify the firm related social or the rest of it, which is linked to the firm's activities.

How far the social capital gets measured depends much on the evaluation methods concerning willingness to pay, which are applied to stocks and activities evaluation. Different methods may lead to different volumes of social capital. Here restrictions concerning data and methodological problems arise. This is especially relevant with respect to the indirect eval-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

uation methods (Eerma 2014). One of the advantages concerns the comparability of the evaluations through willingness to pay.

Moreover, there is assumed that the demand curve shows the willingness to pay of the buyers. This is no problem if a final consumption good is offered, e.g. a study programme to students. With an intermediate product the analysis also assumes that the demanders firms and public offices are expressing their willingness to pay in the demand curve, in which also the willingness to pay of their customers is reflected. Therefore, no deferrals, etc. have to be made. However this problem has to be discussed more in detail⁴. If this assumption holds no social capital has to be considered in the framework of the commercial accounting.

The non commercial social capital not caused by the economic unit considered is expressed in the additional social accounting. The economic welfare oriented social accounting is especially applicable to measure the economic unit referred social capital.

However, some limitations are related to this tool to identify social capital. As the bookkeeping system uses welfare theory based evaluations it is related to the individualistic welfare theory (Graaff, 1963; Sen, 1982; Samuelson, 1983; Mishan, 1987, Adler & Posner, 2006). The role of social groups (e.g. administrators, trade unions, entrepreneurial associations) in determining the content of social welfare is seldom emphasized. Therefore, the values identified by the willingness to pay approaches do not necessarily reflect the true evaluation in society. Moreover, the assumption of constant marginal utility of money that means, ignoring the fact that an Estonian croon (euro) may stem from a rich or poor household, points to a strong assumption. Further debates concern the so-called compensation tests discussed in literature on welfare theory. However, the stated difficulties are also with other approaches to measure performance.

If the bookkeeping approach suggested for one Faculty should also be applied to several faculties and the University itself, or if it should be applied to other economic units the chart has to be adapted. Then, the conventions of deferral get evidently much more specific and complicated. Also the chart of social accounts needs further elaboration, when isolated

⁴ It has to be investigated whether all consumer surplus changes, turnover changes and cost changes with all economic units involved in production have to be included, whether it is sufficient to turn to value added, which in a national accounting is based on commercial accounting, by deducting the value added of the institution looked at from all economic units involved.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

social net benefits of the group of clients, such as types of students or of research clients, should be assessed. Some social benefits and costs are to be excluded. More group specific conventions to deferral of social benefits and costs have to be developed. Additional corrections of social benefits and costs, which are booked in commercial bookkeeping, have to be made and considered in the additional social accounting. Total social net benefit and total social assets and liabilities can be assessed in principle.

And last, but not least some efforts are necessary to complete the economic welfare oriented social accounting. All the bookings in the commercial part of the social accounting have to be checked whether they reflect really willingness to pay. With respect to the additional social part more sophisticated criteria to split social benefit and costs and to allocate them to the institutions causing the social net-benefit should be available. Then the identification of social capital becomes more precise. Further research is needed to improve the identifications of effects, the determination of depreciation rates for knowledge of students, scientists, researchers, professors etc., the assessment of consumer surpluses for individual services, methods to evaluate stocks and the allocation of pre-services to linked economic units. Charts have to be developed for different kinds of economic units.

The approach can be redeveloped to kinds of different social capital identifying approach according to types of evaluations. It must be determined, which evaluation methods are linked to which social capital type. Then the bookings for which the respective evaluations are used can be summarized in special accounts, which then show the types of individual social capital involved. In this way a supplementary bookkeeping would be introduced.

Another approach to identify social capital would be a bookkeeping system developed to measure different types of social capital. Then the chart has to be shaped according to the different types of social capital. An ex-post analysis of an economic unit for social capital would be designed. The transactions have then to be booked on accounts of different social capital and deferrals have to be made and booked. The different social capitals will emerge concerning social stocks, social liabilities and the current social capital caused.

A very demanding project would be not to start with the measurement of the individual social capital at the level of an economic unit, but to try to fix the total type of social capital in an economy or a region. However as the development of national accounting has shown this needs the develop-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

ment of an individual social capital accounting first in order to assign an aggregated system of accounting^{5[5]}. That would enable also a place related determination of total social capital for a region or a location. Special deferrals or restricted aggregations criteria become necessary.

Conclusions

The social capital is a vague concept comprising networks, norms, values and actions of actors concerning these features. In literature the characteristics of social capital are debated. Different types of social capital exist at different levels, e.g. individual level, group level, civic society level and total society level. How far it has features of capital in an economic sense is under debate. Some authors discuss a division consisting of real capital as fixed and working capital and financial capital on the one hand and capital, which are referring to human capital and social capital in a narrow sense on the other hand.

Many economists are convinced of its importance, because of its effects on growth, innovation, management, types of markets, knowledge, etc. but the measurement of social capital as such is mostly done by sociologists. Attempts by economists are rather descriptive turning to practical cases, policy results or market developments or they turn to regression and other statistical analysis to identify the importance of social capital for some economic phenomena. However, measurement of social capital turns out unsatisfactory.

One possibility to measure social capital is yet not used. Social accounting serves to measure social impacts of economic activities. Several approaches of social accounting exist, however most of them are not developed to such an extent that the social capital can be determined through an adequate ex-post analysis. Most of them try to show the social and economic impacts of an economic unit in particular a firm on society. Only some special types of social capital of a firm can be identified. The usual social accounting have mostly no basis to aggregate different sorts of social capital or social capital at all. However, the welfare economic oriented approach of social accounting comprises monetary evaluations on basis of the willingness to pay approach applied in benefit-cost analysis and an ex-post

⁵ As an example serves the determination of the value added on the production account of national income accounting that results from aggregations of profit statements accounts from commercial bookkeeping.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

analysis that allows a bookkeeping of the relevant transactions occurring during a past period.

The definition of net benefit allows splitting social benefits and social costs in those which are reflected as revenues and expenses in commercial accounting and additional social benefits and social costs, which can be considered an additional social accounting which constitutes a supplementary bookkeeping. The results of both show the net commercial assets as difference between assets and liabilities plus the profit on the one side and the social capital as difference between the additional social assets reduced by social liabilities and the current social net benefit on the other side. This allows identifying social capital on the level of an economic unit.

The author demonstrates the basic features of the welfare economic oriented approach of social accounting of the Faculty of Economics and Business Administration for the University of Tartu in Estonia using data for 2006. How social capital of the faculty becomes expressed in the bookkeeping results has been explained. The social capital of the faculty turns out to be positive. It refers to networks, knowledge, values, norms and management actions. The part of social capital of the faculty that is not due to the faculty has been deferred. It refers to the additional social capital as remainder of the social cash account as a stock and the current social net benefit.

The welfare oriented approach of social accounting assists primarily to identify the social capital related to one economic unit. It also enables through the deferrals to estimate the part of social capital the economic unit is involved in that refers to activities of other economic units related to the economic unit under consideration. The approach does not inform about the total existing social capital in society, in a region or at a place. As the welfare economic oriented approach of social accounting was developed in order to detect social success, it is also not assigned to fix the amount of different types of social capital. Different social capitals are related to the different evaluation methods applied. Therefore, a next step of social capital identification, could lead to an extension of the approach by introducing a social capital oriented supplementary accounting where special remainders of accounts which are related to special types of social capital are transferred. An even more drastic extension would be when the total welfare oriented approach of social accounting is directed to entering the transaction within a chart of accounts which is defined according to different kinds of social capital. This, however, requires a totally new orientation of the whole approach.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

A measurement of the total social capital in society or region cannot take place within the social accounting directed to one economic unit. On the basis of social welfare oriented accounting for one unit similar to national accounting a framework for total social capital accounting has to be developed in future.

Limits of the welfare oriented approach of social accountings are due of the individualistic welfare theoretical basis of the approach, the weakness of the so-called compensation tests, the question how far the willingness to pay expresses social priorities, etc. Moreover, the approach needs further development with respect to deferral rates and depreciation rates, etc. and in particular to evaluation methods and possibilities to apply them and impact analysis. With respect to social capital a detailed analysis concerning the kind of social capital which is going to be measured when applying those methods is necessary.

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
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**Using Genetic Algorithm in Dynamic Model
of Speculative Attack**

JEL Classification: *C6; F3; E5*

Keywords: *currency crisis; dynamic model; genetic algorithms*

Abstract: Evolution of speculative attack models show certain progress in developing idea of the role of expectations in the crisis mechanism. Obstfeld (1996) defined expectations as fully exogenous. Morris and Shin (1998) endogenised the expectations with respect to noise leaving information significance away. Dynamic approach proposed by Angeletos, Hellwig and Pavan (2006) operates under more sophisticated assumption about learning process that tries to reflect time-variant and complex nature of information in the currency market much better. But this model ignores many important details like a Central Bank cost function. Genetic algorithm allows to avoid problems connected with incorporating information and expectations into agent decision making process to an extent. There are some similarities between the evolution in Nature and currency market performance. In our paper an assumption about rational agent behaviour in the efficient market is criticised and we present our version of the dynamic model of a speculative attack, in which we use a genetic algorithm to define decision-making process of the currency market agents. The results of our simulation seem to be in line with the theory and intuition. An advantage of our model is that it reflects reality in quite complex way, i.e. level of noise changes in time (decreasing), there are different states of

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

fundamentals (with “more sensitive” upper part of the scale), number of inflowing agents can be low or high (due to different globalization phases, different capital flow phases, different uncertainty levels).

Introduction

Speculative attack models try to catch a complicated relation between information and expectations. Informed agents (provided by either private signals or common knowledge or both of these) formulate their expectations and due to these expectations make strategies either to attack or hold. This mechanism from information through expectations to attack has always been extremely difficult to cover in any theoretical framework. Evolution of speculative attack models show certain progress in developing idea of the role of expectations in the crisis mechanism. Obstfeld (1996) defined expectations as fully exogenous. Morris and Shin (1998) endogenised the expectations with respect to noise leaving information significance away. They proposed static model, including information but excluding any possibility of so-called common knowledge in the currency market. Dynamic approach proposed by Angeletos, Hellwig and Pavan (2006) operates under more sophisticated assumption about learning process that tries to reflect time-variant and complex nature of information in the currency market much better. But this model ignores many important details like a Central Bank cost function.

If we look at the speculative attack as at the optimisation problem, why not to use genetic algorithm to present the agent behaviour in the market? Genetic algorithm allows to avoid problems connected with incorporating information and expectations into agent decision making process to an extent. Evolution means that the species that are prepared to the environment worse, have smaller chances to survive, and as the time passes by, improved species appear. There are some similarities between the evolution in Nature and currency market performance. In the currency market the speculators make wrong decisions and are eliminated from the market by these speculators who generate high pay-offs. Therefore, we can assume that learning in the currency market may in fact be characterised like species adaptation process to the environment. That is why we believe that introducing genetic algorithm may be a right step towards finding some optimal solutions for the speculative attack model.

This paper is organized as follows. In the second section assumption about rational agent behaviour in the efficient market is criticised and we explain why we use genetic algorithm. In the third section dynamic model

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

of a speculative attack is presented. In the fourth section optimal strategies for the Central Bank and for speculators are defined. In the fifth section genetic algorithm that reflects decision making process is described. In the sixth section our results are presented. We also show evolution of a learning process. The last section contains conclusions.

**Critical approach towards rational agent behaviour
in the efficient market**

Foreign exchange market can not be characterised as a good example of strong efficiency paradigm by Fama (1970). Information is not equally available to all agents. The market is rather decentralised and trade transparency is low (see Lyons (2001)). It is well known, that this distinguishes the foreign exchange market from other financial markets. Moreover, results of the surveys (Sarno and Taylor (2002)), especially these based on the microstructural logic suggest that the static expectation hypothesis should be rejected. The results confirm heterogeneity of expectations.

Using behavioural finance perspective we can say that although an agent may store and process only a tiny part of the relevant information, the agent is not brainless. If we agree to abandon traditional rational expectation model that assumes perfect knowledge of the market participants, then it is possible to redefine an individual forecasting strategy, which is neither fully rational (in a sense of *homo oeconomicus*) nor fully irrational. It is in line with heuristics rules taken from the psychology. So-called *trial and error* strategy represents bounded rationality framework and means *ex post* checking how profitable certain rule is while comparing it with some others. If the rule does not prove to be the profitable one, then the agent switches to the better one. If the agent's strategy turns out to be successful, then she/he sticks to it. *Trial and error* strategy is rooted in Nature, it has got strongly evolutionary character.

In the behavioural model of exchange rate by De Grauwe and Grimaldi (2006) the mechanism of making forecasts by the agents is well described. The authors show that in the foreign exchange market the agents follow *trial and error* strategy, no matter if they are so-called "fundamentalists" or "chartists" (no matter if they analyse macroeconomic fundamentals or they rely on technical analysis to forecast the exchange rate). *Ex post* assessment of the forecasting strategies may transform "fundamentalist" into "chartist" or vice versa. It is worth mentioning that according to Tversky, Kahneman (1991) the agents need some time to adopt a new strategy, they are slightly

conservative, therefore “status quo bias” must be considered in their decision making process even though it is true that the agents react to the relative profitability of the rules. *Trial and error* strategy is thus a dynamic process that requires further assumptions concerning “memory” of the agent. De Grauwe and Grimaldi (2006) use the short-run memory hypothesis that implies that the agent refer just to last period’s squared forecast error to make their decision.

Frydman and Goldberg (2007) formulate some critical remarks towards rational expectation and efficient market hypothesis too. They are quite close to the behavioural economists’ point of view. The authors pay attention to the fact that the individuals in the foreign exchange market cope with imperfect knowledge. They stress importance of the revision of the agent forecasting strategies over time at the same time mentioning that even “social context” should be considered as important determinant of the strategy formulation process. They also describe the agents as conservative, defining this as follows: “*an individual’s forecast of the future exchange rate is not too different from the forecast she would have had if she did not revise her forecasting strategy*” (Frydman and Goldberg, 2007, p. 184).

It seems that formulating a model that would reflect true agent behavior in the foreign exchange market in a proper way is more complicated task than the supporters of traditional efficient market hypothesis would like to present. Such a model should have an evolutionary, dynamic character, show making decision processes based on *trial and error* strategy which are treated as optimisation, however, under imperfect knowledge assumption. Genetic algorithm appears to be quite suitable to imitate agents’ behavior in the foreign exchange market in the real world if we want to meet majority of these criteria.

Methodology of the research

Dynamic Model of Speculative Attack

Both models by Obstfeld (1986) and by Morris and Shin (1998) have some shortcomings and in this paper these models are extended (especially Morris and Shin’s one) and made more applicable. Neither “multiple equilibria” approach nor “uniqueness” take into account time as important factor, they are both static. Therefore, in our paper dynamics of the model is introduced. We follow some elements of the model proposed by Angeletos, Hellwig and Pavan (2006). Their model offers rather general framework

how to apply dynamic global games into a regime change mechanism. It can be applied for modeling speculation against a currency peg (which is of our priority interest), at the same time the model can be also used for some other purposes like explaining run against a bank or some other (not strictly economic) processes, for example a revolution against a dictator. There are two important features of the model. Firstly, it allows the agents to learn, therefore, the multiplicity is connected with information dynamics. And secondly, the fundamentals matter for the regime outcome prediction, although not for timing and number of attacks. However, the model presents only one side perspective, i.e. the speculator one, and the payoff function of Central Bank is not analysed. Moreover, we are not quite sure if it is fully satisfying to accept:

“summarizing the private information by the agent about at any given period in a one dimensional sufficient statistic, and capturing the dynamics of the cross-sectional distribution of the static in a parsimonious way” (Angeletos, Hellwig and Pavan, 2006, p. 1-2),

and then to apply this algorithm to examine the effects of learning on equilibria in the model. Instead, we offer well defined genetic algorithm to simulate learning process, and as we think that the Central Bank can also learn, in fact the genetic algorithm is used to show how decisions of two categories of agents are changing as far as their knowledge on the proportion of attacking speculators is concerned.

In our model time is discrete and indexed by $t \in \{1, 2, \dots\}$. Agents are indexed by $n \in \{1, \dots, N_t, N_t + 1\}$, where agents $1, \dots, N_t$ are speculators and agent $N_t + 1$ is the Central Bank. Subscript t is used, since we assume that number of speculators considering attack evaluates in time. Therefore there is a sequence $\{N_t\}_{t \in \{1, 2, \dots\}}$, which is not observed. The Central Bank receives ex post information about the number of speculators attacking denoted by α . We assume that each speculator considering attack, attacks with the same probability, therefore we have relationship:

$$\alpha_t = N_t \kappa_t, \quad t = 1, 2, \dots \quad (1)$$

where κ_t denotes probability that a chosen speculators attacks. α is observed ex post, however N and κ are unobserved. Of course α and κ

evaluate in time too, therefore we have sequences $\{\alpha_t\}_{t \in \{1,2,\dots\}}$ and $\{\kappa_t\}_{t \in \{1,2,\dots\}} \cdot \{er_t\}_{t \in \{1,2,\dots\}}$ is a sequence of observed exchange rates and $\{\theta_t\}_{t \in \{1,2,\dots\}}$ is a sequence of the true values of fundamentals. Similarly as in the model of Morris and Shin (1998) we assume that there are only 2 possible states of exchange rate. Exchange rate is pegged at a level e^* or depends on the fundamentals and is equal to $f(\theta)$. An action set for the Central Bank is binary, which means that the Central Bank can defend the exchange-rate peg or abandon it. Since speculators can attack the exchange-rate peg or refrain from doing so, their action set is binary too. We assume that $er_1 = e^*$. The game is continued until a state $er_t = f(\theta_t)$ is reached or if after a finite number of periods dominant strategy is not to attack. According to the model of Angeletos, Hellwig, Pagan (2006) each player receives a private signal $x_t^n = \theta_t + \varepsilon_t^n$, where for $n = 1, \dots, N$

$\varepsilon_t^n \sim N\left(0, \frac{1}{\beta_t}\right)$ is noise, independent identically distributed across agents.

In the case of the Central Bank we assume that a noise $\varepsilon_t^{N_t+1} \sim N\left(0, \frac{1}{\tilde{\beta}_t}\right)$ is independent of noises $\varepsilon_t^1, \dots, \varepsilon_t^{N_t}$ and we assume that for all t the inequality $\tilde{\beta}_t > \beta_t$ is valid because knowledge of the level of fundamentals is more precise in the case of the Central Bank than in the case of speculators. It is assumed in our paper that uncertainty concerning the level of fundamentals decreases and therefore $\forall_{s>t} \beta_s > \beta_t$. Morris and Shin (1998) and Angeletos, Hellwig, Pagan (2006) assumed that the level of fundamentals was random too, however in our model we consider different nonrandom trajectories of $\{\theta_t\}_{t \in \{1,2,\dots\}}$. In our paper $c(\cdot, \cdot, \cdot, \cdot)$ denotes the Central Bank cost function. This cost depends similarly as in the paper of Morris and Shin (1998) the state of fundamentals θ . In our paper this function depends on the total number of speculators considering attack N and probability that a chosen speculator attacks κ . We assume that the total

number of speculators considering attack evaluates according to the formula:

$$N_t = N_1 + (t-1)\tau. \quad t = 1, 2, \dots \quad (2)$$

Our extension of the paper of Morris and Shin (1998) is to make cost of intervention dependent of the level of reserves r too. We assume that $c(N_1, \tau, \kappa, \theta, r)$ is a continuous function and $\frac{\partial c(N_1, \tau, \kappa, \theta, r)}{\partial N_1} > 0$, $\frac{\partial c(N_1, \tau, \kappa, \theta, r)}{\partial \tau} > 0$, $\frac{\partial c(N_1, \tau, \kappa, \theta, r)}{\partial \kappa} > 0$, $\frac{\partial c(N_1, \tau, \kappa, \theta, r)}{\partial \theta} < 0$ and $\frac{\partial c(N_1, \tau, \kappa, \theta, r)}{\partial r} < 0$. Total number of speculators in the beginning period is not known but it has to be predicted by each agent. Therefore for each n , N_1^n denotes predicted by the n -th agent total number of speculators considering attack on the foreign exchange market. Similarly τ and κ is not known and has to be predicted by all agents. τ is constant but predictions of this quantity change in time, therefore for each agent we have sequence $\{\tau_t^n\}_{t \in \{1, 2, \dots\}}$. Analogously we have a sequence $\{\kappa_t^n\}_{t \in \{1, 2, \dots\}}$. Since our model is dynamic, we define time-dependent cost function $c_t(N_1, \tau, \kappa_{t-1}, \theta_{t-1}, r_{t-1})$, $t = 2, 3, \dots$. Lagged variables are included, because action is done in period $t-1$ and results of choice are observed in period t . Comparing to the paper of Morris and Shin (1998), one of extensions is based on the fact that the cost function is specified. We choose linear specification:

$$c_t = \gamma_1(N_1 + \tau(t-2))\kappa_{t-1} + \gamma_2\theta_{t-1} + \gamma_3r_{t-1}, \quad t = 2, 3, \dots, \quad (3)$$

where $\gamma_1 > 0$, $\gamma_2 < 0$, $\gamma_3 < 0$ are nonrandom and known constants.

Similarly as in the model of Morris and Shin (1998), if the Central Bank defends the peg, it receives value v but faces a cost c .

Optimal strategies for the Central Bank and for speculators

We suppose that all agents do action in the period $t - 1$ and the result of this action is observed in period t . Let $\{ST_t^n\}_{t \in \{1,2,\dots\}}$ denotes a sequence of strategies chosen by the n -th agent. $pay_t^n(ST_{t-1}^n)$ denotes the payoff in period t for an agent number n , if this agent chooses action ST_{t-1}^n in period $t - 1$. As we mentioned above $ST_t^n \in \{0,1\}$ for all n . In the case of speculators we suppose that ST_t^n is 1 if speculator decides to attack currency and is 0 otherwise. If $ST_t^{N_t+1} = 1$, the Central Bank decides to defend the exchange-rate peg and if $ST_t^{N_t+1} = 0$, then the Central Bank abandons the exchange-rate peg. The following table shows payoffs for speculators in period t in the period $t - 1$ exchange rate is pegged at the level e^* :

Table 1. Payoffs for speculators in period t ($er_{t-1} = e^*$)

	$ST_{t-1}^{N_t+1}$	0	1
ST_{t-1}^n	0	0	0
1	$(e^* - f(\theta_t)) - tr$	$-tr$	

Source: Own calculations

Central Bank's payoff depends on the proportion of speculators attacking, state of fundamentals and the level of reserves. The payoff is defined in the following way:

$$pay_t^{N_t+1}(ST_{t-1}^{N_t+1}) = \begin{cases} 0 & \text{if } ST_{t-1}^{N_t+1} = 0, \\ v - \gamma_1(N_t + \tau(t-2))\kappa_{t-1} - \gamma_2\theta_{t-1} - \gamma_3r_{t-1} & \text{if } ST_{t-1}^{N_t+1} = 1. \end{cases} \quad (4)$$

Since neither the true proportion of speculators attacking nor state of fundamentals are known in the period of attack, expected payoff is calculated. This expected payoff is given by formula:

$$E\left[\text{pay}_t^{N_t+1} (ST_{t-1}^{N_t+1}) \right] = \begin{cases} 0 & \text{if } ST_{t-1}^{N_t+1} = 0, \\ v - \gamma_1 (N_1^{N_t+1} + \tau_{t-1}^{N_t+1} (t-2)) \kappa_{t-1}^{N_t+1} - \gamma_2 x_{t-1}^{N_t+1} - \gamma_3 r_{t-1} & \text{if } ST_{t-1}^{N_t+1} = 1. \end{cases} \quad (5)$$

Firstly we consider the border cases. We define a binary variable bad_t which is 1 if the state of fundamentals and reserves is extremely bad and even in the case of “no attack” the exchange-rate peg is abandoned and we define a binary variable $good_t$ which is 1 if the state of fundamentals and reserves is extremely good. “Extremely good state of reserves and fundamentals” means that even in the case of all speculators attacking in period t , then $E\left[\text{pay}_{t+1}^{N_{t+1}+1} (1) \right] > 0$. Value of variable bad_t is defined below:

$$bad_t = 1 \left\{ \left(x_t^{N_t+1}, r_t \right) : v - \gamma_2 x_t^{N_t+1} - \gamma_3 r_t < 0 \right\}. \quad (6)$$

Analogously variable $good_t$ is defined by the following formula:

$$good_t = 1 \left\{ \left(x_t^{N_t+1}, r_t \right) : v - \gamma_1 - \gamma_2 x_t^{N_t+1} - \gamma_3 r_t > 0 \right\}. \quad (7)$$

If a variable bad_t is 1, then a dominant strategy for the Central Bank is to abandon the exchange-rate peg. Otherwise if $good_t$ is 1, then a dominant strategy is to defend the exchange rate peg. There is no reason to attack for the speculators, if payoff from attacking (even if the attack is successful) is smaller than a transaction cost, which means that:

$$e^* - f(\theta_t) < tr. \quad (8)$$

Then a dominant strategy for speculators is to refrain from attacking.

If conditions (6) and (7) are not satisfied, then there exists such $\tilde{\kappa}_{t-1}^{N_{t-1}+1}$ that solves the following equation against $\kappa_{t-1}^{N_{t-1}+1}$:

$$v = \gamma_1 \left(N_1^{N_{t-1}+1} + \tau_{t-1}^{N_{t-1}+1} (t-2) \right) \kappa_{t-1}^{N_{t-1}+1} + \gamma_2 x_{t-1}^{N_{t-1}+1} + \gamma_3 r_{t-1}. \quad (9)$$

Then an optimal strategy for the Central Bank is defined as follows:

$$ST_{t-1}^{N_{t-1}+1} = 1 \left\{ \kappa_{t-1}^{N_{t-1}+1} < \frac{v - \gamma_2 x_{t-1}^{N_{t-1}+1} - \gamma_3 r_{t-1}}{\gamma_1 \left(N_1^{N_{t-1}+1} + \tau_{t-1}^{N_{t-1}+1} (t-2) \right)} \right\}. \quad (10)$$

Similarly as in the case of the Central Bank, critical value $\tilde{\kappa}_{t-1}^n$ is defined for each speculator. This value is calculated analogously changing an index $N_{t-1}+1$ by n for $n=1, \dots, N_{t-1}$. Speculators do not have any information on a state of fundamentals observed by the Central Bank and predicted by the Central Bank values of parameters N_1 and predicted by the Central Bank probability of attacking by a chosen speculator κ . Therefore they have to rely on their own observations and predictions to formulate the payoff function of the Central Bank. There is a reason to attack for the speculators if the predicted probability of attacking exceeds the critical value. Therefore if inequality (8) is not satisfied, then an optimal strategy for speculators is given by the following formula:

$$ST_{t-1}^n = 1 \left\{ \kappa_{t-1}^n > \frac{v - \gamma_2 x_{t-1}^n - \gamma_3 r_{t-1}}{\gamma_1 \left(N_1^n + \tau_{t-1}^n (t-2) \right)} \right\}. \quad (11)$$

As we have already mentioned, parameters of the cost function of the Central Bank are known only to the CB but unknown to the speculators.

Genetic algorithm in the process of learning

In the first period for each n predicted total number of speculator considering attack is equal to N . Similarly, predictions of τ and κ are purely random for each agent. In the second period Central Bank knows value

of $\alpha_1 = \kappa_1 N_1$. The Central Bank assumes that probability of attacking by individual speculator in a given period is the same as this probability in previous period and therefore predicts values of κ and τ in the next periods using the following recursive formula:

$$\kappa_{t+1}^{N_{t+1}+1} = \frac{\kappa_t^{N_t+1} N_t^{N_t+1}}{\alpha_t}. \quad (12)$$

Parameter τ is predicted according to the following formula:

$$\tau_{t+1}^{N_{t+1}+1} = \frac{\left(\frac{\alpha_t}{\kappa_t^{N_t+1}} - \frac{\alpha_1}{\kappa_1^{N_1+1}} \right)}{t-1}. \quad (13)$$

Since forex market is not fully transparent, we assume that speculators do not have any information concerning number of speculators attacking in the previous period. But they observe their own payoffs and if payoff for the first speculator is higher than payoff for the second one, then this first speculator has higher chance to “survive” than the second one. It is obvious that speculators with higher payoffs are satisfied with their decisions and they do not have any incentive to change the tactic. Speculators with negative payoffs decide to change their tactic. They learn tactic from the speculators with positive payoffs. New speculators enter the FX market. Dynamics on the FX market imitates nature, where only correctly fitted spiches survive. Spiches that are not able to adapt to the environment are replaced by the spiches that are better fitted. Crossover can be interpreted as a knowledge exchange. Considering all this FX market can be modeled as evolving system of the autonomous interacting agents and hence the genetic algorithm can be applied here. Analyzing formula for optimal strategy of n –th speculator in period t , we can notice that this strategy depends on parameters $\kappa_{t-1}^n, \gamma_1, \gamma_2, \gamma_3, \tau_{t-1}^n, N_1^n$. Speculators do not know these parameters and their knowledge concerning them is changing from first period to the second one. We assume that these parameters are different for different periods and different speculators. We denote γ_{it}^n as predicted value of parameter $\gamma_i, i = 1,2,3$ in period t by n –th speculator.

In order to use genetic algorithm we have to define range of possible values of parameters. It is obvious that:

$$\forall_{t \in \{2,3,\dots\}} \forall_n \kappa_{t-1}^n \in (0,1]. \quad (14)$$

We have to choose minimum and maximum values of parameters $\gamma_1, \gamma_2, \gamma_3, \tau, N_1$, after choosing these values, we have:

$$\begin{aligned} \forall_{t,n} \gamma_{1t}^n &\in \langle \gamma_1^{\min}, \gamma_1^{\max} \rangle, \forall_{t,n} \gamma_{2t}^n \in \langle \gamma_2^{\min}, \gamma_2^{\max} \rangle, \forall_{t,n} \gamma_{3t}^n \in \langle \gamma_3^{\min}, \gamma_3^{\max} \rangle, \\ \forall_{t,n} \tau_t^n &\in \langle \tau^{\min}, \tau^{\max} \rangle, \forall_{t,n} N_1^n \in \langle N_1^{\min}, N_1^{\max} \rangle. \end{aligned}$$

If we choose precision ε , then number of gens in one chromosome is equal to:

$$\begin{aligned} GENS &= \left\lceil \log_2 \frac{1}{\varepsilon} \right\rceil + \sum_{i=1}^3 \left\lceil \log_2 \frac{(\gamma_i^{\max} - \gamma_i^{\min})}{\varepsilon} \right\rceil + \log_2 \frac{(\tau^{\max} - \tau^{\min})}{\varepsilon} + \log_2 \frac{(N_1^{\max} - N_1^{\min})}{1} + \\ &+ 6 - 1 \left\{ \log_2 \frac{1}{\varepsilon} \in Z \right\} - \sum_{i=1}^3 1 \left\{ \log_2 \frac{(\gamma_i^{\max} - \gamma_i^{\min})}{\varepsilon} \in Z \right\} - 1 \left\{ \log_2 \frac{(\tau^{\max} - \tau^{\min})}{1} \in Z \right\} + \\ &\quad (15) \\ &- 1 \left\{ \log_2 \frac{(N_1^{\max} - N_1^{\min})}{1} \in Z \right\}, \end{aligned}$$

where $[x]$ denotes integer value of x . First $\left\lceil \log_2 \frac{1}{\varepsilon} \right\rceil + 1 - 1 \left\{ \log_2 \frac{1}{\varepsilon} \in Z \right\}$ gens represent strategy concerning the expected probability of attacking by a chosen speculator, next $\left\lceil \log_2 \frac{(\gamma_1^{\max} - \gamma_1^{\min})}{\varepsilon} \right\rceil + 1 - 1 \left\{ \log_2 \frac{(\gamma_1^{\max} - \gamma_1^{\min})}{\varepsilon} \in Z \right\}$ gens represent strategy concerning the value of parameter γ_1 etc. In order to introduce crossover and mutation we define quantities $pc(\kappa), pc(\gamma_1), pc(\gamma_2), pc(\gamma_3), pc(\tau), pc(N_1)$, which denote probabilities of crossover for gens of two chromosomes for a given parameter.

$pm(\kappa), pm(\gamma_1), pm(\gamma_2), pm(\gamma_3), pm(\tau), pm(N_1)$ denote probability of mutation of respective gens and $pr(\kappa), pr(\gamma_1), pr(\gamma_2), pr(\gamma_3), pr(\tau), pr(N_1)$ denote proportion of gens in appropriate part of chromosome, which are crossed over. Before we calculate fitness function, for simplicity we define the following variables:

$$\begin{aligned}
 SS_t^n &= 1 \left\{ e^* - f(\theta_t + \varepsilon_t^n) - tr > 0 \right\}, \quad n=1, \dots, N_t, \quad t=1, 2, \dots, \\
 SB_t &= 1 \left\{ v - \gamma_1 \kappa_t (N_1^{N_t+1} + \tau_t^{N_t+1} (t-1)) - \gamma_2 (\theta_t + \varepsilon_t^{N_t+1}) - \gamma_3 r_t > 0 \right\}, \\
 &\quad t=1, 2, \dots, \quad (16) \\
 SBS_t^n &= 1 \left\{ v - \gamma_1^n \kappa_t^n (N_1^n + \tau_t^n (t-1)) - \gamma_2^n (\theta_t + \varepsilon_t^n) - \gamma_3^n r_t > 0 \right\}, \\
 n &= 1, \dots, N_t.
 \end{aligned}$$

If $SS_t^n = 1$, then attack is considered by the n -th speculator in period t . Otherwise transaction costs exceed payoff and attack is not taken into account. Value of variable SB_t informs us about the strategy of the Central Bank. Central Bank abandons the exchange-rate peg if $SB_t = 0$ and defends it otherwise. Variable SBS_t^n can be interpreted as expected (by the n -th speculator) strategy of the Central Bank. SBS_t^n is 1 if the n -th speculator predicts that the Central Bank will defend the exchange-rate peg and 0 otherwise. Since payoff may be negative, we do monotonic transformation in order to calculate the value of the fitness function:

$$F_t^n = \exp(\text{pay}_{t+1}^n). \quad (17)$$

The fitness function in our model is given by the following formula:

$$F_t^n = \begin{cases} \exp(-tr) & \text{if } SS_t^n SB_t = 1 \wedge SBS_t^n = 0, \\ \exp(0) = 1 & \text{if } SS_t^n SBS_t^n = 0, \\ \exp(e^* - f(\theta_t) - tr) & \text{if } SS_t^n SBS_t^n = 1 \wedge SB_t = 0. \end{cases} \quad (18)$$

We use roulette-wheel selection method in order to choose appropriate chromosomes in the next period.

In the first simulation experiment probability of abandoning the exchange-rate peg is calculated. If after 20 periods the Central Bank does not change its strategy and still defends exchange-rate peg or dominant strategy for speculators is not to attack, then we assume that the exchange-rate peg is abandoned. Experiment is done for different states of fundamentals (weak fundamentals, medium fundamentals, strong fundamentals), different levels of reserves (low reserves, medium reserves, high reserves) and dif-

ferent values of parameter τ . We assume that $N_1 = 10$, $N_1^{\min} = 7$, $N_1^{\max} = 13$. If $\tau = 2$, then $\tau^{\min} = 1$ and $\tau^{\max} = 3$. Else if $\tau = 5$, then $\tau^{\min} = 3$ and $\tau^{\max} = 7$. In our experiment predicted numbers of speculators in the first period are randomly selected in the following way:

$$P(N_1^n = k) = \begin{cases} \frac{1}{6} & \text{for } k = 7, \dots, 13, \\ 0 & \text{for } k \notin \{7, \dots, 13\} \end{cases} \quad \text{for } n = 1, 2, \dots, N_1 \quad (19a)$$

and

$$P(N_1^{N_1+1} = k) = \begin{cases} \frac{1}{3} & \text{for } k = 9, \dots, 11, \\ 0 & \text{for } k \notin \{9, \dots, 11\} \end{cases} . \quad (19b)$$

κ_1^n is selected randomly from $U(0,1)$ for all agents. Similarly τ^n is selected randomly for all agents in the first period. We assume that if $\tau = 2$, then

$$P(\tau_1^n = k) = \frac{1}{3}, \text{ for } k = 1, 2, 3 \text{ and } n = 1, \dots, N_1 + 1. \quad (20a)$$

If $\tau = 5$, then:

$$P(\tau_1^n = k) = \frac{1}{5}, \text{ for } k = 3, 4, 5, 6, 7 \text{ and } n = 1, \dots, N_1 \quad (20b)$$

and

$$P(\tau_1^{N_1+1} = k) = \frac{1}{3}, \text{ for } k = 4, 5, 6. \quad (20c)$$

In the case of the Central Bank, values of parameter τ in periods $t = 2, 3, \dots$ are obtained according to the formula (13) and values of parameter κ are obtained according to the formula (12). In the case of speculators, values of parameters τ and κ in periods $t = 2, 3, \dots$ result from the use of genetic algorithm. Speculators with higher payoffs have higher chances not to change their strategy. Speculators with negative payoffs have higher chances to use a different strategy in the next period. Constant parameters are as follows:

$$e^* = 2, v = 3, \quad \gamma_1 = 0,8, \quad \gamma_2 = -0,7, \quad \gamma_3 = -0,8, \quad \gamma_1^{\min} = 0, \quad \gamma_1^{\max} = 2, \\ \gamma_2^{\min} = -2, \quad \gamma_2^{\max} = 0, \quad \gamma_3^{\min} = -2, \quad \gamma_3^{\max} = 0, \quad \beta_t = 5t, \quad \tilde{\beta}_t = 10t, \\ f(\theta_t) = \theta_t, \quad tr = 0,35.$$

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

In the case of weak fundamentals, θ_t is given by the following formula:

$$\theta_t = 1,2 + 0,01t ,$$

in the case of medium fundamentals we have:

$$\theta_t = 1,4 + 0,01t ,$$

in the case of strong fundamentals θ_t is given by formula:

$$\theta_t = 1,6 + 0,01t ,$$

whereas in the case of very strong fundamentals we have:

$$\theta_t = 1,7 + 0,01t$$

In the case of low reserves, r_t is given by the following formula:

$$r_t = 1 + 0,01t ,$$

in the case of medium reserves we have:

$$r_t = 3 + 0,01t$$

and in the case of high reserves we have:

$$r_t = 5 + 0,01t .$$

τ takes on values 2 and 5.

We conducted 10 000 replications and calculated probability of abandoning the exchange-rate peg. We received the following results:

Table 2a. Probability of Defending the Exchange-Rate Peg if number of speculators increases slowly

$\tau = 2$				
Fundamentals Reserves	Weak	Medium	Strong	Very strong
Low	0,0770	0,1006	0,2807	
Medium	0,2826	0,3214	0,5763	0,8281
High	0,5479	0,5735	0,8291	0,9832

Source: Own calculations

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 2b. Probability of Defending the Exchange-Rate Peg if number of speculators increases fast

$\tau = 5$				
Fundamentals Reserves	Weak	Medium	Strong	Very strong
Low	0,0063	0,0120	0,0915	0,5573
Medium	0,0437	0,0679		0,8092
High	0,1367	0,1779		0,9827

Source: Own calculations

According to the results from the tables 2a and 2b, probability of defending the exchange-rate peg increases if state of fundamentals improves. The same relation concerns level of reserves. If the Central Bank keeps high level of reserves then the probability of abandoning the exchange-rate peg is higher than in the case of medium and weak reserves. Comparing values in the table 2a to the corresponding values in the table 2b, we can notice that probability of defending the exchange-rate peg is higher when number of speculators increases slower. It means that with the intensification of globalization and financial markets liberalization process, the Central Bank has lower chances to defend the exchange-rate peg.

In the second simulation experiment mean payoff for speculators is calculated. The same parameters are used as in the first experiment and the same variants are considered. Experiment is based on 10 000 replications. The results are as follows:

Table 3a. Mean payoff for speculators if number of speculators increases slowly

$\tau = 2$				
Fundamentals Reserves	Weak	Medium	Strong	Very strong
Low	0,28	-0,96	-1,72	-0,87
Medium	-1,35	-2,25	-2,24	-0,56
High	-2,23	-2,89	-2,25	-0,46

Source: Own calculations.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 3b. Mean payoff for speculators if number of speculators increases fast

$\tau = 5$				
Fundamentals Reserves	Weak	Medium	Strong	Very strong
Low	1,56	0,02	-1,58	-0,84
Medium	0,56	-1,15	-1,98	-0,78
High	-0,39	-2,31	-2,78	-0,63

Source: Own calculations.

According to the tables 3a and 3b, speculators reach positive payoffs for weak fundamentals and low reserves. For increasing level of reserves and for better fundamentals, mean payoff for speculators decreases, but this relation is non-linear. It can be seen that in the case of very strong fundamentals mean payoff for speculators is higher than in the case of strong or sometimes even medium fundamentals. This phenomenon results from the fact that if fundamentals are very strong then speculators know that probability of inefficient attack is higher. Therefore lower number of speculators decides to attack and even if they attack, they change tactic after first period of inefficient attack. Comparing values in the table 3a to the corresponding values in the table 3b, we notice that if number of speculators increases faster, then mean payoff for speculators is higher.

In the third simulation experiment average time of collapse the exchange-rate peg is calculated. Though we assume that if the exchange-rate peg survives 20 periods, game is over, we put value 20 if the exchange-rate peg is defended. The same parameters are used as in the first experiment and the same variants are considered. Experiment is based on 10 000 replications. The results are as follows:

Table 4a. Mean time of duration of the exchange rate-peg, when number of speculators increases slowly

$\tau = 2$				
Fundamentals Reserves	Weak	Medium	Strong	Very strong
Low	3,80	4,40	7,39	12,79
Medium	8,54	9,19	12,90	16,73
High	13,59	13,98	17,40	19,68

Source: Own calculations.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 4b. Mean time of duration of the exchange rate-peg, when number of speculators increases fast

$\tau = 5$				
Fundamentals Reserves	Weak	Medium	Strong	Very strong
Low	2,01	2,25	4,04	7,57
Medium	3,80	4,32	9,16	16,41
High	6,60	4,59	11,32	19,67

Source: Own calculations.

Comparing results in the tables 4a and 4b, we can notice positive relation between the state of fundamentals and duration of the exchange-rate peg and positive relation between the level of reserves and duration of the exchange-rate peg. If the fundamentals are weak and the level of reserves is low, exchange-rate peg collapses very fast. If fundamentals are very strong and the level of reserves is high, then the mean duration of the exchange-rate peg is close to 20 periods, which means that in most situation exchange-rate peg is defended. This result agrees with the result from the first Monte Carlo experiment. Comparing values in the table 4a to the corresponding values in the table 4b, we can notice that average duration of the exchange-rate peg is higher in the case of slower pace of increasing of number of speculators.

Conclusions

1. The model seems to catch reality in more complex way: level of noise changes in time (decreasing), there are different states of fundamentals (with “more sensitive” upper part of the scale), number of inflowing agents can be low or high (due to different globalization phases, different capital flow phases, different uncertainty levels).
2. Dynamic nature of the model is also reflected in defining some kind of continuity of CB and agent behavior. Both sides must formulate their strategies in continuous way, and therefore simultaneously, which is a shift from a single-action approach (single nonreplicable attack, located in the short run and therefore sequential decision making process) to a longer perspective.
3. In fact, the results are in line with intuition, which may confirm that the usage of genetic algorithm was a right decision. Weaker level of fundamentals decreases probability of defending the exchange rate peg and increases pay-off for speculators. If dynamics of inflow of agents is

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

higher, then probability of defending peg is lower, pay-off for speculators is higher and mean time of peg maintenance duration is lower. The higher the level of international reserves the higher probability of peg defending, the lower pay-off for speculators and the higher duration of peg maintenance.

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**Pro-investment Local Policies in the Area
of Real Estate Economics – Similarities and
Differences in the Strategies Used by
Communes**

JEL Classification: *H7*

Keywords: *public economics; real estate economics; policy mimicking; local policy instruments; clustering*

Abstract: In the article we discuss importance of the real estate related instruments, used by local government to attract investment and stimulate local economic development. The article discusses economic literature related to public economics at local government level, with the special emphasis put on link between urban and real estate economics and development. In the empirical part of the paper we analyze results of survey conducted at a local government level in Poland (Malopolska). There are two major research objectives: (1) to identify the scope of the real estate economic instruments used by the communes as part of their development policies' strategies; (2) to examine the coexistence of certain types of instruments as part of the commune development strategies.

Introduction

Since 1990s. Polish communes have become an interesting object of economic research, but some of the valid still remain unanswered. Decentralisation of the public authority in Poland, directly linked with political

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

changes initiated after 1989, resulted in creating, in its first phase, two levels of public administration, that is the central and the local (commune) levels. Further reforms undertaken a few years later introduced additional self-government levels: districts and voivodeships. Communes, constituting the smallest areas, were acknowledged to be the basic units of the local government in Poland. They were entrusted vast competences and tasks in order to meet the local societies' needs. In the light of contemporary theoretical views on the role of public authorities in social-economic life as well as views on the local development concepts which have dynamically been developing since the 1960's, local government authorities started to be perceived as the bodies responsible for undertaking active measures in order to develop local areas. Polish literature (making use of foreign literature achievements) widely discusses the real impact of the commune bodies upon development processes, the commune bodies' activity forms as well as the efficiency of available local interventionism tools. Regardless of these results and the ongoing discussion it was felt a strong responsibility of communes authorities for the proper conduct of the local economic policy and taking efforts to stimulate the development processes.

The aim of this paper is to assess the role of the real estate related instruments used by local government, in order to attract investment and stimulate local economic development. Research interests were threefold:

- 1) to identify the scope of the real estate economic instruments used by the communes as part of their development policies' strategies;
- 2) to examine the coexistence of certain types of instruments as part of the commune development strategies;
- 3) to determine if there is spatial autocorrelation between communes entities as a result of mimicking behavior in local development policies.

Empirical part is based on the data collected from the communes located in the South of Poland, in the Malopolska voivodeship.

Previous research

One of the key issues in the economic literature on local economic policy is the role of public sector in creation of a favorable investment climate and promotion of local and regional economic development. There is, however, a debate about the real impact of local economic policies on the creating a favorable business climate. In the theory, better competitiveness in local areas may attract the private capital and as the result improve the welfare. In many empirical studies the relationship between economic devel-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

opment policies and their effects was measured (Fisher, 1997, pp. 53-82; Domański and Jarczewski (Ed.), 2006, p. 100). Some authors are convinced of a lack or only small positive impact of economic policy on the economic growth, and even argued that the negative effects of such policy are underestimated (Rubin and Rubin, 1987, pp. 37-62; Ross 1996, pp. 354-380; Piasecki (Ed.), 2007, p. 288). Others believe that economic policy is the important factor in supporting economic development (Fox and Murray, 1990, pp. 413-427; Blume, 2006, pp. 321-333). Since Tiebout (1956) significant evidence is based on the literature on effects of fiscal instruments such as taxes, subsidies and public expenditures on economic growth and welfare (Helms, 1985, pp. 574-582; Baum, 1987, pp. 348-360; Bartik, 1992, pp. 102-110; Caplan, 2001, pp. 101-122). An important focus of research in this area is the issue of tax competition. Local governments shaping local tax rates are trying to influence the investment locations of taxpayers. This action is two-pronged - on the one hand, the local authorities determine the level of the fiscal burden, on the other hand, the generated tax revenues determine the level of public services (Głuszak M. and Marona B., p. 256). In this way, there is a competition between neighboring public entities, which is debatable whether this competition is effective (Wilson J., 1999, pp. 269-304; Caplan B., 2001, pp. 101-122). Research on the local tax policy effects is often combined with the phenomenon of tax mimicking (Revelli, , p.2002, pp. 1723-1731; Allers and Elhorst, 2005, pp. 493-513; Santolini 2008, pp. 431-451; Delgado and Mayor, 2010, pp. 149-164), which indicates spatial interaction among local governments in tax setting. Empirical studies identified the impact of local tax policy on the decisions in tax policy in the neighboring entities. In the theory there are three explanations for tax mimicking (Allers and Elhorst, 2005, pp. 493-513):

- expenditure "spillovers" or "externalities" model,
- tax competition based on Tiebout model (mentioned before),
- political agency - yardstick competition model.

On the other hand, the imitation behavior is rarely examined as regards the references to other instruments of economic development (Małkowska and Telega, 2012, pp. 175-183).

Interesting approach to research is presented by the authors studying the impact of public services on economic development. In many such studies public services are estimated as statistically significant and positive for economic development process (Luce, 1994, pp. 139-67; Dalenberg and Partridge, 1995, pp. 617-640; Papke, 1991, pp. 47-68). Fisher (1997, pp.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

53-82) comparing known results in this area notes that the “results of studies vary greatly and it can be concluded that some public services have a positive effect on some measures of economic development in some cases”. Therefore, in order to take into account the specific nature of the area and the factors determining the effectiveness of economic development policy, some researchers use the case studies instead of or in addition to the econometric analysis.

One of the areas used by public authorities in order to, among others, stimulate the process of local economic development, is the real estate economy. The notion of the "real estate economy" is, from a practical point of view, reduced to managing commune real estates. A wide approach to "real estate economy" of the local governments can be defined as conscious and purposeful actions of the authorized self-governing subjects, in accordance with the law. It encompasses making decisions and undertaking factual and legal acts related to the real estate's located within the local area and aiming at specific targets which are subject to economic development policy run by the local authorities. (Cymerman, 2009, pp. 29-46). It is, in other words, a total amount of actions undertaken by the local governments and related to real estate stock in a given commune. Public real estate economy run by local governments is increasingly frequently described in the context of instruments which those governments use. There are two interesting issues:

- the problem of tools selection by the local authorities and the co-occurrence of such instruments of the groups within the local development strategies,
- mimicking the nature of politics in neighboring communities.

It is worth mentioning that only few papers investigated the influence of the instruments from the area of real estate economics on the economic development - with the exception of tax incentives and public services related to technical infrastructure (Smith, 2009, pp. 209-234). In reverse, there are not many researches on the impact of economic development policies on the local real estate market. D'Arcy and Keogh (1998) argued that the new research on territorial competitiveness should be supplemented by the role of real property and property market. So far, however, Polish literature lacks systematic studies on the real estate economy instruments, their choice, implementation or effects.

Methodology of the research

The paper presents empirical study aimed to identify different strategies in the selection of the available tools by the local governments, to assess the coexistence of chosen tools and to verify the thesis about the occurrence of imitation effect in the policy pursued by the local authorities.

The data basis of the analysis is the results of a survey conducted in the 2009. The sample in the survey was communes' authorities of the Małopolska voivodeship. The general object of the study was to determine the relationships between local government policy on the field of real estate economics and the level of local economic development. The required information was gathered through a questionnaire sent to all the communes of the province via postal mail and e-mail. Questionnaire, due to the deliberately simplified form, allowed the measurement of the majority of the variables tested according to nominal and ordinal scale. The survey form was completed by 92 commune offices, giving slightly more than 50% response rate. The share of the various types of communes (urban, rural and urban-rural) in the research sample corresponds to the overall structure of the voivodeship. The results presented below are based on the analysis of one of more important questions raised for local self-governments in the organized survey. This question referred to utilization of the enumerated instruments of real estate economy by the local authorities within the last ten years.

The potential instruments of real estate economy listed in the survey were as follows (Table 1)

Table 1. Real estate related instruments analyzed in the study

Var	Description	Percent
X ₁	preparation of location offers for investors	72,8
X ₂	local authority support for an investor in the process of granting construction permit	68,5
X ₃	local authority support for an investor in the process of negotiation with the owners of real estate to get land for investments	62,0
X ₄	preparation of land for investments by means of conversion – reclassification, combining and dividing	73,9
X ₅	adopting plans of spatial development which are actual and convenient for investors	89,1

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

X ₆	application of lower property tax rates that statutory rates	67,4
X ₇	differentiation of property tax rates due to the character of business, location of the real property and type of construction	35,9
X ₈	using property tax reliefs and tax exemptions in relation to the character of business or investment activity	45,7
X ₉	development of infrastructure in the investment area for private entities	53,3
X ₁₀	investing into development and appropriate maintenance of local road connections	93,5
X ₁₁	purchasing land by the commune from private owners in order to prepare and provide the land to investors	84,8
X ₁₂	temporary provision of buildings and commune premises on a lease/rental basis to conduct business activities	28,3
X ₁₃	application of preferential rental rates for public real property in order to conduct business activities	43,5

Source: authors' own

Information obtained from communes showed, which of above tools were applied and which were not. The research is exploratory. We analyze the survey data using multidimensional scaling (MDS) and cluster analysis (CA).

Exploratory analysis

To examine the coexistence of instruments used by communes to promote local development we analyzed survey response patterns. In the dataset 13 dichotomous variables represented real estate economy instruments potentially used (1) or not used (0) by communes. To assess similarities in response patterns we used Jaccard Index – a measure of similarity suggested by Sneath (1957). The Jaccard Index (J) for two dichotomous (0-1) variables X and Y is given by:

$$J = \frac{a}{a + b + c}$$

where:

a is number of cases where both X and Y have a value of 1.

b is number of cases where X has a value 1, while Y has value 0.

c is number of cases where X has a value 0, while Y has value 1.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

There are other measures of similarity between dichotomous responses – for example indices proposed by Dice (1945)or Rao (1948), but according to Finch (2005) the results of cluster analysis do not depend significantly of the index used to describe dis(similarity).

Table 2. Jaccard Similarity Index for real estate economy instruments used by sample communes

	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13
X1	1,00												
X2	0,71	1,00											
X3	0,65	0,71	1,00										
X4	0,73	0,68	0,67	1,00									
X5	0,73	0,71	0,62	0,79	1,00								
X6	0,61	0,58	0,57	0,67	0,67	1,00							
X7	0,33	0,39	0,34	0,40	0,40	0,46	1,00						
X8	0,49	0,46	0,46	0,45	0,48	0,53	0,44	1,00					
X9	0,49	0,53	0,41	0,56	0,60	0,52	0,49	0,42	1,00				
X10	0,72	0,69	0,63	0,75	0,91	0,68	0,38	0,49	0,57	1,00			
X11	0,69	0,64	0,61	0,70	0,82	0,69	0,35	0,45	0,49	0,86	1,00		
X12	0,31	0,35	0,34	0,32	0,32	0,31	0,31	0,33	0,39	0,30	0,30	1,00	
X13	0,47	0,45	0,49	0,50	0,45	0,46	0,43	0,49	0,41	0,45	0,48	0,29	1,00

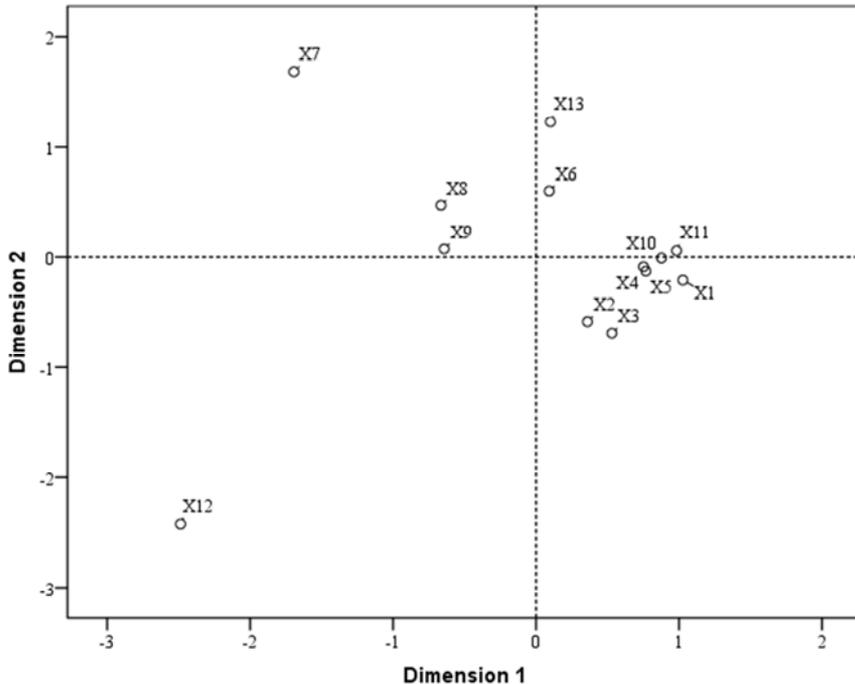
Source: authors' own

When analyzing data in Table 2, it seems obvious that some real estate instruments are often used together (for example X5 and X10, $J=0,91$) whereas other are not (for example X5 and X12, $J=0,32$). In order to facilitate the interpretation of the results, proximities were analyzed further with the use of multidimensional scaling.

Multidimensional Scaling (MDS) is not a separate statistical method, but rather a group of techniques used to produce maps, that can facilitate the description of multivariate phenomena found in the data. In the research we used MDS (ALSCAL algorithm) to explore relations between real estate based instruments used to promote local development. Jaccard distance was used to show (dis)similarity of instruments. Again, we assumed that the most similar instruments are these that are used together by communes

in the sample. Results are presented on a exhibit (Figure 1). The closer the points on the map the more related the respective instruments are.

Figure 1. Derived Stimulus Configuration (Euclidean distance model)



X1- preparation of location offers for investors; X2- local authority support for an investor in the process of granting construction permit; X3 - local authority support for an investor in the process of negotiation with the owners of real estate to get land for investments; X4- preparation of land for investments by means of conversion – reclassification, combining and dividing; X5- adopting plans of spatial development which are actual and convenient for investors; X6- application of lower property tax rates than statutory rates; X7-differentiation of property tax rates due to the character of business, location of the real property and type of construction; X8- using property tax reliefs and tax exemptions in relation to the character of business or investment activity; X9- development of infrastructure in the investment area for private entities; X10 - investing into development and appropriate maintenance of local road connections; X11 - purchasing land by the commune from private owners in order to prepare and provide the land to investors; X12 - temporary provision of buildings and commune premises on a lease/rental basis to conduct business activities; X13 -application of preferential rental rates for public real property in order to conduct business activities.

Source: authors' own.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Based on the results of multidimensional scaling (visualized on the Fig. 1) we differentiated several groups of instruments:

- **supply side instruments:** instruments connected to zoning, conversions, planning and land development. They create new supply (X1, X4, X5, X10, X11)
- **demand side instruments:** incentives, direct and indirect financial support for new or existing investment. They aim to attract new investors (X6, X8, X9, X13).
- **procedural instruments:** the instruments from this group are connected to guidance and procedural business support for investors willing to start new operations (X2, X3)

Two instruments were distinct from the others:

- temporary provision of buildings and commune premises on a lease/rental basis to conduct business activities (X12)
- differentiation of property tax rates due to the character of business, location of the real property and type of construction (X7)

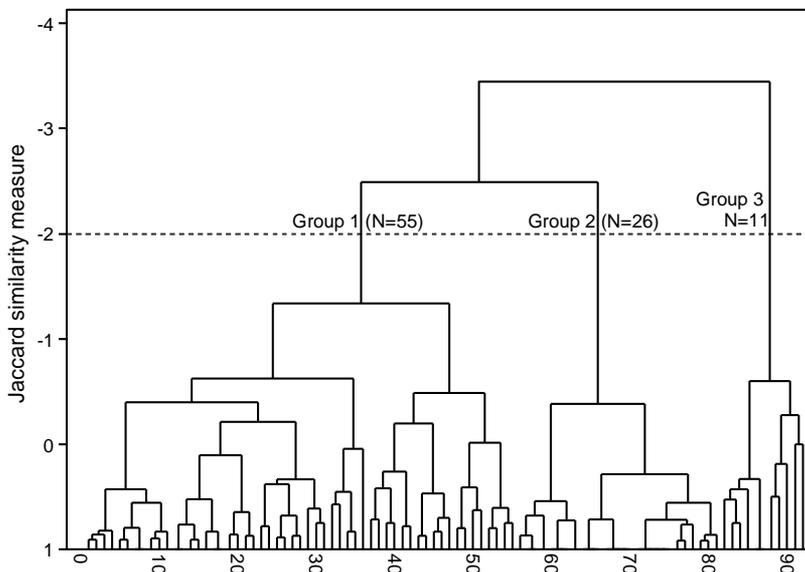
The latter two instruments are usually not used as a part of real estate strategy – they are rarely used compared with other tools. These can be referred as to occasional instruments.

Cluster analysis results

Another interesting research topic is connected to strategies used by communes while using real estate economy instruments. It is interesting to see whether there are groups of communes that use the same set of tools to promote local development. These could imply other interesting question – is there mimicking effect when it comes to applying real estate based instruments by local government. In order to find relevant answers we start from cluster analysis.

To group communes in the sample based on real estate economy instruments used in practice we used hierarchical cluster analysis. We applied Ward method of clustering described by Ward (1963), which is probably most frequently used clustering method.

Figure 2. Dendrogram for cluster analysis of sample communes based on real estate economy instruments used



Source: authors' own.

Based on the agglomeration schedule (dendrogram) we conclude that there are three basic groups of communes, clustering 55 (group1), 26 (group2, and 11 (group3) communes respectively. Descriptive statistics referring to real estate instruments usage (percentage of communes using selected instruments) were presented in the table (Table 3).

Table 3. Real estate economy instruments used by clusters of communes

Var	Group 1	Group 2	Group 3
X1	74,5%	88,5%	27,3%
X2	72,7%	88,5%	0,0%
X3	61,8%	88,5%	0,0%
X4	78,2%	96,2%	0,0%
X5	94,5%	96,2%	45,5%
X6	61,8%	96,2%	27,3%
X7	20,0%	84,6%	0,0%

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

X8	34,5%	84,6%	9,1%
X9	56,4%	69,2%	0,0%
X10	96,4%	100,0%	63,6%
X11	81,8%	96,2%	72,7%
X12	29,1%	38,5%	0,0%
X13	23,6%	100,0%	9,1%

Source: authors' own.

Based on the results of cluster analysis we identified three groups of communes. While communes within each group differed to some extent – it was hard to find two communes who used exactly the same set of instruments – they were relatively homogenous. The clusters were:

- Group 1 (Selective): Communes within this cluster utilized several instruments of real estate economy. On the other hand members of this cluster did not in general use property taxation incentives (lower property tax rates, differentiation of property tax rates), as well as rental tools (temporary provision of buildings for lease, or lower rental rates for public real property).
- Group 2 (Unitary): Members of this cluster were using most of real estate economics instruments. The only exemption was temporary provision of buildings and commune premises (utilized by only 38,5% communes), but this particular tool was rarely used in general.
- Group 3 (Passive): Cluster members were relatively inactive in terms of real economy instruments used to promote local development. Any of these communes declared support for investors. They did not provide infrastructure in selected areas in order to attract investors.

Last interesting question is related to geographical distribution of the clusters found. One interesting example would be nonrandom spatial distribution of the communes representing three types (groups) found in the cluster analysis. The latter case could indicate some kind of mimicking behavior. The results of the cluster analysis were plotted on the map, but the effect was inconclusive. As we only got approximately 50% response rate, there were substantial blank spots (missing observations), that make analyzing spatial distribution pattern challenging. Another problem is connected to the fact that we only have static data, and could not observe the dynamics of the mimicking process (adoption of certain tools by other communes). It is an interesting question for future research.

Conclusions

In the article we discussed the of the real estate related instruments, typically used by Polish communes to attract investment and stimulate local economic development. We analyzed results of survey conducted at a local government level in Poland (Malopolska) using multidimensional scaling and cluster analysis.

We found that direct measured like investing into local road network are the most frequently used instrument to promote local development. On the other hand, differentiation of property tax rates, and temporary provision of public buildings to investors are rarely used. In general three major categories of instruments were identified: demand, supply and procedural. Based on the array of real estate instruments used to promote local development, we grouped communes in the sample, using Ward's clustering method, into three clusters – selective (dominant), unitary and passive.

Finally, we discussed the mimicking behavior in local public policies both on theoretical and empirical level. However, we were not able to find conclusive answers on empirical bases, due to significant non-response rate in the survey in Malopolska. We conclude that more panel data research is needed, to find links between urban and real estate public policy and local government.

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Semi-strong Informational Efficiency in the Polish Foreign Exchange Market

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Abstract: During the financial crisis a notion that the Polish exchange rate is not determined effectively was very dominant, because of a contagion effect of the global financial crisis on the Polish economy. In addition, many foreign exchange market analysts explained developments in the Polish exchange market through a hypothesis that the Polish zloty exchange rate follows other exchange rates. This contradicts market efficiency as this would lead to profitable arbitrage possibility based on past information on other currency prices and possibly gives a rationale for government intervention. In contrast, a foreign exchange market that is efficient needs no government involvement and its participants cannot earn abnormal gains from foreign exchange transactions. Therefore, the aim of the article is to examine the efficiency of the Poland's foreign exchange market. In order to test for market efficiency a cointegration analysis is used. The main argument builds on the semi-strong form of the market efficiency hypothesis. On an informational effective market a pair of prices cannot be cointegrated, because this would imply predictability of one asset price based on the past prices of the other asset. The main hypothesis of the article is verified using Unit Root tests and Johansen Cointegration Test on the pair of EURPLN and USDPLN exchange rates. It is shown that the null hypothesis cannot be rejected; therefore, the Polish foreign exchange market is efficient in the semi-strong sense.

Introduction

The answers to questions regarding the form of the efficiency of the foreign exchange markets may be of fundamental importance. These markets are in fact a place where expectations on the overall economy are reflected in currency prices. These expectations, if the market is efficient, provide a valuable signal to business managers and decision-makers, stimulating them to take effective decisions. On an effective market the role of regulatory bodies is limited. In contrast, if the capital market is inefficient, their investment decisions are *ceteris paribus* more often suboptimal and this can result in significant costs for the economy as a whole. For these reasons, the conclusions drawn from the analysis of the degree of market efficiency can be important both for public authorities and financial institutions, but also for potential investors, especially international investors and market participants.

During the financial crisis the notion that the Polish exchange rate is not determined effectively was very dominant, because of a contagion effect of the global financial crisis on the Polish economy. In addition, many foreign exchange market analysts explain developments in the Polish exchange market through a hypothesis that the Polish zloty exchange follows other exchange rates. This contradicts market efficiency as this would lead to profitable arbitrage possibility based on publicly available information on other currency prices and possibly gives a rationale for government intervention.

Therefore, the aim of the article is to examine the efficiency of the Poland's foreign exchange market. The main argument builds on the semi-strong form of the market efficiency hypothesis (Fama 1970) and is based on a line of reasoning put forward by Granger (1986). On an informatively effective market a pair of prices cannot be cointegrated, because this would imply predictability of at least one asset price based on the past prices of the other asset. This contradicts the market efficiency as this would lead to profitable arbitrage possibility based on past information. The empirical analysis draws on the Johansen (1995) approach. The approach taken in the article was to test for the existence of cointegration between two pairs of daily and monthly Polish zloty foreign exchange rates. The period of observation covers the floating exchange rates of the zloty (2000-2013). It is shown that the null hypothesis can be rejected and, therefore, the Polish foreign exchange market is efficient both in the weak and semi-strong sense.

Literature review

Fama (1970) defines the informational efficiency of the financial market at three levels: weak, semi-strong, and strong forms. The investigation described herein concentrates on the semi-strong form efficiency that stipulates that the current foreign exchange rate not only reflects the historical information but also the information that is publicly available. This hypothesis assumes that foreign exchange rates adjust quickly to absorb new information. Hence, new information cannot be used by anyone for earning abnormal returns. Foreign exchange market informational efficiency can be then considered in two aspects: (i) within-currency efficiency, and (ii) cross-currency efficiency. The first aspect in the semi-strong efficiency hypotheses concerns mainly forward premium and other fundamental analyses. The second aspect of semi-strong market efficiency examines international linkages across different exchange markets in the long run. The focus of the article was put on the latter market efficiency concept.

The notion of cross-country efficiency of the foreign exchange market can be traced to the articles by MacDonald and Taylor (1989), Hakkio and Rush (1989), and Baillie and Bollerslev (1989). These authors implement the argumentation of Granger (1986) concerning stock market efficiency in the foreign exchange market in order to investigate informational efficiency. The authors' results are mixed and depend on the choice of the method - in the first two articles authors show results of the Engle-Granger procedure supporting the efficient market hypothesis, while the last two authors find support for cointegration in a sample of seven exchange rates using multivariate Johansen procedure. This was confirmed in a large study conducted by Zivot (2000) who tests the foreign exchange market efficiency for the British pound, Japanese yen, and Canadian dollar against the US dollar on a monthly basis from 1976 to 1996 and strongly rejects the efficiency hypothesis in all exchange rates.

The foreign exchange market efficiency subject was first revived upon establishing the European Monetary Union, since it was expected that currencies taking part in the monetary integration would have exhibited mean-reversal behavior towards each other on the approach to forming a common currency. Indeed, Haug, MacKinnon, and Michelis (2000), Rangvid and Sørensen (2002), and Aroskar, Sarkar, and Swanson (2004) find cointegration among the currencies of the first members of the monetary union. In particular, strong confirmation of long-run relationships between exchange

rates is present in the period before the introduction of the Euro, in which foreign exchange parities were irrevocably fixed.

The question of market efficiency has been revived for the second time during the 2007-2011 global financial crises, during which investor rationality has been questioned by many commentators. Ahmad et al. (2012) examine the within and cross-country market efficiency for 12 Asia-Pacific foreign currency markets using daily spot and one-month forward exchange rates from 1997 until 2010, and compare the 1997-98 Asian and the global financial crises. Authors conclude that foreign exchange markets are generally efficient from within-country and cross-country perspectives according to their results of Johansen cointegration tests. This study confirms the findings of Pilbeam and Olmo (2011).

Kuhl (2010) tests for cointegration in pairs of daily foreign exchange rates for periods before and after the introduction of the Euro. Only the Deutsche mark-US dollar and French franc-US dollar are cointegrated before the creation of the EMU. Like other authors, the author attributes this to the monetary integration. However, the introduction of the Euro creates two different cointegration relationships that are between Euro-US dollar and the four most important exchange rates.

The only studies in Polish foreign exchange market efficiency concern much earlier periods Grotowski and Wyroba (2006) and deal with market efficiency in the weak sense. To our knowledge there are no studies concerning the recent period of Polish zloty exchange rate instability using cointegration methods.

Methodology of the research

Consider three countries, each with a single currency following a floating exchange rate regime. This implies three exchange rates for each pair of countries. For the ease of exposition each pair of exchange rates are expressed in the same currency. The exchange rate e^{ij} can be defined as the price of the domestic currency i in terms of the foreign currency j (indirect quotation), where $i, j=1,2,3$.

It can be assumed that the expectations regarding the exchange rate $e_t^{i,j}$ in period t are based upon publicly available information set $\Phi_{t-1}^{i,j}$ that includes past realization of this exchange rate:

$$\Phi_{t-1}^{i,j} = \{e_{t-1}^{i,j}, e_{t-2}^{i,j}, e_{t-3}^{i,j}, \dots\} \quad (1)$$

This is trivial, however it is straightforward to assume that past realization of *both pairs of* exchange rates to a given domestic currency $i=1$ are known to the market participants, therefore the information set Φ_{t-1}^1 for a given currency entails both the information on historical behavior of the exchange rate $e_t^{1,2}$, that is $\Phi_{t-1}^{1,2}$, and $e_t^{1,3}$ $\Phi_{t-1}^{1,3}$. Formally:

$$\Phi_{t-1}^1 = \Phi_{t-1}^{1,2} + \Phi_{t-1}^{1,3} \quad (2)$$

If a market is informational semi-strong cross-efficient, the expectations regarding the exchange rate $e_t^{1,2}$ are formed using both information sets. It stems from this that:

$$E(e_t^{1,2} | \Phi_{t-1}^{1,2}) = E(e_t^{1,2} | \Phi_{t-1}^1) \quad (3)$$

This allows to put forward the relation of the cross exchange rates in the cointegration framework and relate it to the semi-strong form informational efficiency hypothesis in the empirical model, since the value of other exchange rates in a given currency are known to the market participants. Let us consider the Johansen procedure to test the existence of cointegration. The exposition follows Goczek, Mycielska (2014).

Assume that the two time series for the exchange rate pairs considered form a bivariate data vector \mathbf{X}_t given by:

$$\mathbf{X}_t = \begin{pmatrix} e_t^{1,2} \\ e_t^{1,3} \end{pmatrix}_t \quad (4)$$

The two variables are used to form a Vector Autoregressive (VAR) model described with the following equation:

$$\mathbf{X}_t = \Pi_0 + \Pi_1 t + \sum_{i=1}^K \Pi_i \mathbf{X}_{t-1} + \mathbf{u}_t \quad (5)$$

where the error term $\mathbf{u}_t \in N(0, \sigma^2)$ is uncorrelated over t , the data vector \mathbf{X}_t is of a dimension $p \times T$, Π_i is the deterministic coefficient matrix (intercepts or/and trends) of a dimension $p \times p + 2$. If the data are non-

stationary in levels and stationary in first differences, then the equation (2) can be rearranged to form a vector error correction mechanism:

$$\Delta \mathbf{X}_t = \Pi^* \mathbf{X}_{t-1}^* + \sum_{i=1}^{K-1} \Gamma_i \Delta \mathbf{X}_{t-i} + \mathbf{u}_t \quad (6)$$

where: $\mathbf{X}_{t-1}^* = (\mathbf{X}_{t-1}, 1, t)'$, $\Pi^* = (\Pi, \Pi_0, \Pi_1)$, $\Pi = \sum_{i=1}^K \Pi_i - I$ and $\Gamma_i = -\sum_{j=i+1}^K \Pi_j$.

The matrices Γ_i contain information on the short-run adjustment coefficients of the lagged differenced variables. Furthermore, the expression $\Pi^* \mathbf{X}_{t-1}^*$ denotes the error correction term, i.e. it includes the long-run relationships between the time series (Lutkepohl, 2005).

In general, the rank of a matrix shows the number of linearly independent processes that is equivalent to the number of linearly independent columns. According to the assumption that $\mathbf{X}_t \sim I(1)$ and $\mathbf{u}_t \sim I(0)$, both the differences of the endogenous variables and their lagged differences are stationary, thus the matrix Π is of reduced rank for the equation (6) to be balanced. If Π is of reduced rank, then there exists $p \times r$ matrices α and β such that $\Pi = \alpha\beta'$ and the equation (6) can be transformed to:

$$\Delta \mathbf{X}_t = \alpha\beta' \mathbf{X}_{t-1}^* + \sum_{i=1}^{K-1} \Gamma_i \Delta \mathbf{X}_{t-i} + \mathbf{u}_t \quad (7)$$

The term $\beta' \mathbf{X}_{t-1}^*$ with $\beta' = [1, -b]$ is the cointegrating vector showing the steady state relationship between the exchange rates. In the context of exchange rates those are linear combinations, which themselves are non-stationary, but the relationship between them is stationary with a steady state cointegrating vector. In this case, the system shown in equation (7) becomes a vector error correction model and the matrix α describes the adjustment speed for each variable after it deviates from the long-run relationship. If the matrix Π is of rank one, this means that a single cointegrating vector exists, and β' is $1 \times p + 2$ (deterministic components of the cointegrating relationship). If the rank is in fact one, this means that there exists a single cointegration vector - a single steady state relationship. In the article, three types of methods for determining the number of cointegrating

equations. The first is Johansen's "trace" statistic method. The second is his "maximum eigenvalue" statistic method. The third method chooses rank to minimize an information criterion (Akaike or Schwarz-Bayes, although Schwarz-Bayes is probably the more frequent one as it prevents the over-parametrization to greater extent – as for example in Witkowski, 2014).

This implies that the estimated error correction term ($e_{t-1}^{1,2} - b \cdot e_{t-1}^{1,3}$) becomes significant in determining the exchange rate behavior. Using the error correction term, one exchange rate can be predicted by using the other if the long run relationship and past exchange rates are known to the market. This means that causality between the exchange rates runs at least in one direction and past information on the one exchange rate can be used to profitably predict the other. It stems from this, that providing there is cointegration between the exchange rates, the market is not efficient in the weak form.

Unfortunately, a more detailed investigation of the choice of deterministic components of the potential cointegrating equation is only provided by only a few of the authors reviewed in the previous part article. The same critique applies to the number of lags used in the model. The approach taken in this article after Aznar and Salvador (2002) is to develop an unrestricted Vector Autoregressive (VAR) model in order to determine the optimal number of lags using information criteria. As in the lag-length selection problem, choosing the specification of the cointegration equation that minimizes either the Schwarz Information Criterion (SIC) or the Akaike information criterion (AIC) provides a consistent estimator of the steady-state equilibrium. Of the two criteria SIC was the preferred measure, however, changing into AIC did not change the results.

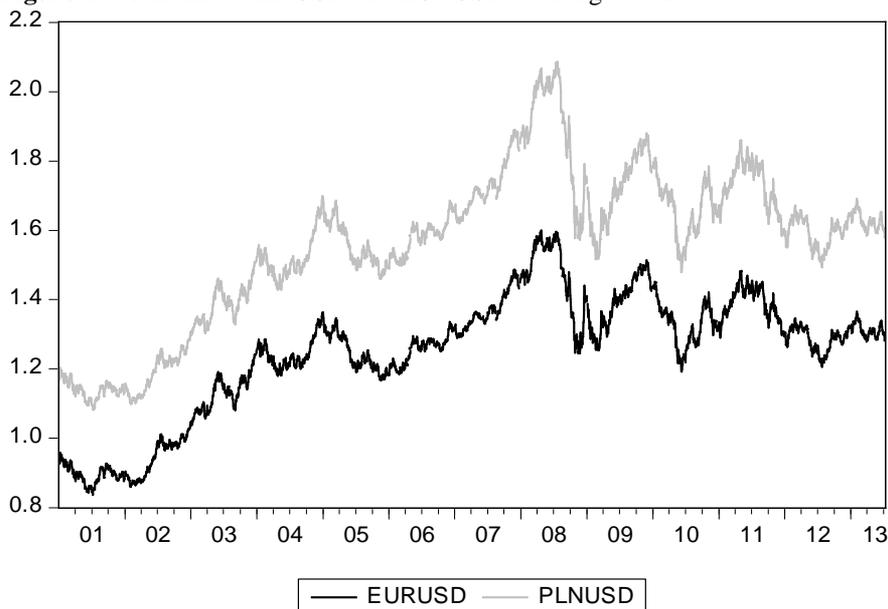
Empirical results follow in the next chapter.

Empirical model results

In the empirical investigation the EURUSD and the PLNUSD exchange rates with daily and monthly frequency are used during the period starting from April the 1st 2000 to April the 1st 2013. The start date relates to the de facto floatation of the Polish zloty. Figure 1 plots the two variables using a standard normalization procedure. It can be seen from a basic visual inspection of the two series that the stochastic processes generating this data seem to exhibit individual trends ie. the stochastic process guiding the series are not stationary. This is verified by the summary results of unit root tests. Furthermore, a visual inspection of two series makes it possible that

the two rates share a common trend. In the case of variables which are integrated of the same order it is possible to investigate the presence of a long-run relationship, which relates to the macroeconomic concept of a steady-state dynamic equilibrium between the two series. This can be determined in the data using tests for the existence of a cointegrating vector for the exchange rates.

Figure 1. Normalized PLNUSD and EURUSD exchange rates



Source: Own calculations.

The empirical analysis started with Granger Causality testing to confirm with casual the relations visible in the data. Based on the results, presented in Table 1, it was concluded that there exists a casual relationship between the two variables of interest. Based on these preliminary results it can be hypothesized that EURUSD and PLNUSD exhibit a positive feedback relationship while the USDEUR exchange rate is not influenced by PLNEUR. USDEUR is an exogenous variable that impacts PLNEUR in the Granger sense. These empirical relations point toward the notion expressed at the beginning of the article that many foreign exchange market analysts explained developments in the Polish exchange market trough a hypothesis that the Polish zloty exchange rate follows other exchange rates. In this sense, the results are quite straightforward to interpret. While this gives the motivation to devel-

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Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

op market efficiency verification argumentation further, it is not in any way a rejection of the efficiency hypothesis, as argued by Ferre and Hall (2010). The authors present a line of argument that if the economy is composed of N exchange rates and the closed system is analyzed without dynamics, as it is the case when considering the no-arbitrage condition, the Granger causality does not inform about efficiency.

Table 1. Pairwise Granger Causality Tests (10 Lags)

Null Hypothesis:	Obs	F-Statistic	P-value
EURUSD does not Granger Cause PLNUSD	3402	22.44138	0.0071
PLNUSD does not Granger Cause EURUSD		9.54662	8.E-16
PLNEUR does not Granger Cause USDEUR	3291	1.31777	0.2145
USDEUR does not Granger Cause PLNEUR		2.07564	0.0232

Source: Own calculations.

As a second step, Unit Roots tests were run. These tests are frequently used in the informational efficiency literature as an indication of market efficiency in the weak form. In this form of efficiency the information set includes all past prices and foreign exchange rates fully and instantly reflect all available historical information. Consequently, a market is said to be weak-form efficient if past exchange rates are useless in predicting future exchange rate. In this sense the prices are to follow a random walk and stochastic processes guiding the series should be non-stationary in levels and stationary in first differences as discussed in Goczek and Kania-Morales (2015).

The tests results for the time series exchange rate in levels and differences are shown in Table 2. The first tests were described previously generalized version of the ADF test of Elliott, Rothenberg and Stock's (1996). The test results for the time series rate in levels and differences are shown in Table 1. Both the number of levels and the number of first differences in applying the Schwert criterion determined to select a maximum number of 29 lags. This is also the number of lags was preferred by the information criteria Ng and Perron sequential t statistic in the case of data in levels. For a number of different data it was also suggested selecting the test criteria of 17 lags. In both cases, the results gave no grounds for rejecting the hypothesis of the existence of a unit root in levels and the null was rejected for first differences. On this basis, it can be assumed that the stochastic process generating exchange rates of the Polish zloty is an $I(1)$ process.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

To confirm the degree of integration of the data guiding process, the exchange rates were also tested using Kwiatowski-Phillips-Schmidt-Shin (KPSS, 1992) stationarity test. The bandwidth of the KPSS was selected according to the Schwert criteria and Bartlett kernel was used to estimate the variance term. Based on the KPSS test results shown in middle rows of Table 2 it can be stated that the stochastic processes of exchange rates are non-stationary, but the results are not as strong as in the previous tests case. Determining the order of integration of the process guiding EURPLN is quite cumbersome due to the size of the test statistics, which is not clear on the stationarity of the level series used for all standard levels of significance. In particular, the obtained test statistic is between 1% and 5% critical values, and thus depending on the accepted level of significance the stochastic process is either an I(0), or I (1).

This result was investigated further. It could be that structural breaks in the data are responsible for this result. Therefore inference on the existence of unit root using test by Zivot Andrews with a structural break in the level plus breaks in both the level and trend followed. Zivot-Andrews (1992) test confirms that the stochastic processes guiding both EURPLN and USDPLN are integrated of order one. This suggests that the Polish zloty exchange rate follows a random walk with structural breaks in both intercept and trends, and thus the Polish foreign exchange market is weak-form efficient and past prices are useless in predicting future prices, i.e., technical analysis is of no use for Forex investors.

Table 2. Summary of Unit Root Tests

	EURPLN in levels	EURPLN in first differences	USDPLN in levels	USDPLN in first differences
Phillips-Perron test for unit root				
Z(t)	-2.123	-58.78	-2.87	-50.364
MacKinnon p-value	(0.2355)	(0.0001)	(0.0489)	(0.0000)
DF-GLS test				
DF-GLS tau statistic	-2.010	-8.341	-0.749	-3.684
1% Critical	-2.565	-3.48	-2.565	-3.48
5% Critical	-1.940	-2.89	-1.940	-2.834
10% Critical	-1.616	-2.57	-1.616	-2.547

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Kwiatkowski-Phillips-Schmidt-Shin test				
KPSS statistic	0.439	0.061	4.112	0.132
1% Critical	0.739	0.739	0.739	0.739
5% Critical	0.463	0.463	0.463	0.463
10% Critical	0.347	0.347	0.347	0.347
Zivot-Andrews unit root test with a break in intercept				
Minimum t-statistic	-2.804	-20.971	-3.568	-17.651
1% Critical	-5.43	-5.43	-5.43	-5.43
5% Critical	-4.80	-4.80	-4.80	-4.80
Zivot-Andrews unit root test with a break both in intercept and trend				
Minimum t-statistic	-2.804	-4.796	-4.796	-27.559
1% Critical	-5.43	-5.43	-5.43	-5.43
5% Critical	-4.80	-4.80	-4.80	-4.80
DGP Integration	~I(1)		~I(1)	

Source: Own calculations.

The analysis of the data generating process went further on to analyze a simple VAR model. The reason for this analysis was to determine the number of lags necessary to perform an effective Johansen Cointegration test using information criteria. The lag length selection was based on the SIC to penalize large over identified models. Under this criterion lag length of two was selected. Changing into the AIC changed the number of lags to 19 without any impact on the obtained results. Based on this two versions of the Johansen Cointegration Test were run (the trace rank test and the maximum eigenvalue test) in order to determine the rank of the matrix Π for each possible specification of the cointegration equation. The results were summarized in Table 3 listing the number of cointegrating relations by all possible deterministic component models. The results show no significant cointegration in any of the specifications at 0.05 level, though no p-value was lower than 0.2. The lower part of table 3 contains the AIC and BIC information criteria guiding the choice of the deterministic components of the cointegrating relation, as discussed in the methodology section. Again the information criteria show point toward no cointegration in the bivariate

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

vector of exchange rates, however, the model with no intercept in VAR, but with an intercept in cointegrating equation was chosen.

Table 3. Johansen Cointegration Test Results

Selected (0.05 level*) Number of Cointegrating Relations by Model					
Data Trend:	None	None	Linear	Linear	Quadratic
Test Type	No Intercept	Intercept	Intercept	Intercept	Intercept
	No Trend	No Trend	No Trend	Trend	Trend
Trace	0	0	0	0	0
Max-Eig	0	0	0	0	0
Information Criteria by Rank and Model					
Data Trend:	None	None	Linear	Linear	Quadratic
Rank or	No Intercept	Intercept	Intercept	Intercept	Intercept
No. of CEs	No Trend	No Trend	No Trend	Trend	Trend
Log Likelihood by Rank (rows) and Model (columns)					
0	14700.29	14700.29	14700.99	14700.99	14701.99
1	14703.57	14703.80	14703.93	14703.95	14704.22
2	14703.58	14705.72	14705.72	14706.19	14706.19
Akaike Information Criteria by Rank (rows) and Model (columns)					
0	-9.194289*	-9.194289*	-9.193470	-9.193470	-9.192841
1	-9.193837	-9.193351	-9.192804	-9.192195	-9.191734
2	-9.191332	-9.191421	-9.191421	-9.190458	-9.190458
Schwarz Criteria by Rank (rows) and Model (columns)					
0	-9.118185*	-9.118185*	-9.113560	-9.113560	-9.109126
1	-9.110122	-9.107733	-9.105284	-9.102772	-9.100409
2	-9.100006	-9.096290	-9.096290	-9.091522	-9.091522

* denotes rejection of the hypothesis at the 0.05 level

Source: Own calculations.

Table 4 lists the results of both Johansen Cointegration tests with the chosen model specification. No steady state cointegrating relationship was found with a very large statistical significance. This precludes any possible errors coming from the "noise" from daily frequency of observations. Similar tests were run for monthly data obtaining the same results. This confirms the main hypothesis of the article - there is no relation between Polish zloty exchange rates and the Poland's foreign market is informatively efficient in the semi-strong sense.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 4. Johansen Cointegration Test Results - full sample

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.002195	10.85155	20.26184	0.5565
At most 1	0.001204	3.842845	9.164546	0.4360
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.002195	7.008703	15.89210	0.6684
At most 1	0.001204	3.842845	9.164546	0.4360

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Source: Own calculations.

The obtained results have been checked for robustness. As already mentioned both daily and monthly data were analyzed to account for the noise generated in daily data. Moreover, different pairings of exchange rates with zloty were used, however, with no change in the results (as expected due to arbitrage possibility). In addition, the sample was cut into smaller subsamples to account for the possibility of contagion in of the global financial crisis to the Polish market. The crisis interval was set from beginning of 2008 to 2010 and the whole analysis was re-run to verify the any possible contagion effect that would show through market inefficiency. Again, there are no grounds to believe that the semi-strong efficiency of the Polish zloty is violated.

The analysis was carried out also with other crisis time-spans with no difference in results. For all tested sub-periods market efficiency cannot be rejected. It seems that the Polish zloty market continues to be semi-strongly efficient even in times of crisis - a trait characteristic of the most liquid currencies in the world.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 5. Johansen Cointegration Test Results - financial crisis period (2008-2010)

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.015665	11.56604	20.26184	0.4885
At most 1	0.007088	3.592362	9.164546	0.4762
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.015665	7.973679	15.89210	0.5509
At most 1	0.007088	3.592362	9.164546	0.4762

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Source: Own calculations.

Conclusions

In this article, the Polish zloty foreign exchange market is tested for cointegration in pairs of daily foreign exchange rates for periods before and after the financial crisis in order to test semi-strong informational market efficiency. The main hypothesis of the article has been confirmed. It is shown that the null hypothesis of no cointegration cannot be rejected. As a result, it can be argued that the financial crisis has not resulted in a cross-sectionally inefficient foreign exchange market for the Polish zloty, because the cointegration relationships were not found in any of the investigated crisis sub-periods.

Confirmation of the weak and semi-strong efficiency of the market is a prerequisite for an average investment profitability based on analyzes that measure the intrinsic value of the assets of the designation (such as broadly defined fundamental analysis based on other exchange rates) and those based solely on the analysis of graphs and historical data on asset prices (broadly defined technical analysis) alike and from the point of investors these instruments are of no use. In this sense, however, there is no rationale for government intervention in the market as it allows taking optimal investment decisions. However, only a subset of the whole spectrum of tests on the effectiveness of information in foreign exchange market has been carried out and this still remains open for future research.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
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**Assessing the Non-financial
Investment Profitability with
Variable Discount Rate***

JEL Classification: *G11; G31; G32*

Keywords: *the cost of equity capital; risk premium; CAPM*

Abstract: In the work, the subject of the discount rate assessment is presented. It is crucial as regards assessing the non-financial investment profitability. The discount rate is usually considered as constant one in the whole investment period, which seems to be the main problem. The constant discount rate does not take into account the actual money loses value in time. Moreover, the discount rate elements can change in time and it should be remembered that many factors, which also could change, influence the value of those elements. In the work, the results of conducted research are presented and they confirm that the assumption of using the constant discount rate is erroneous. The possibility of using different techniques of risk premium valuation is also mentioned. The research allows to select the risk premium valuation to assess the non-financial investment profitability which has been characterized as long-term one.

* I would like to thank the Polish Ministry of Science and Higher Education for bailout the research presented in the work.

Introduction

The main aim of the work is to present that the use of constant discount rate at assessing non-financial investment profitability is incorrect. To fulfill the goal, the empirical research was conducted on the basis of construction area. Such research allowed to take a stance on such a formulated aim. The discount rate evaluation is one of the core elements of assessing the non-financial profitability. The incorrect discount rate value or mismatched assumption, connected with its constancy through the whole period of investment realization, can lead to incorrect assessment of non-financial investment value. The acceptance of unprofitable investment or rejection the profitable one can be the effect of such an activity. For an investor, it is crucial to realize profitable investments which can give extra profits in the future. It should be remembered that the aim of each company is the maximization of its value and it is possible because of investing. So correct investment assessment is really important.

The research methodology

The aim of the research was to show the inconsistency with assumptions of assessment methods of the non-financial investment profitability, regarding the use of constant discount rate. The research has concerned ten years' period of time and has included the period before and after the economic crisis (2004 – 2013). The analysis was realized with an example of construction area¹. The companies target screening concerned the defined period when the enterprise was traded in Polish stock exchange. The theoretical interpretation of the discount rate at assessing the non-financial investment profitability is presented in the first part of the work. Then, the methods of equity capital cost are discussed. The last part presents the measurements of conducted analysis which was used to assess the cost of capital, especially the own one. This part of the work mainly focused on determining the risk premium.

¹ According to the WIG-BUDOW enterprises condition in August 2014.

The discount rate used in the evaluation of non-financial investment profitability

The decisions referring to the non-financial investments concern the expending determined sum at present, in exchange for the income flow in the determined, future years. The process which allows to bring future cash flows into one comparable period is called discounting. The discount rate itself is a measure of used interest which should be gained to pay the credit interest or equalize the interest on alternative deposit, which was disclaimed in order to invest cash, as well as defray equity risk premium (Michalak, 2007 p.88). The discount rate at assessing non-financial investment profitability is usually set as constant one in the whole period of investment realization. The discount rate takes time preferences as well as the opportunity costs into account. It presents the possible profits from capital, invested in alternative investments. So, the whole discount rate value does not reflect the appropriate money loses value in time. The discount rate, used i.a. to assess the non-financial investment profitability, is also a part of capital cost.

As Szczepankowski shows (2007, p.85) the cost of capital can be defined in several ways (compare Hucik-Gaicka, 2007; Dulinić, 2001; Blanke-Ławniczak et. al., 2007):

- It is a value of expected return rate from alternative ventures in assets. It has got identical investment risk.
- It is a price that should be paid by an enterprise for the right to administer every single coin from the received capital.
- It is a hurdle rate of return that should be generated by a company to maintain its value.
- This is both the minimum and risk-considering return rate, that should be gained from possessed assets, and realized investments to have the presents ventures accepted by owners.
- This is the minimum profitability represented by interest. By this profitability, the investors can plough their equity capital into enterprise to get the expected profits.

The definition of capital cost was also taken up by Byrk-Kita (2007, p.89-90) who, besides the definitions presented by Szczepankowski (2007), additionally emphasized that the cost of capital is e.g.:

- The cost of enterprise financing
- The price of engaging funds

- The expenses borne by a company as a result of managing capital, in relation to its market value
- The discount rate used to discounting company cash flows which would have generate if it had not been funded with debt.

In the literature, the most common definition of equity capital cost is to determine it as desired return rate from invested capital by investors (Duliniec, 2011; Blanke-Ławniczak et.al., 2007; Pęksyk et al., 2010). The way of setting the discount rate is conditioned upon the structure of invested capital which can come from own or foreign sources as well as both the own and the foreign ones. The cost of each funding source is related to assessing both equity and debt capital cost.

The cost of equity capital

The most known methods to assess the cost of equity capital are:

- build-up method – which consist in determining risk-free rate and adding different, predetermined risk premiums (risk premium, value premium, sector-risk premium, specific-risk premium, peculiar-risk premium),
- Dividend Discount Model (DDM) – which consists in assumption that the shares value is determined by the flow of futurely pay dividends,
- Capital Assets Pricing Models (CAPM) – connected with the modern portfolio theory where the main investors aim is to maximize the return rate in relation to borne risk,
- Arbitrage Pricing Theory (APT) – based on almost one price and an arbitrage, this is the co-efficient model.

The process of determining equity capital rate, that reflects its cost, can be a problem. The difficulties can be caused not only by choosing the appropriate technique. More important is that the attention should be paid to methods imperfection. This defect can cause incorrect level of assessed equity capital cost. Above all, limitations and assumptions are the whole methods group fault. The problem concerns not only their amount but also nonverification in reality. The build-up method is proved only with smaller, nontraded enterprises. The majority of the method elements lie in subjective value calculation, which are not empirically proved. Many assumptions are out of touch with reality. For example, using the Gordon growth model (DDM), it is hard to predict and expect the constant dividend growth for longer period of time. It should be added that Gordon growth model can be used for mature enterprises with stabilized policy of dividends pay. On the

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

other hand, no-one can agree with optimistic assumptions of CAPM method concerning the lack of transaction costs (the lack of extra fees) and no limits in relation to incurring and granting loans with risk-free rate. It could cause over-liability which would reflect the lack of solvency and thereby, the possibility of bankruptcy. The point at issue is i.a. the assumption that all investors have an aversion for risk. The only one investor's attitude cannot be a limitation because it should be remembered that an investor can also be neutral or take a risk.

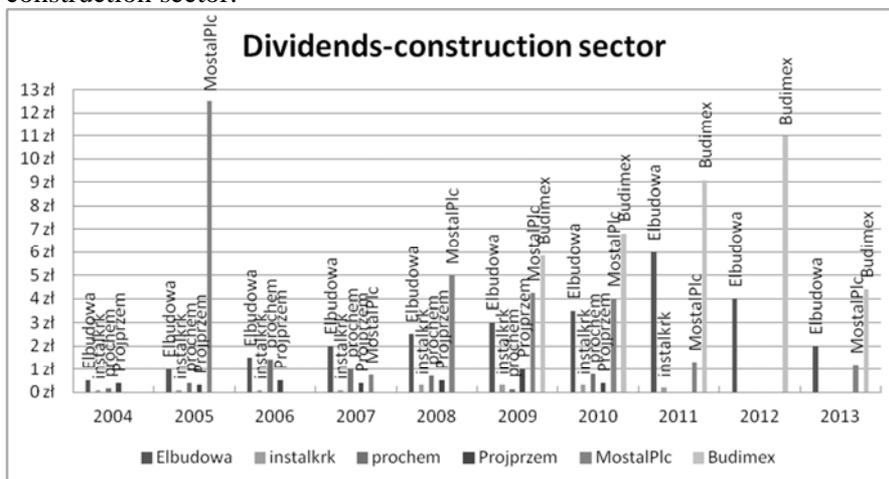
The mostly used method to assess the rate of equity capital cost is CAPM model. It was the subject matter for a lot of research but it is not critique-free. Some of the researchers called into question the linear relationship between expected return rate and systematic risk - beta (Fama, 1996). Other factors which explain return rates configuration are determined e.g. business value effect, Price Earnings Ratio, price-to-book ratio (Banz, 1981; Basu, 1977; Chan & Yasushi 1991). Some research appealed in favour of CAPM model (Black, et al., 1972; Fama & MacBeth, 1973). In the literature, besides the CAPM model critique, there are methodological problems connected with particular elements. In this case, the way of setting the risk premium is generally remarked. The difficulty in assessing the Equity Risk Premium (ERP) concerns not only the selection of appropriate data or the calculation period, but also the way of its determining. In the face of the wide range of problems, the assessment of Equity Risk Premium has been a curious issue to examine.

**The research analysis – the chosen model to assess the rate
of equity capital cost and assumptions**

The research subject to analyze the assessment of equity capital cost was the Capital Assets Pricing Model. On the other hand, the build-up method is used for nontraded company and it was counted out of using the method to assess the rate of equity capital cost. Meanwhile in the Dividend Discount Model the assumption of constant dividend growth rate is presumed. The lack of stability, in the policy of paying out dividends for construction sector, is confirmed by the analysis of enterprises reports. From among thirteen companies in the analyzed period, only one of them pay out the dividend every year, whereas the half companies pay out the dividend from five to ten years' time (diagram No. 1). Other companies did not pay out any dividends or did it once or at least three times. That is why the Div-

idend Discount Model cannot be used to assess the rate of equity capital cost for the analyzed sector.

Diagram 1. The dividends paid out for the period of five to ten years' in the construction sector.



Source: Own study on the basis of financial reports

The Arbitrage Pricing Theory was not considered because it needs the same assumptions as the CAPM model.

The Capital Assets Pricing Model is based on Sharpe, Lintner and Mossin's works (cf. Sharpe, 1964; Lintner, 1965, 1965a; Mossin, 1966) but the best known model formula was created on the basis of Fama proposal (1968):

$$E(R) = R_f + \beta^2(R_m - R_f)$$

In the conducted research, the risk-free return rate of an asset (R_f) equals the profitability of 52-week³ country treasury bills. In the literature, the way of asset choice, that represents the return rate of free-risk asset, is discussed. On one hand, the return rate of long-term securities, guaranteed by

² Enterprise systematic risk

³According to the Ministry of Finance, <http://www.finance.mf.gov.pl/dlug-publiczny/bony-i-obligacje-hurtowe/baza-transakcji>, 52-week country treasury bills were issued till 28th of March 2012. Then, the bills with the nearest period of time, in relation to the previously analyzed ones, were chosen.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

the country (debentures), is mentioned. On the other hand, the researchers indicate that the risk-free return rate is the return rate value of short-term treasury bill. The advantage of long-term assets is better time horizon match for long-term investments taking by an enterprise. The flaw is the sensitivity of interest rate future fluctuations. The investors are certain of purchasing power as well as reinvestment rate which will be available for their reinvestment of interest payment, gained from the debentures. However, short-term treasury bills are more influenced by short-term fluctuations than the debentures. But there are the treasury bills which both risk of issuer insolvency and risk of interest rate changing equal almost zero. So, the treasury bills can be described as the purest base risk-free return rate because they actually have not got the risk of interest rate uncertainty. The treasury bills contains the compensation of inflation uncertainty. However, debentures are free of insolvency risk but they are not “risk-free”. (Pratt & Grabowski, 2008 p.92).

Equity risk premium and capital cost – the research results

Equity risk premium is reflected by the difference between return rate and risk-free rate. The return rate, which is measured by the appropriate stock market index, is gained from the whole capital market (in Poland it is Warsaw Stock Exchange Index – WIG). The main aim of the conducted research was to set a premium, which was calculated in several ways:

- The difference between the market asset represented by WIG return rate, according to the beginning of the year (in accordance to the methodology of calculation the WIG annual return rate by Warsaw Stock Exchange - GWP), and the return rate from a risk-free asset at the given day.
- The difference between the daily WIG return rate and the return rate from a risk-free asset at the given day.
- The difference between average value of the WIG return rate in the year and the return rate from a risk-free asset at the given day.
- The average premium from 10 years’ time which is the average from the differences between WIG return rate, in accordance to the beginning of the year, and the return rate from a risk-free asset⁴ at the given day (it is

⁴ The average is calculated within the limits of the given year because 1) it comes out of the short history of Warsaw Stock Exchange (GWP), which is still not well developed, 2) in the past, there was another system of quotations, the Warset system, and it was implemented

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

called the average from Premium (1)). It should be added that the analysis, which treasure bills profitability was calculated on daily interest rate, was excluded because the goal of the research was to gain value “at” the given day, not “for” one given day.⁵

The risk premium can be assessed as an arithmetic or geometric mean of the differences between return rates, which are considered to assess a premium. The arithmetic mean is a historical mean of assessments of the differences between rates – it is the simplest solution and also the most popular among analysts and matches the designated Premium (4). The Premium designation in arithmetical way is correct when annual return rates are not correlated⁶, otherwise the better idea is to use the geometric mean but the weight for a geometric mean should increase including the impending of the period in hand (Prusak, 2009; Hucik-Gaicka, 2007). Using geometric mean is conditioned by positive values of the analyzed variables, it was not achieved when we consider WIG return rate. That is why, the arithmetic mean was taken into consideration in the work. That mean is also coherent with the method of determining the beta co-efficient (Szczepankowski, 2007). What is more, the weak⁷ correlation between examined return rates is in favour of using arithmetic mean.

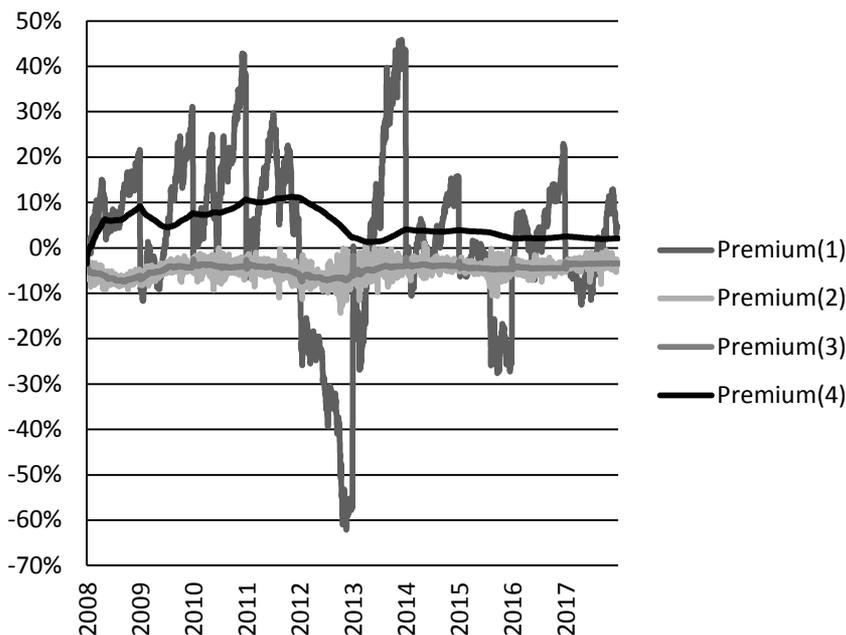
in 2003, 3) running into the past can remarkably deform the results, considering the short history of GWP.

⁵ Moreover, the incoherence between calculation interest rate should be noticed – to calculate the annual interest rate, when we have got m -number of capitalizations during the year, the formula for the effective annual interest rate should be used. The rate bases on involution. On the other hand – to get the daily rate from the annual one, the rate should be divided by the number of days in a year, which is not the opposite of involution and what our intuition can suggest.

⁶ The correlations co-efficient for annual return rates equaled -0,36. The arithmetic mean was used to calculate the premium (4) which was calculated for the given day between 2004 and 2013 – the correlation co-efficient (according to the daily data) was -0,28. Both values should be found as weak correlation.

⁷ According to the widely published interpretation of Guilford’s relationships correlation power.

Diagram 2. Risk premium assessed in four ways

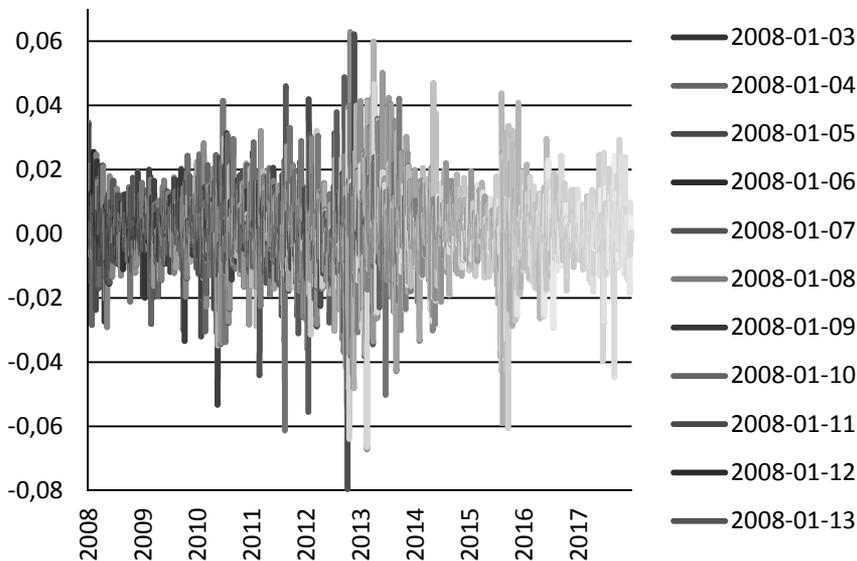


Source: Own study on the basis of market data

GWP has got comparatively short history of working. The characteristic issue is that after periods of hossas, a lot of besa periods can be expected. That is why, the premium determination, as a difference between average market return rate and fisk-free rate, was not considered in the analysis. The average return rate from the whole market would be the average of very high positive return rates and very low ones. In the diagram No 2, the results of the analysis of assessing market premium with the established methods were presented. The Premium (2) and the Premium (3) are characterized by negative values. They are caused by extremely low WIG values, which referred to daily changes. In the analyzed period, WIG-2 value (which is R_m) was changing in the range of $\langle -7,95\%; 6,27\% \rangle$, which is shown in the Diagram No. 3. However, the treasury bills value was always positive and in the range of $\langle 3,47\%; 7,51\% \rangle$, which caused the low premiums, assessed with those methods.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Diagram 3. WIG value – daily changes



Source: Own study on the basis of market data.

Much better way to assess is considering the WIG changes in accordance to the beginning of the year, which is coherent to the methodology of annual WIG⁸ value calculation, according to GWP.

Premium (1) reflects the capital market behaviour. Considering the premium, the period of crisis can be noticed, which strongly left an imprint on the premium value. So, it should be considered that Premium (1) is the best variant to imitate the situation in the market. Notwithstanding, considering non-financial investment, which are characterized by long time of realization, the best assessment of risk premium is Premium (4). The last of analyzed possibilities of determining the premium “flattens” the temporary return rates fluctuations and this is the premium for the given period – the long-term one. Moreover, the values premium assessed in that way are best suitable for long-term investments. It is proven by research

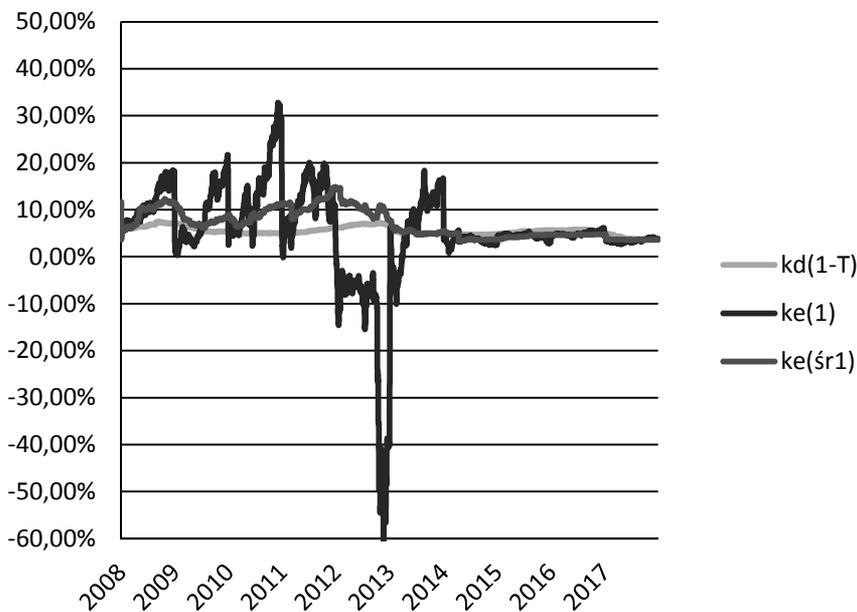
⁸ According to GWP, the value of WIG return rate for the given year is calculated as a difference between a closing bell from the last day of the year in relation to a closing bell from the last day of the previous year. The closing bell from the last day of the year equals an opening bell from the first day of a year – that is why, the concept “according to the beginning of the year” is used.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

conducted by numbers of analyzers. Those values determine the premium value, up to a few percent for longer periods. What is more, the risk premium, determined with this method for several-years period, is consistent with using arithmetic mean.

Determination and selection of risk premium allow to assess the rate of equity capital cost. Next, the cost of debt capital was determined. It caused the determining of WACC rate for analyzed companies. The results are going to be discussed for all⁹ examined companies, however the diagrams are going to be presented only for 3 previously selected companies – Diagrams No. 4, 5, 6.

Diagram 4. The rate of equity capital cost¹⁰ (for premium(1) and premium(4)) and the cost of debt capital – Elkop



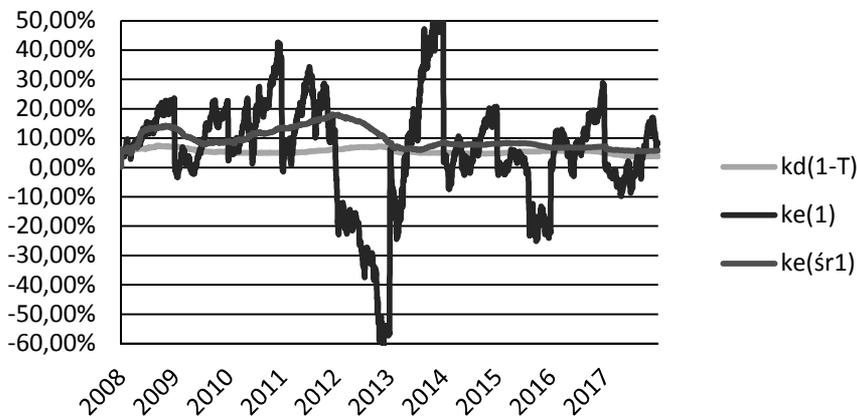
Source: Own study.

⁹ Analyzed companies from the construction sector: Awbud, Budimex, Elbudowa, Elkop, Enap, InstalKrk, MostalPlc, MostalWar, MostalZab, Prochem, Projprzem, Ulma, CNT.

¹⁰ $Ke(1)$ for premium(1), $ke(\acute{s}r1)$ for premium(4) because it is the average of premium(1).

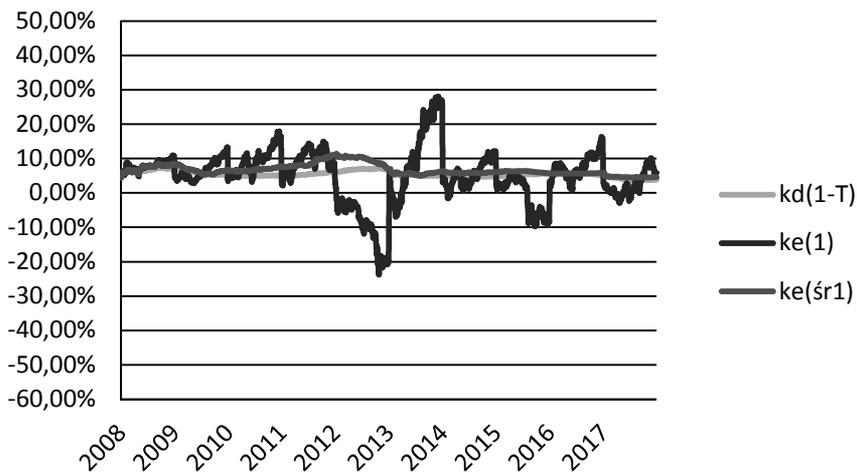
**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Diagram 5. The rate of equity capital cost¹¹ (for premium(1) and premium(4)) and the cost of debt capital – MostalZab



Source: Own study

Diagram 6. The rate of equity capital cost¹² (for premium(1) and premium(4)) and the cost of debt capital – Prochem



Source: Own study

¹¹ Ke(1) for premium(1), ke(śr1) for premium(4) because it is the average of premium(1).

¹² Ke(1) for premium(1), ke(śr1) for premium(4) because it is the average of premium(1).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

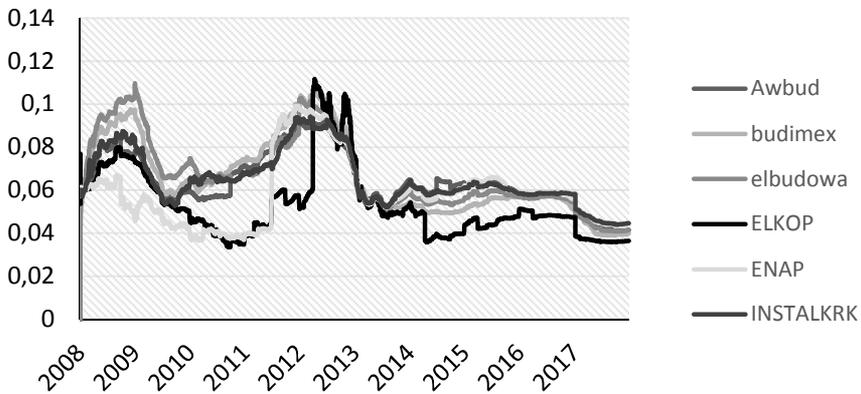
Because the assessed values of risk premium concern WIG return rates and treasury bills, the risk premium does not change for each company. Within the limits, the differences in capital cost are related to beta coefficient¹³, which is the reflection of systematic risk of the given company. So, the systematic risk has the biggest influence on the value of equity capital cost in CAPM model. However, the same tendency of changing the rate of equity capital cost is determined by assessed risk premium. Additionally, it should be noticed that, in the years of economic crisis, the cost of equity capital ($k_e(1)$) for all companies was negative, which results from the calculations. It confirms in the belief that the best assessing method of risk premium, for the needs of non-financial investments, is Premium(4). That premium is related to the characteristic feature of non-financial investment which is long-term. The negative cost of equity capital would not reflect in the interpretation of equity capital cost, which is the demanding return rate from the invested capital. The negative value would mean negatively about the invested capital of the enterprise. It should be noticed that the equity capital cost at the given day can differ remarkably.

The analyzes of capital cost was enriched by the determining debt capital cost (calculated on the basis of the rate of Warsaw Interbank Offered Rate (WIBOR)3m and 2% margin), reduced by tax shield. It allowed to determine WACC for each company. The results of assessing the discount rate with WACC method are presented in the diagram No. 7 and diagram No. 8.

¹³ Co-efficient beta was measured as co-variance of investment returns, together with the return in the portfolio market. To save the comparison of co-variances for particular investments, the comparison of co-variance is divided by the returns from the whole market.

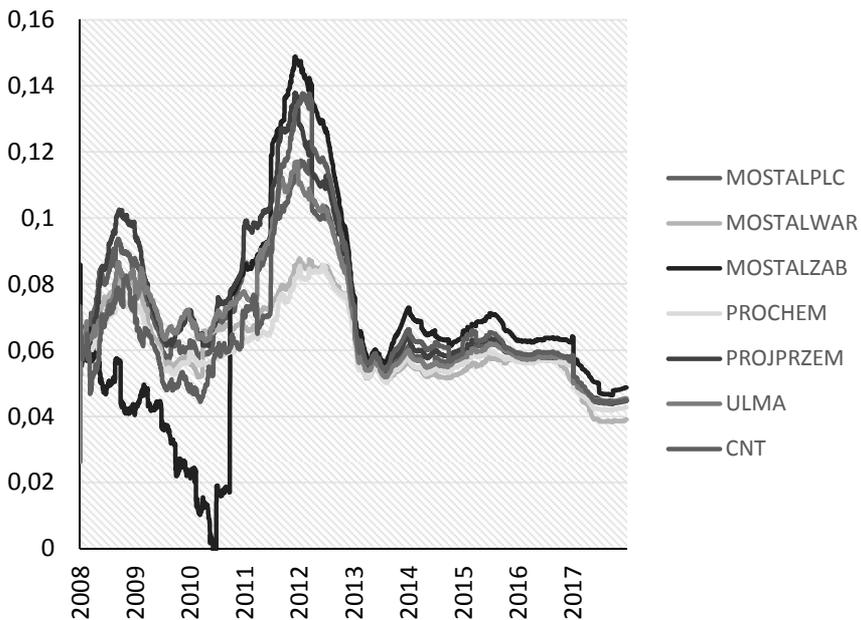
**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Diagram 7. The value of the discount rate (WACC) in the analyzed period part 1.



Source: Own study

Diagram 8. The value of the discount rate (WACC) in the analyzed period part 2.



Source: Own study

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The results present that sometimes, the debt capital cost can be higher than the equity capital cost (it depends on the situation in the market) which happens very often during the years of crisis. The assumed methods of calculation the risk premium allow to take such situations into consideration. Among conducted research for 13 companies, it was the most significant for: Elkop (diagram No. 4), MostalPlc, MostalWar, CNT, Prochem (diagram No. 6). Nevertheless, the most important conclusion is the assumption that the capital cost rate (calculated with WACC), which is the discount rate, is not constant in the analyzed period – Diagram No. 7 and Diagram No. 8. Over the ten years, the capital cost measured with WACC (assumptions: $k_c(\text{sr}1)$ for equity capital cost because it is the best match to the long-term investment character) was changing. Over the course of time, the difference minimized (using average premium “flattened” the values), however the value of capital cost was changing with time.

Conclusions

The conducted research allows to calculate equity capital cost considering several different possibilities of assessing risk premium. The value of risk premium can differ remarkably, not only considering the choice of the premium assessing methods. The value differs every day. The conducted research allows to select the market premium assessing method. Premium(1) exemplifies the situation in the market well, which is short-term as well. In the case of decision-making, concerning non-financial investments, which are long-term, the best solution is premium(4). Premium(4) is the average value of premium(1) for the given period. The average value is better for long-term period because, when assessing the discount rate for the needs of non-financial investments, the investor should consider long-wave market information.

In the analyzed period, it was presented that the capital cost of examined companies, calculated on any given day in the examined period, changes. The conducted research allowed to show that the discount rate (determined by WACC) varies in time and the constant discount rate should not be determined during the assessment of non-financial investment profitability for the whole period of investment realization. The variable discount rate can cause that so far considered investment will be unprofitable, however if constant discount rate was used, the investment would be profitable.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
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18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
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Comparison of Public, Non-Profit and Private Hospitals

JEL Classification: *I110; I120; I130; P36*

Keywords: *analysis; comparison; health care; hospitals; soft budget constraint syndrome (SBC)*

Abstract: The health care system in Germany is undergoing a phase of transformation. The resulting challenges and fields of action for the hospitals were described as one outcome of a scenario analysis conducted by the author. These include, for example, setting up new organisation structures, professionalising management competence or also developing a comprehensive quality management system. In the following analysis, the hospitals are to be described and compared to one another in terms of their initial conditions regarding these fields of action. The question at the focus is which different prerequisites and options the clinics have subject to their organisational structure.

Introduction and Research Questions

The hospital sector in Germany is in undergoing a phase of transformation. The reasons are, amongst others, increasing costs, also furthered by enormous scientific advances in medical and pharmaceutical research and insufficient income, also due to the changing age structure in Germany. In addition, there are the inefficient healthcare structures, which, compared with other structures in the service provider market, remain below its po-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

tentialities. All this causes a paradigm shift of inpatient hospital care organisation in Germany.

The article builds on the already available research results of the author. Using the methodology of scenario analysis, the author has analysed the present situation of the German healthcare systems and from this has derived a trend scenario. This trend scenario describes the progressive development of regionalised, commercially oriented healthcare structures rather as a result than as a directed process, caused by the economic crisis of the public healthcare sector. According to this, not one of the fragmented participants in the healthcare system is today in a position to bring the potentials of medical top-level research, training and medical technology to the regions, to the customer, with integrated health services. The changes to the determining factors for hospitals, such as the increasing shortage of funds, the demographic change as well as the developments in medical technology and the reform course in the healthcare sector, such as the introduction of Diagnosis Related Group (DRG) payments, the repeal of the sector border between outpatient and inpatient care and the introduction of quality management and quality assurance demand consequences from the clinic operators. These include creating new organisation forms to secure financial survival, professionalising management competence, establishing a stringent management of the business processes, developing comprehensive quality management systems, adapting the portfolio to suit customer needs, professionalising the service and reflect their hospital with ethical corporate principles.

Based on this, it is to be investigated in the following, which determining factors the hospitals bring to the table, based on their formal structure, in order to rise to the challenges described in the trend scenario. Specifically the following research questions will be dealt with:

- Which initial conditions and options for action can be derived for the hospitals in the context of their formal structure?
- How does the management of the hospitals react to the options for action in the context of their formal structure?

The analysis theoretically draws upon the findings of Luhmann (1971, 1984) that system structures and/or their formal structures act as decision-making premises to take social action and can be used for organisational analyses. In this connection system structures are the operative programs as conditional or as purpose programs, the organisation structure as the form of coordination and communication, here in the extreme characteristic between hierarchy and market and thirdly the staff (type) and its (value) cul-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

ture. The thesis that is derived from this is that the hospitals have different possibilities for solutions and approaches to solutions to rise to the described challenges depending on their organisational structure.

In order to develop a better understanding of this thesis, public, non-profit and private hospitals will hereafter be analysed in terms of their specific features such as program, objective target, organisation, management and leadership and governance. These specific features are to be compared to one another in the context of the challenges, fields of action and possibilities for solutions to achieve effective hospital management for the benefit of the patient.

Research Methodology

The qualitative research method in the form of qualitative, guideline-based interviews was selected as the research design.

Table 1. Hospitals participating in the evaluation, status 2012

Facility/ operator	Approval	Beds	Employees	Patients (inpatients) /cases per year
University clinic-Corporation of public law//Federal state	Maximum care	3200 beds/ 100 clinics grouped in 17 centres	13.000	Approx. 136,000
Municipal hospital as state-run enterprise /Local authority	Acute care hospital with specialised medical services	960 beds/ 15 clinics and special wards/ 3 centres	1800	Approx. 35,000
Denominational hospital as an association/ Social welfare association	Acute care hospital with basic medical services	240 beds/ 5 special wards/ 3 centres (certified)	600	Approx. 12,000
Hospital as GmbH [private limited company]/ District/Local authority	Acute care hospital with basic medical services/ specialised medical services and other hospital psychiatric care	4 hospitals/ totalling approx. 1000 beds	1900	Approx. 32,000
Helios-Klinikum*	Acute care hospital with basic medical services and specialised medical care	570 beds/ 15 clinics	1000	Approx. 24,000

*The HELIOS Kliniken Group is made up of 74 own clinics, including 51 acute care hospitals and 20 rehabilitation clinics and medical care centres, status as in December 2013. HELIOS provides services in all areas of patient care, from the outpatient and inpatient acute medical care to rehabilitation and geriatric care.

Source: own research.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

This means that clinics of all organisation types and legal forms are included in the study. In terms of approval status, the hospitals range from maximum care to basic care. All clinics are federated in networks. Although this selection does not permit a representative statement, it does nevertheless document the trend of the respective operator and the management in the hospital. This is a conscious approach.

Alongside the case study, the analyses from the studies, an extensive literature research and also a databank research were incorporated.

Seven interviews were conducted according to the interview guideline. This method makes it possible to determine subjective views of those involved, e.g. on past events, opinions or experience, which in turn make enhanced insights possible (Bortz & Döring, 1995, p. 283). The following persons were interviewed:

- Head of the Division Corporate Development (university clinic, public hospital)
- Commercial Director (non-profit hospital)
- Managing Director (private hospital (P KKH))
- Medical Director (non-profit hospital, public hospital)
- Nursing Service Management (non-profit hospital, private hospital)
- Quality Manager (non-profit hospital, public hospital)
- Ward Doctor (non-profit hospital, private hospital).

The following central questions were developed.

Table 2. Guideline for conducting interviews in the hospitals

Corporate policy, intent and purpose of your hospital
Where do you see the main intent and purpose of your hospital (basic purpose)? Humanity and treatment according to the will of the patient? Fulfilment of social and humanitarian duty? The term "production" is often referred to in hospitals, where do you stand on this? The hospital as a service provider for the needs of the people? How would you describe the basic objectives of your hospital? Have you formulated principles of conduct when dealing with stakeholder groups (e.g. social objective targets)? Have you developed a basic concept for management?
Societal and social context
What would you say to the following influencing factors: Demographic development and impact on costs Scientific and technical advance as cost driver Regional network-building Standards that are specified by health care policy and state administration
Citizen / patient
How would you describe a patient /citizen? Responsible, self-determined, active and confident, well informed - or? Who would you consider to be your customer: Health insurance or patient? Patient or citizen?

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

<p>The patient as an economic production factor? What does concern for the patient mean to you? Pastoral care as an offer -"Advertising" or mission?</p>
Employees
<p>Burnout/ sickness of employees, what is the picture in your hospital? How do you motivate the employees? What do you ask for / expect from the employees? Are your employees all regular members of staff or do you also sometimes have temporary workers in care and treatment? How do you integrate the doctors in private practices who also attend to patients in your hospital into your team? There is often talk of "Senior Consultants having their own kingdom..." etc. "Doctors are the gods in white", what is your view? As an employer what "performances" do you offer your employees?</p>
Structure and process
<p>How is your view on the proposition?: Working in an environment accustomed to hierarchy impedes inter-disciplinary OE processes? How does the flow of information function in your hospital? What reports are prepared and how are they communicated? Which communication tools and structures are used? Could you describe typical procedures and the tools used? Process organisation, SOP (Standard Operating Procedure) what do you think, is the present organisational structure in your hospital appropriate? Structures impact the culture, the values and the practices. Please describe each of these in your division in two to three statements.</p>
Economy/ quality as area of tension
<p>What is your view on: Conduct and relationships of organisation members: thinking and acting in the interest of the organisation (intrapreneurs) or thinking and acting in their own interest? What has priority? Economy or quality? How are these measured at first? What is your view on: Conduct and relationship of doctors to care/ patient? Competent, responsible, exploitation of power gap?</p>
Strategy (Strategic Management)
<p>Can you state your strategy in a few words?</p>
<p>Who is the funding body and do you know its strategy and how are you as the hospital involved in implementing the strategy?</p>
<p>Could you please describe how the strategic planning process works in your hospital?</p>
<p>How do you measure the success of the planning targets?</p>
<p>What are the most important key figures, indicators with which you measure the success of your hospital?</p>
<p>How was the mission statement developed? Who was involved in the process? How is the mission statement communicated?</p>
<p>In one sentence, describe how you see your hospital 10 years from now?</p>
<p>Are you familiar with the macroenvironmental analysis tool PEST or the Five Forces model? Do you use these tools?</p>
<p>Specialisation, standardisation, segmentation, comprehensive care, integrated care, patient-centred care, what comes to mind when you hear these terms?</p>
<p>What do you think of network structures, how would you describe your present situation and which related developments could you imagine?</p>
<p>Who are your most important stakeholders? How do you involve them in your business?</p>
<p>What is your opinion on key figure systems, such as e.g. the Balanced Scorecard?</p>

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Are you using a similar system?
How often and with whom do you meet for so-called strategy meetings? What is the outcome of such meetings? How do you develop your strategy further?
What is more important in your view: Placing the patients at the focus or the basic economic conditions for the hospital?
Please briefly describe the cooperation with the doctors in private practice. Who is the Owner of the patient data?
How often do you follow the situation in your "rival hospitals"? Do you look at e.g. market share, patient numbers, case numbers, etc.? And do you follow the development of your "rival's" portfolio?
Are you judged by the attainment of the strategic objective targets?
Do you judge the responsible officers of the subordinate hierarchies by the strategic target attainment?
Who bears the responsibility for what in your hospital?
As how functional and success promoting would you characterise and assess your management organisation (perhaps three-person board)?
If you were to summarise the trend in the healthcare system, how would you describe it?
Which IT is used in your hospital?
What are the most important challenges for the immediate future that you must tackle as hospital management and what areas for action do you see here?
Strategic planning: Do you have a 5-year plan? Do you have a budget on a multi-annual basis? Please describe the planning process.
Operative management
What are your most important targets in this year?
What kind of cost accounting do you perform? Do you already calculate using the hospital fee system InEK [Institut zur Entwicklung des Entgeltsystems im Krankenhaus]? Do you already use activity-based costing? Do you have a breakeven analysis? Could you please describe it briefly?
Please describe the annual planning process. Do you set cost targets in the budget? Based on what? Do you negotiate these with the specialist clinics? On which level is the budget employed? Do you have a business plan?
Does accounting controlling take place in your hospital? How is the medical documentation performed? How would you judge the quality here? Key word: revenue controlling how does that work in your hospital? What are the most important operative key figures that you use to manage the hospital? On which function level are these key figures employed?
Do you have a Quality Manager? What tasks and functions does he fulfil? Do you have a process handbook? What is the status of the conversion to standardised treatment paths?
How do you measure the utilisation of your infrastructure? (Equipment / operating theatres / beds etc.)
Which role does controlling play and where is it located? Do you perform target-performance comparisons / deviation analyses / proposals for action / assumption monitoring?
Reducing the length of stay: How do you control this?
Do you measure patient and also employee satisfaction?
Management and leadership
Do you work with target agreements? Up to which level are these employed?

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Do you check these target achievements and if so, how?
Incentive system: what means do you employ?
Is there any (planned) staff development? How do you plan this?
If you were to describe the basic leadership style in your hospital, how would you characterise it?
How is your target achievement judged and by whom? Who determines your targets, do you have personal goals or goals that involve the whole hospital?
How do you manage the problem that you must exert economic pressure onto the medical staff? How do they deal with this?
What is your view on: Management based on figures and key figures versus management that influences behaviour

Source: own research.

Proceeding from the idea that "telling stories" is a better way to record subjective perceptions, emotions and feelings than in a controlled interview, the following 10 interviewees participated in a narrative interview:

- Head of Division Corporate Development (public hospital)
- Commercial Director (non-profit hospital)
- Managing Director hospital association (public hospital)
- Managing Director (private hospital, public hospital)
- Quality Manager (non-profit hospital, public hospital)
- Head of Human resources (public hospital)
- Controller (public hospital, non-profit hospital)
- Doctors (public hospital, non-profit hospital, private hospital)
- Nursing staff (public hospital, non-profit hospital, private hospital)
- Specialist nurse (public hospital, non-profit hospital, private hospital)

Various questions from the guideline interview were used to encourage the interviewees to talk and tell. The group discussion is closely related to the method of questioning and can be seen as a "specific form of group interview" (Lammek, 1995, p.125); in other words as a talk under "laboratory conditions", in which several people provide information on a topic that a discussion leader defines. In this case the talks were rather of an "investigative" nature that means the focus during the discussion was on the information than content results. By using this method the author was primarily interested in recording the opinions and attitudes of the individual participants of a group, and checking whether these deviate from the group opinion (e.g. when investigating the goals of the individuals participants, the researching of the values and maxim for acting of the individuals as well as of the group as a whole) in addition to analysing how the problem solving functions in the group (e.g. in the board meeting as well as in the coffee break in the non-profit and in the public hospital).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Observation in the narrower sense is understood as the collecting of experience (data) in a non-communicative process using all possibilities of perception. In contrast to day-to-day observation, the scientific observation is more focused, method-controlled and inter-subjective. It typically uses tools that guarantee the self-reflection, systematics and traceability of the observation and help extend the limits of our own ability to perceive. Using observation, quantitative and also qualitative data can be produced; the latter then form the interpretative access to the observed events (Bortz & Döring, 1995, p. 240).

The aim of the scientific observation here was mainly the direct observation of human actions, linguistic statements, non-verbal reactions (facial expression, gestures, body language) and social characteristics (clothing, symbols, habits, etc.) The focus was on recording the course and the significance of individual actions and action patterns as well as the relationship structure. No other form of data collection permits the researcher to gain such a deep insight into the day-to-day events in a social community, the manifold moral concepts and interests of the participants and their social context. All those observed were informed in advance of the scope, execution, date and content of the observation. Amongst the tools used was a certification process in the hospital over two days on which all hierarchy levels including nurses and doctors of the hospital were represented. This method was used in a non-profit hospital.

Further, the qualitative analysis was evaluated according to the following structure:

Table 3. Structure of analysis

Profiles of the hospitals according to corporate policy, intent and purpose/patients/ employees		
Strategies	Structure	Systems
Entire hospital (funding)	Processes: Normative orientation process Strategic decision-making process Operative management process Management business process Supportive processes	Management system (including Controlling)
Hospital	Quality Management	Financial system
Specialist ward / clinic	Risk management	Communication system
Normative	Organisation structure	Incentive system:

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Strategic	Staff	
Operative	Segmentation	
Instruments/ methods such as e.g. mission statement, Standard Operating Procedures (SOPs)/ target agreements/ key figure systems		
Shareholder/ expectations from management perspective		
Tasks: Definition of targets/ planning / organisation / controlling		
Instruments and methods of operative management		

Source: own research

The aim is to present the strategic and operative management of the hospitals and the hospital management in the actual situation of the, in order to make conclusive statements whether and how the different operator and so the formal structure affect the management and how the individual clinic operators react to these challenges.

Results

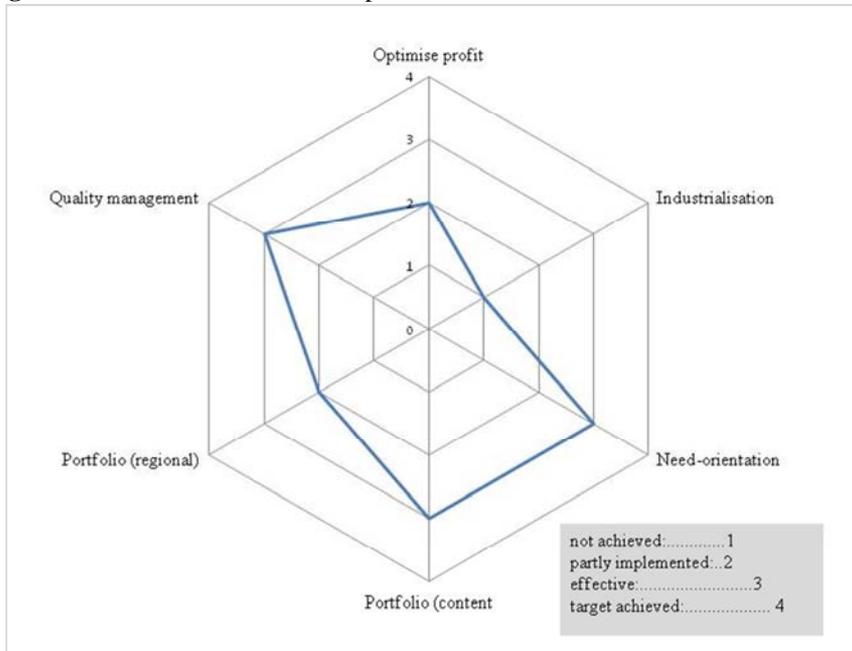
This article refrains from presenting the actual situation in detail and rather refers to the publication by Held (2014, pp. 53-105). This paper focuses on the comparison of the hospitals in the context of meeting these challenges. The challenges are derived from the scenario analysis (Held, 2012, pp.99-250) and outline the following:

- securing the operative profitability and long-term existence of the hospital, ensuring the required investment (result optimisation and use)
- integrated provision of services, personalised for the patient, industrialised in the service preparation (industrialisation and realisation of personalised medical care)
- management of the own service offerings (portfolio) oriented according to the customer needs (need orientation)
- organisation of the need-oriented and end-to end provision of services along the value chain (adaptable integration of the own portfolio into a complete overall portfolio)(content portfolio integration)
- integration of the own portfolio in the regional context (the right service in the right place)(regional portfolio integration),
- ensuring a high quality level of service (Quality Management).

In a hexagonal shape the individual hospitals are now divided into public hospital as a state-run institution, non-profit hospital and private hospital, and compared regarding their potentials to meet the challenges. The potentials were derived as conclusions from the actual-analysis.

Public hospital

Figure 3. Action areas and their implementation



Source: own research.

Typical for the public hospital are:

- no sustainable corporate profit targets
- very good quality in the required services provided (particularly university clinics)
- regional (according to politically defined regions) competition amongst hospitals (regarding patients, funding, retention of workplaces)
- No potential (finances) to shape transformation, scientific and technical possibilities or strategic restructuring.
- As an individual hospital no possibility to realise inter-disciplinary, personalised medical care, innovation and clinical studies (exception: university clinic).

The public hospitals are very good regarding the provision of services (quality). However, operative measures and the daily business, one-sided cost-saving activities (such as e.g. restructuring, outsourcing, lean management) are merely an effort to optimise the status quo. Measures to in-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

crease profitability develop substantial growth potentials by following a new strategic direction, are still missing in most public hospitals (approx. 50% of all hospitals in Germany generate losses in 2012 (www.dki.de; Krankenhausbarometer 2012)).

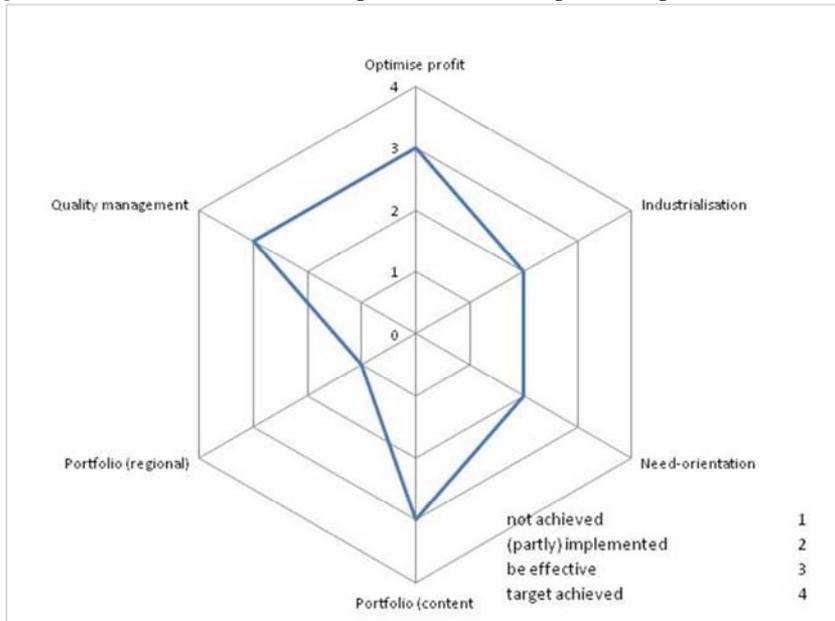
Municipal hospitals are limited in their development due to the regionalising tendencies. The politically determined constituencies thus represent a management inconsistency in themselves. The financing of the restructuring can only work if sufficient funds are available, these must be earned. This means: Standardisation and industrialisation are the necessary requirements to improve the result orientation whilst maintaining stable demands on quality. Personalised medical care, standardisation and industrialisation in order to utilise the economies of scale mean being cross-regional and acting in networks and associations.

From a historic perspective, the service offerings of the public hospitals are well established. The fulfilment of the public service mission with a state-prescribed bed plan was and still is the main focus of hospital management. However, every public hospital acts independently, these basic conditions are now cumbersome under the partly introduced competitive conditions. Hospitals that have united to form networks, only do so in the politically determined region, to form maximum purchasing groups. Maintaining and securing workplaces is here often the primary objective. Within the region (municipality, district) instead of joining forces, the hospitals compete with one another and also with private service providers, so that they can offer their core services optimised regarding profits at a high quality level.

It is necessary that the hospitals are integrated into the holistic, patient-oriented healthcare service, within a healthcare region, that is determined by the state (in cooperation with the health insurance) according to the number of insured, accessibility and other service levels.

Non-profit hospital

Figure 4. Action areas and their implementation-non-profit hospitals



Source: own research

Typical for the non-profit hospital are:

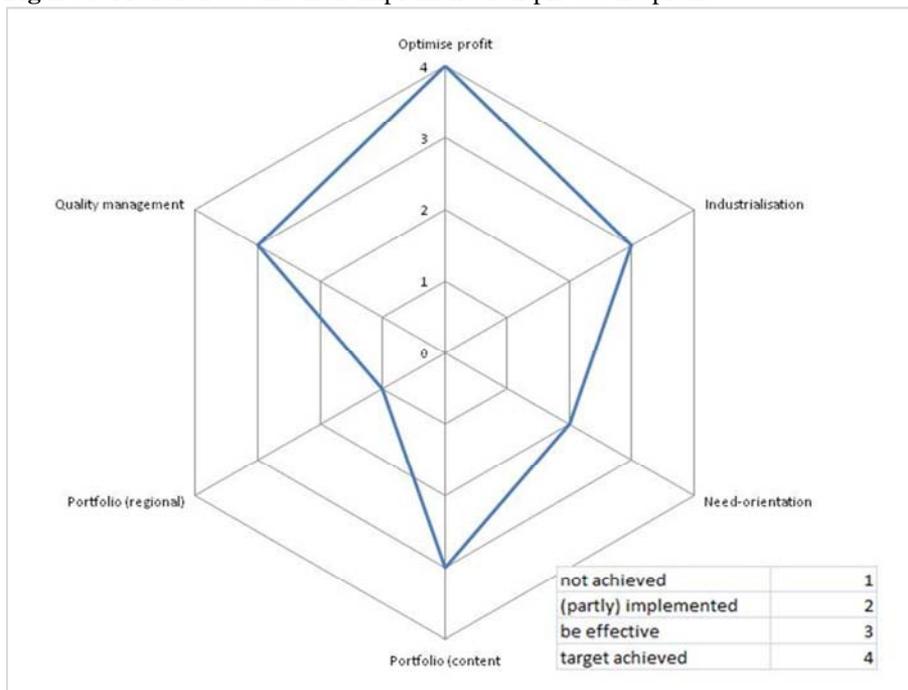
- implementation potential for new strategic orientation among private hospitals
- regional limits regarding operator and funding
- very high quality in provision of services, with additional pastoral care and benefits
- introversive needs orientation.

The content management in the non-profit hospital is primarily geared to profit optimisation, in order to generate revenue for investments with which the need orientation is then pursued. Also here the operator (funding) is the limiting factor. The operators are likewise organised regionally. This means that the same conditions exist as with the public hospitals as a societal conflict of objectives. In contrast to the public hospitals, the profit orientation plays a greater role. As a result, networks are already being established that include a holistic healthcare service package of prevention, to diagnosis, therapy to care and rehabilitation, but also training and child

care, in order to utilise the economies of scale. However, these networks or associations also do not appear as healthcare providers in a healthcare region, that means that they too do not focus on the care requirements of a region, but rather compete with other clinics for patients, for newer healthcare services etc. and are not integrated in the holistic, necessary portfolio of the healthcare region with the healthcare services they offer.

Private hospital

Figure 5. Action areas and their implementation-private hospitals



Source: own research

- The private hospital is
- optimised within itself
- has sufficient potential for transformation and reorganisation due to the good profit situation
- very high quality of healthcare service.

As a rule it generates sufficient margins to make necessary investments and as a private provider with a good profit situation various possibilities to

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

obtain the required funds (loans, leasing) on the financial market. However, here too the needs orientation is rather introversive, the portfolio management is geared to market and revenue aspects and is not orientated to the needs of the healthcare region. Results are measured and deviations are handled in quality management. This is necessary to be able to keep an eye on the quality level whilst optimising profits.

The private clinics also have the potential (financial) but they do not act sustainably in the sense of the healthcare region but rather follow the profits; however, there is not yet a respective (controlled) region described and operated by a regional management.

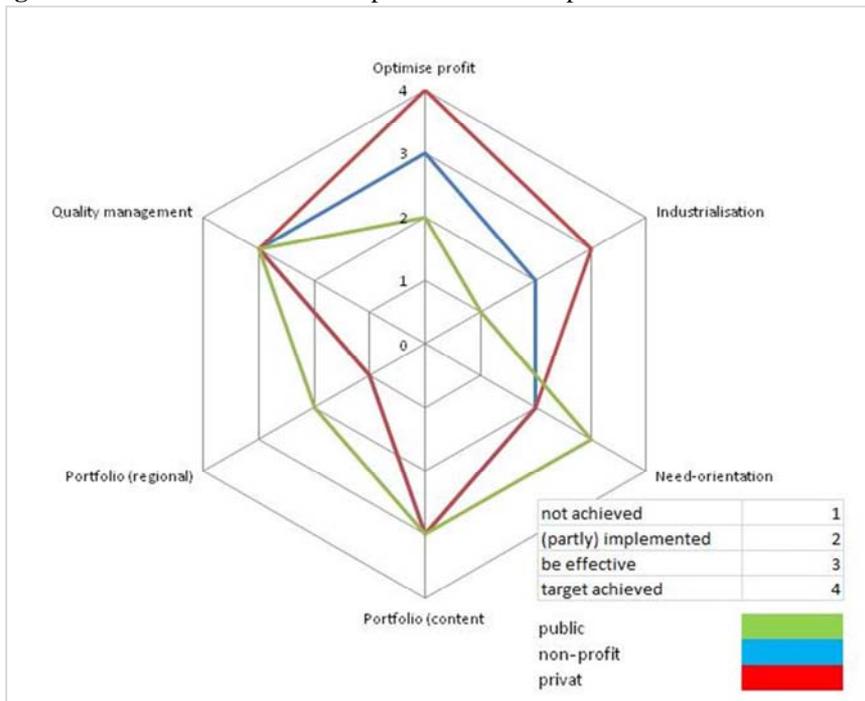
The clinic or the network, the limited company, the holding, the public limited company optimises itself "within itself" since it functions as a corporation. In contrast to the public hospitals, the clinics must prove their liquidity, since otherwise there is the threat of insolvency, operate profitably, since they otherwise use up expenditure without replacement, generate revenue in order to invest, plan and manage strategically, in order to safeguard the long-term existence of the hospital. This has a direct effect on the operative management, the operative targets and the shaping of the relationship between principal and agent. The managing director in the private clinic as the agent will only be able to hold his position if the targets of the principal are also achieved. This creates the pressure, which leads to target-oriented management.

Discussion of the results - formulating recommendations for action

The results of all three types of hospital are superimposed and shown in the hexagon.

It is clear to see that both the private hospitals and also the no-profit hospitals are better equipped to manage the necessary transformation process in the healthcare sector regarding their (also) economic orientation than the public hospitals. The way ahead leads to standardisation and industrialisation in order to utilise economies of scale and scope and release related learning curve effects. These principles do not need to be "introduced" but are rather shaped in the market.

Figure 6. Action areas and their implementation-compare



Source: own research

The operators of the public and non-profit hospitals provide the framework, the premise and so also set the limit for the required reorganisation. It is not the management team on site that determines a respective premise of action in the hospitals, but rather the general conditions, which in turn are determined by the respective type of operator. The management in the establishments thus depends on the respective culture and the target objectives of the operator. And this is not the necessity to be profitable, since until now there was no need to manage shortages as long as financial funds can be topped up at any time, no cost awareness, no transparency and no sustainable economic and also social (for society as a whole) action. This can be subsumed under the term: Soft Budget Constraint Syndrome (Kornai, 2009).

Kornai (2009) has analysed this phenomenon by using the example of the health care system in Hungary and he labelled it the „soft budget constraint (SBC) syndrome“ versus “hard budgets”. He states: „The appearance of a SBC in the hospital sector is not peculiar to Hungary, or the post-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

socialist region. It is propensity that necessarily appears in all regions including modern, democratically governed capitalism, where state ownership, state regulations, and state financing have a necessarily great role to play. Furthermore, it reproduces itself, retreating but resurging after a time.” (Kornai, 2009, p. 133)

The effects of this system guideline can be described as follows:

- The enterprises develop somewhat of a “begging mentality”. They know that they have the support from the state (Held, 2014, p.75). The economy as the mayor force gets suspended (principle of scarcity).
- Soft Limitations for budget distort competition. Because of the fact that the state secures the maintenance, enterprises can act comfortable. Innovation, optimization and product development are no longer decisive for their survival (Held, 2014, p. 91).
- The support of permanently deficit enterprises cost vast sums.
- Because of a missing commitment of the enterprises, there are also profitless investments that are realised (D-M-Modell) (Dewatripont/ Maskin 1995).

All effects described by Kornai, can also be unveiled for the German health care system. Through interviews with experts and the scientific observation the same defects were detected (Held, 2014, pp.130-143). Soft Limitations for budget which lead to a suspension of the economy in the public hospitals are the fourth determinant. Results are deficiencies in the health care system that leads to entropy of the system. The term “deficiencies“ does not mean there is a lack of something generally, rather it is a term we find in logistics (Jünemann, 1989, p.18). There is not the correct amount of goods or services available at the right time, at the right place and in the adequate quality. Therefore, deficiencies in the health care mean an under -coverage of the actual need of goods, deficiencies in services and economic resources, a gap in supplies of goods and services, a gap in supplies of material and equipment, deficiencies in productivity (Held, 2014, pp. 70).

The significance of an under -coverage of goods and services becomes evident if one looks at the waiting time in hospitals (<http://www.dkgev.de/dkg.php/cat/62/title/Statistik>), or if one takes into account that integrated, personalized supply is only available in a central-location-system. Further, there is only a more and more fragmentary supply offered in rural areas, which is not enough to offer all citizens the best possible supply with optimal prices. A planning of locations for hospitals in line with accessibility of primary care simply is not satisfactory. It is not

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

possible to evaluate if 10 or 20 minutes to access the next hospital for the primary care is good or bad, because a benchmark is missing. It would be more needful to provide a service catalogue and guarantee its contents (e.g.: n-days to get to the next specialist, n hours to get to the emergency doctor, n minutes to get in touch with the next doctor for example via an emergency hotline, n minutes resource-availability) which however is not possible within the given structures.

A further significance of a deficiency is that the optimal production factor is not encouraged, e.g. input of material and manpower but rather one uses what is in place. This can be observed in hospitals. Deficiencies stimulates hoarding. Deficiencies cause an excess effort of operative administration and mislead to a neglect of perspective questions towards economic development.

Deficiencies in the health care sector lead to a delay of renewal and modernization investments (e.g. investment bottleneck) and also to a lengthening of the transition of scientific, technical renewals (e.g. therapy, medicine, innovative equipment) (Held, 2012, p.160). Results and insights of scientific studies which are directly produced within therapy are reserved for those patients who are treated in medical centres' (www.kompetenznetze-medizin.de). Deficiencies cause extra hours and slack time simultaneously. A lot of doctors feel overburdened. One out of four works around 80 hours a week- with unforeseeable consequences for the patient. "More than 48 working hours per week, in three out of four cases of hospitalists, are increasingly becoming a risk factor for patients" (www.n24.de). Deficiencies further cause a tendency towards a self-supply of the health companies and inhibit the creation of rational relationships in terms of division of labour (Held, 2014, pp. 95-104; Phoehler, 2010). Market and competition-based elements are introduced with the market however being unable to function with all its rules (Boehlke et al., 2009). What are missing are real prices, market players and concrete buyers for the services offered, and to be able to choose between them respectively, thus actual competition. The competition that is created through the compensation system is not going into the right direction. It is not healthiness as such that is being promoted but rather sickness. One could speak of a "fight" for patients (Held, 2012, pp.147-148).

One can conclude that the survival of the current public health care sector does not depend on efficiency, innovation and effectiveness, because the financial funds are not limited (financing through debts). 19 percent of all public hospitals are bankrupt if measured and assessed by economically

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

criteria, 51 percent make losses (www.dki.de; Krankenhausbarometer 2012), to which all university hospitals belong to (www.vdek.com). The reason for it can be found in the principle of scarcity which is the basic principle for economic behaviour but which is non-existent in this case (SBC). Alternatively, this system also means that social working potential is lying idle while needs are not met pleased. Available work (because there are unlimited needs e.g. research, gain of insights, care, education, prevention, art and culture) is present, but it is not paid for at the moment meaning that a lot of products, goods and services are excluded from the market- a fact which was already absorbed from the economy and the economic theory and was discussed under the term "shared value" as a new concept for the industry and the corporate sector (Porter & Kramer, 2011).

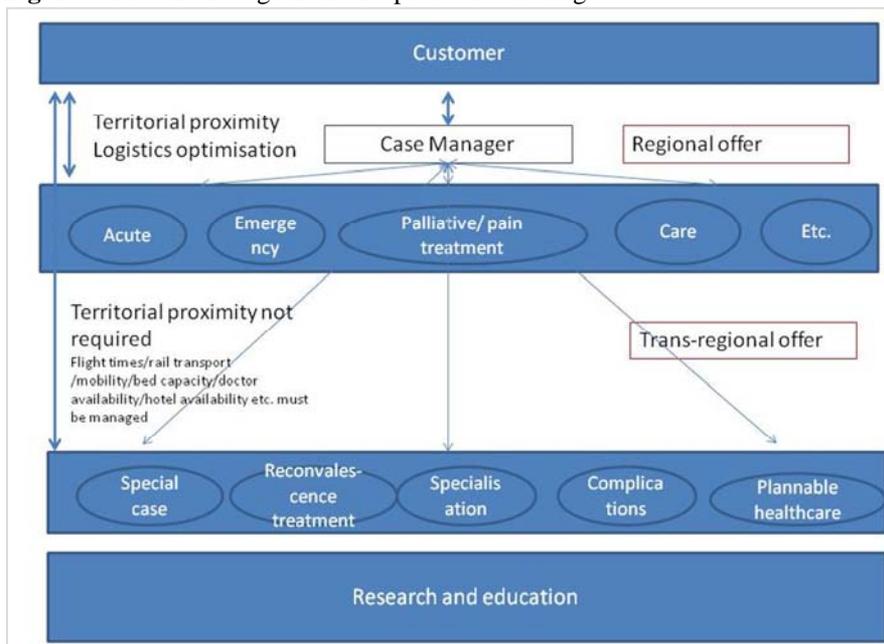
As for the governmental regulation system, the regulation of the market also shows its limits. Major force of the market economy is the utilization of capital while all other forces are subsidiary. According to Schumpeter and aimed at market realization, each innovation is based upon this fundamental drive. The utility of a product is determined by the buyer on the market and is individual and concrete at any time. Economical thinking and behaviour are the fundamentals of the market economy. The public sectors' major force in the utilization of capital indirectly leads to the satisfaction of individual needs (what can be stressed, weakened or is manipulable respectively through marketing). Even less distinct and far weaker than the focus on a direct satisfaction of individual needs, there is the possibility of the public sector to focus on societal needs (e.g. sustainability, health care etc.). Although societal responsibility is accepted as a strong image-factor for private enterprises, it is not a major force as such compared to the efficient utilization of capital. The extreme value of the corporate sector, being based on the maximization of the realization of capital, eventually is the product of limited personal needs (market saturation), limited availability of resources which allows the production for market-adequate prices. Strive for efficiency leads to a progressive edging of people aside from the value creation process (not because of reasons of rationality).

Each hospital requires the respective "freedom" to shape the integrative portfolio management to manage the relevant areas in planning (e.g. medical procedures, resources, products, business areas) under the aspects of risk, growth and revenue. The market economy is the only way to drive the efficiencies in the directly efficient design of the provision of healthcare services. This means that the establishments that were hitherto state-run must be privatised with the related consequences, the risk of insolvency.

Management will act accordingly only when the hospitals have to behave under the market terms.

The next figure shows that there is space for a future healthcare service system that acts on the market without planned economic guidelines, in which each individual healthcare provider can participate, according to the quality specifications of the state regulatory body.

Figure 7. Healthcare region and hospital care offering



Source: own research.

Market economy is not the most suitable system when it comes to shaping society. This applies especially to the healthcare system as a whole. The conditions required to ensure that the healthcare system to be created is sustainable, would therefore be for the state to determine the healthcare regions, but not according to electoral calculation or territorial aspects but rather according to the number of patients, age of the patients, mobility options (infrastructure, such as motorway, railway, airport, etc.) and then advertise for bids from the healthcare service providers. The healthcare system will be organised as a mixture between market and hierarchy. Public Governance appears in the form of a state regulatory body which pos-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

sesses as a hierarchy and so as a positional authority over sanctions and rewards and which checks the provision of the services, as well as defines rules for the healthcare market, such as e.g. defining care corridors for the patients.

The Institute for Quality and Efficiency in the Healthcare Systems will be introduced here as an example. Since its founding in 2004, the legislative principles and tasks of the institute have been anchored in the Sozialgesetzbuch V [German social security statute book] and have been amended and expanded in further healthcare reforms. The only initiators are the Gemeinsame Bundesausschuss (G-BA) [German Joint Government Committee] and the [German] Ministry of Health. The tasks of the independent scientific institute are to investigate benefit and damage of medical measures for patients, to provide information on the advantages and disadvantages of therapies and diagnosis methods and prepare expert reports on, for example: medicines, non-medicinal treatment methods (e.g. surgery methods), procedures of diagnosis and screening as well as treatment and care guidelines and Disease Management Programs.

Alongside the monitoring of quality for the provision of healthcare services, the service and profitability for the citizen/patient must also be monitored and regulated, whereby it is necessary to define appropriate service levels for the citizen / patient and also define quality standards and monitor their observance by the healthcare providers and where necessary impose sanctions (e.g. revoke the business operating license).

The supervisory board of the healthcare region, which is for example made up of health insurance representatives, local and municipal representatives etc. is personalised and also bears personalised responsibility. The supervisory board has the possibility to advertise for bids to provide a healthcare service in a healthcare region and license various healthcare providers that now compete for Quality and Prices. In turn, these providers can merge to form large networks that act (efficiently) also outside a healthcare region and so also cross-regionally. The citizen is committed per contract to a healthcare provider for a defined period of time (e.g. two years). He has the possibility to freely select a doctor after comparing offers (price and quality) and with a personal Case Manager at his side to support and guide him.

Each hospital must then find its place within the advertised healthcare region with an integrative portfolio management according to various strategic reference points and management perspectives. The management of the hospital from an isolation observation horizon raises the risk of a diffi-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

cult business situation. Today the following is regulated by the state; how many beds the hospital may have, whether it is part of the basic-regular or the maximum healthcare system, the revenues for healthcare services rendered are regulated by the state and the actual customer does not appear as a customer, he is even completely unaware of many of the prices for the care and services provided, the health insurance is the actual negotiation partner for the hospitals. They negotiate the cases and the prices. Following the new model, the hospitals themselves decide, depending on the core competence, which healthcare services they provide in the integrated healthcare system and with whom they cooperate, which financial model they choose etc. The required healthcare, service and quality standards are defined and there is a direct customer, the patient, who pays for the services. (The prerequisite would be a health insurance that covers a defined healthcare service corridor but does not constrict the patient as the customer). This requires, alongside the integrative portfolio management, innovative service management to develop new business areas and finally effective management with interdisciplinary supply chains and also integrated supply architecture. This in turn requires standardisation and industrialisation in order to provide the patient with personalised medical care that is affordable, highly modern and permits the healthcare provider to generate the required profits. The prerequisite here would be to include the entire resource consumption into the price of the healthcare services, and not, as is the case today, only to calculate the current expenses. Determining the location of the hospital, in other words, the question "Where do I want to go" can only be answered if the strategy, the way there, is geared to business.

It is therefore important that the hospital management rises to the challenge of value innovation as a growth option using newly defined benefits from the point of view of different patient groups and so develops new areas for growth for itself. The prerequisite here would be that the incentive structure in the healthcare system were turned around and thus connected to a radical, new definition of the business purpose. Only then will new growth areas be opened up for the hospital. Still today growth in the hospitals means: Equipping hospitals, securing healthcare assignments and bed numbers, exploiting bed capacities and gaining patients that require the most expensive operations possible. A reversal of the incentive structure would lead to a change in the purpose definition of the hospitals and from then on the "Value of Health" and not longer the "Value of Disease" would be at the centre of the entrepreneurial activities.

Conclusions

The analysis has shown that the private hospital groups are the only players that have the necessary innovation resources and also the necessary market pressure to be innovative. But, the negative consequences of the dominance of these private corporations have been described. Government hospitals are arrested in their structures. An outdated planning model, the soft budget constraint, the corporatist system of organization and lack of entrepreneurship are the main causes of the defects in public hospitals. All described elements tend to cause an erosion of the corporatist, organized health care sector on its way to classical bankruptcy and towards a private system within the scope of service provision while preserving the model of a solidary health insurance financing. Here, the state keeps on disappearing from investment financing of the hospitals. The employer's contribution regarding health insurance, locked up through the political decision-makers, allocates the rising costs to the insurant even greater.

Simultaneously, the growing offer of direct and chargeable health care services is only partly paid by the insurance. Step by step, the patient becomes the financier of the health care system subsequently leading to a point where he is a player and customer in the health care market, thus puts pressure on the system himself. The patient becomes the subject rather than being the object which means that he is put in the position where he is able to make decisions rather than being the object of other stakeholders' actions. More and more active patients demand for:

- Transparency of information towards the players (information about doctors in the internet and rankings of hospitals) and focus on his needs.
- Transparency of performance/ quality (therapy -> cost/ benefit evaluation)
- Cost- and efficiency transparency therapy -> benefit/ cost evaluation).

It becomes evident that working competition requires the same basic premises for all players. Therefore, they have to be set and must be applied nationally (antitrust law).

On the contrary, a supply that fits the needs must be oriented on the differing social and local/regional needs, thus requires a decentralized management (Böhm, 2008, p.74). The central question, subsequently, is how the three principles (1) an efficient and market-oriented organized health care sector, (2) the social principle of balance of the public services in the health care sector (3) and the local/ regional reachability of the health care services are organized and linked with each other. General problem solving

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

will only occur if management in the health care sector orientates itself on the principles of "hard budgets". „The entry of non-state companies and private capital must be combined with reinforcement of government regulation and control.” (Kornai & Eggleston, 2001, Cap.7) “The way must be opened for the entry of non-state forms of ownership, among other reasons because there are improved changes of hardening the budget constraint on private business. It is desirable to have supply-side competition in the hospital sector.” (Kornai, 2009, p.133) A first problem-solving scenario for the German regional health care supply was worked out (Held, 2014), which has the citizen being a shareholder as its central point. Here, the market in the form of a privately organized health care service provision is the mean (coordination tool) and a union or a stock company stands as the medium. The following basic principles determine this scenario.

- Health is not a common good; supply of health care is a service.
- The patient transforms from being the object into being the subject (transparency/ service/ quality/ costs).
- Replacement of SBC (soft budget constraints) of the central planning with „hard budgets“.
- Industrialised service structures (Customer Care, Delivery, Resource Management) (Held, 2012, pp. 234-239).

The concrete forming of this model like for example the forming of public governance, civil governance, the relations of distribution and – mechanisms need further evaluation, research and discussion.

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18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
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**Reasons for the Changes of the Concepts
of Human Nature in the Economics Exemplified
on the Contemporary Trends***

JEL Classification: *B5*

Keywords: *concepts of human nature; social trends, economic anthropology; heterodox economics; economic psychology*

Abstract: The main objective of this paper is to characterize the key trends responsible for the changes of the concepts of human nature in the economics. The methodology is both deductive (conclusions from theories developed within social sciences and humanities) and inductive (observation of current trends, which according to the theory are potentially responsible for those changes). Basing on the insights of psychology, philosophy of science, sociology, and cognitive science main potential forces are deduced. From the observation of actual trends, the basic contemporary factors responsible for the changes of the concepts of human nature are distinguished. Those can be divided in three groups. The first group contains factors focusing on the advance in knowledge about the human being, occurring within the general and specific sciences dealing with man (e.g. psychology, sociology, philosophy, cognitive science). The second group of factors includes the increasing complexity of the social processes. The third group refers to those social trends, which are responsible for altering understanding the world, which in turn results in real changes. Virtualization of life, greater sensitivity to human and envi-

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

ronmental issues, increased contacts with other cultures and religions, greater sensitivity to the existing social injustice are some of those factors. Basing on those results, the reasons for growing criticism of traditional, orthodox image of man in the economics are discussed and the postulates of the heterodox economics for modifications in the concept of human nature, which reflect the changes taking place in society.

Introduction

The concept of human nature (image of man, concept of man) is a topic, which isn't discussed enough in the economic literature comparing to its crucial meaning for the development of the science. Only some of Polish (Stępień & Szarzec, 2007; Horodecka, 2014a; Turek, 2010; Zboroń, 2010; Horodecka, 2012c) and foreign (Schechner & Zsok, 2007; Bernd Siebenhüner, 2001; Manstetten, 2000; Woll, 1994; Biervert, 1991; Starbatty, 2000) economic literature is focusing at this topic and stresses its meaning for the development of the science.

Therefore the issue of changing concepts of human nature in the economics stays in focus of this paper. The main objective is to differentiate and characterize the main forces responsible for the actual changes of the concepts of human nature.

In order to achieve this goal at first the concepts of human nature will be defined. Then the basic factors responsible for those changes will be evaluated. First of all the changes of the concepts of human nature can be perceived as a result of changes occurring in the contemporary society. Living in the society which is considered as a society based on knowledge (.), and in the economy, called economy based on knowledge the changes in the state and art of knowledge (growing meaning of so called tacit knowledge and who-knowledge Siesfield, p.116-117), which are very prompt, have a crucial effect on the changes of our way of perceiving human being. Another essential factor is the growing complexity of the social changes, which is characteristic for contemporary global processes. Last but not least there are some changes, which result in changing the image of world, which can be perceived as a part of the concept of human nature, which will be explained later.

Methodology of the research

The methodology is in first part a deductive one basing on some conclusions derived from theories developed within social sciences and humani-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

ties. In the second section it is basically inductive, focussed on observation of current trends, which according to the theory are potentially responsible for those changes. Basing on the insights of psychology, philosophy of science, sociology, and cognitive science main potential forces are deduced. From the observation of actual forces basic contemporary factors responsible for the changes of the concepts of human nature are described which can be divided in three groups.

General model

The concept of human nature is a form or scheme, which is applied by human being to deal with the complexity of the world. They help the individual to decide, what action has to be conducted (see: psychology), and what signals are considered as important while dealing with the outside world. Those concepts can be compared to glasses put on by individuals and societies to perceive the outside world. In the science they play similar role, but they take more explicit form. The everyday concepts of human nature have more implicit character.

The concepts of human nature are naïve philosophies, or naïve theories of the individual about human being (Oerter, 1996). They can be referred as well as subjective theories created in order to understand the world (Klewin, 2006, p. 10), which have rational and irrational parts (Groeben & Erb, 1997; Groeben, Wahl, Schlee, & Scheele, 1988). Although they are principally belief systems of the individual (Oerter, 1991, p. 19), which create personal frames of values and convictions of the individual (Oerter, 2007)¹, they have as well some common contents, which encompass traditions, value orientation, overtaken answers on basic questions of life. Other ways of speaking about those concepts is treating them as implicit theories, ethno theories, indigene psychology, in spirit of constructivism According to constructivism people aren't perceiving this world but they rather construct their world. To be able to understand ones world it's necessary to understand this construct of the people (Kelly, 1955/1991). The psychological explanation of this fact is that person's processes are psychologically channelized by the ways, in which he/she anticipates events (John, Robins, & Pervin, 2010).

¹ According to Fahrenberg, 2006, 14: basic beliefs of individual, latent constructs, beliefs about religiosity, belief in God, belief in the hereafter, free will, ethics, responsibility, basic attitudes to meaning, values, goals of life of individuals.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The concepts of human nature change usually on all their levels and in all their dimensions. We can differentiate following levels of the concepts of human nature: individual level, social level and worldview, whereby the individual world can be subdivided in following dimensions, which can be referred to as the body, the soul and the mind. They stay for following aspects of human being – his/her behaviour, motivations and meaning respectively (see: Horodecka, 2014c).

Those concepts are a part of a system, in which we can differentiate (such a differentiation is described by Czaja, 2012a, p. 13) real changes in the environment (like changing patterns of behaviour, social structures, economic problems or inequalities, environmental problems and so on) and logical changes, which result from the changes of information, and knowledge. Those changes impact directly and indirectly on our perception. It is so, because they impact not only on the things we perceive, but the way of perceiving – ‘glasses’ that we put on to see the world. Those glasses are metaphors, concepts, schemas we use to perceive the world. The different concepts of human nature are in this sense as well such glasses.

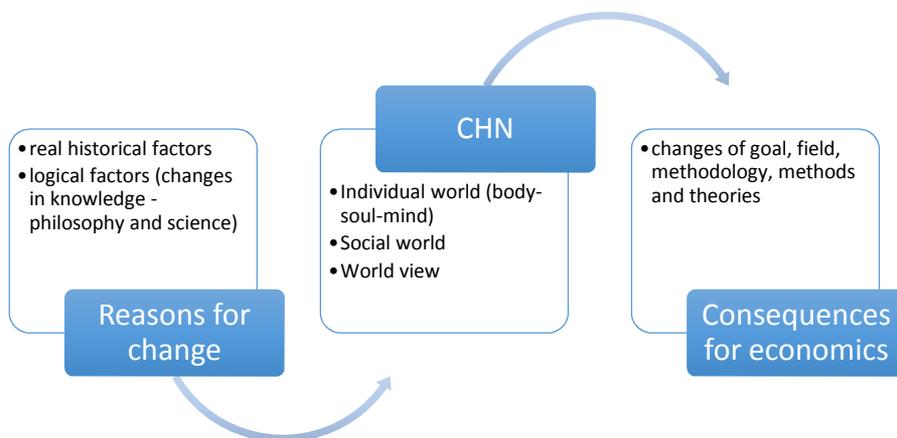
There is a lot of psychological and philosophical literature explaining how the concepts of human are constructed. It’s usually explained in the way the more general concepts – creation of schemas is explained. This occurs in two-ways: top-down, basing on schemas (a concept described by: Neisser, 1976), which impact the process of perceiving or bottom-up, basing on input by senses.

Generally speaking the factors can be subdivided in two groups – one refers to internal factors like for instance personality, or more deeply genetic factors, which influence a particular way of perceiving human being. The second group, which is far more interesting for economics are environmental factors, which influence the way of thinking and perceiving the reality. This group entails for instance existing technical inventions, which can provide dominating metaphors for perceiving the world. Like for instance perceiving human as a perfect constructed mechanism by Descartes [1596–1650], during beginning of Enlightenment or as a machine during industrial revolution (since mid of 18th century), or explaining communication processes between people using metaphor of a phone call (in Shannon model of communication in the mid of 20th century), or a computer for explaining how human mind works (since 80-es of 20th). The knowledge bases on such metaphors and uses them in order to explain phenomena. In such a sense concepts of human nature in technics and economics interact (Detzer, 1999)). Later this knowledge is as well used in order to make anthropologi-

cal presuppositions, which means that we use as well the existing psychological knowledge in creation of our private concepts (Bahrtdt, 1961, p. 2; Behnke & Witte, 2008; Witte, 2008).

The changes in the way of perceiving the world are developed through interaction between the individual and the environment. In this sense they have both individual and common parts in the image of man. In this sense the image of man is a communication instrument (see: Rollka & Schultz, 2011). Therefore they change permanently.

Figure 8. The changes of concepts of human nature: reasons and consequences



Source: the differentiation between logical and historical factors is introduced by Czaja.

The progress in the knowledge about human being and in other disciplines

How the theory explains the connection between growing knowledge and changes in the schemas we use (and therefore concepts of human nature). Growing knowledge and experience deliver to person new insights about the nature of things and persons. It provides a human being with new explanations, metaphors, and different causal relations so the relation cause-consequence is perceived in the different way, which makes necessary to adjust the concept of human nature. For instance knowledge that human are motivated not only by money or material incentives (A. Maslow, 1943, McGregor McGregor, 2002, 2006 (1960)), that they need to see a

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

meaning to their lives (Frankl, 1997), or that we are influenced by the behaviour of other persons in unexpected high grade (a contribution of the social psychology experiments, like Milgram (Milgram, 1970) or by-stand effect (Latané & Darley, 1970) – makes necessary an replacement of the concept of human nature.

The knowledge constitutes the map we use to perceive the world more detailed or sometimes replaces some concepts with others, makes some concept disappear (for instance the idea of ether) and is responsible for the emergence of other. Without those maps, we are unable to perceive some things. Without having knowledge, words for something can't discover, as Wittgenstein said ("The limits of my language mean the limits of my world"). Our maps impact on that what we are ready to see, and what we won't. Schumacher in the Introduction to his book 'Small is beautiful' refers to such maps, which can limit our way of perceiving not only the world, but as well human being (Schumacher, 1973).

The progress in the knowledge of human being leads step by step to the changes in viewing human being. Those changes impacted as well the emergence of new paradigm in the philosophy. This progress can be observed in many fields of knowledge about human being both generally (philosophical discourse) and specific (psychology, sociology, social psychology). These new insights and ideas spread all over the world in the current era of information revolution in a very quick manner. Generally, all subjects taking economic decisions like households, employees and members of other organizations (sportive, cultural) are confronted with this new knowledge.

How is this new knowledge, and new aspects of human nature (like for instance the sense of being embedded in the nature, or perceiving various motives instead of only material egoistic ones) transferred? Many of new concepts of human nature are learned through everyday interactions between social groups and individuals, social institutions and individuals (Rollka & Schultz, 2011). Each social interaction provides a platform for exchanging concepts of human nature. In this way the concepts are implicit or sometimes explicit exchanged (see: results of the research done Horodecka, Martowska, & Wrocławska-Warchała, 2014, Fahrenberg, 2010, Oerter, 1999). Those concepts are implied in social acts and acts of speech.

As soon as the number of those interactions grows (sociology of communication), because we have much more contacts not only in person, but through the introduction of new communication channels by technology like virtual contacts for instance. The number of contacts with persons out-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

side one's cultural background grows as well, because of such social trends like growing mobility for work, social mobility (passing through the borders between social classes and milieus see: script diversity), migration to other countries.

The organizations as well play an important function as transmitters of the concepts of human nature. Organizations use particular concepts of human nature in an explicit or implicit way in their visions of organization, which then influences on the managers and employees working at this company (leader- follower mechanism, see: Ehrhart, 2012). Persons having leading positions play a particular role in this influence². This influence can take a form of preferred leading style. This is the case in non-formal organizations and formal one, oriented on profit and non-profit. Often one particular vision of human being is connected with the activity of such an organization (for instance there is a different approach to the human being in a bank, in education, in medical care, in construction enterprises and religious and volunteer institutions). However an image can be a consequence of some social movements, which encompass different trades. For instance ecological organizations can be lead in different trades (they don't have trade limits). They make their presence in different parts of the economy starting with ecological food, through ecological and green portfolios in banking sectors, green dwellings, religious and social organizations and fair trades³.

Other channel of social interaction, other transmitters of the concepts of human nature are the media, arts (Hartl, 1999), politics (Lenk, 1999), society in general (Endruweit, 1999) which usually represents some ideological elements and depicts the power distribution in the society (this was an idea of Frankfurter critical school developed by Adorno, Horkheimer, Marcuse, see: Horkheimer, Adorno, & Noerr, 2002; Hylewski & Burdzik, 2014; Marcuse, 1964; Hylewski & Burdzik, 2014). Therefore it was so easy for long time to spread the image of man as consumer, oriented on maximization of utility, individualistic etc. As a consequence a demand for products grew, which neither met real needs of the individual nor of the society. It loose as well its contact to the real needs, resembling more wants (see: differentiation of needs and want by humanistic and Buddhist economics, M.A. Lutz & Lux, 1979). The entertainment part of media as well delivers

² This is because of the authority, a contact with this person, dependent or an particular managing style

³ Products supporting trade basing in equal rights, which enable third world countries to participate in profit.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

a particular concept of human nature, reflecting social changes in the society, and on the same time political correct image, respecting interests of people having power in the society. Film maker present not only the artistic ideas of screenplay writer, but as well are interested in the commercial success of the movie adjusting the play to the expectations of the receiver, so that the movie would reflect humans desires concerning who they want to be, or are. The same concerns contents delivered by the TV, which transmit a particular concept of human nature – a consumer, willing be always young, efficient (see: Funiok & Angerer, 1976; Weis, 1993; Pirner & Rath, 2003)

Another transmitter of the concept of human nature is as well the primary, secondary and tertiary and growing meaning education and growing meaning of further education, and self-education (Hentig von, 1999). Reading books, watching informative and educative media programs, podcasts, videos, inter-active programs, assisting self-courses online, and other online services are activities, which as well are growing in recent times.

Therefore each participator of economic processes, the economic subject has his/hers particular idea of that who is the human being and this knowledge can impact on his/her behaviour, or motivation. The kind of this knowledge (for instance scientific, or everyday, transmitted by ads, or news etc.) depends on activity and choices of the person and his/her environment (kind and intensity of contacts, conscious or unconscious choices).

This knowledge about concept of human nature reaches not only economic subjects, but economists as well. The growing interdisciplinary character of conferences, courses offered at universities (for instance new forms of delivering a lecture on economic subject, collaboration with specialists coming from different disciplines like psychologist, sociologist, engineers, who accompany economists), intercultural character (the percentage of well-known economists coming from other countries than Great Britain and United States⁴ is growing, this is confirmed by the tendency to give Nobel to people coming outside of those two countries or even outside of the economic discipline, Czaja, 2012c).

Although the influence of other disciplines on the economics and on the economists is not something new, the intensity of this dialog and creation of platforms of interchange haven't been so vivid before. The impact of

⁴ See: Financial Times, 21.03.2013 r. the paper written by the Reuter's director about the growing importance of scientists coming outside of traditional scientific centres like Great Britain and United States, France or Germany. The meaning of China, India and other countries when it comes to economics or other disciplines is growing.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

other disciplines is enabled by creating structures of cooperation (interdisciplinary scientific or even didactic projects), which lower obstacles to the research on the borders between disciplines.

First such a discipline, which impacts on the economics and on its concept of human nature is the psychology. The progress in the psychology changes the perception of a person by the society and by economists. Especially the behavioural economics adopts the psychological research to the economics. To the fathers of this economic school counts a psychologist, who who obtained Nobel-price in the economics – Kahnemann, who worked together with Tversky, see: Tversky & Kahneman, 1982; Kahneman & Tversky, 1979; Kahneman, 2011). Humanist economics is another economic school, which collaborates strongly with the psychology. However it bases on different psychologist paradigm. Whereas behavioural economicsc bases on cognitive-behavioural approach to psychology, humanist economics is influenced by thoughts of some humanist psychologists like Maslow and Rogers (A. Maslow, 1943, 1970, 1994; A. H. Maslow et al., 1966). The thought of those psychologists was further developed and adapted to economics by: Beaudreau, 2012; Brockway, 2001; Cook, 2001; Mark A. Lutz, 1999; M.A. Lutz & Lux, 1979; McCain, 1990; Solomon & Collins, 1986)⁵.

Another economic school, which collaborates with the psychology is neuroeconomics (see: Camerer, 2008). The psychological paradigm is in this case the cognitive psychology (see: Engelkamp & Zimmer, 2006; Thagard, 2005, Groome, 1999 and Bandura, 1986), which aims to discover how information is processed by the mind. This part of the psychology is working very interdisciplinary with informatics, linguistics, philosophy and neuroscience. The economics basing on the results of cognitive psychology (or cognitive sciences – this term is better adapted, because shows the interdisciplinary character of this science) is practiced not only within neu-

⁵ The development of humanistic psychology lead as well to the development of new concepts of man, which based on the critics to two of other prevailing paradigms in psychology – behavioural and psychoanalytical. According to behavioural concept a human being is treated mechanically as a black box, which is subordinated to the law of looking for appraisal and avoiding punishment. The psychoanalytical approach is assuming the human being as a victim of his/hers self, which consists of contradictory forces (ich, es, Ueberich). The humanist paradigm on the contrary stressed an autonomous character of human being, his/her streaming for self-realization, or even transpersonal experience (last paper of Maslow). Moreover they are first attempts in putting the hierarchical character of human needs what took shape in the so called Maslow pyramid of needs A. Maslow, 1943. It was as well first paradigm, which distinguishes altruistic needs of human being

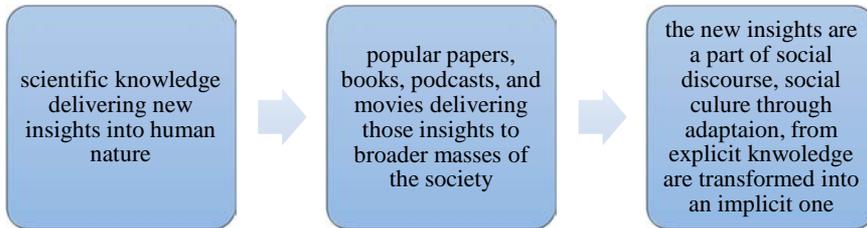
**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

roeconomics, but as well evolutionary economics and within economic psychology (Tyszka & Przybyszewski, 2006), or evolutionary economic policy (Meier & Hauray, 1990; Meier & Slembeck, 1998), see as well: Oetsch, 2007. Due to research done by cognitive science the role of expectations in human behaviour could be explained better. Another aspect was the different approach to the rationality, which is called here 'bounded rationality'. The rationality is bounded because it is often replaced by so called 'fast thinking', which is not different heuristics, which facilitate his/her orientation in the world, taking fast decisions. This on the same time demystified his/her tendency to taking non-rational decisions (compare research done by Kahnemann& Tversky: Kahneman, 2001, 2003, 2011; Kahneman & Tversky, 1979, 1984). All those concepts were pointing to the limitations of the economic man. The economic man with his fixed utility function independent of the influence of other persons, relatively stable in time⁶ didn't match to the real human. Especially psychology of advertisements and media elaborated practical consequences of such new concept of human nature. Those practical consequences were pointing for instance on the possibilities of manipulation of people (through the conditioned reflexes and operative conditioning) and by creating of new needs.

⁶ Within the economic concept of human nature there lacks some cohesion. On the one hand the stability of preferences is assumed and the maximization of the utility. This implies that human being can resist manipulation and creation of false needs, in order to reach the utility in long time (). On the same time it means a kind of independence from the environment in shaping and covering the needs, what is congruent with the assumed perspective of research individualism. On the other hand the economic man is referred to as a behavioural man, reacting to the impulses coming from the environment, and adjusting to this environment his/her decisions. This is one of assumptions for exerting the macroeconomic policy by the state, and explains on the same time reactions on the signals coming from the market. Most of all the focus lies here on such signals as a price and quality. Other signals are often denied which can affect the utility function. Those signals are for instance advertisement or the context. Depending on the context one object can appear to us as more utile than other.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Figure 9. The impact of the altering knowledge about human nature on changes in the concepts of human nature



Source: own.

Many psychological discoveries made it possible to verify the ideas developed earlier by philosophers. One of such example was the discovery of emotional intelligence, which was an important addition to the rational intelligence (see works and tests developed by Stern, 1912), measuring primary the velocity of transforming the knowledge by human⁷. Emotional intelligence is a form of composite intelligence (other form is for instance a social intelligence), which measures the ability to decode the emotions and use them by solving everyday professional and specific problems. One of its elements is the empathy. The ability to empathy was confirmed by scientific inquires during 90-es of the last century called mirror neurons. Practically it confirms the idea of David Hume (who refers to the sympathy as a primary motive, influencing moral and social behaviour, Hume, 2000, 2007) and Adam Smith (Smith, 2000) that people are influenced by emotions of other people. This inquiry undermines the assumption, which is made about the economic man, when it comes to his way of approaching his/her own goals, not paying attention to others. Therefore behavioural economics and other economic schools (for instance: feminist economics, or ecological and even evolutionary economics or care economics) adapted a different concept of human nature. It is here assumed that a human being even if in some aspects may behave egoistically, is shaped as well by altruist motives, which can even ensure the survival of the individual in end effect (like Dawkins maintains in his 'Egoistic gen', Dawkins & Skoneczny, 1996). Further development of evolutionism provides new understanding of the egoism. The evolution is not about survival of the strongest, survival of the individual, but about survival of the gen, which

⁷ There are as well variants of the intelligence tests, which don't focus on the velocity, but only the ability to find a solution, regardless time needed.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

implies taking care of own children and relatives. This gives an important argument for explaining the necessity for caring for next generations (to which the gen is passed). Previous understanding hasn't provided any explanation for the care behind own individual interest.

The social psychology as well refers to speaking about group-solidarity, altruistic behaviour rescuing members of the particular social group, even not related to one other, which ensures a survival of the group as a whole. The progress in sociological knowledge influences as well the changes in creation of the concept of human nature. Especially the insight, that human being is a social being and is influenced by the society. The social thought was as well helpful in understanding of the role of the society and social institutions in the creation of social roles, interactions, habits and interactions. The progress in knowledge about social communication as researched by sociology, social psychology and communication science has had as well a meaning (see as well: Horodecka, 2015; Horodecka et al., 2014). Furthermore the role of media was explored. The concept of human nature can be even as the basis and goal of all communication (Rollka & Schultz, 2011). The next important discovery influencing way of perceiving the human was discovering the meaning of the gender and the culture and their impact on the communication. This showed how far of the reality lie the assumption of shaping the preferences independently of the environment.

Another psychological discovery concerns therefore neurotransmitters. Up to the beginning of the 20th century, it was assumed that the synaptic 'communication' in the brain has an electrical nature. The discovery of the synaptic cleft made by Ramon y Cajal (1852–1934) allowed for the formulating of chemical way of communication. In fact Otto Loewi (1873-1961) proved, that this communication is made by releasing of chemical reactions.

The same concerns the progress in the anthropological knowledge, which puts a new light on human motives and ways of human behaviour in different cultures. The special meaning has here the development of the philosophical anthropology. For its development counted different philosophical schools. They were an impulse for the change of the way of looking on the human being. Here some examples:

Existentialism assumes that the human being chooses himself/herself by taking decisions. Human being is not an already shaped being, but gains his/her humanity by choosing him/herself (Kierkegaard, 1946, Heidegger, 2001, Sartre, 2012). By adapting this way of thinking to the needs of eco-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

nomics, we can say that human being chooses more him/herself than objects, and this choice impacts his/her further choices. The further consequences it, that such human doesn't have any ready list of preferences, but that are shaped within the process of human development and are shaped by each choice made. Although some authors (Lück, 2009, p. 162) don't agree that, that that existentialism of Heidegger or Sartre has much in common with humanist psychology, the former one is still close to some of existentialist like Camus. Especially the idea of self-development for the society sake.

Phenomenology assumes, that our reception depends not only on what we in fact explore, but on ourselves, our cognitive structures. The human is not only a passive receptor of the reality, but the reality is embedded in his conscious processes. Phenomenological method as developed by Edmund Husserl, Theodor Lipps and Ludwig Klages is used by humanist psychology, and humanist economics as well. It can be characterised as a close and judge-free observation and description of phenomena, which include as well the self-observation, as soon as it's assumed, that the observer impacts on the phenomena. It focuses not so much on the discovery of rules, which in fact mean reducing the reality to some ex-ante assumptions, but values as well a description. Phenomenological school provided useful tools to the analysis of social and political events (Foucault, 2012). This gave motivation to the development of constructivism (constructionism), which maintains, that that what we are researching aren't the facts but constructs of the reality, which depend on our perceiving of them (the concept of human nature is as well such an construct). Constructionism demands from us another way to research the 'social facts'. Instead of researching 'objective facts', which according to constructionism aren't objective, we should explore the narration (discourse method), which allow us for discover, what image of world and what concept of human nature we base on, as soon as they shape our reception of events. This provides not only a new understanding of the concept of human nature, but as well additional methods practiced within humanist economics for instance.

Close to constructionism stays the philosophy of mind, which stresses as well the role of human mind. In order to understand and discover the phenomena outside – like the human and his/her environment, we have to know its role in understanding of the phenomena. The mind creates the world, in which we exist. This philosophy can be reflected by the cognitive psychology and in research of learning processes which are done within cognitive studies (Duch, 2011; Duch, 1999)

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Structuralism is another philosophical school, which impacted our way of seeing human nature. The structuralism can be understood as the way of understanding of the social reality and the language by looking for some meta-structures in it (De Saussure, 2001). The psychology has adapted this basing on research done by Chomsky (Chomsky & DiNozzi, 1972; Chomsky, 2002). Due to such genetic equipment with those structures, the child is able to learn how to speak. A way of perceiving economic phenomena depends as well on the structure embedded in us. The reality has only a secondary character as soon as it is subordinated to structures we apply by perceiving it.

Another philosophical school is the evolutionism, which impacts on the way of perceiving a human being. It perceives the reality as being in the process of development. Other philosophical schools which focus on this changing aspect of the reality is for instance the philosophy of process (Whitehead, 1979; Whitehead & Lachmann, 2000). Other is the Lebensphilosophie ('philosophy of life'), developed among others by Bergson (Bergson & Andison, 2007). It can be characterised by the conviction about a complex nature of the processes occurring in life. They can't be reduced neither to simple mechanisms nor to perceiving of the reality as a sum of its elements (Horodecka, 2011). The evolutionary way of perceiving the economic actor and his/her work – economy is a basis for other direction in economics – evolutionary economics. Ecological economics bases as well on the holistic way of perceiving of the reality, and manifests itself in the 'philosophy of life', paying regards as well to the evolutionary processes⁸.

Next philosophical school is a philosophical personalism, which focus on the person, on the human subjectivity or self-consciousness, experienced in a person's own acts and inner happenings—in "everything in the human being that is internal, whereby each human being is an eye witness of its own self" (Wojtyła, 1993). One of the compatible direction is the philosophy of dialogue, which opens the perspective on the essence of the interpersonal communication, within which persons get the possibility to transcend themselves. The focus on communication (an example for this philosophical direction could be 'Ich und Du', 'I and Thou' of Buber, 1995) as a dialogue with one equal person, the acceptance of other as they are without instrumentalizing changes the way of looking at human being. The person discovers him/herself deeper 'I' (for Buber this deeper 'I' is God – the 'Thou') through the dialogue with other person or with the Na-

⁸ One of the creator of the 'life philosophy' – Bergson is famous from his book „creative evolution”, see: Bergson, 1911.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

ture. On the contrary - objectifying of people and nature, the individual departs from him/herself, entering into the world 'Es' = 'It', which compounds from the empty world of objects, which passes, without any meaning. The influence of this philosophy can be seen in the stressing of the meaning of communication in understanding of human nature. It is close to the humanist and transpersonal psychology and economics and their way of perceiving a person – making a focus of the economic analysis but still embedded in the society, and self-realizing itself within the society.

Further research, which contributes to the change of understanding of the concept of human nature is the provided by the communication studies and management science. Within sociology of communication we can observe the growing interest in forms of communication, which go beyond passing of information, but include as well the 'true meeting' (Horodecka, 2015). Within managerial science as well new concepts were developed, which base on the psychological inquires discussed before. As a consequence many diverse concepts of human nature emerged accompanied by the changes within managing styles.

Summing up, the development of knowledge within different disciplines allowed for a more complex and deeper understanding of the human nature. This resulted in the changes of the concept of human nature in those sciences, generally speaking in all social and humanistic sciences and in the economics as well.

**Growing complexity of all processes and other social trends
contributing to the change of the worldview and human nature**

Concepts of human nature change not only because of the changes in the knowledge about human being but as well, because of the changes in the human environment. One of the major trends impacting on the changes on the way of perceiving of human being is the growing complexity of social processes. This tendency is reflected by some economic schools to different extent. Especially the behavioural economics and neuroeconomics are pointing to the growing complexity of the social and economic processes. The person encounters more and more complex problems and have to deal not only with the simple optimization functions, like the rationality of economic man assumes, but has to refer to the emotional rationality as well – build heuristics, some simplifications, which help him/her to take decisions (see: Kahneman, 2001, 2003, 2011; Kahneman & Tversky, 1979, 1984). In the situations of growing number of cultures, contacts, such simplifications

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

allow for a fast understanding of situations. On the same time it leads to the development of many filters, which not always allow for making optimal choices, according to Kahneman Tversky, they aren't likely to be optimal. One of such simplification is the model of man. It allows for sorting people in groups and faster assuming to them some characteristics, and formulating of expectations. Doing so we refer to different concepts of human nature.

Actually more and more goods, and services, which have been 'produced' before outside of the market and outside of what was considered as 'economic system', get a research domain of economics, like for instance the housing, teaching, caring, health, spiritual development. This means a growing meaning of those sectors for the whole economy and for particular companies.

Many scientists and researcher during the last decades stress the growing complexity of the processes occurring in the economy, politics and society. Scientists exploring crucial tendencies, which impact on our environment point to the fact, that the growing complexity is one of major characteristics of the post-industrial epoch, the information era and knowledge. Research on the problem of complexity grew on importance within the social sciences. The growing tendency to discern social and economic phenomena in their set of relations, and on the same time progress in specialization makes different disciplines analyzing the same phenomena out from their scientific perspectives. This is an incentive for the formation of multi-disciplinary teams investigating a phenomenon from many different perspectives. Here count for instance the creators of the system theory like Parsons, 2003 (functionalist approach), Luhmann, 1994 (structuralist approach) as well as theories of the evolutionary nature (as for instance Witt, 2008; Nelson & Winter, 2004; Dopfer, 2001) which base on the idea of the complexity and ways of dealing with it.

How we can characterize best the phenomena of growing complexity?

First of all the number of interaction between individuals grows (number of contacts between persons and their quantity), which is due to the growing number of social roles which we fulfil in the society and growing social mobility, which includes work mobility (changing working place), changing relationships. The measure of those changes may be the average period of employment in one place, number of divorces, number of organizations, we belong to, time spent on virtual platforms (on phone, virtually, on internet). Growing number of interactions enlarges the number of mutual relationships between people.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Secondly the growing complexity can be seen through the observation of the velocity of changes in social and economic relations. This can be observed in the number of contacts per one persons, the diminishing period of life of the company, transformations within the company, which means a change in lives of all engaged persons and the necessity of building relationships within new company for each of employee, entering into contacts again. Moreover the rapid social changes can be seen by the product life, which is getting shorter. This implies the necessity to create new, different one, which have impact on consumers, speeding up the tempo of changes, and rising expectations towards changes.

The innovations are introduced faster, which as Schumpeter describes may have an impact on grave changes of all economic systems. Schumpeter refers here as well to the possibility of the fall of the capitalism (Schumpeter & Röpke, 2006)

The complexity of the processes occurring in the environment of the person, structures in which he/she is functioning, roles, which he plays, grows. This all requires a creation of such an image of man, which can match to this role.

One other factor leading to the change of the worldview and concept of human nature is the confrontation with other cultures, resulting in the need for accepting them. It requires for instance a change of the prevailing thesis of the superiority of Western culture, and this in turn means changing vision of the world (Sztumski, 2011).

The growing contact wit other religions as well may cause some changes in the way of perceiving the world and human nature. Living next to other religions, the contact with them, also induces changes in approaching other religions. Some views, which prevailed for centuries putting own religion above all others can't have a stand anymore. Worldviews and concepts of man have to get more tolerant and flexible, more diverse in order to maintain peace. The changes concern as well religions themselves, which get interested one in another (World Parliament of Religions is one of possible examples). Within a catholic religion there are some changes as well. For instance the concentric model, according to which the Catholic Church has the fullness of salvation remedies, whereas other religions are on further concentric lines, far more away from the Truth than the Catholic Church, has been replaced by other solutions. The worldview and human nature concepts have to adapt to such changes, allowing for diversity.

This interest in other cultures and growing interchange with other cultures is reflected as well by the economics. The Anthropological Econom-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

ics points for instance to the fact, that even the theories we have about the market are relative. Those theories refer primary to the western culture, and don't have necessarily an universal character beyond the culture, as it is often suggested implicit by the IMF. There are some doubts regarding the superiority of the market economy, which was developed in the West. It is considered by some economists still as far from being the best, and may even be harmful in a different cultural situation. It is not possible to look through the prism of our assumptions and 'glasses'. For instance assuming the existence of market and looking on economical processes through this assumption, is similar as looking through particular 'glasses' on a problem.

There are two basic approaches to the anthropology – individualist (Malinowski, 1944; Malinowski, 1994) and collectivist, which perceives the society in a holistic way (for instance communitarists -Etzioni, 1995). Wearing some particular cognitive 'glasses' may change the outcome, especially when they are 'glasses' (cognitive constructs), which match so well the situation of the society and western society.

There are also phenomena in the surrounding world, which essence didn't change much, but their reception did! Thus, for example a poverty, violation of human rights, unequal distribution of wealth has always been existing (even though, for example, the level of relative poverty is deepening, but absolute poverty decreases), but only now people started actively look for global solutions of them. People started to realize the gravity of problems mentioned below. This leads as well to some changes regarding how we think about the world and an individual. In the case of growing sensibility to social problems, the concept of human nature changes as well. It's for instance assumed that a person is not only responsible for his/her own good, but for the good of others, the whole society.

Growing sensibility to ecological issues changes for instance the attitude to so called free resources. They aren't considered any more free. It is as well assumed that they require individual and societal concern about them. Such an engagement for the nature is often contradictory to the self-interest of the individual. It seems therefore necessary to assume that the human being is not responsible for its own interest, but for others as well.

The last two examples make it clear that goals of people are overcoming their own interests (care for people with whom the individual probably doesn't get in contact, and the care for the environment, even when it means larger costs for current generations and profits are most of all be received by the future generations. This again is contradictory to the assumption on which grounds the economics, that people focus only and pri-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

mary on their own interests. For the protection of environment many people are spending private resources (buying ecological products, consumer goods for instance), as only if they have to fulfil the requirements put by the law. It seems that the will to economize costs is not the only motive, which decides about so called 'green investments', green products, which don't yet pay back to the investors. The engagement can be perceived as the growing importance of the value, which has got accepted by the environment, the estimation for the nature and the responsibility for future generations. In this context we use to say about the growing ecological consciousness (Papuziński, 2008). The attitude to animals has changed as well (Leks-Bujak, 2009). People refuse frequently to treat them in the same way as other goods and products, which of course requires a change in a way of looking at not only the agricultural sector, but also for research using animals, and using animals for luxurious products.

The next social trends⁹ of our times is the virtualization of life in the western culture, which is connected with the informatization process and the growing number of different channels of communication. Some new factors are considered as important, which hasn't been enough regarded before like the body language, emotions and context. The majority of our contacts occur more and more basing on diverse channels, where the communication barriers result among other factors from the lacking common context, and lacking knowledge of the culture.

All of the mentioned social trends may result in the growing negativity of the concept of human nature, especially when it comes to the challenges from the environment: growing pollution, growing inequalities in the distribution of income, many different contacts to other cultures, religions and losing of the certainty about the one right way of functioning. This could lead to the growing separation, individualization, and virtualization of the world and human being. But on the other hand many researchers point to the negative outcomes of such tendencies and call for changes in the attitudes. One possibility is to explain those problems by the negative image of man – a destructive and an egoistic one, what doesn't promise much hope for any changes. The other is – by providing an image of man, which is a 'turning back to the sources' – discovering a nature of human being, which when lived according to it, gives a human being a possibility to conduct a happy life, which doesn't harm other. To overcome those difficulties it may

⁹ Trends which played a role for the actual development stage are described in: Horodecka (2008).

be important to create the concept of human nature, which has as well a normative function, as for instance homo sustinens from Bernd Siebenhüener has, which responds to the desires, and wishes of the society (Siebenhüener, 2000; B. Siebenhüener, 2001). The concept of 'homo sustinens' stresses the naturalness of human being and his/her genetic imprint, his/her cooperation and communication skills, his/her ability to learn and creativity as well as its ability to take the responsibility.

The actual changes in the concept of human nature

Changes in the concept of human nature result therefore from factors described above. Those changes reflected by other disciplines and in everyday-life impact as well on the changes of the image of man in the economics.

What are the major changes in understanding the person due to all the above mentioned factors? What are the effects of these major social changes resulting in the change of basic metaphors, growing interdisciplinary character of phenomena, the progress in the knowledge. Due to their activity, the demand for 'new concept' of human nature appears, as soon as the old one doesn't fulfill its functions (Horodecka, 2012a) and the new image emerges. Due to those changes, the 'image of man' is transformed, or replaced by a new one.

The economics as it was mentioned reflects in its concepts of human nature the major tendencies in social science and in the real environment (social trends). It adapts those concepts to the requirements which put on the concepts the economics. Each scientific discipline has its particular attitude to the observed phenomena which as well includes the way of perceiving a human being. What makes this science different from other is the diverse rule, which makes order in all phenomena within a particular science? Within social sciences this is a different concept of human nature, which makes the difference. For instance the psychology treats human being primarily as an individual, as a person whereas sociology is focused more on groups and societies as a primary phenomena. The economics focuses on the economic activity of human being – like working, buying, selling, exchanging. Each of those sciences has its central set of assumptions about human being. One of those sets of assumptions makes the dominating stream, even if there are other streams existing parallel. Psychology, for instance, bases on 4-5 different streams –basic paradigms: psychology of consciousness, phenomenological psychology, psychoanalysis, behavior-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

ism, Gestalt psychology, cognitive science, constructivism. The other schools which differ strongly from the main stream are oft a part of the critics, for they unscientific character, like it is the case in psychoanalytical and humanistic psychology. The same case we have in economics where the central core is basing on the homo oeconomicus, and other especially heterodox concepts are criticized (see: Stępień & Szarzec, 2007) for instance for methodological reasons (inductive and not deductive character).

Those transformations can be seen either by tracing back the concept of 'homo oeconomicus' or by creating new concepts of man. In the first case we can ask, why concept of human nature, which existed in the economics in the pre-Smithian era changed and why such completely new concept like homo oeconomicus emerged. Especially these changes would be interesting, which mark the change of economic man between classical and neoclassical economics. In the second case we focus on watching the emerging concepts of human nature mainly in the heterodox economics.

Watching the transformation of the concept of human nature in the first case we can discover major factors contributing to the changes and formation of the new image of man. This may help to distinguish major forces of change.

During the life of Adam Smith in the end of 18th century, the economics was perceived as part of other sciences like philosophy. It means that the topics about economics were treated by philosophers, especially political philosophers, and by moral philosophers (Adam Smith was one moral philosopher).

What concept of human nature existed in the pre-Smith time and during his life? Answering this questions helps us to show how those factors described above contributed to the creation of a new concept of human nature – the homo oeconomicus, which origin development marked the beginning of classical economics and the mature state – the neoclassical (Stępień & Szarzec, 2007). During the Smith – era, a dominating concept was the Enlightened concept of human nature. In the debate about the economy there were some views on the role of human nature and his role in economic processes. The view that the world history depends not so much on the effort of individuals, but principally on some governors (the ideal was an absolutist enlightened governor), who is responsible for leading of the economics – trade politics and internal politics. All those insights has resulted in the mercantilist economic policy. The homo economicus as created by Adam Smith was an answer to the scientific explorations of a human nature, a reaction to the changes of worldview. Together with the change of

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

the worldview the person lost his/her central place in the world¹⁰. Human being became an element of the new puzzle – the world, a screw in the clock made by craftsmen. The world was like a clock made by the craftsmen God, who made it and after the creation withdrew himself from it. Therefore human being is lost in this great deterministic mechanism, and subordinated to the rules, which don't depend on his will and his action. The science and philosophy started to look for those rules, and other disciplines as well. In the natural science such an example was made by Newton, who created the basic of the physics. This trace was followed by other researches. The demand was as well in the economics. The dominating concept of human nature with the vision of man was requiring a new concept of human being, which would be more adequate to the current changes. In other words an image of man was required which is subordinated to the determinist rules, and deprive of power ruling individuals who became only screw in the world-clock, and subordinated to its rules. It was searched for rules, which could improve the functioning of the world. In order to achieve such an ideal, the role of individual had to be diminished, and deprived of their subject-character. Behavior of individuals was subordinated to the rule of pursuing own interest (or later own utility) and maximizing it with the help of rationality. The meaning of individual was reduced to a role of a part of a system, to which he/she was subordinated in a deterministic way. This was the way of looking on the economy by classic economists and its continuators and his followers (or better said: as classing economists, among them Adam Smith were interpreted by their ers¹¹). According to Smith the economy is working, because the effect of the whole depends on the rule, which is embedded into the human nature. The individual is subordinated to this rule. Smith wasn't appealing to norms, to which human being has to approach, because they are good, but he rather was looking for a law, by which he could describe the human behavior. It was a minimal program. But in his time the minimalist philosophy was a dominating stream, taking a distance from the metaphysics. The contemporary philosophy, especially the moral philosophy in those times can be characterized in a following way:

¹⁰ It meant the lost of the image of a person as created God alike, as microcosmos in a world view of Thomist philosophy.

¹¹ Klimczak, 2000 maintained that according to Smith such a egoistic motivated behavior is only the worst case, which was only taken into the analysis, to prove that even if all people behave in such a wrong way, the system will work. The average person acts diverse - according to some moral principles, and is lead by moral sentiments and empathy.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

- It was dominated by the utilitarianism, putting away the metaphysical problems, and issues which demand for normative judgment, considering ethical behavior as a behavior, where the effect of our actions delivers us the maximal utility to us (extreme utilitarianism) or to the majority of people affected by such an action.
- Smith combined such two utilitarianist rules in one: the individual pursuing for maximization of its own utility maximizes as well the utility of all the people concerned by the action, and in consequence all society, and other countries as well (if the said country is engaged into trade)
- Smith was very far away of perceiving human being as cold egoist. His concept of man was as well subordinated to other laws (described in the 'Theory of Moral Sentiments', Smith, 2000)
- Those laws base on other rules, dealing with human activity. One of those rules is 'empathy, which says that human being can't be happy, if persons around him aren't. This means that the person would neglect behavior, which can harm others. On the same time the economic concept presented in 'Wealth of Nations...' (Smith, 2005) advised people to engage into those activities which we do best, and to neglect activities which we choose only in order to help others, but they don't count to our strengths. Doing that, what we can best, is according to "Wealth.." the most effective way of helping others because it leads to the welfare of the whole state. This economic rationality was later interpreted regardless considering negative effects of an individual activity harming others. The concept of human being created by Smith was a consequence of following changes:
 - a) Change of the worldview – the fate of the world doesn't depend any more on famous individuals but far more on the way of functioning of all screws in the system, which all follow a general rule
 - b) The growth of knowledge about a human being, a discovery that human being is guided by moral sentiments streaming for the maximization of his utility
 - c) Growing complexity of all economic processes, which contributed to the insight that there is no way of forecast of all factors influencing the economics, and so take the good decisions.
 - d) Other factors: the scientific embedding of the author (moral philosophy, England, birth of empiricism). Authorities which could influence the development of the idea: David Hume (1711-1776), John Locke (1632- 1704), Jeremy Bentham (1748-1832)

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

e) Experiences and observations made by the philosopher during birth of the industrial revolution

Those changes happening outside of the economics resulted in the changes in inside of the economics (even if there was no economics as a separate discipline, there were many reflections to the topics concerning economic activities of human science the ancient times). The old concept of human nature could afford the requirements of the capitalist economics, internationalization and industrialization. The separation of the economy of its local forms caused the demand for any theory, which would meet those requirements. Following those changes in the concept of human nature we can come to the conclusion that the factors responsible for the changes play great role in forming of changes in the concept of human nature.

Actual postulates for the modification of homo economicus have many different reasons, and we can differentiate following:

- The progress in the knowledge especially in behavioural psychology led to the discovery that human being is not guided by rational choices (see: Kahneman, 2001; Kahneman, 1973), but by some heuristics, which simplify the reality. The application of those heuristics leads to other results as those done by rational choices. In this way the assumption about maximization of utility can be modified. The term of suboptimal choice and bounded rationality replace such a typical rational choice. The mechanisms of choice applied in place of optimal choice are described by Kahneman. This is for instance the perspective theory, embedding mechanism (Kahneman, 2008)
- Due to the progress of in behavioral, cognitive schools of psychology and neuroscience it was proved that human being doesn't like risk. His/her dislike towards the risk is greater than we could expect by counting the expected value and the probability of achieving a profit (Kahneman & Tversky, 1979). This could be explained by the fact, that the negative and positive changes of income are experienced diversely. The same change in income when it is negative causes much greater 'pain' than the positive change cause 'happiness'. In other words: The utility loss by negative change of one unit of income is smaller than utility gain caused by positive change
- The development of evolutionary psychology (Wright, 2010; Buss, 2009) delivered some explanations towards the human behavior (without the necessity to enter into the subjective experiences of the human being, but remaining only by the sociological observation). This made clear that human motivation is not only oriented on survival or wealth

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

for self, but as well for other persons related to this person (having a part of its gen). According to one equation of William the tendency to show altruistic behavior is related proportionally to the level of relationship, the percentage of genetic code. It have been explored that the choices are determined by institutions, which gave basis to integration of institutional economics to neoclassical economics. As a consequence the new institutional economics emerged (Coase, 1998). Thanks to institutionalism the category of transactional costs is introduced, which cause that the individual doesn't choose the optimal choice¹². However in the new institutional economics, which accepts the homo oeconomicus, the basic motivation of human being for the maximization of utility hasn't changed, only a new category of costs is considered by the individual and social choices. A different use of the discovery of institutions made ecological, evolutionary, and feminist economics. They remained closer to the original thought of old institutionalists.

- The globalization influenced not only the change of world but is as well the next factor, which causes changes in the concept of human nature. Considering the cultural differences in the worldview has opened the eyes to the fact, that economic man is strong connected to the western civilization, but it can be totally unfamiliar to other cultures, which may neither accept it, nor understand.
- Some changes lead to only slight modifications of the homo oeconomicus (the first group). Other aren't yet adopted by the dominating paradigm or even their acceptance may cause the necessity of changing the paradigm. It's due to the fact, that they may possibly cause the necessity of changing the methodology or weren't compatible at all with major concepts of the orthodox economics (the second group).

The following changes caused a completion or slight modification to the existing concept of human nature, by the following dimensions:

- Institutional embedding of a person (institutional economics)
- Risk avoidance, tendency to taking rather suboptimal decisions (behavioral economics)
- Change of needs within time, considering of pre-and postproductive age in the decisions (a function of labour supply and a function for demand which are distributed through a whole life). This requires an institutional and historical analysis.

¹² This would be optimal if there haven't been transactional costs, which aren't maintained in the standard analysis

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

- Altruistic forms of behavior explained by egoistic motives and the growth of own utility and care in old age, children treated as an investment for old age (evolutionary, ecological, humanist, feminist economics)

To the other group count changes, which may lead to the necessity of changing the whole economics. This is because concepts developed here aren't compatible with the concepts developed within the standard economics.

- Streaming for the wellbeing not only per himself/herself but for other people (for instance: evolutionary economics, Hodgson, 2007; Dopfer, 2001 or humanist economics)
- Gender and cultural setting matters. The motives and behavior of people are perceived as being dependent from gender (feminist economics). The masculine homo economicus is completed by introducing of a female view on human being by considering the 'gender' perspective.
- The assumption that fulfilling of needs doesn't enlarge the wellbeing neither of the individual nor of the society. The individual in order to choose something what is good for him/her needs some insight. This insight is not understood as the full information, but as the knowledge about this, what is good for the individual and what not. This idea is close to what we refer to as a character of the person (for Tomer, 2011 it is as well the character). This is the case in the Buddhist and feminist economics, M.A. Lutz & Lux, 1979; M.A. Lutz & Lux, 1988; Schumacher, 1973
- The permanent growth in production isn't possible and required, because it leads to overgrowth of the economic system over the ecological one. The consequence of such a growth is the destruction of the ecological system, and therefore to the person, which depends on this system. The growth in production is often a consequence of enlarging some illusory needs (ecological economics, Daly & Farley, 2010, humanistic and Buddhist economics refers here to wants)

The characteristic of the concept of human nature in the contemporary heterodox economics as a result of social real changes and changes in knowledge

The changing environment resulting in changes in the concepts of human nature, is one of reasons for the criticism towards the homo economicus, who doesn't apply anymore to the environment it was meant for (time

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

of the industrial revolution, relative simple social structure etc.). An overview of major critical issues towards homo economicus can be found in Horodecka, 2014a. Those are for instance: (1) methodological issues, (2) lacking congruence with the empirics; (3) omitting some major factors determining human behavior; (5) short-sight of this approach; (6) lacking adequacy to the actual economic problems (crisis); (7) critics of the economics constructed basing on such an image of man.

The reasons discussed in the paper resulted in some changes of the concept of human nature in the contemporary economics, which are presented in the table below (Table 1). The next table (Table 2) presents the changes in the foundations of economics resulting of those changes in the concept of human nature. This stresses the necessity to deal with the changes of the images of man, in order to understand the contemporary and future economics.

Table 4 The concept of human nature in the contemporary heterodox economics as a result of social real changes and changes in knowledge

	Individual world	Social world and worldview
Behavioural	The critics of rationality – bounded rationality Emotional and rational nature of human being Behaviour: depends not on the subject of choice but on external factors as well (framing) and internal (personality, aversion to risk) Motivation: the role of emotions, often they aren't realized Meaning: this dimension is not discussed	The relation between people base on reciprocity There is no separate vision of world discussing relation to the nature and super-nature
Feminist	Two aspect of human being – feminine and masculine Behaviour: different behaviour associated with gender (man-women): rational-emotional, autonomous-dependent, egoistic-altruistic, rational choice – intuitive, preferences – needs Motivation: female and masculine motives – necessity to overcome this bias Sense: Integration of pluralism	The female and male world – complexity The economy should be part of the society and its values Social embedding of the individual The relation to the nature of human being is widely discussed, humans responsibility of the nature, impacting/reflecting the social structure
Humanist	Behavior: realization of higher needs (not: wants), pro-social behavior, altruistic Motivation: self-interest and social interest, lower and higher	The human is in the centre of the world, the world is a reflection of him/her The environment is changing (evolution of the society and culture), local community, and harmony within society (even if it

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

	needs, non-material, and long-life needs are of importance, the structure of needs Meaning: self-realization transcendence	reduce economic growth), the economics and society shall support human development
Ecological	Behaviour: homo oeconomicus + homo reciprocans + communicus, competition and cooperation, bounded rationality Motivation: happiness, material and nonmaterial elements of wellbeing, procedural utility and not possessive one Meaning: happiness depends as well on the interior factors	Economic system is part of social-cultural and this of ecological system The world system is a closed one, therefore the economic system has to respect the boards put on by the social and ecological system Biophysical foundations of the economics
Evolutionary	Behaviour: rules of behaviour, limits in transforming of impulses, satisfying and not optimizing behaviour, unlimited knowledge contra limited needs Motivation: adjusting to the environment, knowledge, altruistic and egoistic Meaning: surviving, which makes possible the growth of knowledge in the society	The knowledge and its transfer with the help of institutions, technology and products is a key to understanding of the world The process of learning and selection of less effective subjects leads to the multiplying of the knowledge
Neuroeconomics	Man as a black-box –a machine which transforms the signals coming from outside, role of a mind Behaviour: a consequence of neuronal stimulation Motivation: discovered during experiments (for instance: fairness) Meaning: is not discussed	Reductionist world view Determinism biological-physical The world is shaped by the human

Source: own.

Table 5 The consequences of the changes in the concept of the human nature to the economics (goal, field and methods)

	Goal	Field	Methods
Evolutionary economics	Discovering of rules of adapting to the changing conditions and processes of emerging of the most effective rules	Researching on the developing processes, of knowledge and processes of passing it by subjects and institutions	The analysis of dynamic and historical changes and genesis of institutions
Humanist economics	Covering of human needs, bettering of the conditions of economic activity	Human rights, the sustainability of the economy, protection of the environment, ethics, social realtions	Descriptive, observation, the normative ideal concept of human nature and of world, organic, social, institutional
Behavioral economics	improvement of the neoclassical model to	decision-making process + consequences for the	Experimental observation and questionnaires

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

	ensure compliance of the grounds or human model with empirical data	individual and society , heuristics , framing , imperfection	
Ecological economics	Improve of the wellbeing by development, institutions and sustainable ecosystem	interdependence and co-evolution of economics and natural ecosystems	transdisciplinary , social, physical and biological (thermodynamics , biological
Feminist economics	address specific problems in the economy and the economy , not just abstract	decisions in the market and beyond, the values of gender and understanding the economy	"Science -with -wonder " relational thinking , rather than subject- object , the impact of gender on the methods.

Source: own.

Conclusions

Actual changes in the society based on knowledge, exposed to the globalization processes accompanied by the changes in the knowledge and in philosophical views, which are answer to those trends leads to the necessity of changes in the concept of human nature. The paper discussed various reasons of the factors contributing to the changes of those models of man and effects they have on thinking about man in the economics.

The concept of man as it is in the neoclassical economics was developed in other context and doesn't apply to the actual changes. The critics of homo economicus relies on such aspects as: not regarding of actual empirical knowledge when it comes to human behaviour and motives, role and character of knowledge and information in the human life, character of the society, which is not a simple sum of individuals, but rather a net of processes, which are connected one with each other.

Therefore as result of all those social change, the concept of human nature in the contemporary most of all heterodox economics like evolutionary, ecological, humanistic, feminist and behavioural is a concept which is in relations to other people, in whose life play role not only egoistic motives but altruistic as well, and respecting the role of education and knowledge in the life of individual (especially when it comes to evolutionary economics), and cultural embedding of human being (in all mentioned heterodox direction in economics). The change of the goal of the economics, which is not more a positive one, but descriptive and normative as well, and connected to the environment. The focus lied on explaining the reasons and consequences of human economic behaviour, and solving of actual problems, by impacting as well on the institutions and change of attitudes. The enlarging of the field of the economics: not only the market counts, but

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

as well those outside of the market. The behaviour is not so much oriented on optimization but far more on satisfying. The new motives in the behaviour are considered (altruistic for instance) and the category of sense introduced. The economic system is considered as correlated with the natural, cultural, ethical one, and with religion and values. The methodology and methods changed their focus from orientation on models and prognosis, to description, explanations, understanding, experiments, discourse observation, historical, metaphors from other disciplines (like biological ones, evolutionistic).

Do those diverse factors contributing to changes of human nature result in one particular or diverse concepts of human nature. Probably the second answer is closer to the reality, although its not the scope of this paper to provide answer to this question. However many concepts of human nature share an ethical dimension. Therefore ethical concept of human nature or mentioned homo sustinens may be one possible answer to the requirements of our times. Such a concept corresponds with the requirement of the complexity and refers to all dimensions of human being. Ethical concept is not so narrow as religious one, and could be a common platform for many religions, it is a source of values and goals. The ethical approach is one which bases of virtues, self-control, orientation. The chance of adaptation of such a concept of human nature is growing, as soon as moral values and sensibility to questions of justice and responsibility for other and nature find more and more their way into the contemporary discourse¹³.

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¹³ According to Wilber (Wilber, 2000a, 2000c) the share of population, which are open for the spiritual level of development is growing

**Proceedings of the 8th International Conference on Applied Economics
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18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
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Non-profit Institutions' Funding Resources in the Time of Crisis: Market or Government?*

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Keywords: *non-profit institution; non-profit funding; economic crisis; system of national accounts; social services*

Abstract: According to the theory, there are reasons to assume that non-profit institutions (NPI) behave specifically, in the way that is significantly different from the behaviour typical for both for-profit and public service providers. We focus on the research question whether NPIs, in tough times of economic crisis. And such specific “under pressure” behaviour represents the key topic of this paper. Paper investigates NPIs’ reactions to the distinctive changes of the economic environment in the 2008 – 2013 when Czech NPIs were relatively strongly affected by the crisis, although this affection probably haven’t been as heavy as in some other European countries.

Non-profit institutions (NPI) are characterized by their multi-source funding when payments from end-consumers are relatively low. The most reliable data sources are Annual National Accounts and the Satellite Account of NPIs, presenting macroeconomic data. In this article we focus on structure of NPI funding resources changes in tough times of economic crisis.

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The paper derives from the preliminary results of our extensive research project focused on the impact of public financing on the structure of resources and production of non-profit institutions. This project utilizes a quantitative representative questionnaire survey of non-profit institutions. In this article we focus on a specific area of public social services only.

The proposed paper seeks to prove that existing data sources do not capture the real/complex structure of NPI funding resources and will identify the shortcomings of the macroeconomic data and their scope.

Introduction

As stated in abstract, non-profit institutions (NPI) are generally characterized by their multi-source funding. There are numerous publications on this issue, including discussions on the public/private funding impact on the NPI production and behaviour. The examined question is to what extent the Czech official data capture the financial flows to NPI and their real structure. The first aim of this paper is to point to insufficient state of knowing in the context of the CR, especially concerning the structure of revenues of NPIs. After we explored these absent places in the realm of existing data on non-profit sector, we designed a project proposal for mapping the scope and structure of all resources of the Czech NPI. This proposal has been approved by the Czech Science Agency; we are in the second project year now.

Our paper briefly introduces the main objectives and research strategy of our survey-project which will allow us to test theories on the ratio of public and private revenue of NPIs. As the second goal of the paper, we are bringing some preliminary results of the survey concerning the Czech NPIs' behaviour in the times of economic crisis. Because of its specific nature, in particular because of the significant proportion of non-profit providers, the area of social services was selected.

Methodology of the research

We use a descriptive analysis of primary and secondary data to quantify the selected economic activity development and the financial flows to non-profit institution and to evaluate the development from 2008 till 2013.

We utilize secondary data from Satellite Account of Non-profit Institutions; we also use primary data in the form of preliminary findings from our representative survey of "The Impact of public financing on the structure of resources and production of NPIs" research.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The most substantial source of secondary data is represented by the Satellite Account of Non-profit Institutions (hereinafter referred to as SANI). SANI serves as a source of macroeconomic data, including production and resources (revenues) of NPIs, as well as other macroeconomic aggregates. The Czech Republic is one of the few countries that also draw up a Satellite Account of NPIs as a part of their national accounting.

We use relevant data to create a more complete picture of the current state and development of NPIs and their resources in the Czech Republic, specifically in the field of social care.

As we describe before (Fonadová & Hyánek, 2015 pp. 377-384) at the most general level, we will examine whether resp. how the changes in the public sources revenues affect the functioning (and sustainability) of the Czech non-profit institutions. Part of this analysis is to identify the shortcomings of the macroeconomic statistics that provide the information on NPIs in the Czech Republic in order to prove the impact of the resource portfolio on the structure and character of production generated by NPIs.

Our research project is based on the survey method; thus focusing research has not been in this range implemented in the Czech context (representative sample size of 600 units). At the most general level, we examine whether resp. how the changes of the public sources revenues affect the functioning and sustainability of the Czech non-profit institutions.

Main research questions of our survey:

- Does the share of public resources in the total income of non-profit institutions indicated by them correspond to the level indicated by the available official data sources?
- Do the revenues from the central government institutions represent the most important income component of non-profit institutions?
- What is the significance of indirect and commercial resources in terms of total income of non-profit organizations?
- What type prevails in indirect sources of non-profit organizations: public or private?
- Does the internal organization structure of income change over time significantly?

Furthermore, we are interested in whether answers to these questions will vary:

- According to the organizational type (organizational size, age of the organization, industry...)?
- According to the total revenue (total budget) of the organization?

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Firstly, we want to map how the amount and structure of public funds develops, while using the retrospective method of study (cf. de Vaus, 2001). We shall compare the data from 2013 and then retrospectively for the year 2008.

In this part of the research we will be able to determine:

- Whether and at what non-profit institutions report changes in the overall structure of income between the years?
- Is there a relationship between the changes in the revenue structure of the NPI and the amount of direct public revenue?

Through a standardized questionnaire there will be directly from the NPI collected information relating to the amount of their total income. Special attention will be devoted to the division on public and private sources, and also on income from the capital and from economic activity incl. non-financial sources of income.

Target file includes all non-profit organizations active on 31.12. 2013, which have already existed in 2008 (totally 105,522 units).

For the research purposes, we exclude from this set churches, public universities, hunting communities, political parties, professional associations, chambers of commerce and housing organizations; all of them represent organizational types on the edge of the nonprofit sector. This is valid for all the mentioned subjects except church organizations. Religious organizations are not included because they are given a special investigation.

After exclusion of specified categories of non-profit organizations, we get a basic set of about 80,000 units. Because of the high heterogeneity of non-profit organizations, we decided to use stratified random sampling.

We divide the basic set of non-profit institutions into 6 subgroups according to the ICNPO principles. From each of these groups, 75-100 units shall be randomly selected. Data from the first phase will be evaluated. In the second phase, we will focus on a set of non-profit institutions in which we find relevant direct public sources changes between 2008 and 2013 (decrease or, conversely, increase). The aim of this research is to find how the nonprofit production and strategies change as a result of direct public sources change.

In this paper we use preliminary findings derived from the analysis of 82 NPIs in the field of social services from representative survey.

State of Art

There are various theoretical definitions of private nonprofit sector organizations, such as the structural-operational definition (Salamon & Anheier, 1997), the definition based on the system of national accounts, definitions within SNA (United Nations, 2003), various functional definitions (Salamon & Anheier, 1997), specifications within the Pestoff welfare triangle (Pestoff, 1992), and the definition by means of a legal theory (Hurdik, 2003). Most of the definitions are negative ones, formed as authors attempt to perceive the private nonprofit sector alongside the public sector, the profit sector, and the household sector, or to assign definitional attributes to the private nonprofit sector.

Other terms are used in addition to private nonprofit sector, such as voluntary, civil, independent, nongovernmental, or third sector. The term selection depends on the discipline by which the phenomenon is analysed and the characteristics that are the most important for the respective author, and such terms are sometimes used simply to achieve any definition of the sector other than a negative one. Other non-theoretical concepts of nongovernmental nonprofit organisations are used in the Czech legislation (where these organisations are perceived as making no profit) and in the political sphere (where these organisations are perceived as nongovernmental organisations). The information capacity of various data sources with respect to individual definitions is connected with these concepts.

We've decided to use the definition of nonprofit institutions according to the standards of the European accounting system where nonprofit institutions are defined as "a legal or social entity created for the purpose of production of goods or services whose status does not permit them to be a source of income, profit or other financial gains for the units that establish, control or finance them. In practice, their productive activities are bound to generate either surpluses or deficits but any surpluses they happen to make cannot be appropriated by other institutional units" (ESA, 1995, p. 62).

NPI funding, and especially the public-private resource mix, belongs to the key issues in the non-profit sector focused research. In a way, the prominent position is occupied by examining the role and impact of public funding.

Of course, this is a topic that is historically deeply rooted in economic research; both positive and negative connotations of public financing interest and provoke economists at least since the 70s of the 20th century. So, maybe not completely new, but still topical. Moreover, in the environment

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

of post-communist countries Czech Republic, this area remains almost totally unexplored. It is surprising that in this environment we find no serious efforts to deepen the understanding of the structure of resources and their mutual substitution.

The most frequent issue in this context is the issue of the acceptance of commercial sources, especially in the situation of temporarily unstable public funding. Public finance can thus be seen as causing the phasing out the efforts of non-profit organizations to obtain additional private resources (crowding-out effect). And vice versa, we can expect positive impact of public finances (crowding-in) (Lecy & Van Slyke, 2012).

Space for alternative sources of income may generate public institutions themselves, simply by ceasing to subsidize certain types of services. According to Kerlin & Pollak, the nonprofit literature suggests that increases in public funding in earlier decades set the stage for the large impact of government cuts later on (Kerlin & Pollak, 2011).

In this context, strong connection of numerous non-profit subjects, and especially service providers, to any public budgets, represents the real problem. By the Salamon's estimate, social welfare cuts in the 1970s and 1980s resulted in the loss of US\$38 billion for nonprofits outside the health care field (Salamon, 1997). Other authors noted that hopes that private contributions would fill the gap were not realized as private contributions dropped from 26% of nonprofit revenue in 1977 to 18% in 1992 (Hodgkinson & Weitzman, 2001). One of the reasons, why the NPI reach for commercial sources is represented by constraints and cutbacks of public resources, typically in the tough times of economic crisis. Even here, however, there is not unanimous consensus among the authors.

Scholars have tried to prove that non-profit organizations relying on government funding turned to commercial activities to fill the gap left by cutbacks (Crimmins & Keil, 1983.; Eikenberry & Kluver, 2004). Salamon states, that between 1977 and 1989, nearly 40 % of the growth of social service organization income and 51 % of the growth of civic organization income came from fees and other commercial sources (Salamon, 1993). However, Foster and Bradach argue such statistics are taken out of context: "Fees and charges grew no faster in that 20-year period than other sources of revenue; they represented nearly half of the sector's total revenue in 1997, just as they had in 1977" (Foster & Bradach, 2005, p. 93).

There can be identified two research streams examining the phenomena of the public financing impact on the NPI behaviour. See Kerlin & Pollak: "Researchers who claim an increase in commercial revenue often use re-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

source dependency theory to explain their findings. According to this theory, organizations depend on outside resources to operate and use “proactive strategies that can be pursued to deal with environmental constraints” (Kerlin & Pollak, 2011, p. 218). Thus, resource dependency proposes that non-profit losses in government grants and other traditional funding (like private giving, both individual and corporate) may prompt an increase in commercial revenue as a replacement.

This line of thinking considers commercial activities as an alternative that comes into play after the previous major financial source fails. But there is an alternative approach, which argues that more gradual rising costs to nonprofits and increased competition for private and government dollars may be the reason behind a continuing rise in commercial activity (Dees, 1998,; Weisbrod, 2004). Rather than resource dependency, this line of reasoning is more compatible with institutional theory which broadly examines the effect of an operating environment on an organization (Powell & DiMaggio, 2012).

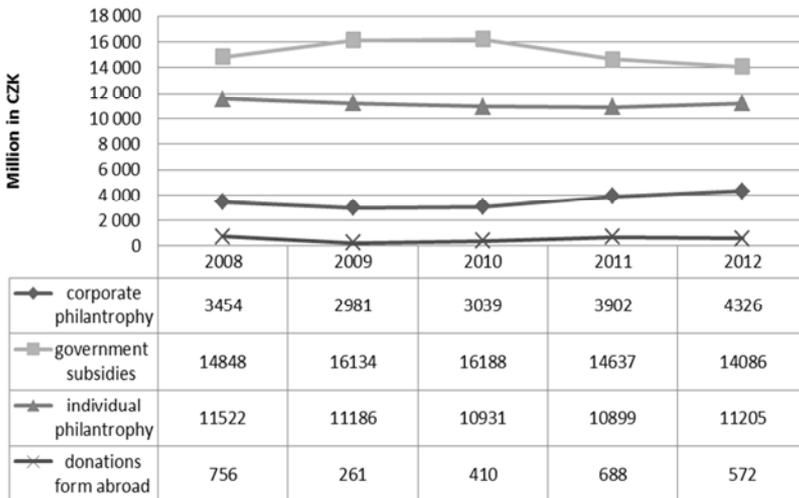
This means that for sustainability of the organization it is necessary to adapt to the institutional environment in which it operates. This is illustrated by the research of Flood, Fennel or Rao (Flood & Fennel, 1995,; Rao, 1998). They, in their conclusions, even speak of "mimetic and isomorphic" tactics adopted by nonprofit organizations. Of course, this line of thinking would mean that the tendency to commercial behavior is higher in countries with higher commercial environment. The increase in the commercial activities of non-profit organizations can then be understood as a kind of passive acceptance of the situation and response “to a number of outside pressures rather than a deliberate effort to subsidize declining revenue from discreet sources.” (Kerlin & Pollak, 2011, p. 701).

Here we’ve found a space for our research project which academic (theoretical) ambition is to test relevant theories in the Czech environment. We shall examine whether in the Czech context the public finance cutbacks really lead to increasing effort of obtaining commercial income or other behavioural changes.

NPI resources in the time of crises: Market or Government?

Figure 1 shows the evolution of donations and grants provided for NPI. After 2008, we witness a very slight decline in corporate and individual donations (including voluntary work). A significant decrease occurs in the level of foreign donations (both corporate and individual); it is logical, since many of these donor countries have experienced more serious impacts of the economic crisis than it was in the CR.

Figure 1. Public subsidies and various forms of donations in years 2008-2012 (in million CZK, 1 EUR = 27,7 CZK)



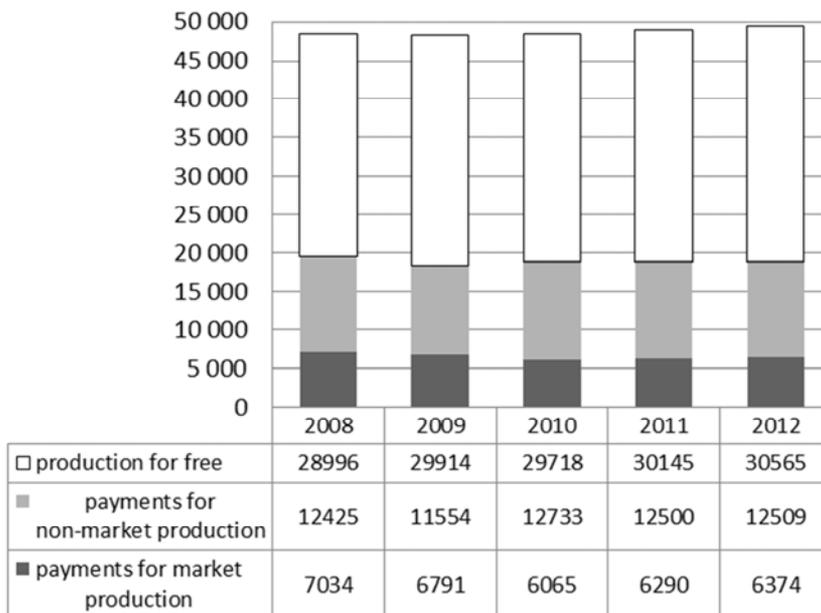
Source: own calculations based on Satellite Account of Non-profit Institutions (Czech Statistical Office, 2015).

In the case of public budgets subsidies, growth continues until 2010 (it took a while before the government responded by the cuts). The decline in these subsidies after 2010 returned to the level before the year 2008.

Production NPI behavior on the markets of goods and services is illustrated by the following graph.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Figure 2. Structure of the NPI production in years 2008 – 2012 (in million CZK, 1 EUR = 27,7 CZK)

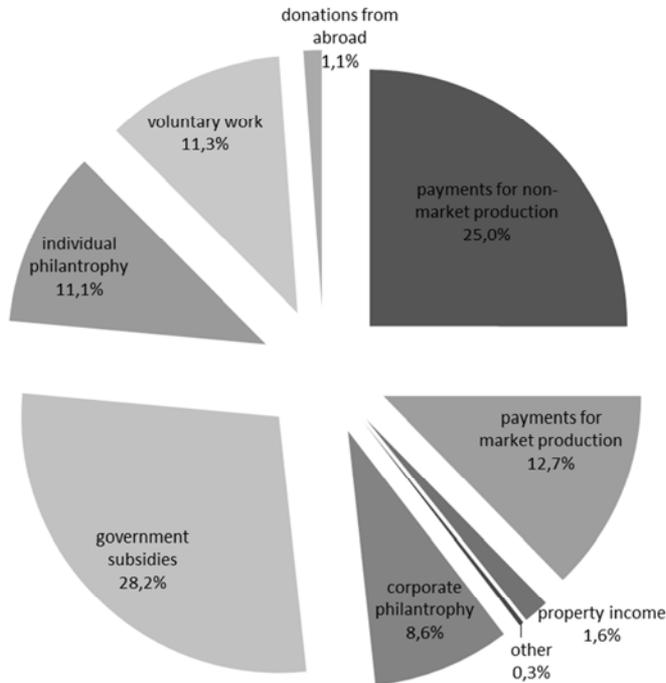


Source: own calculations based on Satellite Account of Non-profit Institutions (Czech Statistical Office, 2015).

In the evaluated period, free production for clients continues to increase. Until the 2010, we cannot talk about transferring the costs (in the form of increased prices) to consumers (see revenue from non-market production).

It is clear that the crisis did not move the nonprofit institutions in the direction of greater involvement in commercial activities. On the contrary, there is visible decline in the market production; the 2012 amount did not even reach the 2008 level.

Figure 3. Structure of NPI resources according to the Satellite Account of NPIs (share of resources in %)



Source: own calculations based on Satellite account of Non-profit Institutions (Czech Statistical Office, 2015).

Satellite Account of Non-profit Institutions shortcomings: case of social services

Czech macroeconomic data can show the structure of revenues and structure of production. But are we able to provide an explicit explanation of the impact of various funding resources on the overall production structure of Czech NPIs based on macroeconomics data? Do the existing data sources capture the real and complex structure of NPI resources and their mutual relationships?

We want to show shortcomings of National Account in the field of NPI resources at the representative sample of 82 social services NPI.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Over 18% of NPI in the field of social services have no financial income. Their production is created by members and volunteers in rented buildings and bestowed or donated means of production.

One-third of the remaining 81% NPI, (which have also financial income) indicates high importance of indirect sources. In addition to the above mentioned indirect sources we can identify an extra tax relief, free accounting, legal and cleaning services, and advertising.

Macroeconomic statistics do not include indirect sources (except of voluntary work) and do not reflect their relevance to the NPI. The question remains, what could be the role of these resource in times of economic crisis.

Donations, in addition to the above mentioned corporate and individual donations, voluntary work and from foreign donors are also being obtained from the inside of the nonprofit sector. Nonprofit institutions obtain approximately 10% of total donations from other nonprofit institution. These are donations and grants from foundations, charities and religious organizations as well as funds provided by central or umbrella organizations.

In social services, payments for non-market production represent 34% of total financial income. According to our estimates, more than half of this 34% consists of contributions, which the government provides to clients in order to be able to purchase the social services. It is therefore an overrating of NPI income from the provision of goods and services and vice versa underestimation of revenues from public budgets.

Conclusions

In the article, we focused on two areas of concern. The first examined question was to what extent the Czech official data capture the financial flows to NPI and their real structure. After explaining the officially reported scope and structure of resources, we took the area of social services to show the “real” structure of resources. As important, but officially neglected, kind of resources we identified indirect sources that official statistics do not capture. These include tax allowances, tax exemptions from local and administrative fees, discount sales, loans or leasing of property, material equipping, services provided for symbolic or non-market prices or even for free, and the use of communication channels.

Similarly, we noted statistically unrecorded financial flows within the nonprofit sector, i.e. between different nonprofit institutions. The structure of NPI resources according SANI is distorted by contributions for client

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

from public finance to social services. Public finance spent on social services (in the form of contributions for client) appears in the budget of NPI as a sale of services. Because of its specific nature, in particular because of the significant proportion of non-profit providers, the area of social services was selected.

As the second goal of the paper, we have produced some preliminary results of the survey examining the Czech NPIs' behavior in the times of economic crisis. Our analysis led to the following conclusions: Statistical data and our research have showed that Czech NPI were not significantly affected by the economic crisis. The only exceptions can be found in a development of the volume of donations from abroad. A significant decrease occurs in the level of foreign donations, both corporate and individual. As we argue, it is only logical, since many of these donor countries have experienced more serious impacts of the economic crisis. It is also evident that non-profit institutions in the analyzed period did not incline to greater use of commercial sources.

Basically, the Czech non-profit institutions prefer a non-market solution of their potential financial insufficiency. Although a certain decline of public subsidies actually occurred, it has been delayed. That's probably also why the NPI managed to prepare for the potential lack of resources. Those potentially lost resources have been substituted by the private philanthropy, or other types of resources, but not by the commercialization of its activities.

In conclusion, this article brings new information not only about the structure of the real sources of the non-profit sector, but also about the behavior of non-profit entities. Of course, our conclusions are still only preliminary, and they will be subjected to other tests in the future. We believe that our work could serve as a basis for the work of other researchers, too.

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015
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**Allocating Tax Revenue to Sub-Central
Government Levels: Lessons from Germany and
Poland**

JEL Classification: *H2; H7*

Keywords: *apportionment of tax revenue, fiscal federalism, Germany, Poland*

Abstract: Tax sharing arrangements provide considerable financial resources to sub-central government levels. This statement is true both for unitary and federal states although tax revenue sharing mechanisms differ significantly across countries. The basic aim of this article is to compare the mechanisms adopted in Germany and in Poland. It assesses the degree of tax autonomy granted to sub-central government levels in the countries analysed, overviews the principles of apportionment of joint (shared) taxes and presents statistics on tax revenue composition of sub-central government levels.

Introduction

Over the last few decades the theory of fiscal federalism has attracted a lot of scientists' attention. According to this theory if there are no economies of scale than a decentralized pattern of public outputs reflecting differences in tastes across jurisdictions is welfare enhancing as compared to centralized outcome (Oates, 2008, p. 314). In order to cover expenditures related to the fulfillment of decentralized functions the sub-central government units require sufficient financial resources. In the case of a restricted

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

fiscal autonomy of these units the financing of their public tasks in a decentralized system is based mainly on a mechanism of transfers from the central (federal) government.

One of the main components of the fiscal autonomy of each government level is therefore taxing power. Governments may have three types of competences: in terms of tax legislation, in terms of tax revenue and in terms of tax administration. The decentralization of these competences may occur in various ways. For instance the central government may be responsible for tax legislation and tax administration, however tax revenue may be apportioned between different levels of government or in a more decentralized system local government may be entitled to set their own tax rates, to impose a surtax on a central (federal) tax liability or even to choose its own tax base, at least within the limits allowed for by a common tax administration system (Boadway, Shah, 2009, pp. 86-87).

The basic aim of this article is to compare the tax autonomy of sub-central government levels and tax sharing arrangements between different government levels in Germany and in Poland. Although Poland is classified as unitary state certain public responsibilities and competences are transferred to lower-levels of government. As a result Poland may be considered as more fiscally decentralized than some federal countries. Germany on the other hand is a cooperative federation, in which, for the majority of policy areas, the federal government sets the policy framework and the states are responsible for its implementation (Kedar, 2009, p. 172). There are significant differences in the scale of federal influence on sub-national governments between federal countries. Germany is amongst the countries where this scale is relatively large and the influence exercised on local governments is strong.

Methodology of the research

This article attempts to compare the taxing power of the public finance subsectors (different government levels) and the tax revenue sharing procedures in two European states which differ extensively with respect to the extent of decentralisation of the public finance sector, i.e. Germany and Poland. It distinguishes three categories of taxing power: power with respect to making tax law, power with respect to obtaining tax revenue and power with respect to managing tax collection (administering taxes). The degree of financial autonomy of a sub-central government unit depends

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

mostly on the two first categories. Therefore, they are the ones the article discusses the most thoroughly.

The methodology of this article is determined by the research topic and the research objectives. The scope of taxing power is specified in the legislation applicable in each of the two countries analysed. Hence, the first part of this article includes a legislative analysis of the regulations comprised in selected national acts. It focuses on provisions included in the Constitutions of both countries, acts specifying the sources of financing for local self-government units and defining principles according to which the tax revenues are shared. The relevant legislation is presented as of 31st December 2014. The first part of this article, also reviews Polish and foreign literature on the topic analysed, along with the publications of the German Federal Ministry of Finance (*Bundesministerium der Finanzen*).

The second part of this article contains the analysis of statistical data in regard to the tax and public revenue sources. This part includes the presentation of the structure of tax revenues by the public finance subsectors in Germany and Poland and a comparison of these structure in both countries. The share of different public finance subsector's in the joint tax revenues and in the total tax revenues of the public finance sector are calculated along with the percentage rate of the joint tax revenues in the total tax revenues and the share of the tax revenues in the total budgetary revenues for each subsector level. The statistical data used for these calculations come from the publications of the Supreme Audit Office (NIK) in Poland, the Central Statistical Office of Poland (GUS), the German Federal Ministry of Finance (*Bundesministerium der Finanzen*) and the Federal Statistical Office of Germany (*Statistisches Bundesamt Deutschland*).

**Tax autonomy of federal, state
and municipal governments in Germany**

In Germany one of the most important legal acts regulating the taxing powers of the Federation (*Bund*), the states (*Länder*) and the municipalities (*Gemeinden*) is the Constitution. The broadest competences to make taxation law are those of the federal government, which has the exclusive legislative power (*ausschließliche Gesetzgebung*) and concurrent legislative power (*konkurrierende Gesetzgebung*). Article 105 (1) of the German Constitution (*Grundgesetz vom 23 Mai 1949*) gives the Federation the exclusive power to legislate with respect to customs duties and fiscal monopolies. Taxes other than fiscal monopolies are regulated by the concurrent legisla-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

tion. The Federation has the right to legislate taxes when the whole or the part of the revenue is allocated to the Federation or if the establishment of equal living conditions throughout the federal territory or the maintenance of legal or economic unity makes federal regulation necessary in the national interest. This means that with respect to other taxes, the states have the power to legislate as long as the Federation has not exercised its legislative power. In compliance with the provisions of Article 105 (2a) of the Constitution, the states have the power to legislate local taxes on consumption and expenditures as long as they are not substantially similar to taxes imposed by federal law. Moreover, the states have the power to specify the rates of the tax on the acquisition of immovable property (*Grunderwerbsteuer*). The municipalities (*Gemeinden*) do not have legislative powers, only the right to apply multipliers (*Hebesätze*) on the trade tax (*Gewerbesteuer*) and the real estate tax (*Grundsteuer*) within the limits specified by federal law. Legislation concerning other local taxes not regulated in federal acts of law is regulated in acts adopted by particular states.

In Germany there is a distinction between the vertical (*vertikale Steuerverteilung*) and horizontal system of tax revenue distribution (*horizontale Steuerverteilung*). The aim of the vertical system is to divide the revenues within the federation – amongst states, municipalities or unions of municipalities. It involves ascribing whole revenues from certain kinds of taxes to the federation, states and municipalities and proportional shares in the so-called shared (joint) taxes. The horizontal system of tax revenue distribution means the redistribution of these resources amongst units belonging to the same public finance subsector.

The rights with respect to obtaining tax revenues are regulated in Articles 106, 106a, 106b and 107 of the Constitution. On this basis the revenue from the following taxes is allocated to the Federation: excise on spirits (*Branntweinsteuer*), sparkling wines (*Schaumweinsteuer*), intermediate products (*Zwischenerzeugnissteuer*), sweet beverages containing alcohol, i.e. alkopops (*Alkopopsteuer*); tobacco tax (*Tabaksteuer*), energy tax (*Energiesteuer*), coffee tax (*Kaffeesteuer*), insurance tax (*Versicherungsteuer*), electricity tax (*Stromsteuer*), nuclear fuel tax (*Kernbrennstoffsteuer*), and air passenger tax (*Luftverkehrssteuer*). Apart from that the Federation receives tax revenues from the road haulage tax (*Straßengüterverkehrssteuer*), the motor vehicle tax (*Kraftfahrzeugsteuer*), and other kinds of taxes on transactions related to motorised means of transport, one-time capital and compensation levies, subsidiary levies on personal and corporate income taxes, e.g. the solidarity surcharge (*Solidaritätszuschlag*), and levies im-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

posed due to the membership in the European Union. The next group of taxes are those which are allocated entirely to the states; these include: the inheritance and gift tax (*Erbschaftsteuer/Schenkungssteuer*), tax on the acquisition of immovable property (*Gründerwerbsteuer*), fire protection tax (*Feuerschutzsteuer*), betting and lottery tax (*Rennwett- und Lotteriesteuer*), beer tax (*Biersteuer*) and gaming casinos levy (*Abgabe von Spielbanken*). As far as municipalities and unions are concerned, they receive tax revenues from the following taxes: the real estate tax (*Grundsteuer*), dog tax (*Hundesteuer*), beverage tax (*Getränkesteuer*), hunting and fishing tax (*Jagd- und Fischereisteuer*), trade tax (*Gewerbesteuer*), secondary residence tax (*Zweitwohnungsteuer*), entertainment tax (*Vergnügungssteuer*), licensing tax on the sale of beverages (*Schankerlaubnissteuer*), and packaging tax (*Verpackungssteuer*).

The most important taxes in the German tax system are shared taxes. Revenues from these taxes are divided between the Federation, the states and the municipalities. They include: the assessed income tax (*veranlagte Einkommensteuer*), wage withholding tax (*Lohnsteuer*), withholding tax on capital gains (*Abgeltungssteuer*), other withheld income taxes (*nicht veranlagte Steuern von Ertrag*), corporate income tax (*Körperschaftsteuer*), and value added tax (*Umsatzsteuer*). The statutory share of the Federation, the states and municipalities in the revenue from the shared taxes is presented in Table 1.

Table 4. Statutory share of Federation, states and municipalities in revenues from shared taxes in Germany

Type of tax	Share in %		
	Federation (<i>Bund</i>)	States (<i>Länder</i>)	Municipalities (<i>Gemeiden</i>)
Assessed income tax; Wage withholding tax	42.50	42.50	15.00
Withholding tax on capital gains	44.00	44.00	12.00
Other withheld income taxes	50.00	50.00	–
Corporate income tax	50.00	50.00	–
Value added tax	53.47	44.53	2.00

Source: Das bundesstaatliche Finanzausgleich (2014, p. 3).

Competences with respect to tax administration are regulated by Article 108 of the Constitution and the Tax Administration Act (*Finanzverwaltungsgesetz vom 30. August 1971*). The law grants the federal government authorities competences to administer duties, fiscal monopolies and consumption taxes where the principles concerning their collection are speci-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

fied in federal acts; these levies include VAT on imported goods and other taxes on transactions related to motorised means of transport, collected since 1st July 2009, as well as taxes collected in relation to the European Communities.

The remaining taxes are administered by the fiscal authorities of the states. The only exceptions are taxes where the revenue is allocated entirely or partially to the Federation. In compliance with Article 108 (3) of the Constitution these levies are administered by the states on behalf of the Federation. The states are free to choose the organisation of their administration and the only rule to follow when organising the administration is the principle of uniform taxation in compliance with the law (Ulbricht, 2008, p. 198).

The statutory share in revenues from the shared taxes allocated to the states is divided amongst them in accordance with a statutory key. With respect to income taxes the principle of residence is taken into account. Thus, a state is given the income tax paid by a taxpayer if the taxpayer lives in this state or – in the case of corporations – if the corporation's management board is located in this state (§ 1 (1) *Zerlegungsgesetz vom 6. August 1998*). As a result the distribution of the revenues depends on the amount of tax revenues generated by a given state. In the case of the distribution of revenues from value added tax, the rules are different: as much as 75% of the revenue from VAT to which the states are entitled is distributed on the basis of the number of inhabitants of the relevant states. The remaining 25% is a subsidy which is divided depending on the so-called fiscal performance index (*Steuerkraft*). Calculating the fiscal performance index involves taking into account the share of a particular state in the revenues from the assessed income tax, wage withholding tax, withholding tax on capital gains, other withheld income taxes, corporate income tax, trade tax and the revenues of these states from the remaining taxes per inhabitant. A state is entitled to a subsidy if this index is lower than the average calculated for all the states (§ 2 (1) *Finanzausgleichgesetz vom 20. Dezember 2001*).

Both the Federation and the states are entitled to a share in the trade tax. Municipalities are obliged to transfer a share of the tax revenues from that tax to the Federation and the states under Article 106 (6) of the Constitution. The amount to be transferred depends on the local multipliers imposed on the trade tax and the location of a particular municipality (whether it is located in a new or an old state). Moreover, since 1st July 2009, the states

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

participate in the revenues from the motor vehicle tax collected by Federation.

The share of a particular municipality in the revenue from income taxes depends on the taxable income and the tax paid by its inhabitants in a statutorily defined year. In the calculation of the revenues from the aforementioned taxes received by a municipality and in order to equalise the differences between municipalities whose inhabitants generate high income and those whose inhabitants generate low income in the case of each taxpayer only income up to a certain level is taken into account. The amount used in the calculation is 35,000 euros, in the case of individual tax settlement, and 70,000 euros, in the case of joint tax declaration (*Gemeindeanteil* 2014, p. 21).

The apportionment of the revenues from value added tax is extremely complicated due to several amendments made in 1998 (implementation of the compensation for the abolition of the trade tax on business capital that accrued to the municipalities) and in 2007 (increase of the standard VAT rate) (Englisch, Tappe, 2011, p. 285). When distributing the municipalities share in the revenues from value added tax amongst particular municipalities, the following elements are taken into account (in statutorily regulated proportions): the revenue from the trade tax, the number of employed obliged to pay insurance contributions, the amount of wages paid from which social insurance contributions must be made.

**Local tax authority and the tax revenue
sharing mechanism in Poland**

Unlike in Germany, in Poland the provisions of the Constitution do not regulate in detail the scope of taxing power of public finance subsectors (the Constitution of the Republic of Poland of 2 April 1997; *Konstytucja Rzeczypospolitej Polskiej z dnia 2 kwietnia 1997 roku*). Article 16(2) of the Constitution includes, however, the principle of independence of local self-governments. In compliance with this principle local self-government units participate in exercising public power and are obliged to perform public tasks assigned to them on its own behalf and responsibility. The execution of these tasks is possible thanks to local self-governments' share in public revenue, including, according to Article 167(2) of the Constitution, their own revenues, general subsidies and specific grants designated from the state budget.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

In Poland competences in the field of tax law-making are vested in the central government. The authority equipped with the power to enact tax law is Parliament. In principle the units of local self-government and their organs do not have the power to make tax law. However under Article 168 of the Constitution the units of local self-government have the right to establish the rates of local taxes and charges in compliance with statutory regulated rules. As far as municipalities (*gminy*) are concerned their competences with respect to tax law are implemented primarily by means of tax resolutions adopted by the municipal council (Popławski, 2009, p. 40).

The provisions of the Local Taxes and Fees Act of 12 January 1991 (*Ustawa z dnia 12 stycznia 1991 roku*) entitle the municipal councils to determine the rates of real estate tax, motor vehicle tax, market duty, visitor's and resort duties, as well as the duty on dog owners. The rates may not exceed the upper limits specified in the statute. Municipal councils also have the right to determine the rules for the collection and time of payment of these taxes and duties, and to introduce tax deductions and exemptions. Moreover under Article 6(3) of the Farm Tax Act of 15 November 1984 (*Ustawa z dnia z dnia 15 listopada 1984 roku*), municipal councils may influence the amount of the farm tax by reducing the purchase prices of rye taken as a basis for calculating the tax, and – on the basis of Article 4(5) of the Forest Tax Act – influence the amount of forest tax by reducing the average selling price of wood taken as the basis for calculating the forest tax (the Act of 30 October 2002; *Ustawa z dnia 30 października 2002 roku*).

Most of the taxes in Poland constitute the source of revenue for the state budget. They include: value added tax, the excise duty on the following products: alcoholic beverages, tobacco products, energy and electricity, passenger cars, the gambling tax, flat-rate tax on registered income, tax on sale of securities, flat-rate tax on income of the clergy and the mineral extraction tax. The Polish tax system does not allow for any taxes which would constitute revenues of the districts (counties; *powiaty*) or regions (provinces; *województwa samorządowe*). The sources of revenue for municipalities, on the other hand, are such taxes as: the real estate tax, farm tax, forest tax, motor vehicle tax, gift and inheritance tax, tax on civil law transactions and the fixed sum tax on the business activity of individuals (so called tax card assessment). Apart from that the following duties also contribute to the municipalities' budgets: the stamp duty, market duty, visitor's and resort duty, duty on dog owners and a share in the mineral exploitation duty.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 2. Statutory share of public finance subsectors in revenues from shared taxes in Poland

Type of tax	Year	Share in %			
		State (<i>budżet państwa</i>)	Regions (<i>województwa</i>)	Districts (<i>powiaty</i>)	Municipalities (<i>gminy</i>)
Personal income tax	1999-2003	69.90	1.50	1.00	27.60
	2004	50.64	1.60	8.42	39.34*
	since 2005	48.81	1.60	10.25	39.34*
Corporate income tax	1999-2003	94.50	0.50	0.00	5.00
	2004-2007	75.99	15.90	1.40	6.71
	2008-2009	77.89	14.00	1.40	6.71
	since 2010	77.14	14.75	1.40	6.71

* The share of the municipalities in the revenues from personal income tax decreases by the number of percentage points equal to the product of 3.81 of the percentage point of the index calculated for the whole country. The index rate is established by dividing the number of inhabitants admitted to residential homes before 1st January 2004, as of 30th June of the base year, by the number of inhabitants admitted by 1st January 2004, as of 31st December 2003. The participation share of municipalities in the revenues from the personal income tax was 35.72% in 2004, in 2005 – 35.61%, in 2006 – 35.95%, in 2007 – 36.22%, in 2008 – 36.49%, in 2009 – 36.72%, in 2010 – 36.94%, in 2011 – 37.12%, in 2012 – 37.26%, in 2013 – 37.42%, in 2014 – 37.53.

Source: Jastrzębska (2012, p. 114).

Local taxes are administered by local authorities: the village head, the mayor or the president. The only exceptions are: the gift and inheritance tax, the tax on civil law transactions and the fixed sum tax on business activity of individuals, which constitute the source of revenue for municipalities but are administered by the central government authorities, i.e. the heads of tax offices. All other taxes are administered centrally.

In Poland personal and corporate income taxes are shared taxes, i.e. revenues from them are distributed amongst the state, regions, districts and municipalities. The share of public finance subsectors in revenue from these taxes is presented in Table 2.

In compliance with Article 9 of the Act of 13th November 2003 on the Revenues of Local Self-Government Units (*Ustawa z dnia 13 listopada 2003 roku*), the amount of a municipality's share in the revenue from personal income tax is calculated by multiplying the total amount of the revenue from this tax by 0.3934 and an index equal to the share due in the year preceding the base year of the personal income tax from persons resident in a given municipality, as the total amount of the tax to be paid by all taxpayers in the same year. In the case of a district the amount of its share in the

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

revenue from personal income tax is calculated by multiplying the total amount of the revenues from personal income tax by 0.1025 and an index equal to the share of the personal income tax due in the year preceding the base year of the personal income tax from persons resident in a given district, as the total amount of the tax to be paid in the same year. In the case of regions, on the other hand – this share is calculated by multiplying the total amount of the revenue from this tax by 0.0160 and an index equal to the share of the personal income tax from persons resident in a given region due in the year preceding the base year, as the total amount of the tax to be paid in the same year. These indices are established on the basis of statistics from tax returns submitted on the amount of income and annual tax calculations made by taxpayers as of 15th September of the base year.

The amounts of shares of regions, districts and municipalities in the revenue from corporate income tax depends on the number of taxpayers having registered offices or facilities in their territories. If a corporate income taxpayer has a facility on the territory of a local self-government unit other than the one where its registered office is located, part of the revenues from the share in the revenue from this tax is transferred to the budget of the local self-government unit in which this facility operates, proportionally to the number of people employed there under a contract of employment. In the case of a corporate income taxpayer conducting business through a foreign facility located in the Republic of Poland part of the revenue from the share in the revenue from this tax is transferred to the budget of the local self-government unit where the employers of this taxpayer or of his foreign facility perform work under a contract of employment, proportionally to the number of people employed by him or this foreign facility located in the Republic of Poland.

**Tax revenue assignment in Germany and Poland
in the years 2009-2013**

Both in Germany and in Poland taxes constitute an important source of the public revenue. However their significance varies considerably for different public finance subsectors. In Germany the share of tax revenue in the total revenue of the Federation and the states in 2009-2013 was similar (Table 5). The basic source of tax revenue for both the Federation and the states are shared taxes, which constitute about 74% of the total tax revenue of the public finance sector (without taking into account the subsector of social insurance) and about 80% of the tax revenue both for the Federation

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

and the states. From Table 3 it can be concluded that the dominant source of revenue for the Federation is the value added tax. This is related not only to its collection efficiency but also to a considerable statutory share of the Federation in the revenue from this tax. A significant source of revenue for the Federation are also excise duties, the revenue from which account for over 20% of its tax revenue. The most efficient are the excise duties imposed on energy and tobacco products.

The tax revenue of the Federation are reduced by amounts transferred to the budgets of other entities of the public finance sector and the budget of the European Union. The amounts deducted from these revenues include their own resources of the EU – both VAT- and GNI-based, as well as supplementary federal grants (Bundesergänzungszuweisungen). Moreover the Federation gives part of its revenue from the taxation of mineral oil to the states under Article 5 of the Regionalization Act (Regionalisierungsgesetz vom 27. Dezember 1993). These resources are used to finance inter alia railway transport. The federal budget also pays the states a percentage of revenue from the motor vehicle tax. The states' share in the revenue from shared taxes and tax revenue in total is slightly lower than the share of the Federation (from 3 to 5 percentage points). The states obtain their own tax revenues mainly from the tax on the acquisition of immovable property, inheritance and gift tax and the excise duty on beer. However the largest revenue of the states comes from their share in value added tax.

Table 3. Tax revenue of the Federation, states and municipalities in Germany in the years 2009-2013 (in million EUR)

Public finance subsectors	TAX	2009	2010	2011	2012	2013
Federation	Assessed income tax	11 233	13 251	13 589	15 837	17 969
	Wage withholding tax	57 445	54 359	59 393	63 352	67 234
	Withholding tax on capital gains	5475	3832	3529	3623	3812
	Other withheld income taxes	6327	6491	9068	10 030	8629
	Corporate income tax	3587	6021	7817	8467	9754
	Value added tax*	95 400	95 860	102 433	103 965	105 084
	<i>Share of the Federation in shared taxes in total</i>	<i>179 467</i>	<i>179 814</i>	<i>195 829</i>	<i>205 274</i>	<i>212 482</i>
	Energy tax	39 822	39 838	40 036	39 305	39 364
	Tobacco tax	13 366	13 492	14 414	14 143	13 820
	Solidarity surcharge	11 927	11 713	12 781	13 624	14 378
	Share in trade tax	1043	1287	1521	1587	1575
	Other tax revenues	24 114	28 382	31 910	32 721	32 892
	Amounts transferred to other entities of public finance sector and the EU	- 41 743	- 48 715	- 48 508	- 50 351	- 54 645

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

	Total tax revenues of Federation	227 996	225 811	247 983	256 303	259 866
	TOTAL REVENUES	282 559	288 689	307 144	335 455	334 893
States	Assessed income tax	11 233	13 251	13 598	15 837	17 969
	Wage withholding tax	57 445	54 359	59 393	63 352	67 234
	Withholding tax on capital gains	5475	3832	3529	3623	3812
	Other withheld income taxes	6237	6491	9068	10 030	8629
	Corporate income tax	3587	6021	7817	8467	9754
	Value added tax	78 059	80 588	83 807	86 785	87 831
	<i>Share of states in shared taxes in total</i>	<i>162 036</i>	<i>164 542</i>	<i>177 212</i>	<i>188 094</i>	<i>195 229</i>
	Tax on the acquisition of immovable property	4857	5290	6366	7389	8394
	Inheritance and gift tax	4550	4404	4246	4305	4633
	Share in trade tax	3864	4638	5368	5551	5478
	Other tax revenues (including amounts received from other entities of public finance sector)	31 812	31 178	31 099	31 005	30 471
	Total tax revenues of states	207 119	210 052	224 291	236 344	244 205
	TOTAL REVENUES	260 134	266 782	286 486	315 642	329 238
	Municipalities	Assessed income tax	3964	4677	4799	5589
Wage withholding tax		20 275	19 186	20 962	22 360	23 730
Withholding tax on capital gains		1493	1045	962	988	1040
Value added tax		3533	3594	3793	3885	3929
<i>Share of municipalities in shared taxes in total</i>		<i>29 265</i>	<i>28 502</i>	<i>30 516</i>	<i>32 822</i>	<i>35 041</i>
Trade tax		27 514	28 625	33 535	35 207	35 974
Real estate tax		10 936	11 315	11 674	12 017	12 377
Other tax revenues		671	623	888	1 037	1 143
Total tax revenues of municipalities		68 386	69 065	76 613	81 083	84 535
TOTAL REVENUES		170 803	175 392	183 908	197 770	205 768
PUBLIC FINANCE SECTOR	Total tax revenues	503 501	504 928	548 887	573 730	588 606
	TOTAL REVENUES**	713 496	730 863	777 538	848 867	869 899

* Before the deduction of VAT-based own resources of the European Union.

** The subsector of social insurance has not been taken into account.

Source: *Kassenmäßige Steuereinnahmen nach Gebietskörperschaften 2007-2013*; *Kassenmäßige Steuereinnahmen nach Steuerarten in den Kalenderjahren 2006-2013*; Statistisches Jahrbuch (2011, p. 563); Statistisches Jahrbuch (2013, p. 250); Statistisches Jahrbuch (2014, p. 254).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 4. Tax revenues of the state, regions, districts, cities with district rights and municipalities in Poland in the years 2009-2013 (in million PLN)

Public finance subsectors	TAX	2009	2010	2011	2012	2013	
State	Personal income tax	28 281	28 473	30 644	31 891	33 395	
	Corporate income tax	24 157	21 770	24 862	25 146	23 075	
	<i>Share of state in shared taxes in total</i>	52 438	50 243	55 506	57 037	56 470	
	Flat-rate tax on registered income	6244	6324	6254	6967	7121	
	Tax on sale of securities	1239	796	1177	952	774	
	Value added tax	99 455	107 880	120 832	120 001	113 412	
	Excise duty	53 927	55 685	57 964	60 450	60 653	
	Gambling tax	1576	1625	1477	1442	1304	
	Mineral extraction tax	–	–	–	1426	1917	
	Total tax revenues of state budget	214 879	222 553	243 210	248 275	241 651	
	TOTAL REVENUES	274 184	250 303	277 557	287 595	279 151	
Regions	Personal income tax	889	882	962	1004	1054	
	Corporate income tax	4178	3968	4438	4385	4062	
	<i>Share of regions in shared taxes in total</i>	5067	4850	5400	5389	5116	
	Total own revenues of regions	6315	5703	6673	6549	6303	
	TOTAL REVENUES	19 548	14 104	15 067	15 236	16 121	
Districts	Personal income tax	2765	2797	3132	3322	3513	
	Corporate income tax	136	128	159	164	154	
	<i>Share of districts in shared taxes in total</i>	2901	2925	3291	3486	3667	
	Total own revenues of districts	5699	6337	6531	6612	6894	
	TOTAL REVENUES	20 085	22 497	23 552	22 523	23 078	
Cities with district rights	Personal income tax	Municipal part	10 489	10 282	10 969	11 300	11 830
		District part	2928	2853	3029	3109	3240
	Corporate income tax	Municipal part	1366	1163	1260	1210	1109
		District part	285	245	263	253	232
	<i>Shares of cities with district rights in shared taxes in total</i>		15 068	14 543	15 521	15 872	16 411
	Tax on civil law transactions	992	1102	1012	804	919	
	Gift and inheritance tax	182	171	154	159	144	
	Fixed sum tax on business activity of individuals	46	44	42	40	40	
	Real estate tax	5702	6062	6483	6995	7419	
	Farm tax	23	15	16	29	30	
	Forest tax	2	2	2	2	2	
	Motor vehicle tax	309	296	288	292	302	
	Total tax revenues of cities with district rights		22 324	22 235	23 518	24 193	25 267
Total own revenues of cities with district rights		33 262	34 284	35 952	37 408	40 059	
TOTAL REVENUES		50 328	53 886	56 860	61 247	64 217	
	Personal income tax	9906	10 080	11 340	12 077	12 824	
	Corporate income tax	653	617	757	789	743	

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Municipalities	<i>Share of municipalities in shared taxes in total</i>	10 559	10 697	12 097	12 866	13 567
	Tax on civil law transactions	707	791	762	688	710
	Gift and inheritance tax	120	121	119	126	112
	Fixed sum tax on business activity of individuals	49	46	45	44	43
	Real estate tax	8488	9061	9771	10 608	11 311
	Farm tax	1215	974	1046	1517	1635
	Forest tax	181	164	186	224	226
	Motor vehicle tax	532	561	597	624	637
	Total tax revenues of municipalities	21 851	22 415	24 623	26 697	28 241
	Total own revenues of municipalities	30 022	32 264	34 490	36 523	38 546
	TOTAL REVENUES	64 882	72 311	75 831	78 408	80 043
LOCAL SELF-GOVERNMENT UNITS	75 298	78 588	83 646	87 092	91 802	
PUBLIC FINANCE SECTOR	429 027	413 101	392 007	465 009	462 610	

* The subsector of social insurance has not been taken into account.

Source: Gospodarka finansowa jednostek samorządu terytorialnego (2011, p. 49-97); Gospodarka finansowa jednostek samorządu terytorialnego (2013, p. 61-110); Gospodarka finansowa jednostek samorządu terytorialnego (2014, p. 54-94); Analiza wykonania budżetu państwa (2012, p. 58); Analiza wykonania budżetu państwa (2014, p. 82-85).

In the case of municipalities both the proportion of the revenue from the shared taxes in the total tax revenue and of the total tax revenue in the total revenues is lower than in the case of the Federation and the states. The share of municipalities in the revenues from the shared taxes is insignificant and does not exceed 8%. The budgets of municipalities are supplied mostly by subsidies and grants. The largest tax revenue sources of municipalities are their share in the wage withholding tax and the trade tax.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 5. Shares of Federation, states and municipalities in tax revenues and revenues from shared taxes in Germany in the years 2009-2013

Specification	Years	Federation	States	Municipalities
Share of revenues from shared taxes in tax revenues (%)	2009	78.71	78.23	42.79
	2010	79.63	78.33	41.27
	2011	78.97	79.01	39.83
	2012	80.09	79.58	40.48
	2013	81.77	79.94	41.45
Share of tax revenues in total revenues (%)	2009	80.69	79.62	40.04
	2010	78.22	78.74	39.38
	2011	80.74	78.29	41.66
	2012	76.40	74.88	41.00
	2013	77.60	74.17	41.08
Share of particular public finance subsectors in revenues from shared taxes (%)	2009	48.41	43.70	7.89
	2010	48.23	44.13	7.64
	2011	48.53	43.91	7.56
	2012	48.16	44.13	7.71
	2013	47.99	44.09	7.92
Share of particular public finance subsectors in tax revenues (%)	2009	45.28	41.14	13.58
	2010	44.72	41.60	13.68
	2011	45.18	40.86	13.96
	2012	44.67	41.19	14.14
	2013	44.15	41.49	14.36

Source: Data from Table 3.

In Poland the share of tax revenue in public revenue is relatively high in the case of the state budget (Table 6). The most important sources of tax revenue are value added tax and the excise tax, the revenues from which account for about 73% of all the tax revenue of the state budget.

The percentage of shared taxes in this budget is definitely lower than in Germany. It must be also emphasized that, unlike Germany, in Poland the value added tax is not a shared tax. At the same time the proportion of income taxes, which are shared in the tax revenue of Federation in Germany was, in the years 2009-2013, 12.5 to 18.0 percentage points higher than the proportion of income taxes in the tax revenue of the state budget in Poland; one of the reasons is the higher collection efficiency of German income taxes. The regional level of local self-government in Poland does not have any tax revenue; it has a share of the shared taxes but they are insignificant. In the case of districts, which also do not have their own tax revenue, the proportion of revenue from the shared taxes in the total is even lower.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 6. Shares of the state, regions, districts, cities with district rights and municipalities in tax revenues and revenues from shared taxes in Poland in the years 2009-2013

Specification	Years	State	Regions	Districts	Cities with district rights	Municipalities
Share of revenues from shared taxes in tax revenues (%)	2009	24.40	100.00	100.00	67.50	48.32
	2010	22.58	100.00	100.00	65.41	47.72
	2011	22.82	100.00	100.00	66.00	49.13
	2012	22.97	100.00	100.00	65.61	48.19
	2013	23.37	100.00	100.00	64.95	48.04
Share of tax revenues in total revenues (%)	2009	78.37	25.92	14.44	44.36	33.68
	2010	88.91	34.39	13.00	41.26	31.00
	2011	87.63	35.84	13.97	41.36	32.47
	2012	86.33	35.37	15.48	39.50	34.05
	2013	86.57	31.74	15.89	39.35	35.28
Share of particular public finance sub-sectors in revenues from shared taxes (%)	2009	60.95	5.89	3.37	17.51	12.28
	2010	60.35	5.83	3.51	17.47	12.84
	2011	60.45	5.88	3.58	16.90	13.19
	2012	60.26	5.69	3.68	16.78	13.59
	2013	59.30	5.37	3.85	17.23	14.25
Share of particular public finance sub-sectors in tax revenues (%)	2009	80.47	1.90	1.09	8.36	8.18
	2010	80.93	1.76	1.06	8.09	8.16
	2011	81.06	1.80	1.10	7.84	8.20
	2012	80.60	1.75	1.13	7.85	8.67
	2013	79.51	1.68	1.21	8.31	9.29

Source: Data from Table 4.

Municipalities and cities with district rights have their own tax revenue, which include also shares in shared taxes. It must be noted that the share of municipalities and cities with district rights in revenues from personal income tax is relatively high. As a result municipalities in Poland are entitled to a higher share in revenue from shared taxes than in Germany. The situation is different in the case of the share of particular levels of the public finance sector in tax revenue. In the case of German municipalities this share is higher than in Poland. This is a result of a higher collection efficiency of local taxes in Germany. One of the most important sources of tax revenue for German municipalities is the trade tax. The most efficient source of tax revenues for Polish municipalities is the real estate tax.

Conclusions

Taxing powers of German and Polish sub-central government units differ considerably. These differences are especially visible when comparing tax competences of regions and districts in Poland and the states in Germany. It must be added that the sources of revenue and their structure are adjusted to a greater or lesser extent to the need for public resources and to the public tasks performed. Due to systemic differences between the two countries the tasks of Polish regions and districts are different from those of German states.

States in Germany have relatively broad taxing powers. The Constitution provides them with the power to legislate with regard to local taxes on consumption and expenditures so long and insofar as such taxes are not substantially similar to taxes regulated by federal law. German states receive revenue from selected wealth and sales taxes. Moreover the Federation and the states have a similar level of revenue from shared taxes, which results in a comparative level of their shares in tax revenue. In Poland, regions and districts have no legislative powers with respect to tax law. They do not generate any of their own tax revenue but do participate in the revenue from the shared taxes. However their share in tax revenue that include only the revenue from shared taxes is insignificant. Therefore, their most basic sources of funding are general subsidies and specific grants.

The taxing power of municipalities is significantly restricted both in Germany and in Poland. The legislative powers of municipalities with respect to tax law are limited to deciding the rates of some local taxes (only within statutory restrictions). Municipalities have no power to independently impose taxes and shape the elements of the overall tax design. German municipalities are entitled to a lower share in the revenue from shared taxes than in Poland but their share in the tax revenue of the public finance sector is still higher. A significant part of the tax revenue of municipalities in Germany comes from a relatively efficient trade tax.

A comprehensive evaluation of the scope of independence of local self-government units in both countries would require the taking into account of not only the level and structure of their tax revenue but also their revenue from other sources and the level and structure of their expenditure, taking into account tasks performed at various levels of the public finance sector.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
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18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015
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**Eco-innovations in the Business Practice of the
Companies Traded on the Warsaw Stock
Exchange – an Overview of Selected Results**

JEL Classification: *O13; O30; O32*

Keywords: *Eco-innovation; green economy; sustainability; environment*

Abstract: The main objective of our study is to identify and assess chosen aspects of eco-innovativeness of the companies listed within the indices: WIG Energy, WIG Oil & Gas, WIG Basic Materials on the Warsaw Stock Exchange. The scope of this analysis encompasses selected results which facilitate achieving environmental benefits. Our investigation, however, does not cover the expenditure on eco-innovative activities as well as the instruments measuring the influence of eco-innovation. The analysis of the investigated dilemma was based mainly on two research methods, namely survey analysis and digital and documentary source analysis. The results indicate a relatively high eco-innovativeness of the companies in terms of organizational and marketing activities, and low in product and services eco-innovativeness.

Introduction

Current sustainability research defines eco-innovation as a global challenge. The transition to Green Economy, based on the integration of economic, social and environmental factors, will depend on eco-innovation. According to the European rating of eco-innovation in 2013 (defined within

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Eco-Innovation Observatory - EIO), Poland is considered to be an outsider among EU countries. The research by Institute for Structural Research (ISR) attributes this situation to a relatively low awareness of eco-innovation, underestimation of cooperation in the process of eco-innovation and lack of knowledge regarding the implementation of eco-innovation.

The aim of our study is preliminary identification and evolution of eco-innovative activities (environmentally-friendly) in the business practice of the companies listed in the Warsaw Stock Exchange in the following indices: WIG Energy, WIG Oil & Gas, WIG Basic Materials, based on the methodology developed in the framework of international projects (OECD, 2005, MEI Project, 2007).

Some countries do lag behind, some do not, in terms of the development and introduction of eco-innovations. Often, the leadership in eco-innovations is accompanied by a leadership in environmental policy. Previous studies focused on examining the impact of environmental performance on the value of an enterprise, and researchers used various methods to study the effect of environmental performance on its value.

Most OECD countries have developed or improved national strategies to support eco-innovations. In the UE there are several studies analyzing and promoting eco-innovations, i.e. the EU Commission study: *Promoting Innovative Business Models with Environmental Benefits* (2008) which recommends a greater action to spread such business models which would estimate the potentials for economic and environmental benefits, and the ways in which the models can be promoted, and the *Environmental Technology Action Plan* (ETAP) which had invited EU members to develop eco-innovation roadmaps. "In the United States, environmental technologies are seen as a promising means of improving environmental conditions and are being promoted through various public-private partnership programmes" (OECD, 2008). Not only European countries or the United States, but also Asian countries promote eco – innovation, i.e. in Taiwan regulators, scholars, and two stock exchanges - Taiwan Stock Exchange Corporation (TSEC) and GreTai Securities Market (GTSM) – get involved in research projects (2010) and lawmaking to encourage or regulate firms to behave in socially (and environmentally) responsible ways.

Poland is at an early stage of developing environmental consciousness, however, the study on the impact of eco-innovations on the value of the company has not been carried out yet. By Eco-Innovation Observatory (EIO), Poland took second place significantly below the EU average (45 out of 100). For this reason the development and implementation of eco-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

innovative technologies are now supported by the key national and regional strategies. Still, some of the scholars conducted a research devoted to the effectiveness of SR investment (Socially Responsible) in which also environmental aspects were taken into account (Janik & Bartkowiak, 2013, pp. 25-33), (Janik, 2014, pp.25-36). There are also several research made about ecological activity in financial institutions (Dziawgo, 2014, pp. 9-24).

The concept of eco - innovation consists of two of separate parts: the ecology and innovation. The ecology according to the definition by Cary Institute of Ecosystem Studies is: “the scientific study of the processes influencing the distribution and abundance of organisms, the interactions among organisms, and the interactions between organisms and the transformation and flux of energy and matter” (CIES, 2015). While the innovation defined according to Oslo Manual (OECD, 2005) “is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practice”. Eco-innovation can be generally defined as innovation that result in a reduction of environmental impact, no matter whether or not that effect is intended. Below are presented the main definitions of eco-innovation in chronological order.

Table 5. Definition of eco-innovation

Author	Year	Definition
Fussel and James	1996	„New products and processes which provide customer and business value but significantly decrease environmental policy”
Klemmer	1999	“Techno-economic, organizational, social and institutional changes to an improved quality of the environment”
Driessen and Hillebrand	2002	Green innovation “does not have to be developed with the goal of reducing the environmental burden” but it “does however, yield significant environmental benefits”
OECD (Oslo Manual)	2005	“is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practice”.
Kemp and Pearson in MEI Report	2007	“Eco-innovation is the production, assimilation or exploitation of a product, production process, service or management or business method that is novel to the organization (developing or adopting it) and which results, throughout its life

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

		cycle, in a reduction of environmental risk, pollution and other negative impacts of resources use (including energy use) compared to relevant alternatives”.
Huppès, G. et al. in ECODRIVE Report	2008	Defined eco-innovation “as the combined improvement of economic and environmental performance of society”.
Oltra and Saint Jean	2009	“Innovations that consist of new or modified processes, practices, systems and products which benefit the environment and so contribute to environmental sustainability”
Eco Innovation Observatory (EIO)	2011	“Eco-innovation is any innovation that reduces the use of natural resources and decreases the release of harmful substances across the whole life-cycle”.

Source: Bitat, (2013) pp. 4-5; Driessen, & Hillebrand, (2002); EIO, (2011); Fussler, & James, (1996); Huppès, G. et al. (2008); OECD/Eurostat, (Oslo Manual), (2005); Oltra & Saint Jean, (2009).

Based on the analysis of literature (by OECD; Eurostat, 2005; Reid & Miedzinski, 2008), eco-innovation can be considered in the context of the three planes: target, mechanism, impact.

- Target (according to *Oslo Manual*, the target of an eco-innovation can be categorized under: products, processes, marketing methods, organizations, institutions).
- Mechanism (relates to the method by which the change in the eco-innovation target takes place).
- Impact (refers to the eco-innovation’s effect on environmental conditions across its live cycle).

The introductory paragraph outlines clearly state the objectives and motivation for writing the paper. The introduction should provide a context for the discussion in the body of the paper.

Methodology of the research

The research on the eco-innovativeness of companies is a relatively young discipline and the methodology used currently to measure eco-innovativeness constitute mostly the achievements of the last years. The first decade of 21th century brought along several huge international research projects on the area indicated above. One of their important result was the definition of clear typologies of eco-innovation and of adequate

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

methods of their measurement. In the subsequent part of this article, we will concentrate on the methodology of eco-innovation measurement in order to prepare a research tool facilitating the implementation of a planned empirical research.

Though current theoretical achievements in the area of eco-innovations took place mostly due to the past decade, still the methodological basis for eco-innovations and their measurement was set up much earlier. At the beginning of the 90s of 20th c. Acs and Audretsch noticed that eco-innovation might be assessed on the basis of the three following measuring tools: *input measures*, *intermediate output measures* and *direct output measures* (Acs & Audretsch, 1993, p.10). Within input measures they enumerated expenditure on research and development activities, personnel employed in R&D as well as expenditure on innovation. Intermediate output measures included the number of patents and academic publications concerning company's eco-innovativeness etc. whereas direct output measures encompassed the number of innovations, the description of individual innovations, the data about the sale of new products etc.

The above mentioned criteria of measurement were modified and developed with time as well as became more specified. To the above mentioned measures, *indirect impact measures* were added. They were identified by aggregate data concerning changes in the effectiveness of using the resources and productivity (based on *decomposition analysis*). Eco-efficiency is defined as „[...] the delivery of competitively-priced goods and services that satisfy human needs and bring quality of live, while progressively reducing ecological impacts and resource intensity throughout the lifecycle to a level at least in line with the earth's estimated carrying capacity" (WBCSD, 2000, p. 9). So, it is measured at the level of a product and service. Among the main ingredients of eco-efficiency the following are enumerated (Arundel & Kemp, 2009, p. 23):

- quantity of product produced (or sold), net sales, etc, as output indicators;
- energy consumption, from renewable sources and non-renewables;
- water consumption;
- greenhouse gas emissions (GHG);
- other emissions to air;
- total waste.

Current research concerning eco-innovation seem to concentrate on effects measures. It may be well shown by the classification of eco-innovation according to the MEI Project, which is based on the criteria of

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

innovation purpose. In this case, it is clearly visible that the attention is put on direct effects of eco-innovation process (see Table 1), however, two measures are combined together (which previously have never been joined), i.e. the measures of innovativeness and environmental ones. Among these measuring innovativeness we can find: the number of organizational innovations environmentally-friendly, the number of produced (and 'service') innovations beneficial to the environment and the number green system innovations, whereas the measure of environmental benefits was based on individual technologies used to control pollution and noise, managing waste, limiting water use, environmental monitoring etc.

Table 6. Eco-innovation measures according to MEI Project

Main measures	Detailed measures
Innovation measures	
Organizational innovation	<ul style="list-style-type: none"> – pollution preventions schemes – environmental management and auditing systems – chain management
Product and service innovation	<ul style="list-style-type: none"> – new or environmentally improved material products – green financial products – environmental services – services that are less pollution and resource intensive
Green system innovation	<ul style="list-style-type: none"> – alternative systems of production and consumption that are more environmentally benign than existing systems
Environmental measures	
Environmental technologies	<ul style="list-style-type: none"> – Pollution control technologies – Cleaning technologies – Cleaner process – Waste management equipment – Environmental monitoring – Green energy technologies – Water supply – Noise and vibration control

Source: Kemp & Pearson (2007, p. 10).

Due to a limited availability of data on particular aspects of eco-innovation in selected companies, in the further part of the article we will use a modified classification of innovation OECD/Eurostat (OECD, 2005). This classification divides innovation into four basic groups:

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

- *product* innovations require improvements to existing goods (or services) or the development of new goods. Product innovations in machinery in one firm are often process innovations in another firm;
- *process* innovations occur when a given amount of output (goods, services) can be produced with less input;
- *organizational* innovations include new forms of management, e.g. total quality management;
- *presentational* innovations refer to the implementation of new design and marketing methods in order to increase firms' sales.

In our research were selected public companies listed on the Warsaw Stock Exchange within the following indices: WIG Energy, WIG Oil & Gas, WIG Basic Materials were selected for the research. Such a selection was dedicated by a peculiarity of the activity, i.e. a potentially significant influence on the natural environment. Therefore, public companies operating in the above mentioned sectors should perform a relatively high level of environmental interests.

The analysis was based on the method of digital and documentary source analysis. Moreover, survey analysis method was also used, however, due to a low return of the questionnaires it was only supplementary. 20 companies were tested including nine companies listed in the WIG Energy index, seven in WIG Oil & Gas and four in WIG Basic materials. It should be emphasized that the examined sample included ten companies listed simultaneously in the RESPECT index (social responsibility index)¹, which as companies socially responsible are obliged to pro-environmental activities. The results of the analysis were presented in Table 3.

The effects of eco-innovation activities were presented in the division into 4 groups pursuant to the adopted methodology of measuring eco-innovation. The first group includes such companies which launched a new or significantly improved product and/or eco-innovation service confirmed by different certificates and distinctions onto the market. The second group encompasses such companies which introduced a new or significantly improved eco-innovative production process. It refers to modernization activities meant to introduce a process that would limit the emission of harmful gases, the liquidation of landfills both in the company area and its surroundings. The third group includes these companies which introduced new or significantly improved organizational eco-innovations such as organizational changes in environmental issues confirmed by proper certificates

¹ In the 8th (current) edition of the RESPECT project, there are 23 companies listed.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

(ISO 14001 concerns environmental management, Eco-Management and Audit Scheme - EMAS). The fourth group lists the companies which launched new or significantly improved marketing eco-innovations such as any visible ecological activities reported on their websites and/or social responsibility reports and other forms of educational activities promoting environmental protection (e.g. the participation in educational programs and projects).

Results

The majority of the examined companies is aware that investments in innovative and ecological technologies as well as raising ecological awareness are profitable to the company. The results presented in the Table below show an uneven distribution of particular types of eco-innovation.

Table 7. The results of eco-innovation activities

Type of eco-innovation	Companies in total	The number of companies divided by indices		
		WIG e	WIG p	WIG s
New or significantly improved eco-innovation product or service launched onto the market	2	1	-	1
New or significantly improved eco-innovation production process	9	9	-	-
New or significantly improved organizational eco-innovation	12	4	5	3
New or significantly improved marketing eco-innovation	12	5	4	3

Source: the authors' own analysis.

The biggest innovativeness is visible in organizational and marketing activities. It may be due to the fact that companies are aware of the benefits resulting from this type of eco-innovation. Among 12 companies which implemented organizational and marketing eco-innovations there are as many as 10 listed in the REPSECT index (all selected for the research). Clearly, the participation in the RESPECT index facilitates the development of organizational and marketing eco-innovations.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

All companies in the WIG Energy index introduced eco-innovative production process. Two companies operate only in the area of green energy and seven companies in this index produce a part of its energy from renewable sources (including wind, water and biomass energy). Similar eco-innovations have not been introduced by the remaining companies, namely companies specializing in oil and basic material. High process innovativeness in energy companies is a result of international and domestic regulations concerning the development of low-emission economy. In Poland the assumptions to develop renewable energy were defined in numerous governmental documents. The fundamental regulation concerning energy produced from renewable sources is the Energy Law Act. The law-maker imposed on energy companies the obligation to buy electrical energy and heat produced from renewable sources of energy. In practice, it obliges the companies, the producers of 'black' energy, to buy certificates of origin or to make a compensatory payment.

A significantly low eco-innovativeness is observed in products and services. Only two companies proved any activities in this area. It may be somehow explained by lack of both market and banking incentives for the development of this type of eco-innovation.

Conclusions

The analysis of eco-innovativeness of the companies listed within selected indices showed considerable differences in terms of particular types of implemented eco-innovations. The relatively highest activity was recorded in the area of organization and marketing. It may be due to a higher awareness of the image and competition benefits which result from obeying international standards in terms of environmental management as well as initiating such activities which are socially responsible. In this respect, a particularly high activity was observed in the companies listed simultaneously in the Respect index which includes socially responsible companies. Moreover, in terms of process innovations a considerable contrast may be observed between the companies from respective indices. All selected companies listed within the WIG Energy index implement eco-innovation activities whereas the 'representatives' of the remaining indices cannot boast of any new pro-environmental processes. This crucial disproportion is justified by international and domestic regulations concerning the development of low-emission economies, which to a much greater extent and directly refer only to the energy sector. The last examined type of eco-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

innovation in terms of product and/or services show an extremely low innovativeness of the companies. We detected only two cases of new products in our study (realized by two companies).

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18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
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**Social Capital as a Key Driver of Productivity
Growth of the Economy: Across-countries
Comparison**

JEL Classification: *I31; O11; O15; O3*

Keywords: *welfare; social capital; knowledge economy*

Abstract: The aim of this work was to show the possible impact of social capital on productivity of the economy. That impact can be measured by such indicators of productivity of the economy as used in our study: the GDP, the total value added of the economy (TVE), and the GNI per total labour force. Thus, this paper was organized as follows: its first part presents the relationship between the development of social capital and productivity growth of the country in the light of the economic development theory. In this context it is pointed out that the significance of social capital as a component of the productivity potential of a given country increases when such country moves to the next stages of economic development. Therefore, social capital becomes a very important driver of the upgrading of national incomes in those countries, in which competitive advantages are based primarily on intellectual capital assets. The other part of the paper describes the methodology and the results of a research conducted on a group of 100 countries in the years 2012-2013 with an aim to illustrate the link between social capital and productivity of the economy as a whole referred to, or indicated, in the first part of the study. The results of the research allowed us to formulate a conclusion that without an appropriate ethical behaviour, not only in business, the productivity growth is

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

hampered because it translates into a lower level of trust and unwillingness to cooperate. In other words, as, among others, W. Bartoszewski stressed, "it is worth to be decent".

Introduction

Social capital as an element of intellectual capital includes, according to specialists working for the World Bank, various institutions, linkages and relationships, norms and customs that determine the quality and quantity of a society's social interactions (<http://web.worldbank.org/wbsite/external/topics/exttsocialcapital> (1.03.2015)). Social capital understood in this way is an important component of a country's soft environment, which determines the further increase in the welfare level through facilitating cooperation and collective action. Cooperation requires the creation of various types of networks and the development of trust. P. Streeten (2002, p. 10) stresses that the ability to associate depends on the degree to which communities share norms, and out of such shared norms grows trust. For F. Fukuyama, trust is the existing belief in a given community that other members of that group are characterized by honesty and cooperative behavior based on shared values and principles (Fukuyama, 1997, p. 38).

In this work social capital is regarded as one of key drivers of the country's productivity growth through its impact on the welfare level of the economy. The Organization for Economic Cooperation and Development (OECD) stresses that a good understanding of the role and drivers of productivity growth is crucial to strengthening the recovery and improving growth and living standards in the longer term (OECD, 2013, p. 7). Therefore, the article discusses social capital in the light of its influences on the formation of the productive potential of the economy. It should be pointed out that the significance of social capital as a component of the productivity potential of a given country increases with moving by this country to the next stages of economic development. In other words, social capital becomes a very important driver of the upgrading of the national income in the countries in which competitive advantages are based primarily on intellectual capital assets.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The aim of this work is to show the possible impact of social capital on productivity of the economy. This paper is organized as follows. Its first part presents the notion of social capital and the link between development of social capital and productivity growth of the country in the light of the economic development theory.

The second part describes the methodological assumptions, the materials and the results of own research conducted on a group of 100 countries in the years 2012-2013. The aim of this research was to illustrate the mentioned links between social capital and productivity in the first part of the study. Based on the data sets of international institutions such as the World Economic Forum (WEF), the Legatum Institute (LI), and the United Nations Conference on Trade and Development (UNCTAD), the relationship among indexes of social capital and its selected dimensions as well as indicators of productivity of the economy as a whole, including the Gross Domestic Product (GDP), the total value added of the economy (TVE), and the Gross National Income (GNI) per total labour force, are analyzed. All those are based on statistical methods.

Social capital and productivity growth

The concept of social capital has been developed by many researchers; hence there are many definitions and explanations of this category. It should be emphasized in this place that the introduction of a category of social capital into economic science has enriched the latter with a socio-cultural context. The main areas of research into social capital have been set out, *inter alia*, by such great sociologists and economists as P. Bourdieu, J. Coleman, R. Putnam, D. North, M. Olson, S. Knack and F. Fukuyama.

Interesting and useful for further analysis seems to be the approach adopted by J. Coleman who describes social capital primarily as a social structure (network) made up of a variety of communities. He treats social capital as every aspect of an informal social organization that creates productive resources for one or more entities. Thus, social capital consists of institutions that enhance the benefits of an individual with cooperation and exchange (Coleman, 1988, p.95; Wildowicz-Gigiel, 2008, pp. 7-8, Libertowska, 2014, p. 96).

P. Bourdieu, in turn, defines social capital as the bonds and obligations based on reciprocity relations of human beings, which may be institutionalized in the form of social trust.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

R. Putman, the biggest promoter of social capital, understands it as “the totality of norms, networks, mutual trust and loyalty that occur in a particular social group”. He defines social capital as connections between individuals, norms and trust that arises from these relationships and can increase the productivity of a society by facilitating the coordination of activities (Przygodzki, 2004, pp. 94-95; Gajowski M., 2011, p. 57; Majewska, 2012, pp. 205-206; Majewska, 2013 a, p. 254).

F. Fukuyama was investigating social capital from a cultural perspective. A key category for him was trust. He stressed the economic dimension of trust and social capital. This approach to social capital has influenced our understanding of social capital presented in this article, because it takes into account the differences in the level of economic development of regions and countries.

In yet another explanation of social capital, the ability of people to cooperate and this cooperation being based on ethical norms and values shared by all members of a community (group) is emphasized. Social capital is therefore an immaterial effect of a collective action, the common good - both public and private.

Finally, we can say that social capital consists of norms and networks that support cooperation. Also the OECD’s definition of social capital states that it “networks together with shared norms, values and understandings that facilitate co-operation within or among groups” (Gellauff, 2003, pp. 1-2). The synergy effect, which occurs as a result of these links, and continued innovations lead to a more efficient use of production factors. In modern economies, social capital is one of the most important determinants of socio-economic development of countries.

Sociological theory distinguishes between two types of networks: bonding and bridging. Bonding, or strong-ties networks, consist of a closely knit set of connections within a specific group of people who are well aware of one another’s behaviour and reputation. These connections generally exist for a long period of time.

Bridging, or weak-ties networks, are much “thinner”. Contacts last shorter but extend to a larger group of people. People in bridging networks more easily connect with outsiders. Because of two types of networks, there are also two kinds of social capital. The main differences between the bonding and bridging social capital are the following (see: Gelauff, 2003, pp. 4-5):

- The bonding social capital is characterized by relatively low transaction costs required to make relationship-specific investments within groups,

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

and it is relatively easy to guarantee confidentiality. This situation creates economies of scale: information asymmetry is low, and it takes less effort for people to get acquainted with one another. Members of a group feel solidarity and are willing to help one another in difficult situations. On the other hand, however, antagonisms between group members and outsiders may appear, which may, consequently undermine standards that are appropriate for this particular group.

- Within the bridging social capital, members have more trust in people (which also more rapidly extends on people) from other places or other cultures or to people with other ideas. This characteristic increases the flexibility in building relationship-specific investments, generates diversity and reinforces motivation for innovation and entrepreneurship.

The long term trends show a shift from a bonding to a bridging social capital.

Various authors indicate three possible levels of analysis of this category of capital: micro, meso and macro levels (Kostro, 2005, p. 8; Łopaciuk-Gonczarek, 2012, pp. 8-9).

At the micro level (the level of a unit) the analysis focuses on the study of attitudes, relationships, norms and behaviours among individuals or groups who are in close relationships with one another (neighbourhood). The most important category which is analyzed at this level is cooperation. The unit is then examined in terms of its individual benefits from participating in networks of social relations.

At the meso level (the level of organization or community) the subject of the analysis is a group (social institution), which helps to build a greater community network and can benefit from its social capital. In this approach, social capital is a resource, which is conditioned by the existing social bonds.

And finally, at the macro level, social capital is treated as a public good and analyzed in relation to the whole of the society. Consequently, the political, social and cultural elements of the environment are taken into account, and the impact of formal institutional structures on the economic situation of society, welfare and the level of satisfaction is examined. Other important areas of study include an analysis of the credibility of a State, the scope of civil liberties available to citizens, the existence or lack of corruption and the efficiency of the administrative system of a given State.

To summarize, social capital can be viewed as the ability of a country to cooperate and work together in order to realize the common purpose of a

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

given community or network. Social capital consists of such dimensions like (see: <http://web.worldbank.org/wbsite/external/topics/exttsocialcapital>):

- different kinds of networks and collective actions,
- values and attitudes such as trust, solidarity, honesty, fairness, egalitarianism, sense of unity, equality of treatment,
- information and communication technology facilitating collaboration and increasing the transparency of government decisions,
- organizational structures, arrangements and solutions for cooperation between the private and public sectors.

The development of social capital may give many benefits. For example, social capital reduces transaction costs, corruption and the scope of social exclusion. Social capital also increases the degree of transparency and accountability of economic policy through the wider access of enterprises and citizens to information. It also strengthens cooperation between the public and private sector, which reduces the waste of public funds and increases the efficiency of jointly-implemented projects. Additionally, social capital facilitates knowledge diffusion and sharing. Those benefits of forming social capital lead to the productivity growth of the economy (see: Czapiński, 2014, p. 320; Majewska, 2013 a, 255-256; Josten, 2013, pp. 5-8; [http://web.worldbank.org/topics/social development](http://web.worldbank.org/topics/social%20development) (1.03.2015)).

However, obtainment of the above mentioned benefits of social capital depends on the level of economic development. For example, the level of trust is correlated with GDP *pc*, which indicator is often used as a proxy of prosperity. At the early stages of development, in countries that are only beginning to implement an industrialization strategy, industry located in rural areas (textile and food) is usually first to develop, and investments in more manufactured goods industries are being made much more later, first, simply to fulfil the needs of the internal market. That is why investments in human capital are so important. Governments of developing countries should also support domestic producers by making it possible to invest into different types of hard infrastructure and develop capital goods industries.

Only then will those economies start to open to foreign markets on a greater scale. In order to cope with international competition, domestic producers must implement technological improvements and learn from the rest of the world, absorb new knowledge, and, as a result, increase productivity, building together with the government a public and business environment in order to upgrade the prosperity of their own country. Thus, in such cases, human capital begins to become the main driving force of productivity growth.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

When it comes to medium-income countries, the economic policy of their respective governments should, among other things, focus on the strengthening of the industrial base and support domestic businesses in their innovation activities that require a good quality human capital. In these activities, what becomes an increasingly important task is the shaping of the socioeconomic structure of the economy, as its competitive advantages should change its character, in order to help a given country to maintain its productivity growth, and hence prosperity.

Due to the implementation of appropriate development strategies, comparative advantages can transform those based on raw materials and cheap labour in the direction of those based on capital and technology. Passing on to the next stages of economic development, frequently referred to as the knowledge economy, is closely related to the higher level of intellectual capital, of which an important part is social capital. Summing up, there is a systematic relationship between the socioeconomic structure of the country, the nature of the sources of productivity growth, and the kind of political economy, which in turn reflects its level of economic development. For example, in the opinion of J. Czapiński, the important role of a human capital as a factor of wealth growth in poorer countries explains why Poland has been so far developing at a good pace, irrespective of its low level of social capital. As Czapiński sees it, the continuation of investments in human capital may turn out insufficient to sustained development (see: Czapiński, 2014, pp.323-333; Jantón-Drozdowska & Majewska, 2013, pp.45-48; Rizwan et al., 2011, pp.270-277).

Failure to take into account the above-mentioned interactions (widely presented in literature on the achievements of the later stages of economic development) in research methodology could lead to a controversial conclusion that social capital does not increase productivity. This does not mean, however, that in an economy where the level of social capital is too low, or if there is so-called negative social capital, as is in the case of corruption and nepotism, its impact on productivity does not appear, or will not be an impediment to economic development (see for example: Streeten, 2002, p. 11-13).

Methodology and materials of the research

The study covered a group of 100 countries included in the rankings of the World Economic Forum, the Legatum Institute and the UNCTAD statistics. The research period covered the years 2012-2013 as it was possible

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

to obtain for that period the latest dataset which allowed us to estimate all selected indicators for the analysis of social capital and productivity for the economy as a whole.

The productivity measures for the total economy in our study are the GDP per total labour force (GDP *pe*), the present Total Value Added of the economy per total labour force (TVE *pe*) and the nominal GNI per total labour force (GNI *pe*). Gross National Income is defined as GDP plus net receipts from abroad of wages and salaries and of property income plus net taxes and subsidies receivable from abroad (see: OECD, 2013, pp. 14-32). The three indicators of economic performance and income levels of a given country: GDP, TVE, and GNI are expressed in current prices converted to U.S. dollars at official exchange rates. They are sourced from the UNCTAD statistics reports, such as total labour force data. The UNCTAD defines total labour force as persons aged 15 and older who are engaged or seeking work. Thus, the estimates of total labour force can be treated as potential employment of the economy.

This variable of potential employment of the economy has been decided upon since it was impossible to obtain data free on real employment and hours of work for such a large set of countries from other sources, such as for example the OECD or the International Labour Organization. The indicators of productivity level of the economy are calculated by dividing the GDP, TVE and GNI of a given country by its total labour force (<http://unctadstat.unctad.org/wds/reportFolders/reportFolders.aspx>). This dataset is presented in Table 1.

Table 8. GDP *pe*, TVE *pe*, GNI *pe* in USD in the surveyed group of countries in 2012

Country	GDP <i>pe</i>	TVE <i>pe</i>	GNI <i>pe</i>	Country	GDP <i>pe</i>	TVE <i>pe</i>	GNI <i>pe</i>
1 Norway	187596	167665	191367	51 Kazakhstan	23054	21651	19731
2 Switzerland	143761	136169	148376	52 Panama	21077	19996	19353
3 Kuwait	127312	131659	133699	53 Costa Rica	19614	18794	19074
4 Australia	128868	120170	125417	54 Jordan	17905	16609	17793
5 Denmark	106646	91828	109821	55 Algeria	17653	17326	16950
6 Sweden	103866	91181	106190	56 Romania	16441	14379	16301
7 United States	100966	100965	102419	57 Colombia	15985	14617	15346
8 Belgium	99998	89038	100956	58 Bulgaria	14741	12663	14400
9 Singapore	94810	89040	93735	59 Botswana	13435	12257	13066
10 Japa	90749	90136	93628	60 Namibia	13052	12146	13023
11 Kanada	94326	88954	92636	61 Dominican Republic	12817	12375	12327
12 Finland	91873	78993	91760	62 Peru	12726	11694	11614
13 Austria	90386	81725	89828	63 Jamaica	11703	10438	11360

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

14	France	87401	78331	88898	64	Tunisia	11455	10918	10882
15	Netherlands	86351	77519	87166	65	China	10289	10120	10099
16	Germany	81024	68126	82959	66	Macedonia	9969	8593	9822
17	Ireland	96653	86929	79376	67	Thailand	9611	9626	9237
18	Italy	79297	70977	78720	68	Egypt	8968	8579	8921
19	United Kingdom	76832	68027	76600	69	El Salvador	8881	8452	8534
20	United Arab Emiratem	72016	75073	74633	70	Guatemala	8290	8028	8046
21	Izrael	75314	68577	72954	71	Morocco	8166	7954	7887
22	Saudi Arabia	70550	70528	71640	72	Paraguay	7983	7250	7820
23	Hong Kong	69750	68946	71235	73	Mongolia	8298	7191	7750
24	New Zealand	71260	65865	67606	74	Ukraine	7698	6841	7617
25	Iceland	69764	61124	62052	75	Philippines	6148	6148	7338
26	Spain	56230	51597	55575	76	Indonesia	7214	7214	7005
27	Grece	46553	40972	46782	77	Sri Lanka	6765	6765	6633
28	Slovenia	43987	38244	43504	78	Moldova	5880	5024	6364
29	Tajwan	41808	40794	43152	79	Honduras	5833	5741	5429
30	Portugal	37520	32810	36605	80	Bolivia	5610	4477	5181
31	Czech Republic	36862	33084	34131	81	Nigeria	4945	4870	4534
32	Trinidad and Tobago	32601	32482	33919	82	Nicaragua	4186	3812	4070
33	Slovak Republic	32937	30120	32246	83	India	3828	3614	3790
34	Chile	32371	29637	30843	84	Pakistan	3402	3286	3578
35	Estonia	31914	27781	30391	85	Ghana	3711	3448	3533
36	Turkey	28756	25632	28748	86	Zambia	3663	3701	3365
37	Uruguay	28752	25898	27909	87	Cameroon	3012	2799	2841
38	Croatia	28753	24414	27749	88	Vietnam	2914	2914	2786
39	Hangary	28952	24248	27397	89	Kenya	2474	2207	2464
40	Wenezuela	27065	24821	26465	90	Senegal	2441	2138	2406
41	Russian Federation	26665	22697	25787	91	Mali	2235	2027	2127
42	Poland	26863	23793	25735	92	Bangladesh	1682	1590	1826
43	Lithuania	25585	23098	24765	93	Cambodia	1689	1592	1607
44	Argentyna	25234	22996	24697	94	Uganda	1519	1426	1484
45	Latria	24178	21619	24147	95	Zimbabwe	1397	1233	1365
46	Malaysia	24418	24153	23483	96	Rwanda	1285	1207	1271
47	Mexico	22887	22178	22553	97	Tanzania	1243	1143	1234
48	Brazil	21526	18290	21189	98	Mozambique	1257	1171	1209
49	Iran	20837	20665	20660	99	Nepal	1062	1000	1072
50	South Africa	20494	18415	20039	100	Ethiopia	956	889	954

Source: own calculation based on <http://unctadstat.unctad.org/ReportFolders/reportFolders.aspx>. (1.03.2015).

The surveyed countries are presented according to the level of GNI *pe* from the highest to the lowest position in this indicator of productivity in 2012. The comparison of three productivity indicators shows big differences in their highs across the surveyed countries. While only 26 countries

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

displayed the productivity level measured by three indicators higher than USD 50 000 per employee in 2012, 51 countries achieved the productivity level lower than USD 20 000 per employee. One of the many possible factors causing the observed divergence in productivity levels, can be social capital. Its role in driving the economic growth and changes in living standards, hence prosperity, is still growing in the present world economy.

Specialists working for the independent British research center the Legatum Institute argue that social networks and the cohesion that a society experiences when people trust one another have a direct effect on the prosperity of a country. Firstly, as a synthetic index of social capital in a given country, has been selected the index of the Legatum Institute. It is a part of the aggregate indicator of economic prosperity and quality of life. The Legatum Social Capital Index measures countries' performances in two areas: social cohesion and engagement, as well as community and family networks. In order to estimate this social capital index, the Legatum Institute assesses how factors such as volunteering, helping strangers, or donations to charitable organizations influence the economic and life satisfaction of the populace as a whole. The index also includes such dimensions of social capital as the levels of trust in a society, the manner in which citizens believe they can rely on others, and how marriage and religiosity provide support networks that improve wellbeing (<http://www.prosperity.com/social.aspx> (1.03.2015)).

The authors have added their own social capital index based on the indicators published in The Global Competitiveness Report 2013-2014. This year's Report features a number of 148 economies, and contains a detailed profile for each of the economies included in the study, as well as an extensive section of data tables with global rankings covering over 100 indicators. The indicators sourced from The Global Competitiveness Report included in our proposition of a social capital index, come from the executive opinion survey the participants of which are business executives. Respondents estimate the presence of a given factor in their country on the seven-point scale, where 1 refers to the lowest level of this factor, and 7 the highest (the best situation). Therefore, this aggregate social capital index puts more emphasis on the level of social capital from the business sector point of view than the Legatum Social Capital Index, and is called by authors the Business Social Capital Index. In constructing our aggregate index, and thus in the selection of variables, we remembered of the recommendation that individual indicators should describe different aspects of the analyzed phenomenon. Therefore, the two analyzed indexes of social capital, that is

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

the Legatum Institute's one and ours, are mutually complementary, creating together a more comprehensive overview of the social capital level in a given country.

The Business Social Capital Index includes 6 dimensions of social capital:

- a) Public trust in politicians: In your country, how would you rate the ethical standards of politicians? (1 = extremely low; 7 = extremely high) (WEF, 2013, p. 413).
- b) Transparency of government policymaking that affects business activities: In your country, how easy is it for businesses to obtain information about changes in government policies and regulations affecting their activities? (1 = extremely difficult; 7 = extremely easy) (WEF, 2013, p. 421).
- c) Ethical behavior of firms: In your country, how would you rate the corporate ethics of companies (ethical behavior in interactions with public officials, politicians and other firms)? (1 = extremely poor—among the worst in the world; 7 = excellent—among the best in the world) (WEF, 2013, p. 426).
- d) Cooperation in labor-employer relations: In your country, how would you characterize labor-employer relations? (1 = generally confrontational; 7 = generally cooperative) (WEF, 2013, p. 488).
- e) State of cluster development: In your country, how widespread are well-developed and deep clusters (geographic concentrations of firms, suppliers, producers of related products and services, and specialized institutions in a particular field)? (1 = nonexistent; 7 = widespread in many fields) (WEF, 2013, p. 526).
- f) University-industry collaboration in R&D: In your country, to what extent do business and universities collaborate on research and development (R&D)? (1 = do not collaborate at all; 7 = collaborate extensively) (WEF, 2013, p. 537).

Each component of the Business Social Capital Index has been assigned a weighting 0.166 (16.66%), which means that it is a symmetrical weighted aggregate index. The Business Social Capital Index was calculated according to a typical procedure. For each country, the total value of this index was calculated by summing the results of multiplying the 2012-2013 average values of 6 indicators presented in the World Economic Forum's annual Global Competitiveness Reports by the weight assigned to them (see: Archibugi & Coco, 2004, p. 175-179; Majewska, 2013 a, pp. 258-259).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Next, Spearman's rank and Pearson's linear correlation analysis were carried out to examine the relationship between social capital and productivity for the surveyed economies and for each distinguished group. Due to the above stressed fact that the role of social capital as a component of the productivity potential of a given country increases with achieving by this country the next stages of economic development, the 100 countries were divided in two groups composed of 50 economies each, according to their social capital level. First, in the Spearman's rank correlation analysis, the social capital level was measured the average position of its aggregate indexes. Then, in the Pearson's linear correlation and a cluster analysis, the sum of values of social capital indexes was measured. In the case of Spearman's rank correlation analysis, there was no need to normalize the data, because that analysis is carried out for the examined variables describing the 100 countries expressed in their positions according to these variables in the rankings considered in our study (see Table 2). Whereas all variables included in the Pearson's linear correlation and cluster analysis were transformed into natural logarithms, which is the recommended procedure in such studies (see.: Majewska, 2013 b, pp.177-178).

Then a cluster analysis was performed too, as it allowed examination of similarities and dissimilarities regarding the indicators of productivity and social capital's dimensions between the analysed groups of countries. The cluster analysis was carried out with the help of an agglomeration method based on Chebyshev and 1-r Pearson distances for grouping the features of a selected group of countries. The Chebyshev measure is a generalized version of Euclidean distance between variables, and it normalizes the differences in distances to the extent necessary for the identification of similarities and dissimilarities between the characteristics of countries divided into different social capital-level groups. In the case of 1-r Pearson measure of distance, variables are grouped for a given set of countries by way of inclusion of the Pearson's multiply correlation coefficients among a number of variables that are analyzed simultaneously. The coefficient of multiple correlation is a measure of how well a given variable can be predicted using a linear function of a set of other variables. This kind of measure of distance allows to present the results of the multidimensional relationships between the variables of productivity and social capital. The results of the two kinds of cluster analysis have been presented graphically in a dendrogram the branches of which represent distances between the examined variables for selected groups of countries.

Results of a research into the link between the level of social capital and productivity growth

In order to ensure comparability of data from different sources it was decided to compile the positions occupied by a given country of concerned rankings of social capital and productivity. Table 2 shows the positions of 100 countries obtained in analyzed rankings for the years 2012-2013. First place achieved by a country in all selected rankings means or the highest level of productivity indicator or the highest scale of social capital development (or its dimension like ethical behavior of firms) across surveyed economies. For example, in the Legatum Institute ranking of social capital (39 rank) and ethical behavior of firms (43), Poland achieved the best position, while it was placed in the worst for the indices of transparency of government policymaking affecting business activities (86) and for the state of cluster development (81). Therefore, in the Business Social Capital Index Poland attained much lower position – 69.

In 2012 the top 5 countries in the LSCI ranking were Norway, Denmark, Australia, the New Zealand, Finland, whereas the five countries classified at the lowest positions were Bangladesh, Turkey, Rwanda, Pakistan, and India. According to the BSCI ranking leaders in 2012-2013 were Singapore, Switzerland, Finland, Sweden, Norway, while the last five places were occupied by Greece, Nepal, Argentina, Algeria, and Venezuela. As regards the level of social capital, the measured average position in two its aggregate indexes, in the researched period among the top 5 countries were Norway, Finland, the New Zealand, the Netherlands, and Sweden. In 2012, the bottom 5 countries according to this indicator were Mozambique, Algeria, Nepal, Romania, Bangladesh.

Table 2. Countries' positions in different social capital and productivity rankings in 2012-2013

Country	Social Capital									2012		
	2012	2012-2013										
	LSC I	BSC I	PTP	TG PB	EBF	CL ER	SC D	UIC	GD P _{pe}	TV E _{pe}	GNI pe	
Algeria	86	97	69	95	95	94	90	100	55	54	55	
Argentyna	57	96	100	99	99	97	89	50	44	44	44	
Australia	3	23	26	38	17	70	31	14	3	4	4	
Austria	14	18	35	16	15	9	16	21	14	13	13	
Bangladesz	96	88	86	71	100	65	54	99	93	93	92	

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Belgium	16	22	21	42	19	55	19	6	8	10	8
Boliwia	81	66	41	91	73	78	67	57	80	81	80
Botswana	70	36	22	32	31	75	66	81	59	60	59
Brazil	53	55	89	80	63	59	23	41	49	53	48
Bulgaria	68	84	62	89	77	68	85	90	58	58	58
Cambodia	84	52	42	85	58	47	36	83	92	92	93
Cameron	89	82	79	41	83	87	71	88	87	88	87
Canada	8	14	11	14	11	22	17	17	11	11	11
Chile	56	24	24	13	23	28	42	35	34	34	34
China	25	26	19	34	39	41	22	30	65	65	65
Colombia	51	57	81	52	75	37	59	44	57	56	57
Costa Rica	54	28	50	37	32	13	39	31	53	51	53
Croatia	87	83	74	76	56	90	88	62	38	39	38
Czech Re- public	38	59	99	72	76	52	37	32	31	30	31
Denmark	2	15	12	40	7	3	29	20	5	6	5
Dominican Republic	61	73	96	49	78	32	65	74	61	59	61
Egipt	82	64	52	66	42	80	41	98	68	68	68
El Salvador	92	75	67	97	88	53	43	78	69	69	69
Estonia	26	25	30	17	29	21	62	33	35	35	35
Etiopia	75	80	44	90	94	83	93	61	100	100	100
Finland	5	3	6	2	2	17	11	2	12	14	12
France	35	29	28	43	20	92	27	29	15	15	14
Germany	15	10	15	19	13	15	4	8	17	22	16
Ghana	74	53	47	51	65	48	64	64	84	85	85
Grece	77	94	91	88	80	85	95	92	27	27	27
Gwatemala	73	41	84	30	55	18	38	46	71	70	70
Honduras	76	74	88	84	74	45	52	69	79	78	79
Hong Kong	22	9	13	3	14	7	10	19	25	20	23
Hangary	65	70	83	94	67	58	87	36	36	40	39
Iceland	13	22	34	21	16	11	46	23	24	25	25
India	100	40	75	44	62	42	15	39	83	84	83
Indonesia	23	30	39	46	47	31	25	27	75	73	76
Iran	93	69	33	93	59	88	76	73	51	49	49
Ireland	7	16	20	20	18	12	20	12	9	12	17
Izrael	19	27	45	53	27	39	32	7	20	21	21
Italy	33	68	93	98	72	93	2	48	18	18	18
Jamaica	41	62	73	73	69	63	47	54	63	64	63
Japan	18	12	23	12	9	8	7	16	13	8	10
Jordan	72	31	29	31	33	30	24	68	54	55	54
Kazakhstan	32	37	25	22	41	26	94	65	47	47	51
Kenya	64	43	53	62	57	51	44	34	89	89	89
Kuwait	47	58	40	81	52	43	68	93	4	3	3
Latvia	69	46	56	33	44	33	80	53	46	48	45
Lithuania	42	39	61	26	35	50	86	25	43	43	43

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Macedonia	83	51	46	35	54	67	73	66	66	67	66
Malaysia	79	17	16	18	24	16	13	15	45	41	46
Mali	45	77	70	96	82	36	61	94	91	91	91
Mexico	52	42	68	48	64	29	30	38	48	46	47
Moldova	67	92	77	58	86	54	100	97	78	79	78
Mongolia	28	89	80	75	84	76	98	87	70	74	73
Morocco	20	49	43	47	46	62	49	89	72	71	71
Mozambique	91	85	66	60	89	89	78	77	97	97	98
Namibia	78	47	37	56	38	71	63	59	60	61	60
Nepal	88	95	95	78	93	98	84	96	99	99	99
Netherlands	6	6	8	11	8	5	9	11	16	16	15
New Zealand	4	7	4	4	1	10	58	18	22	24	24
Nicaragua	85	65	48	67	68	61	77	72	82	82	82
Nigeria	71	78	78	79	92	69	53	75	81	80	81
Nowary	1	5	3	15	5	4	14	13	1	1	1
Pakistan	99	76	71	83	79	72	51	79	86	86	84
Panama	50	38	60	25	51	40	48	37	50	50	52
Paraguay	44	91	98	61	98	49	91	95	73	72	72
Peru	80	81	85	65	81	56	79	84	62	62	62
Philippines	59	45	57	68	50	24	45	55	77	77	75
Poland	39	67	64	86	43	60	81	58	41	42	42
Portugal	55	35	49	55	34	66	33	24	30	31	30
Romania	90	93	94	82	96	96	74	71	56	57	56
Russian Federation	58	72	54	74	71	77	92	51	42	45	41
Rwanda	98	20	7	6	21	23	56	49	96	96	96
Saudi Arabia	37	19	9	28	22	34	21	28	23	19	22
Senegal	95	60	55	45	61	38	82	80	90	90	90
Singapore	34	1	1	1	3	2	8	4	10	9	9
Slovak Republic	40	79	92	57	90	73	57	76	32	33	33
Slovenia	31	61	87	39	45	82	72	45	28	29	28
South Africa	66	40	63	27	30	100	35	26	52	52	50
Spain	29	48	65	63	40	74	34	40	26	26	26
Sri Lanka	27	54	58	50	53	35	50	91	76	76	77
Sweden	9	4	5	7	6	6	18	9	6	7	6
Switzerland	11	2	10	5	4	1	5	1	2	2	2
Tajwan	21	13	18	8	25	19	1	10	29	28	29
Tanzania	49	71	51	77	87	79	70	60	98	98	97
Thailand	17	44	82	69	49	25	28	42	67	66	67
Trinidad & Tobago	63	86	72	70	85	91	69	82	33	32	32
Tunisia	94	56	38	59	48	81	60	86	64	63	64
Turkey	97	32	27	29	36	57	26	43	37	37	36
Uganda	43	63	59	54	70	64	83	47	94	94	94

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Ukraine	48	90	76	92	91	86	97	63	74	75	74
United Arab Emirates	36	8	2	10	12	14	3	22	21	17	20
United Kingdom	12	11	17	9	10	20	12	5	19	23	19
United States	10	21	36	36	26	27	6	3	7	5	7
Uruguay	46	33	14	23	28	95	75	52	39	36	37
Venezuela	62	98	97	100	97	99	99	67	40	38	40
Vietnam	30	50	32	87	66	44	55	70	88	87	88
Zambia	24	34	31	24	37	46	40	56	85	83	86
Zimbabwe	60	87	90	64	60	84	96	85	95	95	95

Legend: LSCI - Legatum Social Capital Index, BSCI – Business Social Capital Index, PTP - public trust of politicians, TGPB – transparency of government policymaking affecting business activities, EBF - ethical behavior of firms, CLER – cooperation in labor-employer relations, SCD – state of cluster development, UIC – university-industry collaboration in R & D.

Source: own calculation based on WEF 2013, pp. 413, 421, 426, 488, 526, 537;
<http://unctadstat.unctad.org/ReportFolders/reportFolders.aspx>. (1.03.2015).

In 2012-2013 public trust in politicians was the highest in Singapore, the United Arab Emirates, Norway, the New Zealand, Sweden, and the lowest in Dominican Republic, Venezuela, Paraguay, Czech Republic, Argentina. In transparency of government policymaking affecting business activities, the best results across the surveyed countries achieved Singapore, Finland, Hong Kong, the New Zealand, and Switzerland. For businesses to obtain information about changes in government policies and regulations affecting their activities were the most difficult in Mali, El Salvador, Italy, Argentina and Venezuela.

In 2012 to the five countries classified at the highest positions in the ranking of ethical behavior of firms were the New Zealand, Finland, Singapore, Switzerland, and Norway. The lowest places in this dimension of social capital occupied Romania, Venezuela, Paraguay, Argentina, and Bangladesh. According to the cooperation in labor-employer relations ranking leaders in 2012 were Switzerland, Singapore, Denmark, Norway, and the Netherlands. The most confrontational labor-employer relations occurred in Romania, Argentina, Nepal, Venezuela, and the South Africa.

In 2012 to the top 5 surveyed countries, where the state of cluster development were the most widespread in many fields, belonged Taiwan, Italy, the United Arab Emirates, Germany, and Switzerland. In this dimension of social capital the ranking bottom reached Zimbabwe, Ukraine, Mongolia, Venezuela, and Moldova. In 2012 the five countries classified at the highest positions in the extent of university-industry collaboration in R&D were Switzerland, Finland, the United States, Singapore, and the United King-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

dom. The lowest places in this dimension of social capital attained Nepal, Moldova, Egypt, Bangladesh, Algeria.

Table 3 presents the results of the research obtained from estimating Spearman's rank correlation between positions of surveyed countries in rankings of social capital indexes, its dimensions, and productivity indicators in the years 2012-2013. In the case of a whole set of countries and a group of countries with the higher level of social capital all correlation coefficients are positive and statistically significant on the level 0.05. However, for a group of countries with the lower level of social capital all correlation coefficients are not statistically significant on the level 0.05. The same results obtained with the help of the method of Pearson's correlation analysis (Table 4), which was performed additionally to increase the reliability of the outcomes. In the case of Pearson's correlation analysis we correlated the values of social capital and productivity variables. Reminding, the values of variables have been previously standardized, and countries were divided into two groups of higher or lower level of social capital according to the sum of the values of LISCI and BSCI.

Table 3. Spearman's rank correlation coefficients across various indexes of social capital and productivity for a given group of researched countries in 2012-2013

	All researched country								
	ARSC	LSCI	BSCI	PTP	TGPB	EBF	CLER	SCD	UIC
GDP _{pc}	0.669*	0.641*	0.589*	0.448*	0.464*	0.658*	0.376*	0.504*	0.675*
TVE _{pc}	0.672*	0.639*	0.595*	0.455*	0.471*	0.661*	0.384*	0.514*	0.675*
GNI _{pc}	0.665*	0.633*	0.589*	0.448*	0.463*	0.658*	0.372*	0.510*	0.674*
	The first 50 researched countries according to the average rank of LISCI and BSCI								
	ARSC	LSCI	BSCI	PTP	TGPB	EBF	CLER	SCD	UIC
GDP _{pc}	0.646*	0.590*	0.620*	0.497*	0.393*	0.702*	0.400*	0.517*	0.707*
TVE _{pc}	0.627*	0.556*	0.622*	0.501*	0.400*	0.694*	0.412*	0.541*	0.689*
GNI _{pc}	0.631*	0.564*	0.622*	0.498*	0.395*	0.703*	0.402*	0.534*	0.699*
	The next 50 researched countries according to the average rank of LISCI and BSCI								
	ARSC	LSCI	BSCI	PTP	TGPB	EBF	CLER	SCD	UIC
GDP _{pc}	0.092	0.215	-0.072	-0.204	-0.134	0.121	-0.200	-0.103	0.189
TVE _{pc}	0.086	0.210	-0.073	-0.207	-0.127	0.117	-0.202	-0.095	0.187
GNI _{pc}	0.084	0.205	-0.073	-0.203	-0.127	0.119	-0.203	-0.096	0.189

Note: * coefficients statistically significant on the level 0.05.

Source: own calculation based on data from table 2.

The values of Spearman's rank correlation coefficients show that the higher position of a given country according to the level of social capital, the better place in the rankings of productivity. The considered links between an increase in social capital and a higher level of productivity has been confirmed also by Pearson's linear correlation analysis. Moreover the

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

research results have indicated that according to the theory of economic development path of a country, the significant impact of social capital on the level of prosperity appears only after a country has accumulated a sufficient stock of it. This requires different kinds long-term transformations in soft and hard infrastructure of the national economy.

An important component of such soft infrastructure is just social capital, including examined in this study its dimensions. The values of correlation coefficients presented in Table 3 and 4 indicate that the strongest interactions occur between the level of productivity and such dimensions of social capital as ethical behavior of firms and university-industry collaboration in R&D. The values of correlation coefficients are the lowest for the cooperation in labor-employer relations and transparency of government policy-making affecting business activities.

Table 4. Pearson's correlation coefficients across various indexes of social capital and productivity for a given group of researched countries in 2012-2013

	All researched country						
	SSCI	PTP	TGPB	EBF	CLER	SCD	UIC
GDP _{pe}	0.611*	0.431*	0.434*	0.669*	0.393*	0.498*	0.660*
TVE _{pe}	0.613*	0.437*	0.439*	0.671*	0.400*	0.510*	0.660*
GNI _{pe}	0.606*	0.433*	0.435*	0.670*	0.393*	0.502*	0.660*
	The first 50 researched countries according to the sum of LSCI and BSCI						
	SSCI	PTP	TGPB	EBF	CLER	SCD	UIC
GDP _{pe}	0.616*	0.469*	0.425*	0.706*	0.386*	0.533*	0.666*
TVE _{pe}	0.616*	0.479*	0.429*	0.706*	0.394*	0.546*	0.664*
GNI _{pe}	0.614*	0.474*	0.423*	0.708*	0.385*	0.544*	0.667*
	The next 50 researched countries according to the sum of LSCI and BSCI						
	SSCI	PTP	TGPB	EBF	CLER	SCD	UIC
GDP _{pe}	0.255	-0.114	-0.082	0.152	-0.122	-0.012	0.209
TVE _{pe}	0.250	-0.110	-0.076	0.154	-0.115	0.005	0.204
GNI _{pe}	0.248	-0.114	-0.079	0.151	-0.120	-0.015	0.206

Note: * coefficients statistically significant on the level 0.05.

Legend: SSCI - Sum of Legatum Social Capital Index and Business Social Capital Index.

Source: own calculation based on WEF 2013, pp. 413, 421, 426, 488, 526, 537;

<http://unctadstat.unctad.org/ReportFolders/reportFolders.aspx>. (1.03.2015).

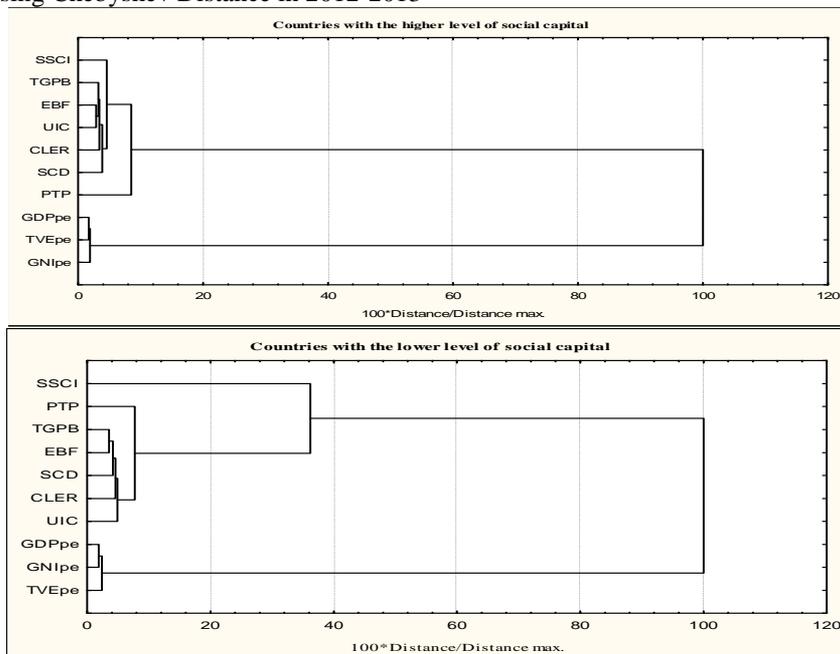
Two separate cluster analyses were made to check whether the above introduced characteristics of interactions between the productivity and social capital levels took place for the two groups composed of 50 economies divided according to the social capital level. In this case the social capital

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

level was measured by the following proxy - the sum of values of social capital indexes. The results of the cluster analysis here show which clusters of variables are more typical for these groups of countries.

The cluster analyses confirmed that for a group of countries with higher level of social capital are the strongest links between social capital and its dimensions and the value of productivity indicators than in the case of a group of countries with lower level of social capital. In two groups of analyzed countries we deal with one main clusters of productivity variables joined, at different longer nodes, by the second main cluster contained the variables of social capital. In the examined countries with higher level of social capital the variables of social capitals and the productivity indicators are closer in terms of distances between them. It is more visible in the case of 1-r Pearson measure of distance.

Figure 1. Dendrogram for Selected Variables of Surveyed Countries Clustered Using Chebyshev Distance in 2012-2013

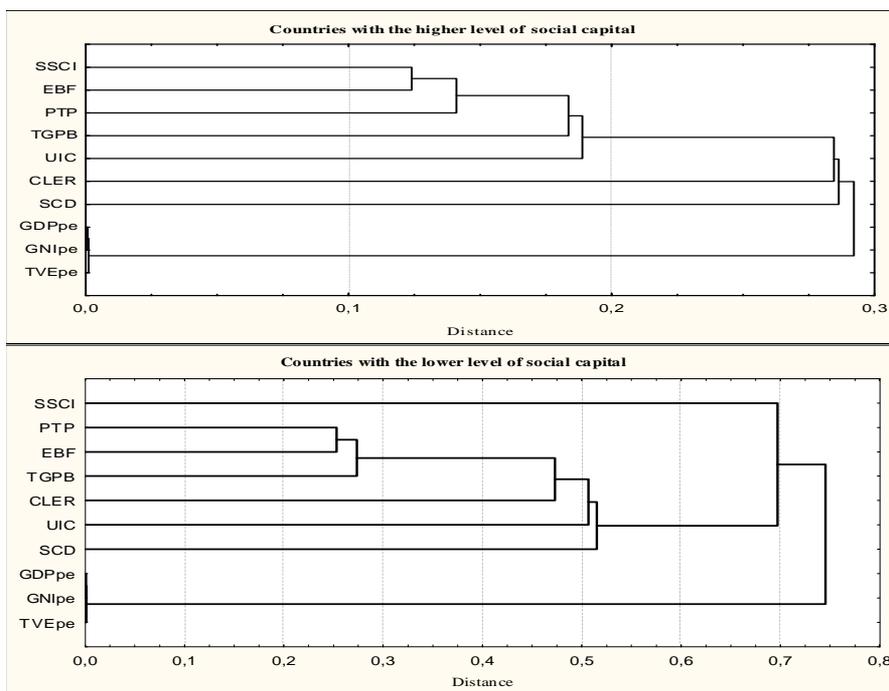


Source: own calculation based on WEF 2013, pp. 413, 421, 426, 488, 526, 537; <http://unctadstat.unctad.org/ReportFolders/reportFolders.aspx>. (1.03.2015).

Countries with higher level of social capital demonstrate therefore explicitly a larger similarity of analyzed features. Indicators of social capital and productivity change in a similar manner, and almost all at once, and their changes are correlated with each other. In other words, the variables that we have examined may influence one another more strongly in the group of countries with higher level of social capital than in the group of countries with lower level of social capital.

The results of our study again suggest that social capital in the high-income countries is more important element increases the productivity, comparing to countries with lower its level, where the drivers of productivity growth, and thus prosperity, are still different, which is explained by the economic development theory (see Introduction).

Figure 2. Dendrogram for Selected Variables of Surveyed Countries Clustered Using 1-rPerason Distance in 2012-2013



Source: own calculation based on WEF 2013, pp. 413, 421, 426, 488, 526, 537; <http://unctadstat.unctad.org/ReportFolders/reportFolders.aspx>. (1.03.2015).

Conclusions

The results of our study have shown that social capital is an important source of raising productivity of the national economy, provided that the country is already in a later stage of economic development. This is related to the fact that the previous growth drivers of wealth, associated mainly with the improvement of hard infrastructure and revenues from foreign trade based on labour-intensive and capital-intensive comparative advantages, have been diminishing.

To ensure further growth in productivity, certain actions will necessary, including actions aimed at the development of a soft business environment, strengthening of cooperation between the public and private sector, higher professionalization and better transparency of state policies. All these help to rebuild trust in socio-economic relations, but requires the promotion of ethics, fairness, and well understood social justice. This happens because without honesty and ethical behaviour, there is no trust, and without trust, there is no real cooperation and integration, or, consequently, resulting from them different types of synergies. Our research has led us to the conclusion that without appropriate ethical behavior productivity growth will be hampered, because it translates into a lower level of trust and unwillingness to cooperate. In other words, like for example W. Bartoszewski stresses, "it is worth to be decent".

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
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18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
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**Investment Attractiveness of Central
and Eastern European Countries in the light of
New Locational Advantages Development**

JEL Classification: *F21; O33; O52; O57*

Keywords: *investment attractiveness; Central and Eastern European countries*

Abstract: The aim of this work was to present the similarities between the components of competitiveness and investment attractiveness as two complementary categories, and to show the role of new locational advantages in determining the level of investment attractiveness of a country. The other objective of this paper was to provide a comparative analysis of Central and Eastern European countries in terms of their investment attractiveness. Thus this paper was organized as follows: the first part of the paper focused on a country competitiveness and the traditional and new location advantages that determine its investment attractiveness in view of direct investment inflows in the light of M. Porter's model of a diamond, an eclectic paradigm of J. H. Dunning and new growth theories. The second part presented the results of investment attractiveness analysis including selected countries of CEE in the years 1995-2013. Comparing the investment attractiveness of Central and Eastern European countries shows that rather a narrow group of countries attract a greater amount of FDI and many more countries have experienced a decline in FDI. Therefore, the research results allow the conclusion that Central and Eastern Europe reduced its investment attractiveness over the past years. This means that the majority of Central and Eastern European countries are becoming

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

less successful in attracting FDI, and therefore in shaping the environment in which foreign companies wish to conduct their business.

Introduction

The aim of this work is to present the similarities between the components of competitiveness and investment attractiveness as two complementary categories, and to show the role of new locational advantages in determining the level of investment attractiveness of a country. As it will be stressed during our consideration, competitiveness is frequently associated with productivity, where inputs are transformed into goods and services. Therefore it can be stated that the larger and faster of obtaining opportunities for productivity growth in a particular country or a group of countries, understood in this paper as the location of economic activity, the greater competitiveness of the area in attracting various types of investments. In the process of the upgrading of a country's competitiveness, and consequently its investment attractiveness, an increasing role is attributed to new locational advantages compared to traditional determinants of foreign investment inflow, the assets of which constitute intellectual capital.

The other objective of this paper is to provide a comparative analysis of Central and Eastern European countries in terms of their investment attractiveness. Thus this paper is organized as follows: the first part of the paper focuses on a country competitiveness and the traditional and new location advantages that determine its investment attractiveness in view of direct investment inflows in the light of M. Porter's model of a diamond, an eclectic paradigm of J. H. Dunning and new growth theories. The second part presents the results of investment attractiveness analysis including selected countries of Central and Eastern Europe (CEE) in the years 1995-2013. The source materials for analysis of investment attractiveness of CEE countries were data and indicators published by the United Nations Conference on Trade and Development (UNCTAD).

Competitiveness as a global category

Competitiveness is a complex and multidimensional concept that is applied widely to various social and economic circumstances. Consequently, there are many definitions of competitiveness used by different authors in various contexts and for varied research purposes. The concept of competitiveness, particularly in terms of its defining factors and measures, is not

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

unambiguous¹. There is no doubt however that this category is inextricably connected with performance of particular companies. When related to the enterprise, competitiveness means the capacity to compete in the global market. In this sense it is frequently understood as synonymous with the market share and gains of companies with significant shares in the product markets. Such a static approach to competitiveness can in no way be adopted as a yardstick for any analysis. A large market share is rather a result of a high competitive position of a company.

In relation to the entire economy, however, competitiveness can be defined as the capacity to produce and sell competitive products on the domestic and foreign markets, with the real income growing (Sachwald, 1994, p. 32). This condition is very important in the dynamic approach to competitiveness because economy must retain the capacity to grow and create possibilities for raising the society's standard of living. So, the productivity of employed resources, i.e. labor and capital, is more important both from the point of view of the companies and the economy as such. Productivity is the value of an output produced by a unit of labor or capital. Its level depends on the product quality and its characteristics as well as on the efficiency of production (see: Jantóń-Drozdowska, 1998, pp. 231-232).

The World Economic Forum (WEF) defines competitiveness as a set of institutions, policies and factors that determine the level of a country's productivity. The level of productivity, in turn, sets the level of prosperity that can be reached by an economy (WEF, 2013, p. 4). The WEF measures competitiveness using a global competitiveness index according to which a weighted average is composed of many different components that are grouped into 12 pillars of competitiveness: institutions, infrastructure, macroeconomic environment, health and primary education, higher education and training, goods market efficiency, labor market efficiency, financial market development, technological readiness, market size, business sophistication, innovation (WEF, 2013, pp. 4-9).

Competitiveness is treated as a global category but its various types or levels should be distinguished. Authors dealing with this problem suggest different approaches (see: Porter, 1990, Jantóń-Drozdowska, 1998, Nezeys, 1993). For the purpose of this study it seems justifiable to point out to three types of competitiveness, which allow combining the analysis in the micro-economic (company) and macroeconomic (economy) scale. They are:

¹ Different explanations for competitiveness have been reported by M. Porter (1990, pp. 3-6).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

- cost-price competitiveness,
- technological competitiveness, prerequisite for differentiation,
- structural competitiveness.

Gaining the competitive advantage in at least one of the three above mentioned areas, and assuming a good position in the other two, constitutes a condition for a success in the global market.

An organization operating in the competitive environment can gain advantage if its production costs are lower than those of its direct competitors. It means that it is able to use the productive elements in the most efficient way. The relative lowering of production costs allows an enterprise to:

- increase its sales and market share,
- generate more cash flow than its competitors do,
- survive recession in the economy or sector.

Companies that want to gain a competitive advantage in costs and prices can do that in a number of ways, which may link into the effect of experience (Porter, 1980, pp. 11-13, Jantón-Drozdowska, 1998, pp. 232-235). This category consists, first of all, of:

- economies of scale, which are related not only to the volume of production in the plant or company but also to other functional areas in the organization. Their realization optimizes all elements of the value chain. Economies of scale are essential to the competitor's differentiation not only at one time but also over the time: the value necessary to gain competitive advantage changes with the expansion of the market,
- permanent learning and job training of staff and management, which determines an increase in productivity and improvement of the system and operating concepts. Frequently, competitors are not able to lower the costs to the level of those of the leader by means of a simple increase in the productive capacity – this advantage is related to the time that they need to increase their professional knowledge,
- innovation, which is an essential element of the experience effect and the basis for differentiation. Innovation is usually understood as an improvement in technology and better methods of doing things. Innovation results in product and process changes, new approaches to marketing and new forms of distribution.

The cost of production and prices also depends on the environment in which an enterprise operates. It determines factors influencing the total unit cost which consists of labor cost, capital cost, tax charges and cost connected with the system of distribution. Moreover, the costs and product prices

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

are affected by the foreign rate, the exchange rate policy and increasing risk.

Porter argues that technological competitiveness of a company and a country is determined by investment and innovation. At the end of rational investment outlays companies create modern and efficient facilities, equipped with the most recent technology, bringing economies of scale. Acquiring technology through licenses and joint ventures is an investment that also enables gaining a competitive advantage. Investment ventures carried out by companies and governments result in improved productive elements and changed structures, strategies and competition (Porter, 1990, p. 549). Consequently the domestic demand, which influences the sales of produced goods, increases. The role of the state in stimulating investment should be underlined. Government's interventions in channeling capital towards particular industries may play an important role, promoting risk taking, providing temporary protection to encourage the entry of domestic rivals and the construction of efficient scale facilities, stimulating and influencing acquisition of foreign technology and encouraging exports (Porter, 1990, p. 551).

Investment is inextricably connected with innovation, which at the company level is essential for technology and product differentiation, and which in turn enables gaining segments of the global market under existing competitive conditions.

Next, at the industry level, factors determining the innovative activity are stimulated by the changes in demand and prices and the industry-specific technology. The latter is determined by the pressure of international competition and the rate of technological development. Technological advancement of suppliers and buyers is also of relevance.

At the country level, determinants of innovative activity can be presented in M. Porter's model of a diamond (Porter, 1990, p. 533, Jantón-Drozdowska, 2009, pp. 68-71), which covers four components: factor conditions, demand conditions, related and supporting industries, and finally firm strategy, structure and rivalry. Porter stresses, that a firm, an industry or a country, which wishes to be competitive should be able to create specialized factors. The more sophisticated the consumer demand is because of rising personal incomes, the higher level of education, increasing the desire for convenience, while the more invigorating role of domestic rivalry, the more it stimulates innovative activity.

Finally, structural competitiveness is most often described as an indicator of general performance which summarizes the set of non-price determi-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

nants of competitiveness. In the notion of structural competitiveness the sources of competitive advantage are especially emphasized. It is not just a composition of trade which brings the competitive advantage, but the structure of economy. In this approach competitiveness is the result of multiple interactions within national economies, and is systemic in nature. Some nations are more competitive because of a higher efficiency of their entire production and distribution systems and their capacity to innovate. This approach again introduces firms as crucial actors. One of the main components of structural competitiveness is the set of relationships between firms and their national environments.

The interactions between firms' and nations' competitiveness has two aspects. On the one hand, firms that operate in an economy determine its competitiveness, and on the other hand, firms are largely dependent upon their environment for their development. At this point we return again to the set of four factors (diamond) of M. Porter in which numerous interactions between firms' and nations' competitiveness are analyzed.

**Traditional and new locational advantages determining
investment attractiveness for FDI**

Nowadays, with increasing the global competition, countries have become influential in international business operations. Differences in national values, culture, economic structures, institutions and histories contribute to competitive success. The national environment influences national competitiveness through the development of particular characteristics of resources and capabilities and through its impact on the conditions for innovation. The impact of country competitiveness on FDI and TNC can be characterized by four points – they also decide on the country attractiveness (see: Shenkar & Lou, 2004, pp. 127-128):

1. country competitiveness affects an TNC's selection of its global operations location (by e.g. cheap labor, abundant materials, large market demand);
2. country competitiveness affects an TNC's industry selection. For diversified corporations, it is important to choose a foreign industry which will fit with its global product portfolio and benefit from industry structure differences between home and host countries. A country's competitiveness is industry-specific, that means that no country can maintain high competitiveness in every industry. Thus, a more important question

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

to solve by firms is which industry in the target country is superior in terms of environment and competitiveness;

3. country competitiveness affects an corporation's innovation and capability building. Trade and FDI pattern often reflect the sectors favored by a country's organizing and technological strength and these patterns promote further expansion and investment in these capabilities. The variations of country competitiveness relate to differences in organizational and institutional capabilities. So, investing and operating in a country with superior organizing and technological strengths companies can learn more from local partners and host country business;
4. country competitiveness affects an TNC's global strategy. As it was said above, a country's competitiveness is reflected in different elements, including among others rich resources, strong and sophisticated market demand, efficient government administration and superior infrastructure for innovation. This diversity enables companies to globally differentiate their internationally split up functions and businesses so as to leverage the advantage of various countries' competitiveness.

Country competitiveness should be then analyzed not only by international institutions and countries but also by transnational corporations to make a good decision where – in the sense of country and industry – to invest. This explains also why investment attractiveness is considered in the relevant literature either as a component of country competitiveness or as a result of competitiveness development by different institutions established for this purpose.

Country competitiveness is often viewed as combining the competitive advantage of firms and the comparative advantage of a territory. These two collectively contribute to the increase in social income. Therefore, a country's competitiveness can be studied at both the firm and the regional, levels, in the latter case covering also investment attractiveness analysis. This is related to the fact that researches of regional competitiveness frequently refer to M. Porter's model of a diamond as well. A good example is the definition of the European Commission for which regional competitiveness means the ability to produce goods and services which meet the test of international markets, whilst at the same time maintaining high and sustainable levels of income, or more generally, the ability of (regions) to generate, while being exposed to external competition, relatively high incomes and employments levels. In other words, for a region to be competitive it is important to ensure both quality and quantity of jobs (Budd & Hirmis,

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

2004, pp.1015-1028, Dimian & Danciu, 2011, pp. 67-78, the European Commission, 1999, pp. 71-146).

Countries, as locations of economic activity, compete with each other for investment through the ability to attract different types of international capital flows which requires knowledge and innovation. The transfer of innovations by international capital flows like FDI can stimulate the emergence of new knowledge generation and spillover effects of knowledge dissemination to other firms in the recipient area. In this situation FDI as a channel of knowledge spillovers and a factor stimulating local firms to learn in order to cope with the pressure of international competition can support the modernization and growth of technological progress in the recipient country. FDI can also help improve productivity by transferring soft technology to host country operations. Therefore, according to the specialists working for the UNCTAD, mobilizing investment and ensuring that it contributes to sustainable development is a priority for all countries (Budd & Hirmis, 2004, pp.1015-1028, Kitson et al., 2004, pp. 991-999, Majewska-Bator & Jantón-Drozdowska, 2007, pp. 115-127, UNCTAD, 2008, pp.149-168, Ushakov, 2011, pp. 159-169, UNCTAD, 2012, pp. 97-160).

In the literature of the subject, investment attractiveness is usually defined as a set of advantages and shortcomings of an investment location. Therefore, investment attractiveness can be seen as the cumulative outcome of a number of factors which create an environment that influences the business activities of all enterprises located there. An assessment of investment attractiveness is the basis for selecting a particular location where foreign investments will be carried out. Foreign investors, choosing the future location of capital investment, first assess the attractiveness and risks associated with a given region, and then the attractiveness of a local market. The second component of the eclectic paradigm (OLI) is the locational attractions (L) of alternative areas, for undertaking the value adding activities of MNEs. The locational advantages of countries in the eclectic paradigm are a key determinant of the foreign production of MNEs. According to Dunning the more the immobile, natural and created endowments which firms need to use jointly with their own competitive advantages favor a presence in a foreign, rather than domestic, location, the more firms will choose to augment or exploit their ownership (O) specific advantages by engaging in FDI. J. H. Dunning argue that explanatory variables of investment attractiveness differ according to the motives for FDI, its sectoral composition, the home and host countries of the investing firms, and a variety of firm specific considerations. The dependence on the adopted busi-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

ness internalization strategy is also attributed to different meanings of individual factors that determine investment attractiveness (Dunning, 1998, pp. pp. 45-66, Dunning, 2002, pp. 83-99, Jantoń-Drozdowska & Majewska, 2002, pp. 231-251, Majewska, 2005, pp. 79-110, Dunning & Lundan, 2008, pp. 93-115, Pierścioneck, 2011, pp. 115-119, Hildebrandt et al., 2013, pp.5-6).

Investment attractiveness can be measured by many factors that are very often called, following the eclectic paradigm of J. H. Dunning, locational attractions or specific advantages of different host countries. These factors create jointly an optimum portfolio of locational advantages of a given recipient territory. There are mainly economic, social and political features of the country in which firms are seeking to invest. Dunning, like other authors, emphasizes the emergence of new locational variables as a result of the knowledge based economy's development and the growing importance of various types of network relations within which a business can be more easily and effectively run on domestic and foreign markets. As Dunning described, this is connected with systematic structural changes in the global economy – notably, the maturation of the knowledge based economy and the emergence of the Internet as a dominant technological force, as well as an increase in intellectual capital and other kinds of intangible assets. Dunning argues that these systematic changes and their geographical significance have fundamentally altered the parameters affecting the locational preferences of firm and the actions which have to be taken by national and sub-national governments. Therefore, Dunning stresses that governments need to give more attention to identifying and providing the locational bound resources and capabilities sought by foreign investors: asset of unique (and non-imitable) competitive advantages.

The increasing importance of new type of locational determinants has caused that in shaping a favorable environment for FDI should start to focus more on government policies aiming to develop endogenous comparative advantages in terms of a new growth theory. According to new growth theories the structural changes in a country speed up owing to the creation and implementation of innovations and by creating infrastructure allowing to facilitate the emergence of knowledge spillovers and their external effects. In this context, Dunning emphasizes the role of private and public created location bound assets like for example supportive educational and technological infrastructure, and the role of governments in encouraging entrepreneurship and the innovatory contributions of small and medium-sized enterprises. In other words, governments should provide the appropri-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

ate economic and social infrastructure that creates an environment useful for the development of distinctive and hard to copy locational bound created assets.

It should be noted here, that not all enterprises will be seeking a new type of assets in foreign markets because the FDI motives continue to be the more traditional locational advantages of host countries, such as variables of labor, materials and transports costs, or the size and prosperity of the local market. In this context, scholars have identified four main types of foreign-based MNE activity: market seeking or demand oriented FDI, resources seeking (e.g. minerals, unskilled labor) or supply oriented FDI, rationalized or efficiency seeking FDI, and strategic assets seeking FDI.

A good example of foreign investors who sought traditional locational advantages was FDI in the period of political and economic transformation in Central and Eastern Europe countries. Then the integration with the global economy led to inflows of foreign investments mainly looking for markets and resources. Underfinanced, and infrastructure-delayed Central and Eastern Europe during the transition period was perceived as an attractive market for investment to many Western companies, primary in labor- and resources-intensive industries. Firms invested in this area through different types of economic links with local companies like joint ventures and other strategic alliances. It was preceded by an analysis of investment risk and locational advantages of CEE countries depending on the strategic objectives of foreign investors (Porter, 1994, pp. 35-39, Dunning, 1995, pp. 461-491, Dunning, 1998, pp. 45-66, Dunning, 2002, pp. 2-29, 83-93, 121-134, Jantoń-Drozdowska & Majewska, 2002, pp. 231-251, Dunning & Lundan, 2008, pp. 63-78, 116-144, 383-399, Majewska-Bator, 2010, pp. 48-63, Dimian & Danciu, 2011, pp. 67-78).

For example, according to the endogenous growth theory, the key determinants of a country's competitiveness in terms of investment attractiveness are the following factors associated with strategic assets seeking FDI (Dunning, 2002, pp. 95-97, 121-128, 185-186, Majewska-Bator, 2010, pp. 141-203, Dimian & Danciu, 2011, pp. 67-78, Hildebrandt et al., 2013, pp. 15-40):

- quality of national and local infrastructure and institutional competence in the area of accumulation of knowledge, exchange of information, and improving learning experiences.
- different kinds of expenditures on information and communication technology (ICT).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

- different kinds of expenditures on research and development and other instruments of economic policy conducive to the intensification of business R&D activities and knowledge accumulation, which is connected with spatially related innovations and local firm-specific knowledge-intensive assets useful in the wealth-creating process.
- investment in human capital, especially in the growth of technical knowledge resources, quality of state educational systems and education level of human capital, the effects of which are visible in the availability and price of skilled and professional labor.
- activities that foster entrepreneurship and collective learning connected with the availability of local partners to jointly promote knowledge.
- effective dissemination of knowledge and supporting this process through the creation of information and social collaborative networks.
- specialized areas like various type clusters and techno-parks and their spillover and synergies effects.
- Whereas the traditional locational advantages include, among others, such factors as:
 - the presence and cost of traditional factors endowments, e.g. availability, quality and price of natural resources and labor, exchange rate, transportation costs, comparative advantages of immobile assets like labor, land, and artificial barriers to trade.
 - demand levels and patterns associated with current and future capacity of sales markets and the level of economic development.
 - external economies of scale and scope, e.g. urbanization economies as the availability of transport and communications facilities and municipal services, the availability of a specialized business service not specific to a particular activity, a pool of qualified labor, supply related clusters and the availability and quality of adjacent markets, and the degree to which firms can exploit them in a given location.
 - availability of financing, fiscal incentives, quality of administrative and legislative framework, opening and functioning of markets, legal regulations concerning operation of foreign business entities and special privileges for foreign investors.
 - various types of hard and soft infrastructure like the physical facilities as transportation, electricity and telecommunications infrastructures, institutions and organizational structures and social infrastructure (e.g. health or labor market infrastructure).
- distance related transaction costs as inter-country cultural differences, e.g. the need for marketing research and negotiation costs.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

- macroeconomic circumstances for maintaining sustainable development, such as political risk and rapid changes in exchange rates, the levels of inflation, interest rates, unemployment indicators, GDP and other variables influencing economic growth and development (Dunning, 1995, pp. 461-491, Dunning, 2002, pp. 95-96, Jantoń-Drozdowska et al., 2002, pp. 231-251, Jantoń-Drozdowska & Majewska, 2002, pp. 231-251, Budd & Hirmis, 2004, pp. 1015-1028, UNCTAD, 2014, pp. 106-114).

Methodology of the research

Due to the availability of data in a comparative analysis of investment attractiveness of Central and Eastern European countries it has been decided to include the following 17 economies: Albania, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Moldova, Poland, Romania, Russian Federation, Slovak Republic, Slovenia, Ukraine. Remaining the research period is the years 1995-2013 and surveyed materials cover the data of UNCTAD.

Firstly, the inward FDI attraction indexes of CEE countries have been calculated by the authors based on the methodology used by UNCTAD for the period 1995-2013. It was decided to own calculations, as UNCTAD published only these indicators for the years 2000-2011. The inward FDI attraction indexes proposed by UNCTAD's experts rank countries by the FDI they receive in absolute terms and relative to their economic size. It is the average of a country's rankings in FDI inflows and in FDI inflows as a share of GDP. This index according to the specialist working for UNCTAD is more relevant because FDI flows can fluctuate significantly year on year, and direct investment decisions can span more than one year and imply long-term commitments (UNCTAD, 2012, p. 30).

Secondly, we assumed that a progress in the development of new locational determinants of FDI inflow by CEE countries can be observed in the changes of character of their comparative advantages for example thanks to the proxy of merchandise trade specialization index calculated by the UNCTAD secretariat. As it was described, new locational advantages are connected with acquiring knowledge and innovation activity and thus a segmentation criterion of trade structure was chosen the degree of technological sophistication. Using the UNCTAD data in the study taken into account the following groups of products:

1. Primary commodities, precious stones and non-monetary gold (PC).
2. Manufactured goods by degree of manufacturing:

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

- Labor-intensive and resource-intensive manufactures (LRM).
- Low-skill and technology-intensive manufactures (LSM).
- Medium-skill and technology-intensive manufactures (MSM).
- High-skill and technology-intensive manufactures (HSM).

Values of merchandise trade specialization index (TSI) are used to measure the degree of specialization in the production/consumption of goods through trade. It compares the net flow of goods (exports minus imports) to the total flow of goods (exports plus imports). This is also known as normalized trade balance by product. The formula of this index is as follows: $TSI_{ji} = X_{ij} - M_{ij} / X_{ij} + M_{ij}$, where i is product or product groups, j economy, X_{ij} economy's j exports of goods i , M_{ij} economy's j imports of goods i .

The range of values is between -1 and 1, the positive value indicates that an economy has net exports (hence it specializes on the production of that specific product) and negative values means that an economy imports more than it exports (net consumption). This index removes bias of high exports values due to significant re-exports activities, thus it is more suitable to identify real producers than traders (UNCTADstat: <http://unctadstat.unctad.org/TableViewer/summary.aspx>., access data: 10.12.2014).

The values of merchandise trade specialization indexes of CEE countries are presented together with the volumes of inward FDI stocks and inflows expressed in USD at current prices and current exchange rates per capita in 1995-2013. A comparison of variations in the volumes of FDI stocks and inflows per capita shows again, like in the case of inward FDI attraction indexes, the changes in investment attractiveness of CEE countries. In measuring success in attracting FDI by countries using stocks shows long-term commitments of foreign investors, and if policy initiatives to improve FDI attraction have an effect.

Then, it was decided to perform the linear correlation method to verify which export groups in terms of technological sophistication probably stimulated the most FDI inflows to the observed countries of CEE in three periods 1995-2013, 1995-2004 and 2005-2013. As it was above stressed this kind of export structure according to the level of technological sophistication reflects comparative advantages of countries and can stimulate FDI inflows of a specific profile, e.g. strategic assets-seeking FDI or resource-seeking FDI. The observed variables, i.e. the variation in the size of exports groups and FDI inflows, were expressed in USD at current prices and current exchange rates. All included in correlation analysis variables were

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

transformed into natural logarithms. The Pearson's correlation analysis also was accounted for the time delays in which the independent variable being a given export group in year t_0 , is the cause of the emergence of the phenomenon being explained, i.e. it refers to a change of the size of inflow of FDI in year t_{+1} .

**Research results of Central and Eastern European countries
investment attractiveness**

In table 1 are presented the positions of researched countries according to calculated inward FDI attraction indexes obtained first in a group of 17 CEE economies and second in a ranking of 195 countries included in the study. Were also calculated the changes in ranks of surveyed countries for for the whole analyzed period.

In 2013 the first four places in the ranking of CEE countries according to the values of inward FDI attraction indexes occupied the Russian Federation, the Czech Republic, Albania and Belarus. The last positions took Poland, Slovenia, Slovakia and Lithuania. In 1995 first four positions gained Hungary, Slovakia, the Czech Republic and Poland, and the last four Bosnia and Herzegovina, Belarus, Croatia and Bulgaria. Therefore, in the years 1995-2013 Belarus recorded the highest rise in the ranking by 12 positions, and Poland and Slovakia, the biggest drop of 13 places.

In the years 1995-2013 the largest increases in the ranks of CEE countries according to the inward FDI attraction indexes among of all 195 economies experienced Belarus, Bosnia and Herzegovina, and the Russian Federation. In the whole analyzed period the greatest decline recorded Poland, Slovakia and Slovenia. In the first 10 years of the research period, that is 1995-2004, Bosnia and Herzegovina (up 107 ranks), Bulgaria (up 83 ranks) and Romania (up 51 ranks) stimulated the most FDI inflows relative to their economic size. In 1995-2004 the drop in FDI inflows occurred only in the case of Hungary (down 39 ranks), the Czech Republic (down 17 ranks), Slovakia (down 14 ranks), Moldavia (down 13 ranks) and Latvia (down 11 ranks). In the next 9 years, that means 2005-2013, their positions in this respect increased only three countries: Belarus (up 51 ranks), Albania (up 47 ranks) and the Russian Federation (28 ranks). In turn in this period, the greatest decreases of investment attractiveness characterized Poland (down 135 ranks), Slovakia (down 95 ranks), Slovenia (down 80 ranks) and Croatia (down 66 ranks). Moreover, among the 14 CEE countries that have worsened their ranks in the volume of FDI inflows relative to their econom-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

ic size, the smallest decline in this category has reached Latvia, and it was up to 20 places.

Table 9. The ranking of CEE countries according to inward FDI attraction index, 1995-2013

Country	a. Position of country in the group of 195 economies b. Position of country in the group of 17 CEE economies										A change of position	
	1995		2000		2005		2010		2013		1995-2013	
	a.	b.	a.	b.	a.	b.	a.	b.	a.	b.	a.	b.
Albania	79	9	90	12	104	15	61	5	57	2	22	7
Belarus	146	16	127	16	129	17	94	9	78	4	68	12
Bosnia and Herzegovina	179	17	105	15	99	14	112	14	129	12	51	5
Bulgaria	105	14	41	4	30	4	81	7	90	9	15	5
Croatia	112	15	57	6	69	10	135	16	135	13	-23	2
Czech Republic	32	3	29	2	24	1	66	6	72	3	-40	0
Estonia	53	5	57	7	28	2	56	3	86	7	-33	-2
Hungary	13	1	43	5	35	5	99	11	80	5	-67	-4
Latvia	61	6	64	8	77	11	128	15	102	10	-41	-4
Lithuania	99	13	82	11	77	12	108	12	135	14	-36	-1
Moldova	76	7	64	9	84	13	109	13	113	11	-37	-4
Poland	42	4	39	3	59	8	60	4	194	17	-152	-13
Romania	77	8	74	10	39	6	91	8	86	8	-9	0
Russian Federation	81	10	93	13	68	9	55	2	40	1	41	9
Slovakia	15	2	26	1	45	7	97	10	140	15	-125	-13
Slovenia	93	11	130	17	111	16	141	17	191	16	-98	-5
Ukraine	98	12	94	14	28	3	51	1	82	6	16	6

Source: own calculations, based on: <http://unctadstat.unctad.org/ReportFolders/reportFolders.aspx>. (10.12.2014).

Table 2 presents the sizes of inward FDI stocks and inflows per capita and the values of merchandise trade specialization index for CEE countries in 1995-2013. The biggest success in attracting FDI at a longer time frame in absolute terms gained Estonia, the Czech Republic, Hungary and Slovakia – all these countries obtained FDI stocks per capita higher than 10000 USD in 2013. The smallest long-term commitments of foreign investors occurred in the case of Moldova, Ukraine, Belarus and Albania - all these countries obtained FDI stocks per capita lower than 2000 USD in 2013. The largest increases of FDI stocks per capita in the absolute terms in the researched period recorded again Estonia (16 493 USD), the Czech Republic (12 374 USD), Slovakia (10 674) and Hungary (10 614 USD), and the

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

lowest increases Moldova (1048 USD), Ukraine (1686 USD), Belarus (1785 USD) and Albania (1898 USD).

In the researched period the average FDI inflows to the observed CEE countries were the largest sizes in 2005-2008 – precisely in 2005 446 USD, in 2006 518 USD, in 2007 713 USD, in 2008 652 USD. In 2013 the average FDI inflow per capita to the observed seventeen CEE countries was only 213 USD. In 2013 to the top 5 CEE countries in the size of FDI inflow per capita belonged Estonia, the Russian Federation, the Czech Republic, Latvia and Albania, and among the five countries classified at the lowest positions were Slovenia, Poland, Moldova, Ukraine and Bosnia and Herzegovina. Moreover, in the case of Slovenia and Poland the FDI inflows per capita attained a minus value. In the last five considered years 2009-2013 the largest average FDI inflows per capita occurred in Estonia (964 USD), Hungary (552 USD), the Czech Republic (459 USD), Latvia (373 USD) and the Russian Federation (369 USD), and the smallest in Slovenia (-4 USD), Moldova (63 USD), Bosnia and Herzegovina (96 USD), Ukraine 132 USD) and Romania (153 USD). Thus these sizes of average FDI inflows can indicate which countries' policy initiatives had lately the biggest effect in attracting inward FDI.

Table 2. Inward FDI stock and flows in USD at current prices and current exchange rates per capita and merchandise trade specialization indexes for CEE countries, 1995-2013

Year	FDI pc		PP	LRM	LSM	MSM	HSM
	stock	inflow					
Albania							
1995	63	21	-0.705	-0.519	-0.603	-0.938	-0.881
2000	75	44	-0.763	-0.263	-0.530	-0.896	-0.912
2005	319	83	-0.646	-0.255	-0.646	-0.881	-0.916
2010	1033	334	-0.457	-0.181	-0.460	-0.837	-0.876
2012	1462	271	-0.357	-0.113	-0.383	-0.828	-0.869
2013	1923	386	-	-	-	-	-
Belarus							
1995	5	1	-0.051	0.156	-0.308	-0.234	0.055
2000	131	12	-0.288	0.282	-0.142	0.154	-0.085
2005	247	32	-0.035	0.268	-0.137	0.061	-0.035
2010	1044	147	-0.205	0.054	-0.265	-0.109	-0.089
2012	1551	156	-0.040	0.074	-0.273	-0.026	0.188
2013	1788	239	-	-	-	-	-
Bosnia and Herzegovina							
1995	0	0	-0.766	-0.626	-0.667	-0.736	-0.910
2000	282	38	-0.257	-0.356	-0.570	-0.792	-0.798

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

2005	593	91	-0.372	-0.398	-0.380	-0.587	-0.837
2010	1729	106	-0.283	-0.106	-0.165	-0.376	-0.709
2012	1929	96	-0.369	-0.063	-0.067	-0.336	-0.669
2013	2107	87	-	-	-	-	-
Bulgaria							
1995	53	11	-0.157	0.110	0.419	-0.136	0.079
2000	338	127	-0.163	0.063	0.155	-0.463	-0.301
2005	1803	510	0.142	0.051	-0.078	-0.516	-0.436
2010	6392	206	-0.038	0.058	-0.174	-0.175	-0.306
2012	6766	189	-0.037	0.092	-0.192	-0.137	-0.337
2013	7285	201	-	-	-	-	-
Croatia							
1995	106	22	-0.264	0.101	-0.156	-0.525	-0.214
2000	625	235	-0.268	-0.047	0.021	-0.585	-0.408
2005	3315	416	-0.290	-0.172	-0.264	-0.529	-0.463
2010	8083	113	-0.270	-0.161	-0.014	-0.320	-0.406
2012	7372	315	-0.268	-0.132	-0.150	-0.248	-0.387
2013	7572	135	-	-	-	-	-
Czech Republic							
1995	711	248	-0.185	0.174	0.181	-0.114	-0.304
2000	2111	486	-0.284	0.123	0.081	0.089	-0.310
2005	5929	1139	-0.221	0.079	0.059	0.173	-0.116
2010	12176	582	-0.202	0.030	0.009	0.217	-0.087
2012	12799	749	-0.203	0.047	0.050	0.234	-0.032
2013	12705	466	-	-	-	-	-
Estonia							
1995	470	141	-0.032	0.020	-0.264	-0.389	-0.306
2000	1936	286	-0.044	0.093	-0.480	-0.492	-0.033
2005	8511	2165	-0.068	0.100	-0.294	-0.316	-0.122
2010	12858	1231	-0.007	0.121	-0.092	-0.014	-0.082
2012	14992	1175	-0.131	0.106	-0.229	-0.117	-0.065
2013	16664	738	-	-	-	-	-
Hungary							
1995	1092	493	-0.010	-0.065	-0.174	-0.068	-0.257
2000	2237	270	-0.039	-0.036	-0.237	-0.061	-0.019
2005	6053	764	-0.206	-0.053	-0.190	-0.007	0.097
2010	9064	220	-0.159	0.044	-0.110	0.145	0.118
2012	10373	1402	-0.109	0.086	-0.103	0.194	0.083
2013	11152	311	-	-	-	-	-
Latvia							
1995	247	72	-0.088	0.115	-0.073	-0.420	-0.496
2000	879	174	-0.049	0.060	-0.224	-0.712	-0.611
2005	2213	317	-0.097	0.038	-0.162	-0.568	-0.517
2010	5143	182	-0.035	0.083	0.001	-0.200	-0.271
2012	6589	538	-0.062	0.085	0.024	-0.288	-0.204
2013	7635	394	-	-	-	-	-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

	Lithuania						
1995	97	20	-0.126	0.126	-0.299	-0.389	-0.142
2000	667	108	-0.138	0.157	-0.351	-0.436	-0.259
2005	2498	313	-0.033	0.117	-0.256	-0.328	-0.237
2010	4325	261	-0.094	0.192	-0.076	-0.064	-0.091
2012	5295	231	-0.081	0.229	-0.137	-0.033	-0.046
2013	5651	176	-	-	-	-	-
	Moldova						
1995	22	15	0.050	-0.161	-0.252	-0.307	-0.307
2000	109	31	-0.138	-0.077	-0.139	-0.178	-0.145
2005	271	51	0.278	0.375	0.053	-0.408	-0.349
2010	830	58	-0.338	-0.446	-0.739	-0.656	-0.519
2012	981	50	-0.608	-0.781	-0.855	-0.809	-0.766
2013	1052	66	-	-	-	-	-
	Poland						
1995	204	95	-0.054	0.148	0.264	-0.331	-0.479
2000	892	246	-0.264	0.093	0.035	-0.212	-0.545
2005	2379	269	-0.123	0.174	0.001	0.039	-0.380
2010	5645	363	-0.114	0.139	-0.055	0.081	-0.205
2012	6153	159	-0.108	0.184	0.003	0.106	-0.189
2013	6595	-158	-	-	-	-	-
	Romania						
1995	36	18	-0.371	0.240	0.399	-0.394	-0.337
2000	311	47	-0.150	0.140	0.154	-0.366	-0.426
2005	1167	293	-0.262	0.105	0.035	-0.295	-0.520
2010	3214	134	-0.168	0.043	-0.054	-0.016	-0.325
2012	3586	126	-0.196	0.073	-0.059	0.025	-0.351
2013	3899	167	-	-	-	-	-
	Russian Federation						
1995	38	14	0.485	-0.475	0.338	-0.461	-0.728
2000	219	18	0.629	-0.518	0.454	-0.426	-0.884
2005	1252	108	0.746	-0.644	0.305	-0.661	-0.911
2010	3416	301	0.739	-0.758	0.052	-0.791	-0.867
2012	3467	353	0.763	-0.716	0.022	-0.816	-0.805
2013	4030	555	-	-	-	-	-
	Slovakia						
1995	242	482	-0.253	0.379	0.434	-0.092	-0.176
2000	1294	505	-0.321	0.185	0.267	0.054	-0.236
2005	5489	577	-0.268	0.119	0.166	0.043	-0.191
2010	9263	326	-0.286	0.064	0.132	0.122	-0.039
2012	10249	519	-0.207	0.043	0.103	0.168	-0.053
2013	10794	108	-	-	-	-	-
	Slovenia						
1995	908	77	-0.443	0.315	-0.031	-0.021	-0.186

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

2000	1454	67	-0.469	0.190	-0.082	0.045	-0.196
2005	3617	294	-0.436	0.128	-0.058	0.113	-0.118
2010	7106	175	-0.380	0.040	-0.018	0.152	-0.040
2012	7481	-29	-0.358	0.063	0.031	0.171	0.012
2013	7353	-328	-	-	-	-	-
	Ukraine						
1995	18	5	-0.388	-0.163	0.720	-0.212	0.084
2000	79	12	-0.276	-0.012	0.809	-0.163	-0.050
2005	365	166	-0.184	-0.224	0.720	-0.439	-0.273
2010	1259	141	-0.212	-0.322	0.654	-0.288	-0.436
2012	1617	172	-0.146	-0.331	0.535	-0.416	-0.368
2013	1696	83	-	-	-	-	-

Source: <http://unctadstat.unctad.org/ReportFolders/reportFolders.aspx>. (10.12.2014).

Among the observed CEE countries in the case of Albania, Bosnia and Herzegovina, Croatia and Moldova there are no positive values of merchandise trade specialization indexes for all considered groups of products. In the case of Hungary the comparative advantages are just beginning to emerge. Only the Russian Federation among the observed CEE countries specializes in primary commodities, precious stones and non-monetary gold. For this country the positive value of TSI also occurs for low-skill and technology-intensive manufactures. Ukraine specializes only in low-skill and technology-intensive manufactures. Belarus, Bulgaria, Estonia, Latvia, Lithuania and Romania have in fact their comparative advantages only in labor-intensive and resource-intensive manufactures. Among all researched CCE countries the highest degree of specialization in labor-intensive and resource-intensive manufactures occurs in Lithuania. Moreover, only in the case of Lithuania and Poland a comparative advantage in labor-intensive goods has deepened in recent years.

The Czech Republic and Slovakia have their comparative advantages in three product groups, with the highest specialization in medium-skill and technology-intensive manufactures, and significantly improving the situation in high-skill and technology-intensive manufactures. Poland has also a comparative advantage in three product groups, but the highest degree of specialization occurs in labor-intensive and resource-intensive manufactures. Slovenia explicitly loses its advantage in labor-intensive and resource-intensive manufactures, and strengthens its specialization in medium-skill and technology-intensive manufactures. Additionally, in the case of Slovenia are starting to emerge the comparative advantages in low-skill and high skill manufactures.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

As to Poland, it should be noted that in 2013 compared to previous years there was a large decrease in FDI inflow measured the inward FDI attraction index, because in 2012 Poland occupied 98, and in 2011 54 place, in this category, among 195 economies in question. However, does not change the fact that there is currently a deterioration of perceived Poland's investment attractiveness. Unfortunately, the interest in investing in Poland as a TNCs' top prospective host economy, declared by the respondents participating in the research conducted by UNCTAD in the group of 164 companies, is not yet reflected in the volume of FDI inflows (UNCTAD, 2014, p. 28). It can be connected with the negative values of Poland's trade specialization indexes for high-skill and technology-intensive manufactures (see table 2). At the same time, the highest degree of specialization remains in labor-intensive and resource-intensive manufactures. However, this situation does not imply that in comparison to other economies with more resources of cheap labor and less developed, Poland is still competitive in this regard. Therefore, UNCTAD experts emphasize that Poland adopted the "Program to support investments of high importance to the Polish economy for 2011–2020", with the aim of increasing innovation and the competitiveness of the economy by promoting FDI in high-tech sectors. In other words, Poland needs to invest in the development of new locational advantages to increase the inflow of FDI (OECD, 2014, p. 55-64, UNCTAD, 2014, p.113).

Table 3 presents the results of the research obtained from estimating Pearson's linear correlation between considered in this analysis export groups in terms of technological sophistication and FDI inflows to the observed seventeen CEE countries in the years 1995-2013. All correlation coefficients are positive and statistically significant on the level 0.05. The scale of FDI inflows is the strongest positively correlated with an increase in labor-intensive and resource-intensive exports in the whole researched period and in the years 1995-2004. In the period 2004-2014 the correlation relationship was weaker, and the highest value of correlation coefficient occurred for low-skill and technology-intensive manufactures exports. The values of correlation coefficients also indicate that the relationship between FDI inflows and medium-skill and high skills technology-intensive exports has become weaker over time. This may be due to the fact that foreign investors rather are looking for strategic assets in other areas of the world, and the advantage in the labor-intensive industries are currently not as competitive, as compared to the rest of the world, which was described above on the example of Poland.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 3. Correlation coefficients for relationship between foreign direct investment inflows (FDI) and export groups of CEE countries in USD and current prices, 1995-2013

1995-2013	EXPP_{t0}	EXPLRM_{t0}	EXPLSM_{t0}	EXPMSM_{t0}	EXPHSM_{t0}
FDI _{pc t0} (n=314)	0.797*	0.792*	0.816*	0.747*	0.752*
FDI _{pc t+1} (n=298)	0.795*	0.787*	0.811*	0.741*	0.751*
1995-2004	EXPP_{t0}	EXPLRM_{t0}	EXPLSM_{t0}	EXPMSM_{t0}	EXPHSM_{t0}
FDI _{pc t0} (n=167)	0.725*	0.806*	0.775*	0.761*	0.747*
FDI _{pc t+1} (n=168)	0.747*	0.819*	0.791*	0.772*	0.770*
2005-2013	EXPP_{t0}	EXPLRM_{t0}	EXPLSM_{t0}	EXPMSM_{t0}	EXPHSM_{t0}
FDI _{pc t0} (n=147)	0.791*	0.697*	0.806*	0.640*	0.687*
FDI _{pc t+1} (n=130)	0.778*	0.666*	0.776*	0.610*	0.657*

Note: n – number of observations, *statistically significant coefficient on the level 0.05.

Source: own calculations, based on: <http://unctadstat.unctad.org/ReportFolders/reportFolders.aspx>. (10.12.2014).

Research results indicate, therefore, that the investment attractiveness of CEE countries was higher and more stable in the period 1995-2004 than in the years 2005-2013, when took place an explicit decrease in interest of investors in this region of the world. Analysis of changes in the nature of comparative advantages of the concerned CEE countries shows that the reason may be that these countries either do not have a comparative advantage, or lose their comparative advantages in less technologically advanced product groups, not attaining a sufficient degree of specialization in more technologically advanced goods.

Conclusions

Comparing the investment attractiveness of Central and Eastern European countries shows that rather a narrow group of countries attract a greater amount of FDI and many more countries have experienced a decline in FDI. Therefore, the research results allow the conclusion that Central and Eastern Europe reduced its investment attractiveness over the past years, measured both by the inward FDI attraction indexes and the FDI inflows per capita. This means that the majority of Central and Eastern European countries are becoming less successful in attracting FDI, and therefore in shaping the environment in which foreign companies wish to conduct their business.

The reasons can be many and varied depending on the country. First, the strengthening of competition for FDI from Asian countries, especially the

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Asian Tigers, as the international statistics show. Secondly, the loss by a large part of Central and Eastern European countries of their relative cost advantages towards the rest of the world, without, for example, offering in exchange, locational attractions, are emphasized in this work. These, so called new locational advantages, attracting mainly foreign investment seeking strategic assets that allow achieving higher added value of business activities not only by foreign firms. These new locational advantages also provide a country an opportunity of increasing productivity based on different forms of knowledge development and sharing, as a result of creating infrastructure to facilitate the emergence of knowledge spillovers and their external effects.

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
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The Transmission Mechanism of Unconventional Monetary Policy

JEL Classification: *E42; E52; E58*

Keywords: *unconventional monetary policy; monetary transmission mechanism; central banking; quantitative easing*

Abstract: The implementation of unconventional (nonstandard) monetary policy instruments by the leading central banks at the wake of the financial and economic crisis was the most significant shift in the practice of central banking in the recent years. Evaluation of their effects is not feasible without a thorough recognition of the transmission mechanism of various balance-sheet policies, such as quantitative easing. The transmission channels of a standard interest-rate policy are based on a group of theories that are relatively coherent and well-documented. On the contrary, identification of similar framework for unconventional measures proved to be a complicated task. The aim of this paper is to extract and evaluate the theoretical efficiency of particular channels of unconventional monetary policy. This goal requires references to at least several, to some extent mutually exclusive, theories. It is also inevitable to draw one's attention to the relative significance of identified channels, depending on the nature of used unconventional tools, as well as on reactions of financial institutions and other economic agents to undertaken actions. This paper discusses three broad channel of the unconventional policies transmission mechanism: the signaling channel, the liquidity channel, and the portfolio-balance channel.

Introduction

Intensification of the financial and economic crisis led to unprecedented cuts in interest rates by central banks around the World. However, in the last quarter of 2008 these actions faced three serious obstacles (see Wright, 2012). The first one was the zero lower bound, which caused the inability to cut main interest rates any further, even though the natural interest rate was negative. The second problem arose from a sharp increase in demand for reserves in the financial system, limiting the redistribution of liquidity among financial institutions and making central banks less capable of controlling market interest rates. Finally, due to heavy distortions in monetary transmission mechanism, traditional interest-rate policy led to weak (or even no) reaction of economic agents to monetary impulses. Searching for an alternative or a substitute for traditional monetary policy many central banks chose to try unconventional or non-standard instruments.

The term “unconventional” monetary policy is used to describe a broad set of measures, directed both at financial and macroeconomic stability goals of central banks (compare Borio & Disyatat, 2009). They have been providing funds at longer maturities and use broader lists of accepted eligible collateral. Some of the policies involve changes in either the composition (qualitative easing) or size (quantitative easing) of a central bank’s balance sheet. Qualitative easing often introduces “unconventional” (i.e. asset-backed securities) assets that replace “conventional” ones. Since the failure of Lehman Brothers, however, both approaches have been used simultaneously and changes have been denoted both in size and structure of central banks’ balance sheets. Moreover, there has been a significant change in the way operations were carried by central banks and announced to market participant, such as forward guidance.

Implementation of unconventional policies also started a fierce debate concerning their numerous effects: direct and indirect, intended and unintended, both domestically and internationally (see Krishnamurty & Vissing-Jorgensen, 2011). The lack of precise evaluation of these effects may be attributed to the insufficiency of empirical work in the field. The available empirical material is relatively short period of use of such tools as quantitative easing. What is more, numerous spillovers from the use of unconventional tools make it hard to isolate specific impact of certain policies. Yet this scarce evidence also stems from the limitations of standard macroeconomic model and its theoretical predictions, particularly an incomplete analysis of the transmission mechanism of non-standard actions.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The aim of this paper is to identify and evaluate the channels of the transmission mechanism of unconventional monetary policy. The next section briefly describes the methodology of the research. Then I proceed to specific channels of transmission mechanism: the signaling channel, the liquidity channel, and the portfolio-balance channel. The last section concludes and points out several areas for the future research

Methodology of the research

In order to outline the transmission mechanism of unconventional monetary policy, this study makes use of a comprehensive literature research. Transmission mechanism channels of conventional monetary policy are a broad, but a relatively well-investigated group of concepts allowing to have a better understanding of effects of interest rate changes in different economy sectors. Due to lack of thorough research in the relevant area, preparing a corresponding list for unconventional monetary policy seems to be a complicated task. The classic model gives only a narrow explanation of the effects of certain policy, referring to economic agents' expectations only. The attention is drawn to the differences between the theoretical assumptions of the model and the empirical results (Farmer 2012). The number of transmission channels that are used in different studies varies between two (Bernanke & Reinhart, 2004) and seven (Krishnamurty & Vissing-Jorgensen, 2011), depending on the author's approach. Additional difficulties arise due to high level of uncertainty in setting and measuring effects of different unconventional tools used simultaneously, recognizing their implications and presenting the possible scenarios of a reaction of a central bank. The attempt to isolate and evaluate channels of the transmission mechanism is of curtail importance. Not only allows it to define the recent outcomes, but also to evaluate the potential effects of the strategies of the exiting unconventional monetary policy.

Since there is no single coherent theory that allows to explain in-depth functioning of the transmission mechanism of unconventional monetary policy, this study analyzes different attempts to explain effects of non-standard tools and classifies them as channels of the mechanism. The paper involves various critical references to theoretical and empirical studies. The conducted literature study makes use mostly of the recent literature, however, when needed, certain references to fundamental works in the field are made. The analysis of each channel is divided into three parts. The first one sets-up the underlying theories of a channel. The second part explains the

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

details of particular effects of monetary impulses. The third one provides an exemplification of how unconventional policies work through a channel works, as well as outlines condition of their effectiveness.

The Signaling Channel

The first approach to be discussed in the matter of explaining transmission of unconventional monetary policy's actions is the signaling channel (Bauer & Rudebusch, 2013), also called the inflation risk channel (Krishnamurty & Vissing-Jorgensen, 2011). The analysis of transmission mechanism starts with the description of this channel, as from theoretical perspective, it is based on mainstream economic models. These models put a strong emphasis on inflation expectations in effective realization of monetary policy. And so signalling channel, in its core assumptions, is similar to the expectation channel of interest rate policy; the main difference being the actions or communicates of the central bank triggering it that are far beyond the standard way of conducting monetary policy (Cecioni et al., 2011).

The idea behind functioning of signalling channel is so called neutrality proposition introduced by Wallace (1981), which states that the way of conducting the open market operations by the central bank has no impact on the dynamics of main macroeconomic indicators¹. The hypothesis was formulated with the assumption of full rationality of agents, as well as completeness of financial markets. However, Curdia and Woodford (2010) claim that formulating it requires only two key assumptions:

- market value of assets depends only on previous cash flows – they not necessary have to be absolute substitutes, but the only differentiating criterion is their risk factor,
- all the investors can buy the same amount of assets at the same price; the only limitation being their budget constraints.

From the perspective of unconventional monetary policy, and balance-sheet policy in particular, the irrelevance proposition, derived from Wallace hypothesis, seems to be of crucial importance (Eggertsson & Woodford, 2003). According to this theorem, not only the operations of a central bank, but also the relative share of different assets in its balance, have no impact

¹ The Wallace neutrality reveals significant ties with the Modigliani-Miller theorem, that states that the capital structure of a company is irrelevant for the value of this firm.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

on the general equilibrium of an economy. There are two complimentary ways to explain this phenomena.

First of all, having two beforehand-mentioned assumptions fulfilled, calculating the current market price of each asset is based on pricing kernel, which can be understood as a discount factor of future cash flows generated by this asset. The pricing depends on the expected value of the marginal utility of income of a household, which is a random variable. The use unconventional monetary policy (e.g. qualitative easing) influences only shifts in distribution of available assets between a central bank and a private sector. However, it does not change the availability of stock to consume in the future. And so the assets pricing done by a household as well as its level of consumption is not changed.

On the other hand, if we assume that agents treat the balance of a central bank as a part of the general balance of a public sector (central bank and government), applying unconventional monetary policy will not lead to the “removal” of risk of certain assets, but rather to its transfer from the balance of private sector to the public sector. Having in mind that the balance of the public sector is protected by the tax income from the private sector, the rational agents will follow the Ricardian equivalence. The optimal choice of a household will be affected by the wish to protect future losses connected to higher taxation (the transfer of income). If the central bank buys certain assets, households will change their financial portfolio in order to neutralize its behaviour and keep the future income on the unchanged level.

Accepting the thesis on irrelevance of central bank does not necessarily mean that monetary policy has no impact on the on-going economic processes. The only thing is that the operations involving assets flow as well as expanding the monetary base will not be effective in the situation of liquidity trap. The temporal rigidities of prices and wages implies that a central bank has a possibility to affect the size of inflationary expectations, and indirectly on the deviation of the interest rate of a central bank (adjusted with the current inflation rate) from the natural interest rate, the price level and the size of the demand gap. Therefore, the signalling channel includes the following phenomena (Bauer & Rudebusch, 2013):

- stimulation of inflationary expectations,
- fall of the real interest rates,
- changes in the term structure of market interest rates, particularly the fall of long-term interest rates,
- increase in consumption, investments and the overall demand.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

It is commonly assumed that using the signalling channel in the situation of zero interest rates comes from the seminal work of Krugman (1998). The recommendation he formulated might have seemed provocative, as it included a central bank openly supporting the inflationary processes' escalation². Later on it was wildly commented within the formal models of Reifschneider and Williams (2000) or Eggerston and Woodford (2003).

The effectiveness of transmission of the monetary stimulus through the signalling channel is almost fully based on the reliability of a central bank, the appropriate communication of its intentions and the type of inflationary policy. In the situation when a central bank does not have a sufficient reputation, introducing the optimal monetary policy might be impossible. The realisation of the previous commitments might be also interrupted by the strong and persistent shocks that influence inflation but stay beyond the control of monetary authorities. Partial solution to the this problem is the complementary applying of the different unconventional tool. The changes of the structure or of the size of the balance may lead to the "strengthening" the effects of commitment on the expectations in the following ways (Lenza et al., 2010):

- increasing the power of commitments to preserve the monetary expansion for a longer time,
- causing fall in risk premium component of market interest rates,
- causing direct decrease of the of bonds and securities yields.

Applying the unconventional assets of the high value lowers also the probability of the quick rise of the interest rates, which would later lead to some financial losses of a central bank.

The way the signalling channel functions implies that the stronger effects in terms of economic activity will be caused by the unconventional tools of the wide scope and the ones requiring the strong involvement of a central bank. Among all, one should mention the instruments that require buying assets with the long-term maturity, which affects the flattening of the yield curves. The high effectiveness will be also a feature of the tools requiring future reinvestments of income from the current assets as well as of the "pure" form of quantitative easing, which includes buying bonds and securities as a point of reference to other values.

The idea of the signalling channel has been exposed to a strong criticism, mainly because of the derived conclusions, but also because of the

² In the exact words of Krugman (1998, p. 161), a central bank should be "committed to be irresponsible".

theoretical background. According to some researchers, this way of explaining the effects of unconventional tools is far too narrow and it does not allow to capture its actual, even temporal, consequences in terms of market value of the assets or the cost of gaining the capital (Joyce & Tong, 2012). The objections mainly point out that the irrelevance theorem does not hold if one allows for a slight modification of its assumptions. There are certain non-pecuniary factors influencing risk calculation (such as agents' sentiments) which may boost demand for safe asset during financial crises (Gagnon et al., 2011). Some of the author, for instance Farmer (2012), acknowledge the theoretical construction behind the signaling channel, yet indicate its limited significance in practice.

As a results of this critique, recent studies interpret the signaling channels in a broader way than the standard model. In particular, the assumption of financial markets efficiency is repealed. This leads to a possibility to distinguish the so-called announcement effects, capturing the direct impact of new information on unconventional actions on actions of market participants (Gagnon et al., 2011; Szczerbowicz, 2014). Among these effects are not only shifts in inflation expectations, but also other consequences in markets segments in which unconventional tools are (or will be) implemented (e.g. increased liquidity or trade volumes).

The Liquidity Channel

The second channel of the transmission mechanism of unconventional monetary policy is the liquidity channel (Bowdler & Radia, 2012), sometimes referred to as the bank funding channel (Joyce & Tong, 2012). According to the studies supporting this view, the effects of unconventional tools should be mainly view through the increase in liabilities of a central bank and reserves supply. Such policies are thus bound to improve balances of financial institutions and increase an overall availability of external financing to economic agents.

Historically, the first theoretical approach that allows to explain the functioning of liquidity channel is monetarism. One of the seminal works in this area is the influential paper by Brunner and Meltzer (1968). The authors analyzed several examples of changes in the demand for money under the liquidity trap and rejected the hypothesis of the complete ineffectiveness of monetary policy to overcome the trap. They found out, however, that the lower bound of interest rates is just a kind of an "institutional barrier", and not the effect of the infinite money demand. Consequently, chang-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

es in the official short-term interest rate (and also of some market interest rates) do not always properly indicate whether monetary policy is expansive or not. What is more, considering short-term interest rate as a first “chain” in the monetary transmission mechanism is often insufficient. Instead, they propose a very broad concept of this mechanism, in particular they suggest that all adjustments of relative market prices could be seen as responses to monetary impulses (shocks) (Meltzer, 2001).

The importance of the liquidity channel, according to the monetarist school, stems from the fundamental differences between the reserve money and other market assets. Due to the fact that agents use money as a store of value, it is considered by financial institutions as a safe asset when compared to more risky securities. Particularly during financial crises, when an average riskiness of other assets increases, the demand function of real money balances must have, at least asymptotically, a finite value. If one assumes, that the demand is a positive function of real transaction volume, and a negative function of an opportunity cost of holding money, then an increase in the nominal money supply may lead to a decrease in yields of securities held by financial institutions.

Consequently, the effects of unconventional monetary policies depend on shifts in a central bank’s liabilities, and an increased monetary base should induce changes in broader monetary aggregates, even under the zero lower bound. The way unconventional monetary shocks transmit to the real economy is yet independent on assets in a central bank’s balance sheet, including a structure of assets bought in order to increase the supply of money. Researchers that currently use this approach in empirical studies, suggests a possible way to use the liquidity channel in order to improve conditions in financial systems, for instance during the periods of a sudden increase in money market interest rates. The effects of unconventional actions may cause a decline in liquidity premium components of interest rates, as they facilitate conversion of securities into money (Gagnon et al., 2010). Increased level of liquidity may then prevent commercial banks from credit rationing or fire-sales of assets, what eventually leads to higher aggregate consumption expenditures and investment.

An alternative theoretical explanation for the liquidity channel of unconventional monetary policy can be derived from the flow-of-funds class of models, which are mainly used for the national income accounting. Such an example is provided by the model of Cobham and Kang (2012), that captures and evaluates the effects of quantitative easing. This simple analytical scheme is based on relations among the basic sectors of the econo-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

my, represented as flows changing relative asset and liabilities positions through the modification of mutual financial claims. The flow-of-funds model comprising of such agents, as a central bank, a government, and financial and non-financial sectors can be built in a matrix form. Consecutive columns may be interpreted as budget constraints of each sector, while rows represent balances of supply and demand on financial claims, such as a financial deficit of government and private sector, bank deposits and securities.

The analytical framework of the flow of funds model allows considering the impact of monetary policy and the economic shocks on the changes of high-powered money, as well as the money supply, defined as a sum of changes in the amount of cash and the deposits on demand ($\Delta M_S = \Delta C + \Delta D$). The traditional monetary policy, based on the open market operations, will lead to the excessive liability of commercial banks ($-\Delta CB$) as well as the increase of reserve money (ΔR), and as a result the rise of a monetary base ($\Delta H = \Delta C + \Delta R$). The final result of those changes on the money supply will depend on the endogenous mechanism of credit creation in the banking system (Table 1).

Table 1. The effects of quantitative easing in the flow-of-funds matrix

	Central bank	Government	Financial sector	Non-financial sector
Financial deficit	–	$G - T$	–	$I - S$
Bank deposits	–	–	$-\Delta D$	ΔD
Other liabilities	–	–	$-\Delta ND$	ΔND
Monetary base	$-\Delta H$	–	ΔR	ΔC
Government bonds	ΔGD_{cb}	$-\Delta GD$	ΔGD_f	ΔGD_{nf}
Central bank loans	ΔCB	–	$-\Delta CB$	–
Private sector loans	–	–	ΔK	$-\Delta K$

Note: positive values of flows denotes changes in assets, while negative values denote changes in liabilities of sectors;; G i T – government expenditures and taxes, D i ND – deposits and other liabilities of commercial banks, H – monetary base, including reserves (R) and cash (C), GD – government bonds, including bonds held by the central bank (GD_{cb}), by the financial sector (GD_f) and by the non-financial sector (GD_{nf}), CB – central bank operations, K – loans by financial sector.

Source: Cobham & Kang (2012, p. 56).

When the economy is hit by a financial crisis, the financial sector cuts down flow of loans to the non-financial sector (ΔK), what causes an equivalent decrease in deposits between sectors. As a result, despite any changes in in the monetary base (ΔH), market participants are subject to an adverse money shock, ($\Delta M_S < 0$), which slows down investment activities of com-

panies. The limits of conventional interest-rate policy push the central bank towards unconventional actions, which are narrowed down in the model to purchase of government bonds from the non-financial sector by the central bank ($\Delta GD_{cb} > 0$; $\Delta GD_{nf} < 0$). A decrease in the value of bond held by this sector lead to an increase in demand for deposits in commercial banks (ΔD). On the other hand, an increase in government bonds held by the central bank commercial banks, along with an increase in commercial bank liabilities, requires an equivalent flow of reserves (ΔR). If the above assumptions are met, quantitative easing leads both to an increase in the monetary base, as well as in the broader supply of money ($\Delta M_S > 0$). The liquidity channel of unconventional monetary policy can be thus perceived as a provision of a “liquidity buffer” by a central bank, which facilitates adjustments after financial crises.

The relative importance of the signaling channel is proportional to the kind of reaction of the financial system induced by the use of unconventional policies. This reaction, in turn, relies on the following factors:

- a degree in which money is exogenous to real economic activity,
- a value of money multipliers,
- a degree of an overall indebtedness and a pace of deleveraging in the economy.

In order to be effective, unconventional measure must, in accordance with the liquidity channel, facilitate available liquidity (reserves) to financial institutions. The examples of such measures involve long-term open market operations and enhanced liquidity support to certain segments of markets.

The Portfolio-Balance Channel

The third channel of the transmission mechanism of unconventional monetary policy is the portfolio-balance channel. The idea behind this channel relies on changes in the overall value and composition of a central bank’s assets, and their impact on decisions of economic agents. As a consequence, this channel is also named in the literature as the portfolio rebalance channel (Cecioni et al., 2011; Bowdler & Radia, 2012) or portfolio substitution channel (Joyce & Tong, 2012). Conceptually, this channel may be compared, too some extend, to the wealth effects, balance channel and risk-taking channel of interest-rate policy.

The theoretical basis of the portfolio-balance channel is the preferred habitat theory, which received some attention over the past decades, yet is

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

still considered as heterodox. Its origins may be tracked back to works of Tobin (1969), who proved that an average yield and risk factors specific to a particular class of assets are dependent on the relative market supply of these assets. Unlike the standard asset-pricing model, in which demand curves of financial assets are perfectly elastic, this theory assumes that heterogeneous groups of market participants undertake their investment choices only in a particular segment of the market. Their so-called “habitat” depends on indifference curves of market agents regarding both an expected rate of return and risk of a specific asset class. Latest models building on this theory follow this assumption by allowing agents to choose only a limited segment of markets regarding the time structure of asset (a certain segment of a yield curve) (Vayanos & Vila, 2009). For instance, some of the agents may have preferences for particularly long maturities, that would match the structure of their liabilities and allow them to solve the so-called maturity mismatch problem. Consequently, market assets are not considered perfect substitutes because of income they generate, but due to factors connected with their maturity.

The assumption of an imperfect asset substitution and market segmentation change the way that a central bank’s purchases of assets influence portfolios of market agents. When a central bank starts buying a chosen class of assets, their market availability diminished, due to the so-called local supply effect (Bowdler & Radia, 2012). At the same time economic agent re-balance their portfolios in order to remain within a specific segment of the market. The process of quantitative or qualitative easing will then lead to an increase in prices of assets bought by a central bank. These price adjustments will depend on shifts in private sector’s portfolios. Unlike the signaling channel, which emphasized the impact of unconventional tools on the risk-free interest rate, asset substitution will influence other component of market interest rates, such as (Krishnamurty & Vissing-Jorgensen, 2011):

- term premium, proportional to the maturity date of an asset,
- default premium, connected to the evaluation of issuer’s default risk.

The decrease of these components may further cause an overall fall in various interest rates, increase the availability of loans to households and corporations, and boost consumption and investment. Rising prices of asset may, on the other hand, start balance-sheet and wealth effects, and eventually stimulate aggregate demand.

Recent studies on the transmission mechanism of unconventional monetary policy try to incorporate the portfolio-balance channel into and the

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

preferred-habitat theory into the standard macroeconomic model. A significant contribution in this field was made by Farmer (2012). Farmer used a two-period general equilibrium model with rational expectation, and supplemented this framework by adding several assumption. Most importantly, the model incorporates a few different economic agents, one of which has only a restricted access to financial markets. In the first period, entitled agents buy or sell two types of financial assets. In the second period, they receive corresponding returns, which are subject to an extrinsic uncertainty, impossible to foresee in the first period, that changes relative prices of both assets. These effects are then transmitted to agents' real income, labor supply, and consumption.

Such a model makes it possible to compare two different cases: when a central bank remains passive, and when it uses qualitative easing, "replacing" agents that are not entitled to participate in financial transactions. Due to the heterogeneity of agents, a central bank's actions affect market prices of securities. Indirectly, qualitative easing leads to the redistribution of assets among agents, as well as transfers to market participants characterized by higher propensities to consume. Based on this results, Farmer (2012) draws strong a conclusions regarding the portfolio-balance channel. He proves that unconventional monetary policy can be Pareto-improving, since it reduces the overall risk in the economy. What is more, qualitative easing can be implemented in an optimal way, when a central bank carefully choses its portfolio this policy may be self-financed and bears no potential costs for taxpayers.

An alternative approach to the portfolio-balance channel was introduced by B. Friedman (2013) in his "post-crisis" interpretation of the New Keynesian model. Friedman addresses the problem of the effects of unconventional policies by incorporating into the model two different interest rates. Next to the official interest rate set by a central bank, he introduces market interest rate, which is a basis of consumption and investment decisions in the economy. This, in turn, allows to reject the assumption that all assets are perfect substitutes, and incorporate the preferred habitat theory in the model. The key question concern factors influencing the market interest rate. Friedman assumes that the market rate is a function of the official rate, and its expected future path, as well as the ratio of risky assets to all assets. The higher the relative supply of risky assets in the economy, the higher the market interest rate. Unconventional monetary policy in this model can be understood as a process of decreasing the local supply of risky assets and transfer of risk to a central bank's balance sheet. Consequently, non-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

standard programs, such as quantitative easing can be used as a substitute to interest-rate policy.

A relative meaning of the portfolio-balance channel in the entire transmission mechanism of unconventional policy can be influenced by many properties of financial markets, as well as a central bank's decisions. Among the most important factor one should point out the following (Bowdler & Radia, 2012; Dahlhaus, 2014):

- accurate identification of dysfunctional market segments by a central bank,
- relative financial strength of a central bank to market, delimiting the upper limit of risk transfer from private sector to central bank's balance sheet,
- degree of substitutability of assets,
- average pace of portfolios rebalancing,
- response of prices and yields of assets to changes in their relative supply.

Qualitative easing, which involves outright purchases of chosen classes of assets, is undoubtedly among the most effective unconventional tools, when assessed through the lens of the portfolio-balance channel. The non-standard operation in the segments of long-term securities may also induce rapid changes in private sector's balance sheets, and shift of demand to other, more risky assets.

Conclusions

The aim of this paper was to identify and evaluate the theoretical framework of the transmission mechanism of unconventional monetary policy. The analysis covered three broad channels of monetary impulses generated by such policies, as quantitative or qualitative easing. The signaling channel, derived from the canonical model of the new neoclassical synthesis, underlines the importance of the so-called neutrality of central bank's balance sheet. This channel works mainly through stimulation of inflationary expectations and the subsequent the fall of long-term interest rates. Monetarist theory and the class of flow of funds models allowed to identify a liquidity channel, which effects rely on changes in central bank's liabilities. The liquidity channel stresses the importance of non-standard tools used by a central bank, which facilitate adjustments after financial crises. Finally, the portfolio channel is grounded in the theories of imperfect substitutability of assets, and explains the effects of shifts in value and

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

structure of central bank's assets on decisions of economic agents. The overall impact of unconventional instruments is dependent on a decrease in various market interest rates, as well as increase the availability of loans to households and corporations.

Numerous unintended consequence of unconventional policies lead to the conclusion that their theoretical models are still not sufficient to fully explain complex impact of changes in central banks' balance sheets on financial markets and economies. In particular, there is an urgent need for a comprehensive theoretical model of international spillover effects of unconventional tools, that will allow to extract the effects of policies undertaken by the main central banks for the emerging economies, such as China. Another important area of future research is the exit strategy from the unconventional measures which, except for the case of the Bank of Japan, has no precedent.

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
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State Aid and Competitiveness of the Hard Coal Mining Industry in the European Union*

JEL Classification: *D22; E65; F30; F60*

Keywords: *state aid; competitiveness of industries; hard coal mining industry in Poland and the EU; Polish mining enterprises*

Abstract: The hard coal mining industry in the European Union (EU) is in decline, mostly due to a lack of price competitiveness. It is maintained, to a great extent, by state aid; a key objective of the industry's existence is to provide energy security and guarantee employment in the mining regions. In Poland, the hard coal mining industry is currently undergoing a serious crisis that threatens the two largest mining enterprises with bankruptcy. In addition, due to the European Union's restrictions concerning the circumstances of granting state aid, these enterprises cannot count on the financial support for the repair restructuring that they used on a large scale until 2011. Therefore, in this article, the main objective is to determine the influence of state aid on the competitiveness of the hard coal mining industry in 12 countries of the EU, including Poland in specific. In order to achieve the stated objective, the article is divided into three parts. The first part consists of a literature review and legal regulations that are related to state aid for the hard coal mining industry in the EU are presented. The second part identifies the amount of state aid for the mining industry in the examined countries. Next, the influence of the state aid on the economic-financial conditions and competitiveness of the industry in the examined countries is examined. The third assesses the finan-

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

cial results of 24 Polish hard coal mines. The data of Eurostat and EURACOAL were used in the research. Furthermore, the primary data from the Polish mines of power hard coal were also used. The research methodology includes the indicators from the area of effectiveness and productivity assessment, as well as production quality assessment in the mining industry. The research results make it possible to extend knowledge in the range of the influence of the state on the competitiveness of the traditional industries and their restructuring.

Introduction

The role of the state in the theory of economy may be analyzed and evaluated within the frames of two main research trends that differ in their approach to the effectiveness of influence of the state on real values in economy. Accordingly, in the neoclassical trend that was derived from the classical school, a minimal range of state intervention in the economy is advised—it is reduced to providing law obedience and security, as well as to prevent monopoly (Stankiewicz, 2000, pp. 163-164; Smandek, 1993, pp. 9). In turn, in Keynesian trend, state intervention is acceptable in the market mechanism, due to its disability and lack of optimality in business and household decisions in a short-term period (Wojtyna, 2000, pp. 70-76; Sychalski, 2002, pp. 2502-255; Zieliński, 2008, pp. 20-27).

In this article, an attempt is made to conduct an effectiveness assessment of state intervention in the industrial restructuring of hard coal mining in the EU. In many contemporary types of research on restructuring efficiency and effectiveness in state-owned sectors, it is emphasised that the restructuring objectives are more often fully achieved in case of private enterprises. State ownership disturbs the process of resources allocation, slows down management initiatives and delays investment decisions, which makes proper functioning impossible in a liberalised and competitive economic environment (Kam et al., 2008, pp. 567-579; Apostolov, 2013, pp. 680-691). The restructuring process of state-owned enterprises is also disrupted for political reasons of the decisions made (Bhattacharyya, 2007, pp. 317-332; Apostolov, 2011, pp. 124-134).

In the period analyzed in the article, which encompasses the years 2000-2012, the hard coal mining industry in the EU was systematically subsidised within the frames of EU Council Regulation no. 1407/2002 on 23 July 2002, which pertains to state aid for the coal industry. According to the regulation, retaining domestic energy security justified state aid granting for unprofitable hard coal mines (Olkuski, 2011, pp. 42-45). However, financial support for the mining industry concerned a wide subject range,

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

which included aid for the closure of unprofitable mines, operating aid, investment aid (Michalak, 2012, pp. 11-22; Michalak, 2012, pp. 267-276) and aid for extraordinary costs that were inherited and connected to sector restructuring (Paszczka & Białas, 2009, pp. 135-156).

The state aid categories for hard coal mining that are listed above were limited in the decision of the European Commission on state aid to facilitate the closure of uncompetitive coal mines (2010/787/UE). According to the decision, these days state aid may only be granted for:

- The costs of closing unprofitable mines, also including current production losses, provided that the mines will have been finally closed down by 31 December 2018,
- extraordinary costs financed until the end of 2026, mostly connected with social costs (pensions and employee benefits for dismissed staff) and technical ones (securing infrastructure of liquidated mines).

Consequently, support for initial investment and state aid without time limits were dropped, which hinders the domestic initiatives concerning the improvement of sector's competitiveness (Białas, 2011, pp. 7-28; Górczyńska & Szwejca, 2012, pp. 23-29).

Methodology of the research

The main purpose of the article and the research that was conducted was to perform the assessment and comparative analysis of the results of the hard coal mining industry in the countries of the EU in which hard coal mining was subsidised by public resources (Anderson, 1995, pp. 485-496; Frondel et al., 2007, pp. 3807-3814). The author of the article is also searching for an answer to the following research questions:

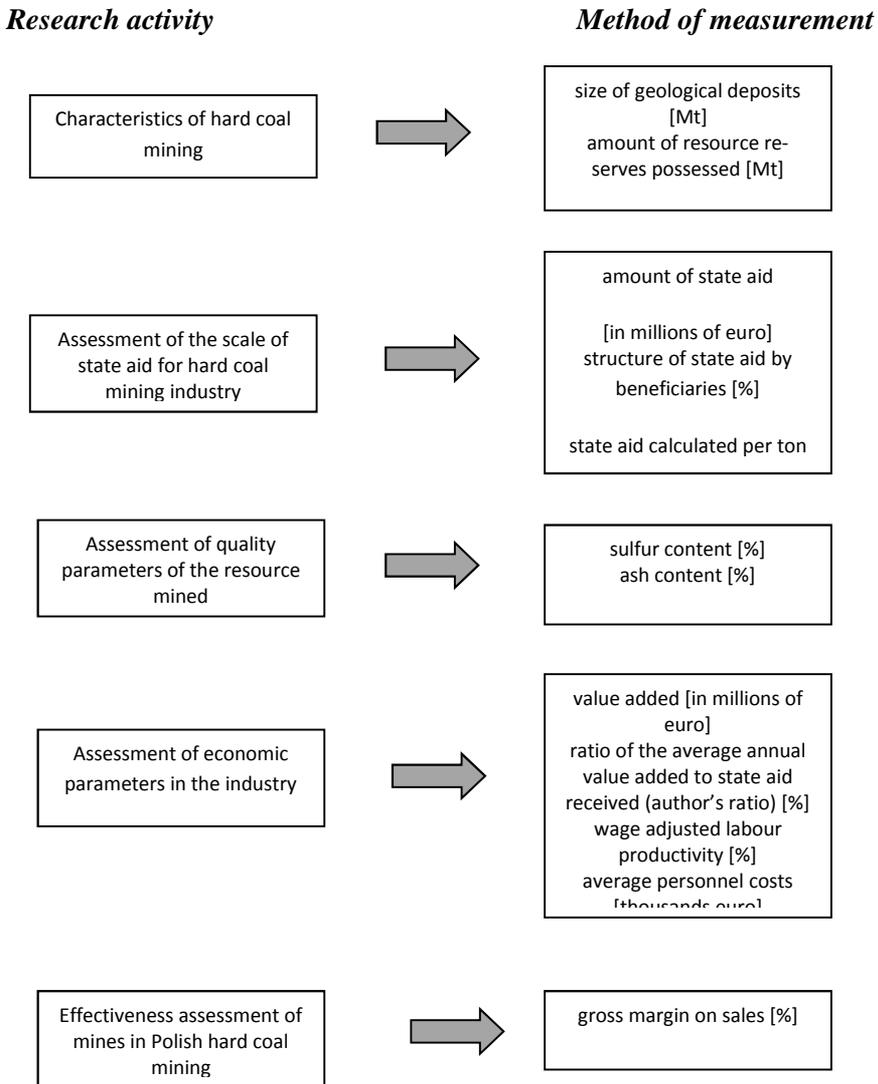
- Which countries, in the years 2000-2012, granted the highest amounts of state aid to the hard coal mining industry? Has such a move found its reflection in the economic and quality results of the examined industries?
- What are the development perspectives of the Polish hard coal mining in the light of the current EU regulations concerning state aid for the industry and in the context of the current economic situation of the Polish mines?

Because of two types of threads in the questions above, the research part of the article was divided into two stages. The first stage includes a comparative analysis of state aid granted for the mining industry from public resources. The second stage encompasses the results of measurement and analysis of effectiveness in 24 Polish hard coal mines from 2005-2012,

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

together with the assessment of the perspectives of their further functioning in the structures of two largest state-owned mining enterprises.

Figure 1. Ratios used in the research methodology



Source: own work.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The research methodology is of interdisciplinary character and contains the ratios typical for economic analysis and for the assessment of hard coal reserves and quality in the mining industry. The detailed information on the universal and special ratios that were used—constructed for the purpose of the research conducted—is presented in figure 1.

In the research, there are statistical data that come from Eurostat and Euracoal databases, as well as data obtained during the author's research carried out in 24 hard coal mines that belong to the two largest Polish mining enterprises.

State aid for the hard coal mining industry in the European Union

The hard coal mining industry in the EU is an industry that is systematically subsidised by state funds, and economic and social-political priorities have been competing with one other for many years in the industry. On the one hand, it is an industry that is characterised by low and decreasing price competitiveness, thus making efficient competitive struggle impossible. On the other hand, it is an industry that provides thousands of jobs in mining regions and/or additionally guarantees energy security (Miller, 2011, pp. 1-51). The characteristics of the working and potential coal deposits (reserves), together with the number of people employed in the mining industry, in the examined countries of the EU is presented in table 1.

The results from the data included in table 1 indicate that Poland possesses largest deposits of hard coal. Significant but smaller hard coal deposits are also found in Germany and Great Britain. In turn, the largest lignite deposits are localised in Poland, Germany and Hungary. Lignite is a kind of fuel that Germany, Poland and Greece (Kavouridis, 2008, pp. 1257-1272; Roch, 2009, pp. 857-867) have at their disposal to the largest potential extent.

Polish hard coal mining employs 113 thousand people, which is a record value in the listing presented. In Germany, the mining enterprises employ about 34 thousand workers and, in Great Britain (Lorenz, 2009), almost 6 thousand people. In connection with the above, the greatest social threat would be even a partial liquidation of hard coal mining in Poland within the Upper Silesian Coal Basin (Zieliński, 2013, pp. 137-143). It is worth mentioning that, in Germany and Great Britain, employment in the hard coal mining industry has been systematically reduced in the last few years, just as in France and Spain (Fernández, 2000, pp. 537-547), which are the countries that formerly lead the production of hard coal in Europe.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 1. The characteristics of the hard coal mining industry in the examined countries of European Union

Country	Deposits [Mt]				Employment	Reserves [Mt]			
	lignite ¹	brown coal ²	hard coal ³	anthracite ⁴		lignite	brown coal	hard coal	anthracite
Bulgaria	3 387	598		-	11 300	1 600	255		-
Czech Republic	1 711	-	611	-	21 959	873	-	171	-
Germany	36 500	-	8 261	-	34 235	40 400	-	2 500	-
Spain	210	-	4 308	-	3 407	210	-	946	-
Greece	4 728	-	-	-	4 795	2 978	-	-	-
Hungary	8 939		1 625	-	2 087	6 580		1 915	-
Poland	22 584	-	48 225	-	113 000	-	1 591	19 131	-
Romania	9 640	-	2 435	-	6 000	280	-	11	-
Slovenia	1 170	-	-	-	1 617	140	-	-	-
Slovakia	1 000	-	8	-	3 700	95	-	0	-
Great Britain	500	-	3 200	-	5 827	-	-	500	-

Source: own work based on the data of EURACOAL, *Coal industry across Europe*, 5th Edition 2013.

The countries listed in table 1 may use state aid as a matter of law in force in EU. The value of state aid granted from 2000-2012 is presented in table 2 and the structure in division into the particular countries is listed in table 3.

¹ It is the first product of coal transformation into bituminous coal. It is characterised by low calorific value and contains about 60-65% of coal. In different classifications, lignite is often called brown coal.

² Coal of calorific value between 7.5-21 MJ/kg.

³ Coal of calorific value between 16-29 MJ/kg.

⁴ The most transformed form of coal of the highest calorific value between 30-33 MJ/kg.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 2. Value of state aid for the hard coal mining industry in the countries of European Union (EU-27) from 2000-2012 [in millions of euro]

Country	Years						
	2000	2001	2002	2003	2004	2005	2006
Bulgaria	0.00	0.00	2.60	2.50	11.00	9.40	6.60
Czech Republic	0.00	0.00	4.70	0.20	19.60	0.40	0.00
Germany	5 303.70	4 645.40	7 865.30	6 947.70	3 278.50	2 925.30	2 513.10
Spain	2 882.80	6 628.30	2 739.00	2 586.50	2 539.30	2 480.00	874.40
France	1 250.60	1 205.10	1 182.00	1 064.60	1 018.00	0.00	0.00
Greece	0.00	0.00	0.00	18.50	0.00	0.00	0.00
Hungary	20.20	22.90	13.60	12.10	110.90	42.30	34.20
Poland	462.30	843.00	526.70	5 442.00	660.90	255.10	170.00
Romania	0.00	0.00	73.20	186.70	254.60	78.80	106.80
Slovenia	14.60	0.30	20.40	18.90	16.50	16.20	16.70
Slovakia	8.30	9.50	6.50	6.60	1.50	4.00	5.90
Great Britain	150.10	106.10	27.90	37.80	54.90	68.20	13.30
Total	10 092.60	13 460.60	12 461.90	16 324.10	7 965.70	5 879.70	3 741.00
Country	Years						
	2007	2008	2009	2010	2011	2012	Total
Bulgaria	0.00	0.00	0.00	0.00	0.00	0.00	32.10
Czech Republic	0.00	0.00	0.00	0.00	0.00	0.00	24.90
Germany	2 460.80	1 859.30	1 795.00	1 796.10	1 489.80	1 437.00	44 317.00
Spain	842.60	819.20	780.10	825.40	804.00	551.80	25 353.40
France	0.00	0.00	0.00	0.00	0.00	0.00	5 720.30
Greece	0.00	0.00	0.00	0.00	0.00	0.00	18.50
Hungary	41.30	37.10	30.90	29.30	0.00	0.00	394.80
Poland	109.60	156.30	97.80	195.90	100.10	96.30	9 116.00
Romania	116.40	91.30	73.70	61.10	0.00	38.20	1 080.80
Slovenia	18.30	18.10	16.50	11.80	10.90	6.60	185.80
Slovakia	4.10	4.00	5.50	5.00	0.00	0.00	60.90
Great Britain	0.50	2.20	0.00	0.00	0.00	0.00	461.00
Total	3 593.60	2 987.50	2 799.50	2 924.60	2 404.80	2 129.90	86 765.50

Source: European Commission (Scoreboard: data on state aid expenditure, http://ec.europa.eu/competition/state_aid/studies_reports/expenditure.html).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 3. The structure of state aid for the hard coal mining industry in the European Union (EU-27) by countries in the years 2000-2012 [in %]

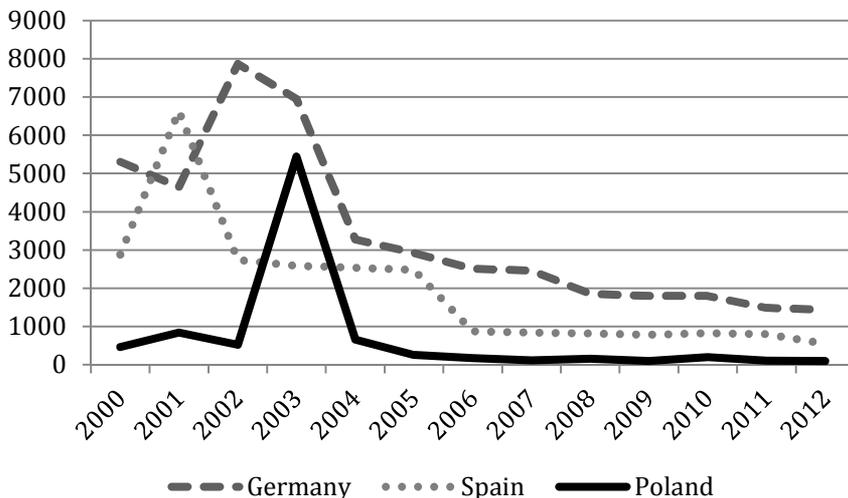
Country	Years						
	2000	2001	2002	2003	2004	2005	2006
Bulgaria	0.00%	0.00%	0.02%	0.02%	0.14%	0.16%	0.18%
Czech Republic	0.00%	0.00%	0.04%	0.00%	0.25%	0.01%	0.00%
Germany	52.55%	34.51%	63.11%	42.56%	41.16%	49.75%	67.18%
Spain	28.56%	49.24%	21.98%	15.84%	31.88%	42.18%	23.37%
France	12.39%	8.95%	9.48%	6.52%	12.78%	0.00%	0.00%
Greece	0.00%	0.00%	0.00%	0.11%	0.00%	0.00%	0.00%
Hungary	0.20%	0.17%	0.11%	0.07%	1.39%	0.72%	0.91%
Poland	4.58%	6.26%	4.23%	33.34%	8.30%	4.34%	4.54%
Romania	0.00%	0.00%	0.59%	1.14%	3.20%	1.34%	2.85%
Slovenia	0.14%	0.00%	0.16%	0.12%	0.21%	0.28%	0.45%
Slovakia	0.08%	0.07%	0.05%	0.04%	0.02%	0.07%	0.16%
Great Britain	1.49%	0.79%	0.22%	0.23%	0.69%	1.16%	0.36%
Total	100.00%						
Country	Years						
	2007	2008	2009	2010	2011	2012	Total
Bulgaria	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.04%
Czech Republic	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%
Germany	68.48%	62.24%	64.12%	61.41%	61.95%	67.47%	51.08%
Spain	23.45%	27.42%	27.87%	28.22%	33.43%	25.91%	29.22%
France	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	6.59%
Greece	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%
Hungary	1.15%	1.24%	1.10%	1.00%	0.00%	0.00%	0.46%
Poland	3.05%	5.23%	3.49%	6.70%	4.16%	4.52%	10.51%
Romania	3.24%	3.06%	2.63%	2.09%	0.00%	1.79%	1.25%
Slovenia	0.51%	0.61%	0.59%	0.40%	0.45%	0.31%	0.21%
Slovakia	0.11%	0.13%	0.20%	0.17%	0.00%	0.00%	0.07%
Great Britain	0.01%	0.07%	0.00%	0.00%	0.00%	0.00%	0.53%
Total	100.00%						

Source: own work.

The data from tables 2 and 3 show that the greatest beneficiaries of state aid for hard coal mining were Germany, Spain (Rabanal, 2009, pp. 4373-4378; Zafrilla, 2014, pp. 715-722) and Poland from 2000-2012 with a share in total aid, respectively, at 51.08%, 29.22% and 10.51%. Furthermore, the period of the most intensive aid for Spanish mining was from 2000-2002; in German mining, it encompassed the years 2001-2003 and in Polish mining it included the years 2002-2004. In all of these cases, these were the years of dynamic repair restructuring in this industry (fig.2).

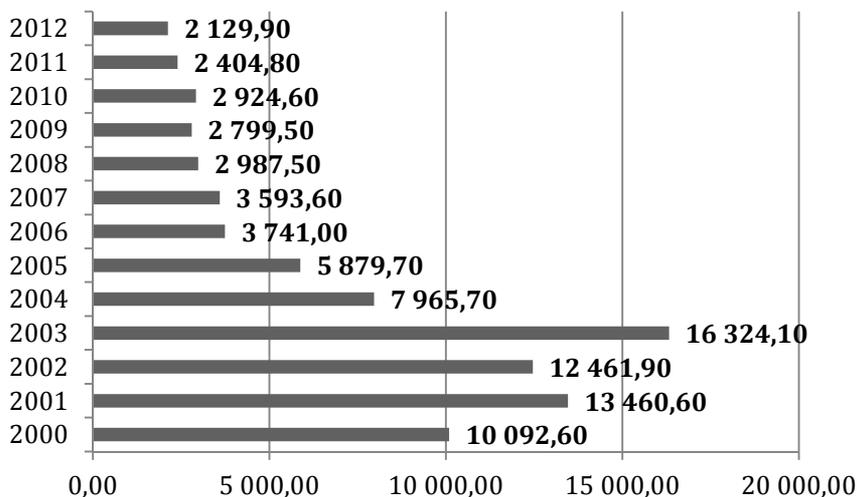
**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Figure 2. The value of state aid for the hard coal mining industry for the largest beneficiaries from 2000-2012 [in millions of euro]



Source: own work based on the data of European Commission.

Figure 3. The value of state aid for the hard coal mining industry in the European Union (EU-27) from 2000-2012 [in millions of euro]



Source: own work based on the data of European Commission.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

After the year 2003, one may also observe the value decrease of total aid for mining in EU in all of the examined countries (figure 3). It was caused by a reduction of aid for major beneficiaries, the completion of the most important restructuring activities and, finally, the tightening the conditions of granting state aid for mining industry in the year 2010, due to a lack of competitiveness improvement of unprofitable hard coal mines despite state support and violation the rules of free-market competition at the same time (Caputa, 2012, pp. 49-71; Szwajca, 2012, pp. 18-20).

Table 4. State aid calculated per ton of the resources mined in the European Union (EU-27) by country from 2000-2012 [in euro/ton]

Country	Years						
	2000	2001	2002	2003	2004	2005	2006
Bulgaria	0.00	0.00	0.10	0.09	0.42	0.38	0.26
Czech Republic	0.00	0.00	0.07	0.00	0.32	0.01	0.00
Germany	26.39	22.95	37.78	33.91	15.78	14.42	12.75
Spain	122.78	292.25	124.33	125.93	123.87	128.14	47.52
France	305.02	436.63	585.15	475.27	1170.11	0.00	0.00
Greece	0.00	0.00	0.00	0.26	0.00	0.00	0.00
Hungary	1.44	1.65	1.04	0.91	9.65	4.42	3.44
Poland	2.84	5.15	3.25	33.23	4.07	1.60	1.09
Romania	0.00	0.00	2.41	5.65	8.01	2.53	3.06
Slovenia	19.73	0.43	31.88	30.98	27.05	27.46	28.31
Slovakia	2.31	2.78	1.91	2.14	0.51	1.59	2.68
Great Britain	4.81	3.32	0.93	1.34	2.19	3.33	0.72
Country	Years						
	2007	2008	2009	2010	2011	2012	
Bulgaria	0.00	0.00	0.00	0.00	0.00	0.00	
Czech Republic	0.00	0.00	0.00	0.00	0.00	0.00	
Germany	12.19	9.66	9.77	9.85	7.90	7.33	
Spain	49.05	80.29	82.57	97.87	122.13	88.57	
France	0.00	0.00	0.00	0.00	0.00	0.00	
Greece	0.00	0.00	0.00	0.00	0.00	0.00	
Hungary	4.21	3.95	3.44	3.23	0.00	0.00	
Poland	0.75	1.09	0.72	1.47	0.72	0.67	
Romania	3.25	2.55	2.17	1.96	0.00	1.12	
Slovenia	38.13	40.22	37.50	26.82	24.22	15.35	
Slovakia	1.94	1.65	2.14	2.10	0.00	0.00	
Great Britain	0.03	0.12	0.00	0.00	0.00	0.00	

Source: own work.

In order to perform a deeper analysis of the range of state aid for the hard coal mining industry and to take into account the differences in the

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

resource and excavation potential of the examined countries, the value of state aid was calculated per ton of the resource mined in the particular country. The results of the calculation are presented in table 4.

The objectified values of state aid only partially confirm the previous conclusions concerning its largest beneficiaries; in a relative approach, they were still Spain (from 48 euro/ton to 292 euro/ton) and Germany (from 7 euro/ton to 38 euro/ton). However, Poland, due to the large range of excavation in the examined group, obtained subsidy for one ton in the amount of 0.67 euro to 34 euro. That means that Slovenia had a similar level of state aid from 0.43 euro/ton to 40 euro/ton. It is also worth stressing that France obtained the highest state aid (from 305 euro/ton to 1170 euro/ton) from 2000-2004; however, these were the means fully allocated for the total liquidation of hard coal mining in this country.

**Qualitative and economic effects of state aid for hard coal mining
in the European Union**

Knowing the scope of state aid for hard coal mining in the examined EU countries, it is worth looking into the quality and economic results attained in this business within the last five years. This is because both qualitative and economic parameters enable the analysis of competitiveness of the examined industry in the particular countries. The basic coal quality assessment parameters are consecutively presented in table 5. The first is the lower heating value, the so-called calorific value. This is the heat of combustion reduced by the heat of vaporization of the water formed during coal combustion, as well as created by the hydrogen contained in coal. The calorific value measurement unit is kJ/kg or MJ/kg (kilojoules or megajoules per kilogram). A higher coal heating value indicates greater usefulness and effectiveness as an energy resource.

The next important quality assessment parameter for coal as an energy resource is the sulfur content in coal, which fluctuates from a few tenths of a percent to 4%. The higher the sulfur content, the worse the coal quality. In the EU, in which great importance is currently attached to the clean production of electricity, this parameter is particularly important, due to the continuous tightening of emission restrictions concerning, among others, sulfur compounds.

Ash content, the next coal quality parameter, is perceived similarly. Ash content constitutes ash residue after the roasting of coal. It enables the determination of the coal purity category. There are 5 basic categories:

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

- high-purity coal with an ash content of less than 10%,
- medium-purity coal with an ash content from 10 to 20%,
- low-purity coal with an ash content from 20 to 30%,
- very low-purity coal with an ash content from 30 to 50%,
- coal slate with an ash content from 50 to 80%.

The coal of the highest quality is characterised by the lowest ash content.

According to the data presented in table 5, lignite mined in the Czech Republic, Bulgaria and Germany is specific for the highest calorific value. In the case of hard coal, the highest heating value is presented by coal mined in the Czech Republic, Germany and Great Britain. The average calorific value of hard coal in Spain, one of the leading beneficiaries of state aid, is very low, at just 18 231 kJ. Poland, with heating value ranging from 21 000 kJ to 28 000 kJ, is located in the middle of the ranking; nevertheless, it should be noted that, in a situation of dropping coal prices on the European market as well as rising expectations in terms of raw materials' quality in the power industry, the average level of calorific value at a high price does not guarantee demand for Polish mining production.

On the other hand, lignite with the lowest sulfur content is mined in Greece, Poland and Slovenia. In the case of hard coal, Czech, British and Polish coal has the lowest sulfur content. The worst quality parameters in terms of sulfur content are characterised by Bulgarian, Romanian and German coal.

In terms of ash content in lignite, the best results are achieved by Poland, Slovenia and Bulgaria (Papagiannis et al., 2014, pp. 414-424). In the case of hard coal, the lowest ash content is contained in Czech, British and German coal. Polish hard coal has average ash content which, in combination with average sulfur content and calorific value, definitely does not favor the competitiveness of the Polish raw materials on the European market.

Summing up the assessment results of the quality of lignite, it should be stated that the best quality parameters are presented by Czech and Slovenian lignite. On the other hand, the best-quality hard coal is mined in the Czech Republic, Great Britain and Germany. Among these countries, substantial state aid has been transferred to the German, British and Slovenian mining industry. Czech mining has not been subsidised in such a wide range, and yet it achieves very good quality parameters.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 5. Qualitative characteristics of hard coal mined in the selected countries of the European Union [as of 31 December 2012]

Country	sulfur content [%]				ash content [%]				calorific value [kJ/kg]			
	lignite	brown coal	hard coal	anthracite	lignite	brown coal	hard coal	anthracite	lignite	brown coal	hard coal	anthracite
Bulgaria	2.28	-	<2.7	-	15.97	-	<26	-	12140-13400	-	6720	-
Czech Republic	0.78-1.44	-	0.42-0.43	-	5.97-37.8	-	4.3-18.9	-	11600-20560	-	25490-32070	-
Germany	0.15-3.5	-	0.45-1.8	-	2.0-20.0	-	3.2-21.0	-	7800-11500	-	21000-32000	-
Spain	2.5	-	-	-	-	-	34.6	-	-	-	18231	-
Greece	0.4-1.0	-	-	-	15.1-19.0	-	-	-	3770-9630	-	-	-
Hungary	1.3	-	-	-	21.0	-	-	-	6880	-	-	-
Poland	0.2-1.1	-	0.4-1.2	-	6.0-12.0	-	8.0-30.0	-	7400-10300	-	21000-28000	-
Romania	1.0-1.5	-	0.5-1.8	-	30-36	-	37-44	-	7200-8200	-	14900-15200	-
Slovenia	1.4	-	-	-	14	-	-	-	11300	-	-	-
Slovakia	<2.5	-	-	-	<25	-	-	-	10450	-	-	-
Great Britain	0.2-5.0	-	0.8-1.0	-	11.0-46.0	-	10.0-15.0	-	8665	-	26000-30000	-

Source: own work based on the EURACOAL data, *Coal industry across Europe*, 5th Edition 2013.

In table 6, there are parameters characterizing the economic results of hard coal mining in the examined countries. Firstly, in terms of value added, the best results were achieved by the Czech Republic and Great Britain, where the average value added from 2008-2012 exceeded almost seventyfold and sixtyfold respectively the value of state aid transferred to hard coal mining from 2000 to 2012. Good results in this area were also achieved by Greece and Bulgaria. Poland, with an outcome at the level of 80%, is placed in the final section of the ranking.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

On the other hand, the best ratio of value added to wages is achieved by Great Britain, Romania and Hungary. The last two of these countries owe their high productivity index value above all to low wages.

Table 6. Average values of economic parameters in hard coal mining in the select countries of the European Union from 2008-2012

Country	Economic parameters				
	Value added [in millions of euro] ⁵	The ratio of the average annual value added to state aid received in the period 2000-2012	Wage adjusted labor productivity [in %] ⁶	Average personnel costs [in thousands euro] ⁷	Gross operating rate [in %] ⁸
Bulgaria	483.58	1506.46%	261.45	8.48	30.75
Czech Republic	1 735.50	6969.88%	237.03	20.43	28.03
Germany	4 106.03	9.27%	161.60	53.53	18.10
Spain	1 702.63	6.72%	173.28	38.35	19.05
France	1 919.45	33.56%	179.55	50.55	14.63
Greece	262.55	1419.19%	162.73	34.45	20.08
Hungary	150.90	38.22%	240.55	15.78	22.78
Poland	7 328.68	80.39%	198.70	22.70	32.63
Romania	3 220.15	297.94%	294.48	14.78	34.05
Slovenia	131.73	70.90%	135.25	32.45	12.28
Slovakia	312.83	513.67%	265.20	14.95	37.00
Great Britain	26 153.35	5673.18%	710.48	79.33	45.20

Source: Eurostat, *Structural Business Statistics*.

⁵ Value added represents the difference between the value of what is produced and intermediate consumption entering the production, less subsidies on production and costs, taxes and levies.

⁶ The wage-adjusted labor productivity ratio is an indicator of labor productivity that is derived from structural business statistics. It is defined as value added divided by personnel costs, which is subsequently adjusted by the share of employee wages in the total number of people employed, or more simply, apparent labor productivity divided by the average personnel costs (expressed as a ratio in percentage terms).

⁷ Personnel costs are the total remuneration, in cash or in kind, payable by an employer to an employee for the work done. This is divided by the number of employees (paid workers), which includes part-time workers, seasonal workers, etc, but excludes people on long-term leave.

⁸ This is an indicator of profitability that corresponds to the share of gross operating surplus in turnover. The gross operating surplus is the surplus generated by operating activities after the labor factor input has been recompensed. It can be calculated from the value added at factor cost less the personnel costs. Turnover is the total of all sales (excluding VAT) of goods and services carried out by the enterprise of a given sector during the reference period.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The highest personnel costs were present in British, German and French coal mining. In this category, Poland comes 7th; however, the Czech Republic, Hungary, Romania, Slovakia and Bulgaria follow behind. Therefore, it may be concluded that, compared with countries with a similar level of economic development, personnel costs in the Polish coal mining industry are relatively high (higher costs were observed only in Slovenian mining).

The highest gross operating rate was achieved by coal mining in Great Britain, Slovakia and Romania. Poland is in fourth place. However, it is worth emphasising that Poland's high position in this ranking results from, periodically, very good performance of the industry achieved in the years of prosperity (2009-2010), as well as including brown coal mining in the statistics.

To sum up, the best values of economic parameters in the examined period were achieved by the British, Czech and Slovak hard coal mining industry.

Effectiveness of Polish hard coal mines in the light of the current EU legislations concerning state aid

As was mentioned at the beginning of this document, since 2010 state aid may be granted to the mining industry mostly for the liquidation of permanently ineffective hard coal mines. In order to relate the aforementioned legislations to the current situation of the two largest state-owned mining enterprises, table 7 presents the gross margin on sales in 24 hard coal mines that belong to these enterprises.

According to data included in table 7, 10 out of 24 examined mines may be considered to be permanently ineffective since, during the eight-year research period, they achieved a positive gross rate for two years at the most. That means they were able to cover production costs by sales revenues then. Two out of those 10 mines had never been profitable.

It is worth emphasising that, since 2010, profitability of all the examined mines has been systematically deteriorating. In 2012, only 7 out of 20 existing mines were performing effectively, whereas in 2009 there were 12 such units. The main reason for this crisis in the Polish hard coal mining from 2012-2013 was the uncontrolled increase of unit production costs which was not accompanied by the increase of production efficiency, either in terms of quality or quantity. The cost increase was driven by an improvement of the economy in 2009-2010 and by price increases of hard

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

coal on the global markets. A periodical improvement of financial results of the examined enterprises escalated the pay demands of trade unions, which translated into economically unjustified pay and production costs increases. Therefore, when hard coal prices decreased, the Polish hard coal mining industry was not able to comply with price and quality requirements of the leading electricity producers. Cheaper, imported coal appeared on the market (Caputa, 2008, pp. 165-177), which caused problems with sales and financial liquidity (Michalak, 2013, pp. 331-346). These days the examined mining enterprises are seriously threatened with bankruptcy .

Table 7. Gross operating rate in Polish hard coal mines from 2005-2012 [in %]

Mine number	Year									
	2005	2006	2007	2008	2009	2010	2011	2012		
1	2.29	1.14	-10.38	6.38	5.74	6.02	-7.76	-1.97		
2	1.46	1.62	-15.88	-22.39	-11.34	-19.39	-38.88	-27.98		
3	-2.30	9.16	10.21	15.92	18.73	20.86	25.12	-4.54		
4	11.20	-1.48	-1.03	22.98	1.42	15.06	21.04	3.92		
5	-3.50	-11.38	-5.23	2.35	-1.19	-14.30	-12.84	-3.80		
6	15.87	-0.32	-9.01	-20.55	-4.53	15.87	Merged with the mine no. 4.			
7	-3.31	-4.35	-27.76	-36.18	-22.63	-52.89	-18.13	-49.89		
8	9.07	9.59	17.06	10.80	19.90	21.36	13.06	8.52		
9	15.52	17.63	13.85	25.17	18.38	19.98	17.05	10.13		
10	-2.63	-13.84	-49.34	-47.03	-29.77	-104.51	-25.80	-25.46		
11	-39.65	-0.65	-13.20	14.43	5.08	-23.40	-10.30	-19.19		
12	5.74	-21.90	Merged with the mine no. 10.							
13	0.63	-13.01	-5.91	12.96	4.34	-24.00	-6.39	-18.36		
14	10.57	12.89	13.03	13.00	20.24	18.91	13.94	18.23		
15	13.18	13.60	8.81	3.59	11.18	8.72	7.14	10.28		
16	12.18	14.48	13.63	31.40	17.78	22.55	28.92	12.18		
17	2.76	-19.04	-28.28	2.79	-37.21	-26.90	-8.08	-5.18		
18	1.54	-23.41	-16.73	-17.00	-22.22	Merged with the mine no. 21.				
19	-5.91	-14.05	-0.23	-10.66	-2.35	-0.84	12.86	10.02		
20	-0.08	2.31	Merged with the mine no. 23.							
21	-21.90	2.12	-5.59	3.15	10.14	5.21	1.06	-8.87		
22	-1.51	4.53	-1.04	2.81	-1.04	-10.70	-3.10	-27.99		
23	21.75	10.99	0.93	0.77	1.78	-19.91	-15.53	-24.20		
24	-0.21	-1.44	1.97	0.46	-6.70	-27.09	-3.63	-16.33		

 mines permanently unprofitable.

Source: own work based on the internal data of the mines.

Conclusions

In the first part of the summary, there is a reference to the first research problem discussed in this article, which is formed by the following ques-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

tion: Which countries, from 2000-2012, granted the highest amounts of state aid to the hard coal mining industry and has this found its reflection in the economic and quality results of the examined industries? From an absolute perspective, the greatest state aid was received by Germany, Spain and Poland. From a relative perspective—that is, after calculating state aid per ton of resource mined—the largest beneficiaries of state aid remained Germany and Spain, which were joined by Slovenia, with its small output but also relatively high state aid. Because of the biggest output, Poland was listed in the latter part of this ranking.

In the examined countries, the best results in terms of quality of the extracted resources were obtained by: the Czech Republic, Great Britain, Germany and Slovenia. Among these countries, only Germany and Slovenia were in the group of the three biggest beneficiaries of state aid (in relative terms).

On the other hand, taking into account the economic criteria, the best values of economic parameters in the examined period were attained by the British, Czech and Slovak hard coal mining industry. Three main beneficiaries of state aid were not present among the listed countries. Consequently, it may be stated that the intensity of state aid did not have the desired results reflected in the quality or economic effects of the three largest recipients of state aid in the hard coal mining in the European Union.

According to above it could be concluded that state interference in the economy has been largely ineffective and insufficient. The main beneficiaries have not improved their competitiveness and financial results. There are also such countries as Czech and Slovakia that in spite of much less amounts of state aid have managed to reach efficiency in free market conditions.

It is also worth noting that Polish hard coal mining is characterised by average quality and economic parameters which, in a situation of influx of cheaper and better imported coal, may become a serious threat to the existence of the entire industry. This is confirmed by the results of the effectiveness assessment of the Polish coal mines, which provides an answer to the second stated research question: What are the development perspectives of Polish hard coal mining in light of the current EU regulations concerning state aid for the industry and in the context of their current economic situation? Thus, 10 out of the 24 examined mines are mines which may be regarded as permanently unprofitable because in the eight-year research period, they only achieved a positive gross margin in two years; that is, they were able to cover the production costs by sales revenues. Two out of these

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

10 coal mines had never been profitable. It is also worth emphasising that, since 2010, the profitability of all of the examined coal mines has consistently deteriorated. In 2012, only 7 out of the 20 existing units worked efficiently, while in 2009, there were 12 such units.

Therefore, taking into account the EU ban on providing state aid to mining enterprises for initial investments, as well as limiting the scope of state aid to cover the costs of the liquidation of unprofitable mines or continuation of the started restructuring activities, it should be concluded that the examined mining enterprises will be forced to close down a dozen or so of the hard coal mines functioning in their structures. These enterprises, despite the considerable public financial support, have failed to improve their competitive position and even partially regain their permanent profitability. State aid granted to Polish hard coal mining in the analyzed period ultimately turned out to be discouraging, ineffective and inefficient.

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18-19 June 2015, Economics and Finance**

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18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
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Accounting Integration issues of EU Member States

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Keywords: *Legal norm; Accounting; Integration; European Union*

Abstract: The aim of this article is to discuss the dilemmas over the integration of accounting in EU member states. The dilemma could be divided into the following main groups. Dilemma of the user of financial statements. This dilemma consists in determining for whom the integration of accounting in EU is crucial, and who is the intended beneficiary of integration. Dilemma arising from the lack of theoretical framework for drafting directives and standards: the accounting paradigm assuming that accounting is strictly quantitative. Accounting is a social science, whereas the accounting practice has greater influence on social, rather than purely economic, reality. Dilemma over legal regulations and the legitimization of standard setters could be attributed to accounting regulations as legal norms. A classic example of this might be the transition from rule-based to principle-based IFRSs.

The dilemma over the legitimization of standard setters has its roots in the legal aspect of accountancy. In order to solve it, it is necessary to answer the question: 'who controls the processes of accounting integration?' since the participants of this process often present divergent viewpoints, and sometimes even opposite priorities. Dilemma over the politicization of accountancy. The more globalized and complex the economic environment is, the more of political intervention there is expected to be in the standard setting process, affected by global geopolitical trends.

Introduction

Despite the economic turmoil, economic crises, conflict in Ukraine and other European turbulences, the EU integration as we know it depicted by the EU politicians seems an idealized reality created by smart diplomatic rhetoric. This pertains also to accounting, or the dilemmas over the its integration in the EU to be more precise. The integration dilemmas could be divided into the following main groups:

- dilemma of the user of financial statements,
- dilemma arising from the lack of theoretical framework for drafting directives and standards,
- dilemma over legal regulations and the legitimization of standard setters,
- dilemma over the politicization of accountancy.

Methodology

The paper uses theories of globalization focusing on the “race-to-the-bottom” (Berle and Means,1932). Some describe the concept as the “race to efficiency,” drawing attention to the way in which global business is using financial reports and economic and political power to shift accountancy toward a more geopolitical practice. As to accountancy, basic theories are used, in particular principle-based accounting theory and normative theory of accounting.

Practical implications

The paper shows that EU corporations, accounting firms and politicians together with Europeans professional bodies are the real force able to transform accountancy in a more integrated way, relevant to EU countries.

Dilemma of the users of financial statements

There are a number of ways in which the evaluation of accountancy can help policy makers better understand the world they are bound to manage. This dilemma consists in determining for whom the integration of accounting in the EU is crucial, and who is the intended beneficiary of integration. Modern standard setters, especially those setting IFRSs, claim universal value of the solutions they develop, as well as moral neutrality, yet in fact

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

this logically contradicts the claim that investors are the main users of financial statements. Widespread international adoption of IFRS offers equity investors a variety of potential advantages. These include (International Financial Reporting Standards (IFRS): pros and cons for investors, (Ball, 2006):

- IFRS promise more accurate, comprehensive and timely financial statement information, relative to the national standards they replace for public financial reporting in most of the countries adopting them, Continental Europe included. To the extent that financial statement information is not known from other sources, this should lead to a more-informed valuation in equity markets, and hence ensure lower risk to investors.
- By eliminating many international differences in accounting standards and standardizing reporting formats, IFRS eliminate many of the adjustments analysts historically have made in order to make the financials of companies more internationally comparable. IFRS adoption could therefore reduce the cost of processing financial information to investors. The gain would be greatest for institutions that create large, standardized financial databases.
- One benefit is that reducing the cost of processing financial information most likely increases the efficiency with which the stock market translates it into prices. Most investors may be expected to benefit from an improved market efficiency.
- Reducing international differences in accounting standards to some degree facilitates removing barriers to cross-border acquisitions and divestitures, which in theory will reward investors with higher takeover premiums;

In general, IFRS offer increased comparability and hence reduced information costs and information risk to investors.

Literature is full of professional judgments on IFRS. They offer several additional yet indirect, advantages to investors. Because higher information quality should reduce both the risk to all investors resulting from share ownership and the risk to less-informed investors caused by adverse selection, in theory it should lead to a reduction in the cost of equity capital. This would increase share prices, and would make new investments by firms more attractive, other things equal. Indirect advantages to investors arise from improving the usefulness of financial statement information in contracting between firms and a variety of parties, notably lenders and managers (Watts, , Zimmerman, 1986)

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Small investors are less likely than investment professionals to be able to anticipate financial statement information from other sources. Having regard to the treaty on the functioning of the European Union; Having regard to the proposal from the European Commission, after transmission of the draft legislative act to the national parliaments; Having regard to the opinion of the European Economic and Social Committee acting in accordance with the ordinary legislative procedure the European Parliament and of the council of 26 June 2013 introduced the Directive 2013/34/UE of on the annual financial statements, consolidated financial statements and related reports of certain types of undertakings.

This Directive should ensure that the requirements for small undertakings are to a large extent harmonized throughout the European Union. This Directive is based on the "think small first" principle. In order to avoid placing disproportionate administrative burdens on those undertakings, Member States should only be allowed to require a few disclosures by way of notes in addition to mandatory notes. In case of a single filing system, however, Member States may in certain cases require a limited number of additional disclosures where these are explicitly required by their national tax legislation and are strictly necessary for the purposes of tax collection. It should be possible for Member States to impose requirements on medium-sized and large undertakings that go beyond the minimum requirements prescribed by this Directive (directive 2013/34/EU of the European Parliament and of the Council of 26 June 2013 EC).

Many factors are linked to the financial crisis, and it is likely that poor implementation and application of fair value accounting rules has also had some effect. For example, default risk assessment was compromised, and the amount of subprime mortgage originations grew from approximately 8% of total residential mortgage originations in 2001-2003 to over 20% in each year from 2004 through early 2007 (Ryan, 2008).

Standards should be reconsidered, with less emphasis being placed on accounting rules that anticipate future income and overstate income and assets, and focusing more on appropriate implementation and standards that require bad news to be recognized when it becomes known. This timely recognition of losses would provide greater transparency to investors about the actual performance of their investments. While standards should allow for innovation and growth, accounting for company's performance must provide an accurate representation of its historical financial performance and health, with comments on fair value included only in notes or other sections of the financial statements. Other suggestions for revisions to the

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

standards include forcing banks to increase actual capital requirements in good economic times to build equity reserves to be used in the event of a subsequent downturn, and separating credit losses from other changes in fair value in the financial statements. Such objectives can be fulfilled through appropriate standards accompanied by greater enforcement, sound auditing practices, and adequate regulatory vigilance. Consideration should be given to these matters, particularly as standards will likely continue to evolve in light of future convergence with IFRS (Kothari and Lester, 2011, Kothari 2012).

The role financial reporting for fair values, asset securitizations, and derivatives played in the financial crisis is being scrutinized. The discussion is focused on banks as the center of the financial crisis. In response to the situation, the FASB and IASB have taken steps to improve disclosures relating to asset securitizations. The approach to accounting for securitizations in the IASB's Exposure Draft requiring banks to recognize whatever assets and liabilities they have after securitization is completed, better reflects the economics underlying the securitization transaction, derivatives, disclosure of more disaggregated information, disclosure of the sensitivity of derivatives' fair values to changes in market risk variables, and the implementation of a risk-equivalence approach to enable investors to better understand the leverage inherent in derivatives. Although accounting standard setters and bank regulators should find a common ground, they keep ignoring other users of financial statements and their role to reassure the society about the stability of the financial system.

In fact, today's users of financial statements are not only investors and banks. In the globalised world, with online transaction systems, economic analytical centres, virtual money, and data analysis software, which investors make their economic decisions based on audited balance sheets submitted to them six months after the reporting date? If investors bought and sold shares according to financial result, perhaps we wouldn't witness financial crises. The usefulness of financial information has been broadly questioned, due to its late presentation and complexity. The problem is that it's not useless, but rather inappropriate. The process of drafting the international standards is sometimes described as 'patch approach,' 'piece-made approach,' or 'mix attribute model' (see ISAR discussion 2010, Geneva). Hence, maybe the IFRS Interpretation Committee should add 'self-serving body' to complement their name. Now it is lawyers, prosecutors, judges, or inspectors from the Supreme Chamber of Control, the Central Anticorruption Bureau, or the Central Bureau of Investigation who make decisions

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

affecting the lives of others, based on financial statements. The target group of financial statements has changed dramatically in recent years.

”Perhaps some members of the profession would prefer to stay out of limelight. But this would risk having no voice in the development of policy. It would also open the profession to accusations that it was not playing a full role in civil society. Lawyers doctors, and other leading professions have long developed a public policy role. If accountancy accepted the wider role, there would be significant potential advantages for accountants and, indeed, for the quality of debate. (Travers, 2014)

Thus, to be overarching, the definition of the user of financial statements should read: “the user of financial statements is every person that takes binding decisions based on financial statements”. Such a definition makes the target group more universal, i.e. features the investor.(Kamela-Sowinska ,2011)

Dilemma arising from the lack of theoretical framework for drafting directives and standards

The globalization of the world of commerce has revealed the urge for international harmonization and standard setting in accounting and audit. *“If a conceptual framework is an attempt to operationalize the accounting theory, the first stumbling block is the lack of agreement on the nature and scope of this theory. So rather than having a common starting point and then a disagreement about in which direction one should go, there appear to be many different starting points, each with its own set of future avenues” (Higson, 2003,)*

The accounting paradigm assuming that accounting is strictly quantitative, i.e. in its nature based on numbers (e.g. financial result) which are then used to make economic decisions, is becoming less ubiquitous. Accounting is a social science, whereas the accounting practice has greater influence on social, rather than purely economic, reality. Thus, IFRSs should be named ‘IFRSs for financial markets’ to make a clear division between financial economy and ‘real’ economy. In principle, psychologists or experts in social and cultural studies are not engaged in setting directives, especially specific standards. This could be reflected in the composition of IASB’s bodies and other European institutions dealing with the integration of accounting, with top-notch experienced auditors, accountants, financial directors serving as former directors or heads of audit firms, banks, or rating agencies.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

IFRS Foundation does not have a research body. Its Commissions and Working Groups are composed of distinguished figures, but they are only practitioners and none of them is a lawyer, psychologist or a specialist in cultural or social studies. The tendency has been to focus on global convergence or convergence with the US GAAP, IFRS or global regulations.

The international nature of financial reporting standards is not determined by the global team of people who develop the standards, but rather by the nature and scope of the standards.(Kamela-Sowinska, 2013)

The crisis of the accounting paradigm is dying out, accounting will cease to be a standard science (compareKhun). The complexity of accounting is outpacing its precision, and once eliminated, the departures from rules reoccur in a different place. Today, an account is the first resort in any discrepancy. The external factors seem to contradict faithful representation and years of tradition. What we need is a new theory of accounting to address the present economic crisis, and determine the role of accounting in the crisis. What we used to see as a result before, now we must learn how to perceive as a cause. Financial result used to be seen as the result of undertaken actions, but today it is considered the cause of these actions. As regards the integration of accounting in the EU, I can see clear lack of theoretical premises to effect the proposed changes. Only consistent application of accounting theories in the integration process could ensure linguistic precision, clarity, argumentative order, and correlation between the specialist language and both practice and social awareness.

**Dilemma over legal regulations and the legitimization
of standard setters**

Another dilemma over the integration of accounting could, in my view, be attributed to accounting regulations as legal norms. A classic example of this might be the transition from rule-based to principle-based IFRSs. In literature, it is common for accounting rules to be juxtaposed with accounting principles. However, it is unjust to distinguish between the two. Principles and rules (or legal principles and norms according to the Polish science of law) differ as to the mode they function. Rules (norms) are based on the 'all or nothing' concept, i.e. they are or aren't met. On the other hand, standards (principles) may be observed to a certain extent. Compared to rules, in case of two conflicting standards, principles do not overrule one of them, but are used to give priority to one over the other, with both remaining in force. The application of norms is precisely determined, which is not

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

the case for principles. In addition, rules are applied automatically in particular situation, e.g. double entry rule, whereas the use of principles is conditional upon the entity's assessment of a situation, e.g. the choice of asset measurement method.

One could refer to Dworkin fundamental work *Taking Right Seriously*, and the famous polemics of John Mackie. Dworkin splits the law into rules and standards, with the latter covering *principles* and *policies*. *Principles* are legal norms to be observed, because they constitute requirements attributed to a certain moral system (justice or honesty). *Policies* mean standards determining general objectives of social, political, and economic activities. Both types of standards require certain state of affairs to be satisfied to the highest possible extent, with legal and actual functions determining the feasibility of this process. In 2006 critical analysis of confusing rules with principles in drafting accounting standards and standards on auditing was carried out by Benston, Bromwich, and Wagenhofer (2006). However, I couldn't find any reflection of or discussion over, the global heritage of the theory of law or accounting.

The growing acceptance by countries across the globe of International Financial Reporting Standards (IFRS), issued by the International Accounting Standards Board (IASB), is being used by some to suggest that the IASB is a model for a transnational standard-setting body (compere Lloyd et al, 2007; Büthe and Mattli, 2008).

The increasing use of transnational standard-setting bodies to address quality uncertainties and coordination issues in the global economy raises questions about how these bodies establish and maintain their legitimacy and accountability beyond the sovereignty of democratic states. Discussion about legitimacy has increasingly emphasized due process norms in its claim for support. The analysis evaluates the IASB due process against the cultural benchmarks established by domestic standard-setters in the USA and UK and against a normative model of procedural legitimacy. These comparisons help to understand the modifications that were made in the hope due process would add legitimacy to setting accounting standards beyond the state level. They also reflect the broader political context of competing legitimacy criteria faced by transnational standard-setters. (Richardson, Eberlein, 2010)

The European Parliament (EP) of the European Union, which accepted the IFRS as the basis for financial reporting by companies starting to operate in 2005, noted in the 2008 motion, adopted by its Committee on Economic and Monetary Affairs, that the IASB: "... is a private self-regulatory

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

body which has been given the role of lawmaker for the EU... [the EP] underlines that the IASCF/IASB... lack transparency, legitimacy, accountability and are not under control of any democratically elected parliament or government, without the EU institutions having established the accompanying procedures and practices of consultation and democratic decision-making that are usual in its own legislative procedures..." (European Parliament, 2008, p. 4).

This dilemma has its roots in the legal aspect of accounting. Broadly speaking, legitimization means justification or legality of a certain social formation. Most common concepts are: legitimization of power, state, or law.

Legitimization of law means justification of law and perceiving it as fair. Legitimization of law is often intertwined with legitimization of power. Interchangeably with legitimization, such concepts as *justification*, *empowerment* or *rationale behind the binding force* are used. Usually, legitimization is analyzed from normative or empirical perspectives. In normative terms, the concept refers to the justification of certain legal norms. All legal norms, as well as the legal system in its entirety, should have such justification (reference to a certain system or quality) to deserve respect and be regarded as law.

Empirically, legitimization means actual compliance with the law. Therefore, high legitimization of laws demonstrates itself in its provisions being followed by a given society.

Legitimization could be viewed from more or less general perspectives. Thus, we can talk about legitimization of specific legal norms or decisions to set and apply laws, or about legitimization of the entire legal system. The integration of accounting laws should be seen from the second perspective.

The IASB does not have the status of an international body such as IFAC, the World Bank, IMF, or the EU. For the proposed standards to obtain legal force, they must be subject to so called *due process*. The significance of *due process* has been referred to on IFRS Foundation's website by David Sidwell, Trustee: "we will look at providing more robust documentation to demonstrate the oversight."

IASB is an institution established in accordance with legal criteria for developing international accounting and audit regulations, hence its activity is rather legal than legitimized.

Without legitimization it wouldn't be possible to exercise power, or establish proper relationships between the authorities and the society. Thus, it is necessary to determine general principles for legitimization, adequate for

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

a given model of governance. In fact, such legitimization remains in the hands of a national legislator.

The discussion over the legitimization of the accounting law requires answering the question: “who controls the processes of accounting integration?” since the participants of this process often present divergent viewpoints, and sometimes even opposite priorities. If we look at IFRS for SMEs, they are not commonly accepted by the accounting profession in the EU, and are still subject to standardization.

Reporting standards for public finance sector should be of particular interest within the EU. The present crisis in Greece, and the imminent crisis in the Southern Europe require focusing on this area of accounting. So what? Well...nothing.

Dilemma over the politicization of accountancy

Over years there was no law on accounting, neither an act nor a code of accounting. There was only practice, which determined how to recognize the results of economic decisions and present them in the measure of value – money. The first modern code containing accounting standards was the Napoleon’s Code of 1807 and Commercial Code of 1808 (Code de Commerce); followed by German commercial law BGH Burgerliche Gesetz Buch of 1900. The regulations of the Commercial Code and the Napoleon’s Code referred to keeping and using accounting books and preparing a bankruptcy balance sheet. Title II of the Napoleon’s Code dealt with merchandise books. For example, in article 10 it obligated merchants to sign the register book and inventory book every year [Turzynski 2010].

Today we have accounting law, IASs, IFRSs, GAAP, IPSASs. There is a huge number of organizations that formulate rules, principles, conceptual frameworks, accounting standards. The most important of them are: IASB, IFRSB, IFAC, EFRAG, IFRIC, SAC. Most of the international organizations mentioned above all act in the public interest, hence allegedly in the interest of all citizens in the world. Nowadays politicians create accountancy, as they have the power to create the law. This is what is called a politicization of accountancy. The number of publications has risen (Ball., 1995; Colasse, 2004; Graham. and Neu, 2003; Nobes and Parker, 2012).

Literature indicates that the phenomenon is linked to the emergence of critical accounting research, which assumes that accountancy is not a neutral and objective tool aiming at improving the effectiveness of financial markets, but on the contrary – a practice that allows to transfer wealth

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

among social classes. Hence, accountancy influences the authorities in the area of political economics, but at the same time it is influenced by them, as it functions within certain political frameworks. Accountancy has therefore a political function – the accounting principles are shaped by the group in power and their ideology and, on the other hand, accountancy influences the way in which profits, wealth and power are being distributed within the society. Literature on political accountancy encompasses works which investigate how accountancy can be engaged in social conflicts and in the process of profit distribution not only within one company, but within the capitalist society as a whole. The research also includes a study on the role of accountancy in the interactions between a country's economic policy and free-market economy [Dobija, 2010].

A Corporate Social Responsibility report, (CSR report) is supposed to present what a particular company decided to do in the following three areas: economic, social and environmental, and whether it has managed to accomplish the goals set. A report on sustainable development is an important source of information for financial analysts who formulate prognoses regarding future financial results of the company. Based on the information included in such reports, their prognoses are more precise and reliable. By preparing a CSR report, the company contributes to building better social and environmental conditions, and consequently - it may trigger positive changes in the global economy. Moreover, emphasizing its openness and transparency, the company improves its relations with local community, non-profit organizations etc.

A CSR report can also play a role of a marketing tool, which creates an image of a company devoted to social and environmental issues. It can help the company to gain advantage over its competitors, who are less concerned with the idea of sustainable development. By promoting activities in the area of sustainable development, companies promote transparency and responsibility over their actions and results.

The more globalized and complex the economic environment is, the more of political intervention there is expected to occur in the standard setting process. Regardless of whether the standard-setting institutions represent the public or private sectors, accounting principles will be shaped by the global geopolitical reality, so by following this tendency, accountancy is obtaining geopolitical knowledge and practice in EU countries.

Conclusions

The developments of international accounting bodies and standard setters have played a vital role in ensuring best accounting and audit practices will be disseminated across the complex modern world. On the other hand, it heralds a number of problems that will have to be solved in near future.

The main role of implementing new solutions in accountancy and audit may be played by IFAC which, in a document “Enhancing organizational reporting” stated that IFAC:

- Supports organizational reporting of broad-based information that is important to stakeholders for managing and directing operations, decision making, promoting transparency, and the discharge of accountability;
- Supports such reporting in accordance with robust international reporting frameworks that produce information on which assurance conclusions can be expressed, in accordance with high-quality international assurance standards;
- Recognizes that the accountancy profession has a significant contribution to make, and an important role to play, in developing and implementing enhanced organizational reporting.
- Professional accountants also play an important role in broad-based organizational reporting arrangements, and in providing assurance;
- Strongly supports the International Integrated Reporting Council (IIRC) and the development of the Integrated Reporting (<IR>) Framework; and
- Recognizes that there is a range of different frameworks and regulations available and being developed, and considers it important to examine the relationship between these frameworks and to promote global consistency and convergence” (www.IFAC.org, IFAC Policy Position 8, October 2013).

Key focus areas of discussion related to the integration of accounting in the EU are as follows:

- whether to strengthen the role of the World Bank, IMF, EU, and IFAC in developing accounting standards for the public finance sector and focus the standardization of business accounting exclusively on listed entities; / is it reasonable to strengthen
- whether to strengthen the role of Directives and Conceptual Frameworks as the basis for regular accounting to clearly define practical rules and principles; / is it reasonable to strengthen

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

- 3. whether to strengthen the role of national standard setters based on Directives and Conceptual Frameworks, particularly as regards SMEs, since it's only them who can acknowledge the cultural and other specific features of their domestic system. / is it reasonable to strengthen.

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18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
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**Healthcare in the Light of the Concept
of Welfare State Regimes – Comparative
Analysis of EU MS**

JEL Classification: *A11; H51; I18; P16*

Keywords: *welfare state; health care; decommodification*

Abstract: This paper addresses issues related to health care in the context of the debate about the typology of welfare state regimes and comparative studies conducted by reference to the debate. Particular attention has been paid to the phenomenon of decommodification as one of the key dimensions that define welfare regimes identified in the literature associated with this debate. The study presents a health decommodification index, on the basis of which an attempt has been made to assess the decommodification potential of health care, taking into account the situation in the 28 EU Member States in 2012. The identification of broadly understood accessibility of publicly funded health care as a basic measure for assessing the decommodification features of health programs is an important result of the empirical analysis. The study has also confirmed the views expressed in the literature about the existence of practical obstacles standing in the way of developing a universal typology of welfare states.

Introduction

Although it is difficult to provide a clear and comprehensive definition of the welfare state, the specific characteristics underlying the concept of welfare state are commonly acknowledged. One of the main features of this

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

concept indicated in a textbook definition is that it involves state responsibility for securing some basic, modest standard of living for its citizens. Other presentations concretise this definition by reference to certain areas of state activity and relevant criteria of social justice (Barr, 1992). In contemporary welfare states, especially European ones, attention is drawn to the key role that the state plays in matters relating to social security, health care, education, housing and working conditions as well as to the principles of equal opportunities and fair distribution of wealth.

The issue of the functioning welfare states and their typology has for many years been at the heart of research and interest in many scientific disciplines, and of social policy decision makers. Theoretical concepts are confronted with the effects of policies and programs pursued within the framework of social security systems. As the E. Karpowicz (2006, p.4) states "social policy is primarily a practical activity but that practice has always been accompanied by investigations aimed at resolving the basic concept, at focusing efforts expressing different views and opinions which ultimately determine the practical arrangements". Szarfenberg R. (2009, p.17) emphasizes the importance of social policy models as a tool to simplify its potential complexity what would allow its characterization and comparison in different times and places.

Comparative analysis of social security systems is accompanied by an interest not only in the extent to which welfare states differ from each other and to what extent they are similar to each other but also in how these similarities and differences may explain the effects of implemented social policies. Particularly noteworthy is the Esping-Andersen' (1990) concept of *the three worlds of welfare capitalism*, in which one of the basic criteria for differentiating the welfare state regimes was the extend of decommodification of the status of individuals in relation to the market. For its assessment the author has examined the decommodifying features of social security programs in the 18 OECD countries using selected indicators related to various types of cash benefits under their income maintenance programs. The extent to which the author's criterion of differentiation and assignment of states to individual welfare state regimes works in the health care sector and, consequently, whether the concept of the three worlds is universal constituted and still does constitute the subject of research investigations (Kasza, 2002, Bambra, 2005a, 2005b, Yu, 2012).

This paper furthers this research trend and aims to assess the decommodification potential of the health care systems in the 28 EU Member States based on 2012 data. In order to accomplish this aim two health care

decommodification indexes have been constructed using different set of measures. This has allowed to examine the concept of health care decommodification and to enrich inference.

The paper's structure and layout have been subordinated to this very goal. First, the author makes a review of literature on typology of welfare state models, with particular emphasis on Esping-Andersen's concept of 'three worlds of welfare state capitalism'. Then, relying on the research method the author presents the results of empirical study and discusses them in the context of a widely understood accessibility of publicly funded health care. Finally, the author draws conclusions, including those as to the usefulness of G. Esping-Andersen's typology of welfare state regimes in relation to the health care sector.

Review of the literature

Relying on reviews of pertinent literature one can indicate two models of the welfare state identified by H. L. Wilensky and C. N. Lebeaux, (1968) i.e. the *residual (marginal)* model in which the intervention of social institutions is justified on the grounds of market or family failure, and the *institutional (redistributive)* model in which social support is treated as a universally acceptable first line function of the state (Van Kersbergen, 2012, p.140, Schustereder, 2010, p.18). R. Titmuss (1974) extends this typology by adding to it the so-called *an industrial-achievement-performance* model in which both the entitlement and the scope of social benefits granted to its beneficiaries is dependent upon their merits, performance and efficiency (Van Kersbergen, 2012, p.140, Schustereder, 2010, p.18). Incidentally, N. Furniss and T. Tilton (1977) also distinguished three models of the welfare state and described them as the *positive state* in which social policy is intended to protect the owner of the capital from the difficulties associated with the interplay of market forces and from the demands of revenue redistribution, the *social security state* in which the goal of social policy is to guarantee a minimum income for all citizens and the *social welfare state* in which the goal of social policy is to equalize the conditions of life of all citizens (Karpowicz, 2006, p. 4).

What is particularly noteworthy is G. Esping-Andersen's (1990, 1999) concept of the three worlds of welfare state in which the author distinguishes three types of welfare regimes: liberal, conservative and social democratic. The basic analytical axis in the above typology was, like in most accepted classifications, a juxtaposition of private and public spheres,

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

while in contrast to previous studies¹, the key dimensions that define the separate regimes are: i) the degree of decommodification referring to the level of individuals' self-sufficiency from the labour market which arises from the existence of cash benefits systems, and ii) stratification or group solidarity models described by the author (G. Esping-Andersen, 2010b, p. 96). The operationalization of adopted dimensions resulted in the assignment of 18 OECD countries to one of the three regimes.

The *liberal* regime is based on market mechanisms. The author assigned to it those states which are characterised by a modest, mean tested, universal systems of social transfers or modest social security systems. This approach to social benefits is an expression of minimal state intervention, individualisation of risk and promotion of market-based solutions. The author indicates that this type of welfare state results in minimisation of the scope of decommodification, limitation of the area of social entitlements and the establishment of a system of social stratification, which is a blend of 'equality in poverty' and 'market-differentiated welfare of the majority' (G. Esping-Andersen, 2010a, pp. 44-45)².

The *conservative* regime, grounded both in the market and in the family, was revealed in countries whose programs and social benefits are universal, their scope generally differentiated on the grounds of professional status and income, and their administration essentially the responsibility of employers. Government intervention in the market is justified by a failure of the family, which determines its subsidiary character. G. Esping-Andersen indicates that the regime results in a moderate level of decommodification, the primacy of the social assistance over entitlements and favouring the consolidation of the existing social divisions as a result of social policy³.

On the other hand, the *social democratic* regime in which the state assumes primary responsibility for the welfare of its citizens is typical of countries where social programs are universal and egalitarian, and benefits granted are of a relatively high level, often close to the amount of the average income. The state actively supports jobs and income protection, which, in turn, translates into a wide range and high level of decommodification. G. Esping-Andersen points out that state involvement and the minimisation of the function of the market leads to the emergence of conditions condu-

¹ Most researchers focused on the volume of welfare spending and its share of GDP.

² In the study group the features of the liberal regime were ascertained in Australia, Canada, Ireland, New Zealand, Great Britain and the USA.

³ In the study group the features of the liberal regime were ascertained in Austria, Belgium, France, Germany, Switzerland, Italy, Japan and the Netherlands.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

cive to a reduction in social divisions and strengthening of social solidarity⁴.

G. Esping-Andersen's concept of the three worlds was for many researchers a reference point for further studies and comparative analyses and the voicing of more or less critical remarks. Some verified the welfare "order" in the 18 OECD countries covered by G. Esping-Andersen (Leibfried, 1992, Castles & Mitchel, 1993, Bonoli, 1997, Korpi & Palme, 1998)⁵, others tested this concept in other countries (Ferrera, 1996, Ferreira & Figueiredo, 2005, Gough, 2006, Walker & Wong, 2005)⁶ or with reference to other social policy areas such as health care and education (Bambra, 2005a, 2005b, Yu, 2012, Czarnecki, 2014), analysing larger sets of countries and more recent data. As a result, objections were raised as to the usefulness of the concept of the three worlds for comparative research (Baldwin, 1996, Kasza, 2002), its theoretical and methodological shortcomings (Lewis, 1992, Gough, 2001, Arts & Gelissen, 2002, Powell & Barrientos, 2011).

Methodology of the research

The author's research methodology involves the use of the health de-commodification index as one of the possible methods of assessing the level of decommodification characteristics of the health care system. To construct such an index G. Esping-Andersen's method has been adopted (2010a, pp. 77-78). As a starting point the health decomodification index proposed by C. Bambra (2005a) was examined. Then, by analysing the results obtained within this index (index I), the author proposed two new indicators and constructed the second index (Index II).

The first index (Index I) has been constructed through the assessment of three measures (Bambra, 2005, p.34):

- private health expenditure as a percentage of GDP,
- private hospital beds as a percentage of total bed stock,

⁴ In the study group the features of the social democratic regime were revealed Denmark, Finland, Norway and Sweden.

⁵ The research resulted, among others, in proposals advocating the assignment of certain countries (e.g. Austria, New Zealand, Japan or Italy) to another regime.

⁶ The research resulted, amongst others, in a suggestion whereby additional regimes should be isolated, e.g. for Southern European countries, Central and Eastern Europe or even certain Asian countries.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

- the percentage of population covered by the health care financed by public means.

The second index (Index II) has been constructed through the assessment of following measures:

- 1) household out-of pocket payment as a percentage of total current health expenditure,
- 2) the percentage of population reporting difficulties in having their basic medical needs met,
- 3) the percentage of population covered by the health care financed by public means.

The degree of decommodifying features of the health care system has been determined by adding the results (points) awarded for the place on the scale (in the ranking of countries) for the above indicators. On the basis of the position of each of the 28 EU countries on the respective scales, between one and three points have been awarded, denoting a low, medium or high level of decommodification, respectively. The point award has been based on the difference between the mean value and standard deviation, in several countries adjusted for extreme values. Sub-index values were then weighted by means of the index of the share of the population entitled to benefit from public services.

The underlying statistics used to compile these indexes have been sourced out from EUROSTAT, OECD and WHO databases, with 2012 data used as the reference year. Whenever 2012 data were not available use has been made of data from the few years adjacent to the reference year, and in the absence of any data use has been made of the EU average with adjustment when necessary for extreme outliers. Table 1 and table 2 below present data (indicators) and author's own calculations used in the paper.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 1. Health index data (Index I)

Country	Private health expenditure (% of GDP)	Score	Private hospital beds (% of total bed stock)	Score	Public health system coverage (% of population)	Score
Austria	2,5	2	29,6	1	99,9	9,99
Belgium	2,7	2	14,3*	2	99,9	9,99
Bulgaria	3,3	1	13,2	2	77 ¹	7,7
Croatia	1,5	3	0,6	3	100	10
Cyprus	4	1	49,2	1	83 ²	8,3
Czech Rep.	1,2	3	14,2	2	100	10
Denmark	1,6	2	4,5	2	100	10
Estonia	1,2	3	10,7	2	93,3	9,33
Finland	2,3	2	5,1	2	100	10
France	2,6	2	37,8	1	99,9	9,99
Germany	2,6	2	59,4	1	88,9	8,89
Greece	3	2	30,3	1	79 ³	7,9
Hungary	3	2	3,1	2	100	10
Ireland	2,9	2	14,3*	2	100	10
Italy	2,1	2	31,5	1	100	10
Latvia	2,1	2	8,7	2	100	10
Lithuania	2,2	2	0,5	3	100	10
Luxembourg	1,2	3	14,3*	2	97	9,7
Malta	3,1	1	7,2	2	100	10
Netherlands	1,7	2	100,0	1	99,8	9,98
Poland	2	2	26,8	1	96,6	9,66
Portugal	3,6	1	27,4	1	100	10
Romania	1,1	3	2,9	2	100	10
Slovak Rep.	2,3	2	14,3*	2	95	9,5
Slovenia	2,7	2	1,1	3	100	10
Spain	2,6	2	30,7	1	99	9,9
Sweden	1,8	2	14,3*	2	100	10
United Kingdom	1,5	3	0,0	3	100	10

Sources: author's own calculations based on Eurostat, WHO, and OECD data, OECD/European Union (2014). Health at a Glance: Europe 2014.

Data availability: (*): EU adjusted average value; (1) 2011; (2) 2007; (3) 2013.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 2. Health index data (Index II)

Country	Household out-of-pocket payment (% of total health expenditure)	Score	Self-reported unmet need for medical examination (% of population)	Score	Public health system coverage (% of population)	Score
Austria	16,7	2	0,3	3	99,9	9,99
Belgium	20,4	2	1,7	2	99,9	9,99
Bulgaria	43,1	1	8,2	1	77 ¹	7,7
Croatia	12,8	2	3,6	1	100	10
Cyprus	47,2	1	3,5	1	83 ²	8,3
Czech Rep.	15,3	2	1	2	100	10
Denmark	12,9	2	1,2	2	100	10
Estonia	18,4	2	8,3	1	93,3	9,33
Finland	19,6	2	4,6	1	100	10
France	7,8	3	2,3	2	99,9	9,99
Germany	12,2	3	1,6	2	88,9	8,89
Greece	28,8	2	8	1	79 ³	7,9
Hungary	29,1	2	2,8	2	100	10
Ireland	16,9	2	2,2	2	100	10
Italy	18,6	2	5,6	1	100	10
Latvia	34,3	1	12,3	1	100	10
Lithuania	31,8	2	2,3	2	100	10
Luxembourg	11,6	3	0,7	2	97	9,7
Malta	32,3	2	1,1	2	100	10
Netherlands	6,0	3	0,5	3	99,8	9,98
Poland	24,3	2	9	1	96,6	9,66
Portugal	31,7	2	3,3	2	100	10
Romania	19,5	2	10,7	1	100	10
Slovak Rep.	23,2	2	2,2	2	95	9,5
Slovenia	12,5	2	0,1	3	100	10
Spain	22,1	2	0,7	2	99	9,9
Sweden	17,4	2	1,3	2	100	10
United Kingdom	9,0	3	1,4	2	100	10

Sources: author's own calculations based on Eurostat, WHO, and OECD data, OECD/European Union (2014). Health at a Glance: Europe 2014,.

Data availability: (1) 2011; (2) 2007; (3) 2013

Results

Analysis of the results shows that the adoption of different measures for the assessment of decommodifying features of health care systems has a significant impact on the final results, both in terms of the indexes values attributed to each of 28 EU MS and consequently of their position on the indexes scale.

In the case of the first index (index I) the potential spreads out between 17 points (Cyprus) and 60 points (United Kingdom), the average value of the index for all EU countries being 38 points. The research method adopted has yielded a distinction into three groups of countries, revealing low, medium or high level of decommodifying potential, respectively. The group of low decommodification index countries (index value ranging from 17 to 24 pts) consists of four countries – two so-called the new Member States⁷, i.e. the already mentioned Cyprus, and Bulgaria, as well as Portugal and Greece. By contrast, the group of high decommodification index countries (index value between 50 and 60 pts) consists of six countries, including five new Member States (Romania, Czech Republic, Lithuania, Slovenia, Croatia) and the UK. The remaining 18 countries, including six new Member States, belong to a group of medium decommodification index level countries, with the index ranging between 27 and 49 points.

The results presented in the framework of this index give rise to doubts especially when one compares the index scores of such countries like Netherlands (30 pts) and Greece (24 pts), Germany (27 pts) and Bulgaria (23 pts), or Luxembourg (49 pts) and Romania (50 pts). Although, the index scores in compared countries are very close to each other in reality these countries differ in many aspects of health care provision. As an example one can point to significant differences in the level of general government health expenditure per inhabitant in Euro/PPS in these countries: in Netherlands (3250) compare to Greece (1217), in Germany (2725) compare to Bulgaria (500), or in Luxembourg (3348) compare to Romania (587)⁸.

⁷ Countries which joined the EU in 2004 (Cyprus, Czech Republic, Estonia, Latvia, Lithuania, Malta, Poland, Slovenia, Slovakia, Hungary) and later in 2007 (Bulgaria and Romania) and in 2013 (Croatia).

⁸ Eurostat database: http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=hlth_sha_hf&lang=en

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 3. Health care decommodification indexes

country	Index I		Index II	
	Index score	decomodification level*	Index score	decomodification level *
Austria	30	medium	50	high
Belgium	40	medium	40	medium
Bulgaria	23	low	15	low
Croatia	60	high	30	medium
Cyprus	17	low	17	low
Czech Republic	50	high	40	medium
Denmark	40	medium	40	medium
Estonia	47	medium	28	medium
Finland	40	medium	30	medium
France	30	medium	50	high
Germany	27	medium	44	medium
Greece	24	low	24	low
Hungary	40	medium	40	medium
Ireland	40	medium	40	medium
Italy	30	medium	30	medium
Latvia	40	medium	20	low
Lithuania	50	high	40	medium
Luxembourg	49	medium	49	high
Malta	30	medium	40	medium
Netherlands	30	medium	60	high
Poland	29	medium	29	medium
Portugal	20	low	40	medium
Romania	50	high	30	medium
Slovak Republic	38	medium	38	medium
Slovenia	50	high	50	high
Spain	30	medium	40	medium
Sweden	40	medium	40	medium
United Kingdom	60	high	50	high
<i>Mean</i>	38		37	
<i>Standard Deviation</i>	11		11	

(*):high > Mean + SD; medium: between (Mean - SD) and (Mean + SD); low < Mean - SD
Sources: author's own calculations.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

In the case of the second index (index II), both the span of the decommodifying potential of health care systems in the countries studied (values ranging from 15 and 60 pts) and its average value for the EU 28 (37 pts) have not changed significantly. On the other hand, the index of 16 Member States has changed, which, in turn, has led to a shift in the position of the Member States on the index scale and, consequently, the current assignment of some of them to the three decommodification level groups distinguished (Table 3). For example in the case of Croatia, but also Romania and Latvia, the score of the second index compared to that of the first index has decreased by 30 and by 20 points (for the last two countries) respectively, while in the case of Holland, but also Austria, France and Portugal, it has increased by 30 and by 20 points (for the last three countries), respectively. Thus, the group of low level decommodification countries (index values ranging from 15 to 25 pts) now features Cyprus, Bulgaria, Greece and Latvia and the group of high level decommodification countries (index values between 49 and 60 pts) includes Slovenia, the United Kingdom, Luxembourg, Austria, France and the Netherlands. The remaining 18 countries are classified as medium level decommodification countries, with the index ranging between 27 and 49 points.

Discussion

The use of two health decommodification indexes in the study has enriched inference. The first one which has been taken as a starting point for analysis was developed by C. Bambra who, for the purpose of her study, extended G. Esping-Andersen's concept of decommodification for the health care sector, which she defined as 'the extent to which an individual's access to health care is dependent upon their market position and the extent to which a country's provision of health is independent from the market' (2005a, p. 33). In order to enhance comparability between the health care and the labour market decommodification indexes C. Bambra has examined the same 18 OECD countries and made reference to the same period of study (1980) as G. Esping-Andersen did. She has chosen three indicators⁹ to operationalize the basic analytical axis consisting in a juxtaposition of the private and public health care sectors. To illustrate this relationship she has considered, in turn, three aspects of the functioning of health care systems, namely: financing, provision and accessibility of health care services.

⁹ The availability of statistical data in reference to the time period of C Bambra's study might had been a decisive factor for the choice of these indicators.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

During the evaluation of this approach in the context of the definition of decommodification of health care as suggested by the author, it has been noted that the three indicators proposed by C. Bambra do not allow to capture a complete and real picture of the extent of market dependence / independence in both areas.

The first indicator e.g. private health expenditure as a percentage of GDP refers to 'the extent of private enhancing by identifying the extent of a country's total income that is spent on private health care' (Bambra, 2005a, p.34). Thus in the nominator next to household out-of pocket payment, are included expenditure of private insurance, of non-profit organizations serving households and of corporations (other than health insurance). It is worth also to be aware that the adoption of the GDP as a denominator may lead to misinterpretation of the level of the indicator due to the differences as to the direction and the rate of changes of GDP and of healthcare spending. Such can occur especially in times of economic change.

The second indicator, in turn, i.e. private hospital beds as a percentage of total bed stock relates to only one mode of health care provision i.e. inpatient services provided by hospitals and thus reflects the ownership of the private means of production to a limited extent. Moreover, in contemporary health care systems the public payer contracts the services from both public and private providers of health care.

The third indicator, i.e. the percentage of the population covered by publicly funded health care, is an important measure of the extent of general access to these goods and services, nonetheless cannot be treated as a perfect measure of public health services accessibility due to the fact that in all health care systems individuals are required to contribute to their cost at the point of use.

In order to address above mentioned shortcomings, the author has proposed two new indicators, which, analysed in conjunction with Bambra's third indicator has led to the construction of the second index. It has allowed to focus analysis on issues related to a widely understood accessibility of publicly funded health care goods and services, that in the view of the author is considered to be a key to the assessment of the decommodifying potential of health care system. The reasoning behind the author's approach is briefly discussed below.

For the purpose of this study the health care decommodification refers to the extent to which an individual's access to health care is not dependent on their market position. Such approach follows the first part of C. Bambra definition *à rebours*. This approach is also in line with G. Esping-Andersen

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

notion of de commodification, which ‘occurs when a service is rendered as a matter of right, and when a person can maintain a livelihood without reliance on the market’ (1990, pp.21-22). Such a broad conception of de commodification has been also adopted by other researchers, including O. Pintelon (2012, p.8) who defined it ‘as any state intervention removing individuals from total dependence on market forces’ and J. Vail (2010, p. 313) according to whom de commodification refers to ‘any political, social, or cultural process that reduces the scope and influence of the market in everyday life’.

The specificity of the health care sector stems both from the common perception of health as a value *per se* and as a precondition for economic prosperity. From an individual’s point of view good health is valued because it allows to provide happy and productive lives. From a society’s point of view protection of citizens’ health is valued because it has an impact on ‘economic outcomes in terms of productivity, labour supply, human capital and public spending’ (EC, 2013, p. 1). For that reasons, health care on European ground is regarded as one of the pillars of the European contemporary welfare states, and the functioning of national health systems is one of a key element of EU’s broader ‘social infrastructure’. It includes both a system of overarching values the most important of which are: the universality of health services, accessibility of high quality health care, equity and solidarity, and a common to European health systems set of rules of conduct governing quality requirements, safety of provision of health care services based on scientific evidence and ethical principles, patient involvement, redress, privacy and confidentiality (EC, 2006).

Analyzing the above values and principles at the level of their practical implementation, one should emphasise that health systems vary across the EU MS. The underlying reason for their variety has been, and continues to be, the choices of systemic solutions made as part of the underlying historical and cultural development as well as of economic and political conditions, including those relating to the rules governing the award of entitlement to public health services or their funding mechanisms and the organization of these benefits.

Firstly, the entitlement to public health services in EU MS can be either recognized as a universal entitlement of all citizens or a subjective right arising from an insurance contract. Thus the public means for health care can be generated either via a tax system or a social health insurance or by a combination of both. As pointed out in Table 1, the public coverage of health care costs for a core set of services is either universal or close to it in

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

all EU Member States. The exception is for example Cyprus, where the public health system, although financed through general taxation, does not secure universal coverage except for these with a low income level. As a consequence, approximately 17% of Cypriots, mainly those of high annual income as well as EU citizens who are not eligible for public health care in their home countries and all legal and illegal immigrants from non-EU countries living in Cyprus, must pay out of pocket to access the public health system, or purchase health care from the private sector (HIT, 2012, p 35). In Greece (79%), two main rules of entitlement co-exist: one on the basis of citizenship for outpatient services provided by the national health system (ESY) and second on the basis of occupational status and insurance contributions for different type of services either provided or financed by insurance funds, ESY or private providers (Economou, 2010, p 18). Both in Cyprus and Greece, have been taken health reform, including these relating to the extension or consolidation the coverage by the public health care, due to the need to implement the recommendations of the adjustment program (Kawiorska, 2014). The relatively low level of public coverage indicator is also observed in Germany (89%). In this country the possibility for opting out of the Statutory Health Insurance (SHI) system and switching to Private Health Insurance (PHI) is seen by certain groups of people as a pragmatic way to save money or, in the case of self-employed individuals, as a necessity since many of them are not eligible for SHI coverage (Busse R., Blümel M., 2014, p 53.). The low level of public coverage indicator can also be observed in Member States where social health insurance is closely related to the labour market. In these countries the share of uninsured population increases with economic downturn, being a reflection of decreases in the labour market participation. Examples are Bulgaria (77%), Greece (79%), Estonia (93%) or Poland (97%)¹⁰.

Secondly, as mentioned earlier public coverage for health care is not a perfect indicator because the range of medical goods and services publicly covered as well as the type and level of cost-sharing that applies to those goods and services vary considerably across European countries (OECD, 2014, p. 108). This variation applies both to form (direct payment, cost-

¹⁰ The ongoing financial crisis of 2007 meant that in most EU countries people out of work for a longer period of time lost their entitlement to unemployment benefits and, consequently, their entitlement to free health services, and equally affected self-employed people who were not able to pay health insurance premiums due to a drop in their income. The crisis also manifested itself in an increase in the number of people employed under contracts that did not guarantee employer's contributions to the system.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

sharing, informal payments) and level of household out-of-pocket payments for health care. Hence the other indicator, i.e. the share of household out-of-pocket expenditure¹¹ in total current health care expenditure has been taken into account for the purpose of this analysis. This indicator captures the financial burden on household budgets. Analysis of this ratio (Table 2) indicates a very large diversity of its size across the EU Member States in 2012. The least financially burdened were households in the Netherlands, France and the UK, where the size of the household expenditure did not exceed 10% of total current health expenditure, while the most burden was borne by households in Cyprus, Bulgaria and Latvia, in which the share was several times higher and represented an equivalent of 47%, 43% and 34%, respectively.

Thirdly, in the context of assessment of the decommodifying potential of healthcare programmes, the situation of the patient, who is the primary recipient and the potential beneficiary of health services should be an important aspect of the analysis. It has been done by the incorporation into the analysis of the third indicator that refers to the percentage of the population reporting difficulties in having their basic medical needs met. This indicator makes it possible to take into account patients' subjective opinion on what they feel are barriers to medical services accessibility. In 2012, in the EU-28, just 3.4 % of the population reported unmet need for medical examination or treatment of which 67% were reported due to a lack of funds, 29.4 % due to a long waiting lists and 5.9% due to the distance to the place where medical services are provided, or the lack of means of transport¹². Just as in the case of the analysis of the previous indicator, also in the case of the indicator in question, one can tell big differences in the situation of the citizens of the EU Member States. The highest percentage of the population reporting difficulties in access to medical services, ranging between 8 and 12% was ascertained in Latvia, Romania, Poland, Estonia, Bulgaria and Greece, while the lowest, not exceeding 1% of the total population, in Slovenia, Austria, the Netherlands, Luxembourg and Spain (Table 2). In

¹¹ Household out of pocket expenditure can comprise both the direct payment for purchasing health care goods and services in the private market and the required contribution to the costs of publicly financed goods and services at the point of use. In some countries it also comprises unofficial payments that may allow patients, for example, to avoid a long waiting list or to receive more care or of a higher-quality.

¹² EU statistics on income and living conditions (EU-SILC): Self-reported unmet needs for medical examination, by sex, age and reason (%) [hlth_silc_03], Eurostat database (07.01.15)

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

countries with the highest proportion of the population reporting difficulties in access to the benefits, lack of funds or too expensive treatment were indicated as their main reasons (Romania - 90%, Latvia - 85%, Greece - 81%, and Bulgaria - 72%), together with long waiting lists (Estonia - 77% and Poland - 56%).

Discussed above three measures underlying the construction of the second index has enabled to assess the decommodifying potential of health care provision taking into account a widely understood access to health care benefits financed from public funds in the Member States.

The indicator that refers to the public coverage of health care costs for a core set of goods and services illustrates the extent of general access to these goods and services that depends on the rules governing the award of entitlement to public health services. In other words it illustrates the extent to which the adoption of certain rules of governing can protect citizens against the economic fluctuations.

The indicator that refers to the ratio of household out-of-pocket expenditure on health care to the total current health care expenditures reveals a real level of financial burden of households that arises due to the various funding mechanisms of health benefits adopted by the country. This indicator is commonly considered as one of the measures of health services accessibility in practice.

The last indicator that refers to the self-reported unmet need for medical examination or treatment shows the scale of encountered barriers to access of those seeking health care. Both the scale and the reasons of these barriers can indirectly reveal the outcome of the countries' systemic solutions, including those related to financial and some of organisational aspects of health care provision.

The concept of the three worlds and further comparative research conducted by reference to it together with the findings of this study allow to formulate two main conclusions. Firstly, in terms of values and principles the health care programs in EU MS that aim to protect against the risk of loss of health differ from social security programs that aim to protect against the risk of loss of income. The former based on the principle of universal citizenship and equality, exhibit characteristics typical of high decommodification level regimes, whereas the income security programs implemented in those countries, if based on the principle of individual risk and professional performance, will exhibit characteristics typical of medium or low decommodification level regimes.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Secondly, analyzing the above values and principles at the level of their practical implementation the extent of a widely understood accessibility of publicly funded health care good and services varies across the EU MS. These results show that even convergence of the values and principles between health programs and income security programs in such countries like Denmark, Finland, or Sweden wouldn't necessarily lead to reveal of similarities in decommodifying potentials of both types of programs.

It should be also pointed out that presented assignment to a different decommodification level groups of countries has been partially determined by the methodology applied. The use of the mean value and standard deviation as the criteria for determining the intervals for fitting countries into different groups has led to the assignment of certain countries to the same group despite a large distance between the values of the indicators and vice versa, in the inclusion of countries into different groups, despite a small distance between the values of these indicators for these countries. This confirmed some criticism about the drawbacks of the adopted methodology (Bambra, 2005a, Castles & Mitchel, 1993, Powell & Barrientos, 2011).

The results of the study also confirm criticism voiced in existing literature as to the usefulness of the concept of the three worlds for comparative studies. Thus, the present study fits into a trend of empirical studies that reinforce the view presented, among others, by researchers such as G. J. Kasza (2002), pointing to the existence of practical obstacles to the development of a universal typology of welfare states due to a lack of internal coherence of national social security schemes. This lack of coherence is due to the specific nature of the various fields in which social programs (e.g. education, health care and social security) are implemented, as well as to variations in the shaping of policies within each of these fields, a diversity of players, and the dynamics of change within individual social policy areas, including the effects of convergence with respect both to the practical and normative solutions used in different countries (Kasza, p. 282). In the light of the study dedicated to EU MS, the argument referring to the effects of convergence has a significant meaning due to the various initiatives undertaken by the EU institutions aiming to promote and coordinate health policies in the Member States.

Conclusions

The importance of G. Esping-Andersen's concept of the three worlds can be gauged from the stand point of the intensity of the ongoing scientific

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

debate about the proposed typology of welfare state regimes, as well as from in terms of the fact that the debate continues to this very day. The issues discussed in this paper are part of the mainstream of the debate, and they focus on the assessment of the decommodifying potential of health systems in the light of the concept of welfare state regimes. This study has confirmed that health care is essential in contemporary European welfare states and that state involvement is equally essential for the functioning of health care systems in the EU. The extent to which the state involvement in health care area secures the individuals' access to health care regardless of their market position should be indicated as a basic measure for assessing the decommodifying potential of health care benefits. The analysis proves it that convergence of the values and principles underpinning the health care systems of the EU Member States does not in itself determine that the result of their practical implementation will be an identical or a similar scope of a widely understood access to health care benefits financed from public funds in the Member States.

The extension of a set of indicators that would allow the continuation of studies, for example, of the assessment of existing social inequalities in accessibility of health services or a sense of security or satisfaction of patients using public health care is an open issue. Such studies undoubtedly will contribute to a more definitive conclusion as to the real decommodifying potential of health care systems in the UE MS.

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Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

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Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
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Macroeconomic Policy Regime in Poland*

JEL classification: *E02; E58; E61; F41; F43*

Keywords: *Macroeconomic regime; open economy policies; emerging countries; industrial policy; Poland*

Abstract: The goal of this paper is to analyse the economic development of Poland using the concept of macroeconomic policy regimes (MPRs). Six elements of a MPR will be identified: foreign economic policy, industrial policy, the financial system, wage policy, monetary policy and fiscal policy. Examining the functionality of the development of these elements applied to Poland is a further aim of this paper. The functionality of the development of the MPR elements will be analysed on the basis of the fulfilment of the objectives, as well as the use of the proposed instruments and strategy assigned to every element of MPR. Due to space limits, we are going to focus on the former in this paper.

Taking into consideration that Poland is an emerging and a relatively open economy, foreign economic policy and industrial policy play very significant roles in restructuring of the economy towards production and exports of high value-added products, which would enable the country to follow a growth path consistent with an external balance. The financial needs of the manufacturing sector and particularly of the producers and/or exporters of high-end products need to be satisfied by the financial system, whose stability needs to be secured with the help of monetary policy. The latter is, moreover, in charge of providing low-cost finance and

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

maintaining the stability of the exchange rate. Stabilising the inflation rate would be given to wage policy. Fiscal policy's main tasks would be to correct aggregate demand shocks and reduce income inequality.

Introduction

This paper attempts to provide a contribution to the empirical literature about macroeconomic policy regimes (MPRs) analysing the economic development of Poland using the concept of MPR. According to this concept, both policies and institutions play an important role in explaining the economic development of a country. A MPR consists of policies (foreign economic policy, industrial policy, wage policy, monetary policy and fiscal policy), the financial system and the institutional frameworks in which the economies are embedded.¹ In emerging countries, which have been the primary focus of my latest work, six elements of a MPR can be identified: foreign economic policy, industrial policy, the financial system, wage policy, monetary policy and fiscal policy. The development of these elements will be examined within the context of the given institutional framework and the most important institutional changes which took place from the mid 1990s onwards. The functionality of the development of the MPR elements in Poland will be analysed using a normative model set in Section 3.

I chose Poland as a case study for the reason that it is firstly, the single country, which managed to avoid a financial crisis and sliding into a recession amidst the latest EU financial, economic and sovereign-debt crises. Furthermore, it is a country which has maintained a certain level of capital controls albeit it joined both the OECD and the EU. The third reason is that Poland is comparatively to the other Central Eastern European Countries (CEECs),² a large economy. Fourthly, both during the times of the Soviet Union and today, Poland has maintained a relatively large industrial sector.

In a nutshell, the analysis of the functionality of the development of MPR in Poland since the mid 1990s shows that owing to the significantly large manufacturing sector, Poland has had an improvement of the trade balance, but not the current account balance *per se*. The country seems to

¹ This definition of a MPR for an emerging economy draws on Kazandziska (2013). Herr&Kazandziska (2011), as well as Heine, et al. (2006) define MPR for industrial countries.

² Here under CEECs we mean the ten countries, which entered the EU in 2004 and 2007: Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

lack behind the EU level with regards to the production and exports of high value-added products. As a result of the financial system regulations and the maintenance of a certain level of capital controls the financial system was able to escape a major banking or financial crisis. Monetary policy was periodically able to provide a low-cost finance to the financial system. The central bank seemed to have been torn between its goals of maintaining price level stability and keeping the exchange rate stable using the interest rate as a main instrument. The conduct of wage policy in Poland was restricted due to the very limited power of trade unions and employers' associations, particularly at the sectoral or national level and the limited efficacy of the alternative instruments of wage coordination (extension of collective agreements or minimum wages), which resulted in low collective bargaining coverage and a low level of wage coordination. Fiscal policy often showed stop-and-go development. After adopting the Euro Plus Pact in 2011, the fiscal policy turned particularly restrictive in the period 2012-2013, which has had a negative impact on the economic growth. The high income inequality of disposable income shows that the redistributive policies of the government had a limited success in favouring income distribution towards low-income and low-wealth households.

In section 2 the focus will be put on the methodology used in this paper. Section 3 sketches the outline of a normative model of a MPR on the basis of which the functionality of the MPR development in Poland will be assessed. In the section that follows a separate analysis of the MPR elopements will be provided. The last section concludes.

Notes on the methodology

To start with, the concept of MPR is of a qualitative nature. As we shall also see below, this concept is also of highly complex and comprehensive nature, using both economic policies and institutions in the process of explaining the economic development of a country. Furthermore, due to the unavailability of long-run, continuous and cross-country comparable data for certain variables, there are limitations to the conduct of a reasonable econometric analysis. Hence, the methodology of this paper includes a brief review of the primary literature related to MPRs.

Moreover, a Tinbergen type of approach is used, whereby I identify objectives, instruments and strategies for all the individual elements of MPR. The analysis of the fulfilment of the assigned objectives and the use of in-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

struments and strategies entails the use of specific indicators. Hereby, statistical data analysis and use of descriptive statistics is conducted.

The elements together with their assigned objectives, instruments and strategies form one normative model, on the basis of which the functionality of the MPR in Poland will be evaluated. The development of a MPR element is considered functional if the elements of MPR met the objective(s) assigned and if they reached the goal using the specific instruments and the strategy allocated to them. Due to limited space, I will concentrate mostly on the first criterion – the achievement of the goals assigned for each element of MPR.

The model proposed in this paper draws significantly on Kazandziska 2013, where it has been more comprehensively elaborated. Kazandziska 2013 puts a focus on the development of MPR in the Latvian economy. We have to be well aware of the many peculiarities in the economic, political or social development in the individual countries. However, due to the significant amount of similarities among the Central Eastern European countries (CEECs), the normative model for an emerging country developed in Kazandziska (2013) can be also applied to the Polish economy. Nonetheless, the country-related specific features and developments, which have played an important role into forming the MPR in Poland, will naturally not be disregarded.

Outline of the model

As described earlier in the text, MPR is defined as a set of policies (foreign economic policy, industrial policy, wage policy, monetary policy and fiscal policy), the financial system and institutions in which the economies are embedded (Kazandziska, 2013). Applied to emerging countries, we can identify the following elements of a MPR: foreign economic policy, industrial policy, the financial system, wage policy, monetary policy and fiscal policy. The functionality of each of these elements will be analysed on the basis of the fulfilment of the objective(s) assigned to it. Furthermore, the major institutional changes, which have had a significant impact on the development of the particular elements, will also be addressed.

In emerging countries as open economies, foreign economic policy and industrial policy will be assigned quite important objectives. The former will be given the tasks of reducing the current account deficits and achiev-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

ing a balanced current account, and reducing the capital flow volatility.³ The reduction in current account deficit is in the long-run to be achieved through exports of high-tech, high value-added products, which will improve the terms of trade.⁴

Here comes industrial policy to the fore by supporting the revival of the manufacturing sector, particularly the production of high value-added products, which in the long-run can improve the terms of trade and the current account. The government spending on research and development (R&D) and various forms of state-aid can be used to support certain sectors/firms, which are involved in the production and/or exports of high-end products, which could increase the income elasticity of exports.

The financial system needs to support this growth strategy based on external balance, by providing a sufficient finance to the manufacturing sector, particularly to the targeted industries/firms (which, produce and/or export high value-added products). Being that the subject of our analysis are emerging countries, whereby banks play a dominant role in the provision of finance, supply of a sufficient amount of finance in the form of credit will be of a paramount importance. The financial system also needs to secure the stability of the financial sector through diverse regulations diverting credit away from the speculative sectors (real-estate, construction sector) especially in times of an asset-price bubble.

Wage policy's main task would be to provide a stable wage anchor and thus, help secure the stability of the inflation rate. A necessary precondition for a functional wage policy is wage coordination within and among sectors, which can be achieved through sectoral or national wage bargaining, supported by extension of collective agreements and minimum wages.

³ Current account deficits lead to drainage of foreign exchange reserves and, particularly in emerging countries they can reduce the credibility of the domestic currency and monetary policy. However, export-led growth strategies to achieve current account surpluses are only possible for individual countries (see for instance, Onaran&Galani, 2012 for more elaboration). Reduced capital volatility serves the aim of preventing financial and currency crises, as well as creating conditions for a more stable investment by the private sector.

⁴ Devaluation can only under certain conditions and mostly in the short- to medium-run, bring positive results (some of the conditions are: low/no dollarization, low level of external debt, stable wage anchor, and low exchange-rate-pass-through, so that the currency can devalue in real terms). Thirlwall (1979, 2013), McCombie&Thirlwall (1999) added also that the devaluation would have to be continuous so that the positive net effects are not only short-lasting. However, if nominal wages continuously lag behind nominal devaluation and the exchange-rate-pass-through is high, the wages of the workers in real terms will erode, which is politically and socially unsustainable.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Monetary policy would be in charge of providing low-cost finance to the financial system,⁵ securing the stability of the latter and, especially important in emerging countries, providing a stable nominal exchange rate anchor.⁶ Providing low-cost finance, mostly provided through low real interest rates is also supportive for the stabilisation of interest payments on the public debt and thus opens more room for manoeuvre for fiscal policy.

Two major objectives will be assigned to fiscal policy: reducing shocks to aggregate demand (mostly by government spending, because of its high fiscal multiplier) and reducing income inequality (through tax and transfer policies)⁷.

It is noteworthy to mention that all the elements need to be coordinated for the most optimal functioning of one MPR.

Macroeconomic policy regime of Poland

In the next section we are going to briefly analyse the main drivers of economic growth in Poland, followed by the examination of the individual elements of MPR and the functionality of their development. Due to data unavailability for the earlier years, the period under observation starts in 1995 and ends with 2013.

Economic development

After declining at a rate of 7 per cent in 1991, the Polish economy recovered a year later, experiencing a positive growth of 2.5 per cent. Until the late 1990s, the economy grew on average at a rate of about 6 per cent (Eurostat 2015). The growth during this period was predominantly driven by the domestic demand. Both private consumption and investment have had a significant contribution to the economic growth. However, government consumption seems to also have had an important impact (Table 4.1).

⁵ Low-cost finance is to be mainly provided through low real interest rates.

⁶ Exchange rate regime in the form of fixed (or close to fixed) exchange rate is commendable (Kazandziska, 2013, Priewe&Herr, 2005).

⁷ Income redistribution towards low-income and low-wealth households can potentially stimulate consumption and thus, economic growth, as these households have a relatively high marginal propensity to consume (see for instance, Hein&Truger, 2014).

Building comprehensive welfare systems is also an important goal of fiscal policy. However, due to space constraints, we are only going to focus on the two other objectives of fiscal policy.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

In 1998 the economy showed the first signs of a slowdown as a consequence of the Asian and later on, the Russian financial crisis. The economy grew at a much lower pace amidst the European and world economic slowdown. During the years of economic downturn, growth remained positively largely due to private consumption expenditure and net exports. Smaller, but positive contribution was made by government consumption. From 2003 until 2007 the economy had a relatively stable growth. From 2008 until 2009, the Polish economy felt some of the negative effects of the European and world financial and economic crisis. But, the economy managed to avoid sliding into a recession owing largely to the positive growth of government consumption and to a lesser extent, to the private consumption. In 2009, net exports improved as a result of the currency devaluation and the undervaluation strategy that followed. In 2011, the government resorted to a pro-cyclical fiscal policy which had a contractionary effect on the economy in 2012 and 2013.

Table 1 Contributions of the components of aggregate demand to GDP (growth rate, per cent)

	1995-1999	2000-2003	2004-2007	2008-2013
Private consumption	3.8	1.6	2.7	1.7
Gross fixed capital formation	2.5	-0.6	2.1	0.5
Government consumption	0.6	0.5	0.8	0.4
Net exports	-1.6	1.3	-0.8	0.9

Source: Eurostat 2015, author's calculation.

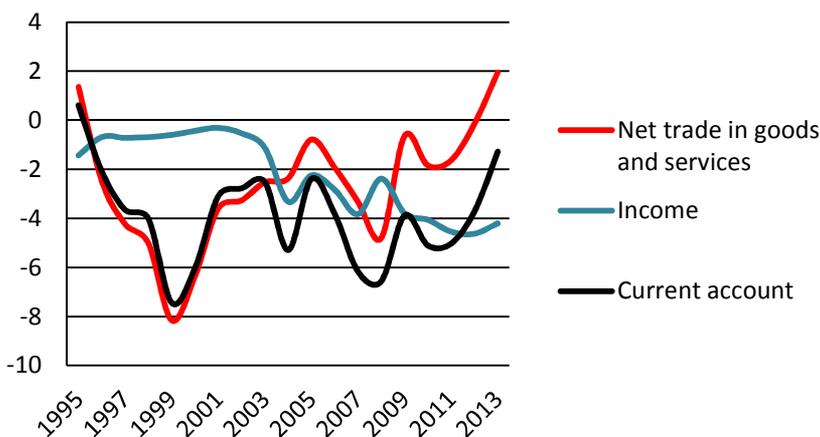
Foreign economic policy

Foreign economic policy in Poland has been shaped by the Polish entry in the OECD in 1995 and the EU accession in 2004. These events had as a consequence institutional changes with a profound impact on the development of the MPR in Poland, such as liberalisation of the trade and capital account. With regards to the latter, Poland followed a path of a gradual deregulation (Sadowska-Cieślak, 2003). The Foreign Exchange Law passed in 1998, stipulated that non-residents were allowed to purchase domestic short-term securities and derivatives only with a foreign exchange permit granted by the National Bank of Poland (Janc&Marszalek, 2014). Poland kept most of the restrictions, particularly on short-term capital flows until 2002. In 2002 the government adopted a new law, according to which the

majority of the restrictions on capital flows to and from the rest of the EU and OECD countries were lifted. In 2007 also many barriers on capital in- and outflows related to a securities trade to and from third countries were also eliminated (Janc&Marszalek, 2014).

Albeit the Polish government has kept a certain level of capital controls even until today, the size of the net capital flows has been quite significant, which had repercussions on the development of the current account.⁸

Figure 1 Development of the current account, trade and income balance in Poland (net, year-on-year percentage change), 1995-2013



Source: National Bank of Poland, author's calculations.

The first objective of foreign economic policy is to reduce the current account deficits and achieve a balanced current account in the medium- to long-run. The current account in Poland was in deficit during the whole period of analysis, from 1995 until 2013 (Figure 4.1). From the mid until the late 1990s, the current account deficits increased mainly due to the rise in the trade deficits. From 2000 until 2005 the trade deficit was reduced, which led to a reduction of the current account deficits until 2003. In the period thereafter the deficit of the income account started rising as a consequence of the primary income deficits. From 2006 until 2008 we can observe an increase of the trade and current account deficits. The period that

⁸ The Chinn-Ito index of capital account liberalisation equalled to 0.06 in 2011 (the latest data available), whereas the index in the EU-countries on average had a value of 2.44, which is close to the highest value of 2.48 (Chinn&Ito 2006, 2001).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

follows is marked by a reduction of the trade deficits (mostly due to a faster decline of imports compared to exports) and an improvement of the current account balance. However, in all these years the decline of the trade deficits was not sufficient to compensate for the increase of the deficit in the income account, which resulted in current account deficits. One important point to make here is that the decline of the trade deficits was highly as a result of the fall of imports below exports. Furthermore, the export structure has not been advantageous (the share of high-technology exports in total manufactured products was only less than 4 per cent on average in Poland, while in the EU the former equalled to 17 per cent) (author's calculation based on World Bank 2015).

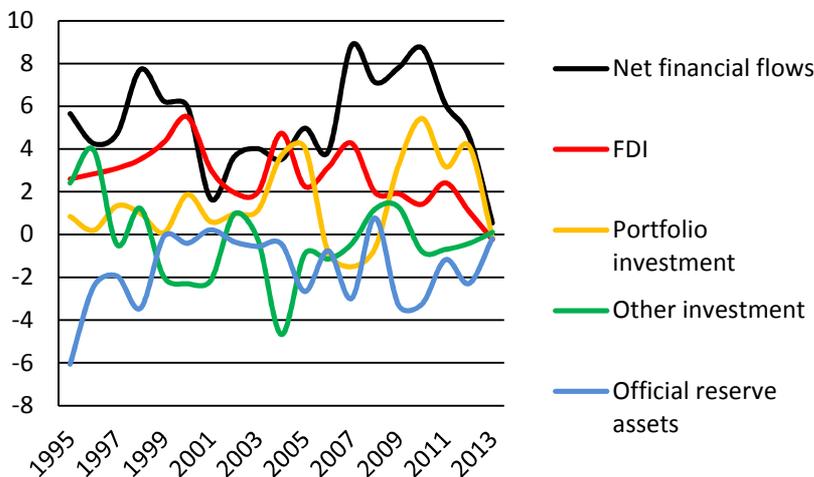
Hence, we can argue that the first objective of foreign economic policy to reduce current account deficit and achieve a balanced current account, was not achieved.

Reducing the capital flow volatility is the second task assigned to foreign economic policy. Figure 4.2 shows that the volatility of capital flows in Poland increased after the mid 1990s. Net capital flows increased particularly until the Russian financial crisis in 1998. The latter accompanied by the downturn in the other European countries in 2000/2001 caused a withdrawal of capital. The period until 2006 was marked by a relative stability. However, in 2007 and in 2009/2010 a very strong rise in net capital inflows can be spotted due to the fact that all member countries of the EU experienced a recession and Poland was the only country that managed to escape entering a recessionary scenario. Thus, international investors saw a very attractive opportunity in investing in Polish assets. Yet, from 2011 onwards, there has been a strong decline in net capital inflows.

If we take the standard deviation as a measure of capital flow volatility, we can see that Poland had a slightly higher volatility than the countries in the EU.⁹ Until 2007 international capital entered mostly in the form of FDI. The reason for this was that long-term flows were liberalised before short-term capital flows (IMF 2008). In 2007 most of the restrictions on capital in- and outflows were lifted, which led to a rise in portfolio flows. From 2008 onwards FDI lost some of its momentum and portfolio flows picked up. In 2013 both net FDI and portfolio flows declined.

⁹ The standard deviation of the net capital flows for the period 1995-2013 in Poland amounted to 2.2, while the former had a value of 2.0 in EU-15 (unweighted average, author's calculation based on Eurostat 2015).

Figure 2. Development of net capital flows and their composition in Poland (per cent of GDP, year-on-year percentage change), 1995-2013



Source: Bank of Poland, author's calculation

Hence, we can conclude that, firstly, foreign economic policy only intermittently was able to reduce the current account deficits, but over the years, current account balance was not achieved. Secondly, a certain stability of capital flows was achieved until about 2006; however, in the period thereafter as net portfolio flows strongly increased, a higher volatility of net capital flows is to be observed.

In the next section, a due attention will be paid to the sectoral composition of the economy and the functionality of industrial policy in restructuring the economy in order to improve the terms of trade and the current account.

Industrial policy

There are various uses and definitions of the concept industrial policy. In this paper industrial policy is used to signify a policy aimed at particular industries/firms that could raise the economic welfare of the whole economy (Chang, 1994, 2006, 2010). In the EU-terminology, it is the so-called 'vertical' or 'sector-specific' policy.

In Poland industrial policy was highly connected to the privatisation process. This has been the first important institutional change that shaped

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

industrial policy in Poland. It was aimed at recovering some very crucial sectors, which had financial difficulties and at privatising or transforming the enterprises, which operated in sectors, which had a potential for high profitability and expansion in future (like, pharmaceuticals, chemical industry, metal industry, telecommunications and the energy sector) (Błaszczuk et al., 1997). The success of these programmes was due to a lack of resources and a clear strategy quite limited. Only in the National Development Programme for 2016-2020 the government for the first time emphasized the need to support the high-technology sectors (Council of Ministers of the Republic of Poland, 2012).

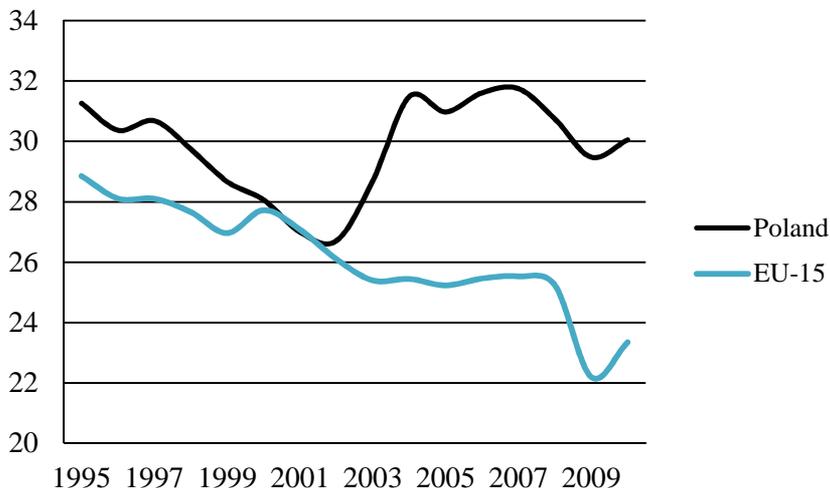
A second important institutional change was the accession of Poland in the EU. The EU membership entailed a restriction on the part of ‘vertical’ or ‘sector-specific’ industrial policy, as it is considered harmful for the ‘healthy’ competition among enterprises. Under the EU-law emphasis is put on the so-called ‘horizontal’ policies, which are universal policies, not favouring any particular industries or firms (Lech, 2007).¹⁰ Thus, upon joining the EU, Poland had to adjust its industrial policy according to the EU guidelines.

Industrial policy in our model has one very important role: reviving the manufacturing sector. We are going to analyse the development of the manufacturing output-total output ratio, which is going to show us the share of this sector in the total economy. Similarly to other CEECs and to the EU countries, Poland also experienced a decline in this ratio in the second half of the 1990s (Figure 4.3). By the early 2000s the share of this sector in the total output increased but the rise was not very impressive. Only in 2004 was manufacturing able to reach the same level relative to total output, which it had in 1995. It stayed around this level until today. One more important point to make is that the share of the high-technology manufacturing sectors in the total output was lower in Poland than the EU-average.¹¹

¹⁰ Such ‘horizontal’ policies are supporting the development of SMEs, investment in R&D and training programmes and environmental protection.

¹¹ The share of high-technology manufacturing sectors in total output equalled to 3.9 per cent in Poland and to 5.4 per cent for the EU-countries for the period 2000-2010 (un-weighted average, author’s calculation based on Eurostat 2015).

Figure 3. Manufacturing sector output in Poland and EU (share of total output, per cent), 1995-2010



Source: Eurostat, author's calculation.

This section can be concluded by arguing that industrial policy was able to stop the declining trend of the manufacturing sector. Yet, the output of the latter recovered at a very low pace. In the conduct of industrial policy in the sense of 'vertical' policy, the Polish government was highly constrained by the EU-Treaties beginning from 2004 onwards. In its recent reports, the government emphasizes the role of high-technology sectors for the economic development of the country. But, targeting of specific industries/companies is not part of the agenda.

Financial system

With the adoption of the Act on the National Bank of Poland and the Banking Law in 1989, the foundations for the functioning of a two-tier banking system were laid. The financial system in Poland (similarly to the other CEECs and many emerging countries) is predominantly bank-based, whereby bank loans are the single most important source of finance for the firms.¹² Banks also own the largest share of assets in the financial system.¹³

¹² In 2010 over 50 per cent of the firms in the economy (excluding the financial and insurance sectors) used banks as a source of finance (Eurostat 2015).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The assets of the banking system in Poland are also predominantly foreign-owned.¹⁴

The main tasks of the financial system in the model presented in Section 3 are to provide a sufficient finance to the business sector and to maintain the stability of the financial system. The analysis of the fulfilment of the first task will encompass mostly the banking sector loans being that banks have been the most important providers of finance in Poland. The indicator we are going to look at is the corporate loans-GDP ratio.¹⁵ On a more general note, we can say that until 2006, the growth of total credit in the economy has not been very high (Figure 4.4). The reason for the relatively poor credit growth is the sluggish development of the corporate credit amidst the Russian and European crises in the period 1999-2001 and even a decline of the corporate sector credit in 2004-2005. In the period after 2007 corporate credit picked up, largely due to the elimination of most barriers to the capital flows and owing to the strong capital inflow. Yet, this growth was rather short-lived. In 2010 and 2011 as a result of the European financial and economic crisis corporate sector credit declined.¹⁶ During the latest economic downturn there has been a decline in demand in the side of the companies for loans. However, during the periods of rising economic growth when also the household credit increased (for instance, between 2002 and 2004), firms seem to have faced a financial constraint and a stronger credit rationing by the banking sector.¹⁷

On the other hand, the household sector credit-GDP ratio showed a trend of stable increase throughout the whole period (except in 2010, when it stagnated).

¹³ For instance, between 2005 and 2008, banks owned 75 per cent of the total assets in the financial system (EBRD, 2009, pp. 13).

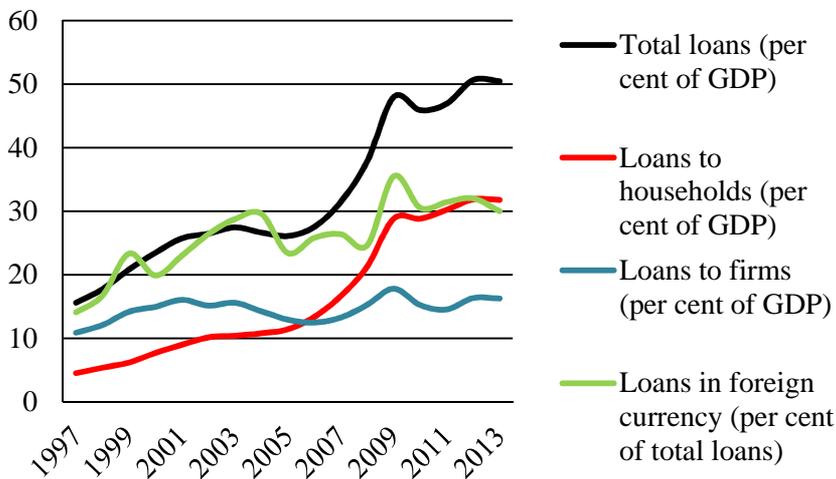
¹⁴ Between 2005 and 2008, 70 per cent of the total banking system assets (which includes the banking sector, stock market and bond market capitalisation) were foreign-owned (EBRD, 2009, pp. 13).

¹⁵ Corporate loans include both financial and non-financial corporation loans.

¹⁶ However, household credit relative to GDP seems to have grown over most of the years (except in 2010 and 2013).

¹⁷ In 2003 the share of firms, which perceived the access to finance to be the strongest obstacle to the firm's performance increased from 34.3 per cent in 2002 to 35.9 per cent in 2003 (World Bank's Enterprise Surveys data).

Figure 4 Development of loans per sector and loans in foreign currency in Poland (per cent), 1997-2013



Source: National Bank of Poland, author's calculation.

Maintaining financial system stability as the second task of this element of MPR will be assessed by analysing firstly, if there has been a banking crisis in the country. For this purpose, the banking crisis dummy from the Global Financial Development indicators database of the World Bank will be used.¹⁸ As this indicator had a value of zero in all the years, we can say that the financial system in Poland managed to keep away from a banking crisis. The share of foreign currency loans to the total loans will be the next indicator, which is going to show us the level of dollarization/euroisation in the country. In the case of Poland we can see that this ratio increased after 2004 (Figure 4.4). But, owing to the timely introduction of several financial system regulations, this ratio was contained at a level of around 30 per cent.

We can summarise this section with the arguments that firstly, the financial system met the objective of providing a sufficient finance to the business sector only partially. As to the objective of financial system stability, we can argue that the financial system has been able to achieve a relative stability owing to the various regulatory instruments.

¹⁸ Visit the website of the Global Financial Development indicators of the World Bank for more information (<http://data.worldbank.org/data-catalog/global-financial-development>). The banking crisis dummy can have a value of one or zero (if the country did or did not have a banking crisis, respectively).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Wage development/policy

We are going to begin this section by the argument that the conduct of wage policy has been restricted in Poland. There are several reasons for making this statement. First of all, wage bargaining, if at all, has been mostly conducted at a company-level (Visser, 2011). Very often due to the absence of trade-union representation, because of the conflict between a few trade-unions representing workers at the same company or the small size of the companies, collective bargaining even at a firm-level is absent and the managers often individually decide on the size of the workers' pay. The collective bargaining coverage still remains low relative to the other European countries.¹⁹ The membership in trade union and employers' associations has also been quite modest.²⁰ Sectoral or national wage negotiations are rare because of the very limited power and a lack of organisation of the social partners at a sectoral or national level. At the national level, social partners are essentially involved in the setting of the minimum wage within the Tripartite Commission on Social and Economic Affairs. Furthermore, from 1994 until 1994 the tripartite commission was also in charge of determining the target maximum increase of the average monthly wages in the public sector and in the private companies with more than 50 employees.²¹ The calculation of the wage increases took into account the projected GDP growth rate and the inflation rate. Although these target wage increases served only as guidelines for the companies in the private sector when negotiating the wage increases of their employees, the former were obligatory for the public sector (Wratny, 2006). Yet, wage coordination has remained at a low level in Poland (Visser 2011). The efficiency of the mini-

¹⁹ The collective bargaining coverage in 2010 was 29 per cent in Poland, while in the EU it was around 60 per cent (unweighted mean average, author's calculation based on Visser, 2011).

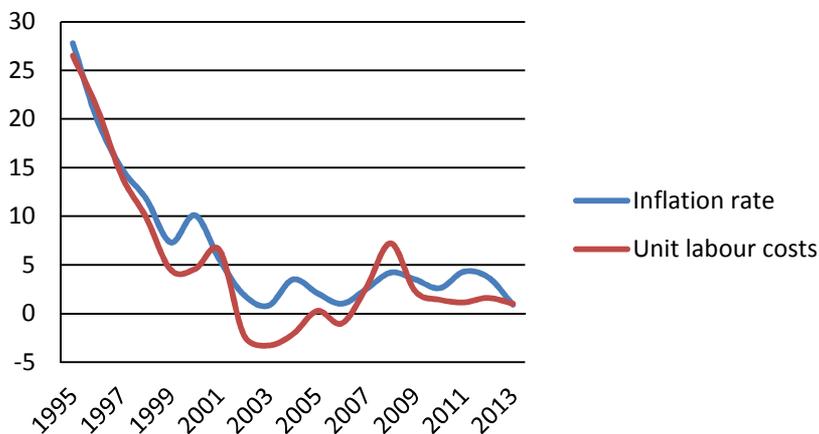
²⁰ Trade union density was 14 per cent in 2010. Employers' associations organised only about 20 per cent of all the firms in 2007 (Visser, 2011).

²¹ Act of 16 December 1994 (Journal of Laws 1995, No. 1, Item 2 and amendments) on negotiating system of entrepreneurs' average wage increases and Act of 23 December 1999 (Journal of Laws 1999, No. 110, Item 1255 and amendments) on creation of wages in the public sector. These acts replaced the wage control tax law (called *popiwiek*), according to which sanctions in the form of higher taxes were to be paid by companies, which paid higher wage increases for their employees than the officially allowed rates (Kabaj, 1998).

minimum wage policy and the extension of collective agreements have been also limited.²²

The most important task for wage policy is to maintain the stability of the inflation rate in the medium- to long-run. The first indicator we are going to look at is the inflation rate. In Poland we can observe a certain volatility of the inflation rate. Put into perspective, we can say that Poland had a higher volatility of the inflation rate compared to the EU countries.²³ There is a strong correlation between the development of the inflation rate and the unit labour costs, which is also confirmed in the case of Poland. Thus, we are going to analyse the development of unit labour costs next.

Figure 5 Inflation rate and the growth of unit labour costs in Poland (per cent), 1995-2013



Source: Eurostat 2015.

In the second half of the 1990s we can observe that the growth of the unit labour costs and the inflation rate slowed down (Figure 4.5). This was due to the narrowing down of the gap between the development of the nominal wages and productivity growth. From 2002 until 2006 the growth of

²² The minimum wage has been often used as a basis for the calculation of the wage increases particularly in companies, which have not been covered by collective agreements. However, minimum wages have not contributed to higher wage coordination within or among sectors (Du Caju et al., 2008).

²³ The value of the standard deviation for Poland was 7.2, the one for the EU-countries amounted to 0.6 for the period 1995-2013 (author's calculation based on EU Commission, 2015).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

unit labour costs turned even negative because of the clear wage moderation policies (Eurostat 2015). The depreciation of the zloty and the increases in import prices helped prevent a deflationary development (Eurostat, 2015). In the following years all through 2010 nominal wage growth picked up beyond the increases in productivity, which stimulated a rise in inflation. From 2011 until 2013 nominal wages grew at a pace close to the productivity growth.

To summarise, wage policy first of all, not faced certain constraints in Poland. Secondly, and connected to the first argument, due to the uncoordinated wage increases, the development of the inflation rate was not stable. Some alternative instruments of wage policy, which serve the purpose of increasing the wage coordination, like, minimum wages or extension of collective agreements, have been put in use, but the effects have been rather limited.

Monetary policy

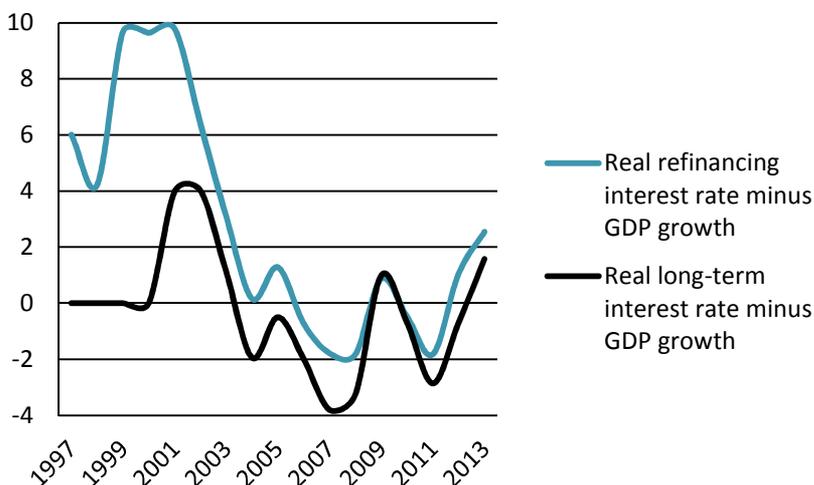
As also established in Section 3.4, the first major institutional change, which had a great impact on the financial system and the use of monetary policy, is the creation of the two-tier banking system in 1989. The second very important institutional change happened two years later, when the National Bank of Poland decided to abandon the fixed peg exchange rate regime and adopt the crawling peg instead. The reason for this decision was the shortage of foreign exchange reserves (Borowski, et al., 2003).

The surge in capital flows and the high costs of sterilisation led the central bank to switch to a crawling band in 1995 (Kokoszczynski, 2002). Chronologically speaking, the fourth important institutional change was the abandonment of monetary targeting as a monetary policy strategy of the central bank and the adoption of inflation targeting in 1998 (Kokoszczynski, 2002). The decision of the central bank to abandon the crawling band and let the currency float was the fifth important change taking place in 2000.

Three objectives have been assigned to monetary policy. The first task this policy is in charge with is ensuring the stability of the financial system. When we analysed the development of the financial system in Section 3.4, we could see that the institutions in charge of the financial system (the financial supervisory agencies, the government and the central bank) were able to relatively keep the financial system intact. Thus, we can argue that the first objective of monetary policy has been met.

The second objective of monetary policy is to provide sufficient low-cost finance to the banking sector. The indicators we are going to use, the real short-term interest rate minus GDP growth and the real long-term interest rate minus GDP growth, give an insight into the *ex-post* monetary policy stance and the availability of low-cost finance. Until 2003, the (short-term and long-term) interest rates were higher than the GDP growth, which means that expansionary policy was *ex-post* restrictive for real investment and economic growth (Figure 4.6). From 2004 until 2008, the both ratios were negative, which means that monetary policy was expansionary. This could be also argued for the period 2010-2012.

Figure 6. Real short- and long-term interest rate relative to GDP growth (year-on-year growth, percentage points), 1997-2013

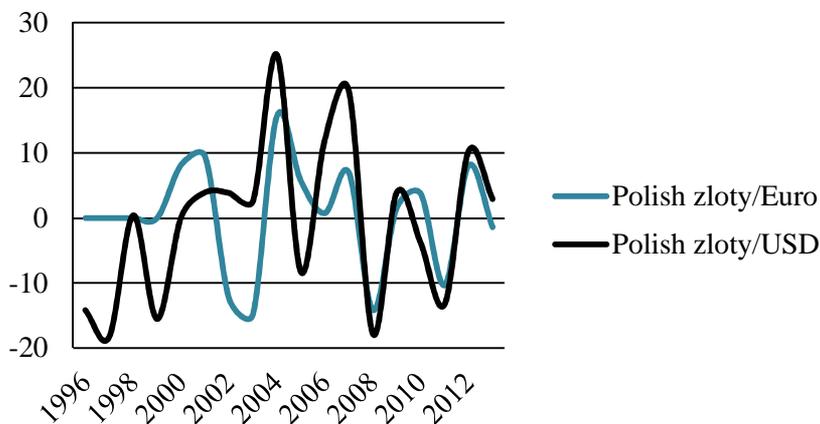


Source: Eurostat 2014, author's calculation.

The third objective of monetary policy is to preserve the stability of the exchange rate. Figure 4.7 shows that the exchange rate development between the zloty and the US Dollar, as well as between the zloty and the Euro has been relatively volatile. This can be argued both for the period prior and succeeding 2000, which is the year when the floating exchange rate regime was introduced. This means that the central bank's foreign exchange intervention was not successful enough so as to prevent fluctuations of the exchange rate, which then also had a negative impact on the competitiveness of the domestic companies.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Figure 7. Exchange rate between the zloty, US dollar and the Euro (year-on-year percentage change), 1996-2013



Source: Eurostat 2015.

In a nutshell, we can conclude that monetary policy was able to protect the financial system from banking, currency or financial crises. Up to 2003, monetary policy was *ex-post* restrictive (real short- and long-term interest rates were above the rate of economic growth of the country). Only after 2004, was monetary policy conducive to investment and growth. This means that the second objective of monetary policy, providing a low-cost finance to the financial system, was only partially met. In spite of the various attempts of the central bank to stabilise the development of the nominal exchange rate through foreign exchange intervention, the fixed peg and the crawling peg could not be defended. The exchange rate development seems to have been relatively volatile in Poland.

Fiscal policy

The first major institutional change, which had a profound effect on the functioning of fiscal policy was the accession of Poland in the EU in 2004 and the requirements of the Maastricht Treaty to meet the fiscal criteria of keeping the budget deficit below the limit of 3 per cent of GDP and public debt-GDP ratio no higher than 60 per cent in order to be able to join the European Monetary Union. The second major institutional change was the adoption of the Euro Plus Pact in March 2011, with which the government committed to a policy of a budget consolidation.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

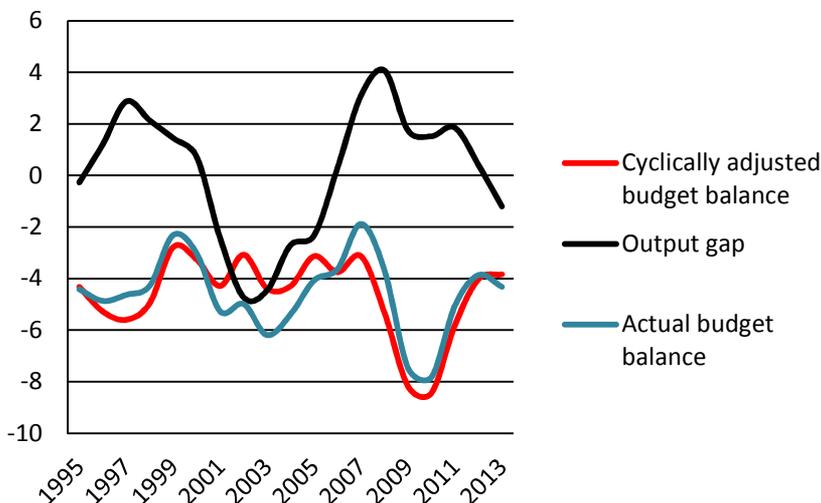
The first major objective of fiscal policy is to reduce the aggregate demand shocks in the economy both in the short- and long-run. One indicator which can show us if the country has gone through a period of aggregate demand shock is the output gap. Between 1998 and 2002 we can observe a fall in the output gap, which signifies that the economy in this period was growing below potential output. During this time, the government attempted to reduce the budget deficits, which is also to be seen in the reduction of the structural (cyclically-adjusted) budget deficits. Hence, the government used pro-cyclically restrictive fiscal policy (Figure 4.8). Between 1999 and 2005, we can spot the stop-and-go fiscal policy, which postponed the economic recovery, although higher government spending was necessary to compensate for the increase in private sector saving (Figure 4.9). Only during the first two years of the recent economic slowdown in Poland (from 2008 until 2010), the government applied counter-cyclical expansionary fiscal policy. However, already in 2011, with the signature put on the Euro Plus Pact, the government deliberately resorted to budget consolidation amidst the economic slowdown.²⁴ The pro-cyclical fiscal policy stance in 2012-2013 did not only weaken the effects of the automatic stabilizers, but also had a negative impact on the economic growth.

The second objective of fiscal policy is to reduce the income inequality in the country. The Gini index of market income shows us the size of the income inequality before adjusting for taxes and transfer payments. The paper by Paci et al. (2004) shows that the Gini index of market income increased from 0.379 in 1994 to 0.407 in 2004. The OECD database shows that the income inequality, measured as pre-tax and transfer income inequality, was reduced between 2004 and 2009.²⁵ Yet, according to the same database, Poland had a higher pre-tax and transfer income inequality than the EU-average (OECD database).

²⁴ In the report from December 2014, the Polish government states that it undertook the following measures to consolidate the budget: it reduced the size of the discretionary public expenditures, it increased the retirement age for men and women, it eliminated the early retirement programmes, it froze the public sector wages and increased the value-added tax (Government of the Republic of Poland, 2014).

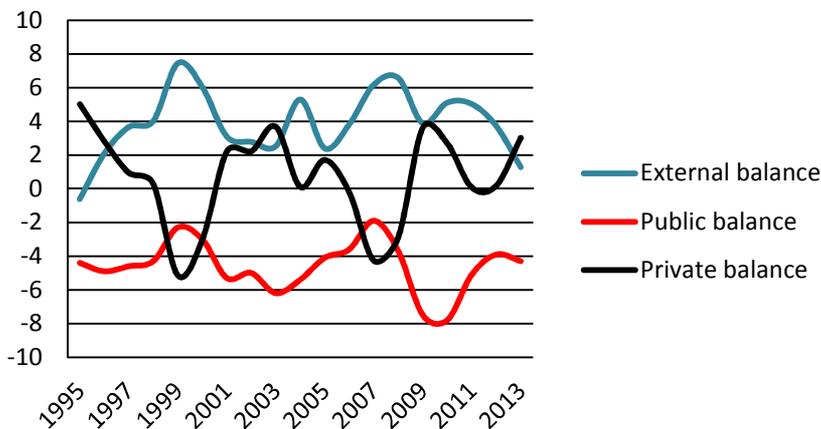
²⁵ According to OECD, in 2004 the Gini index of market income in Poland was 0.57, while in 2009 it amounted to 0.47 (OECD statistical database).

Figure 8. Output gap, actual and structural budget balance in Poland (per cent), 1995-2013¹⁾



Notes: ¹⁾ The cyclically-adjusted budget balance and the output gap are calculated relative to potential GDP. Actual budget balance is given as a share of GDP.
Source: Eurostat 2014.

Figure 9. Financial balances of the different sectors in Poland (per cent of GDP), 1995-2013



Source: Eurostat 2015, author's calculation.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

However, also if we look at the Gini index of disposable income, we can see that Poland has had higher income inequality than the EU-average (Eurostat, 2015). Income inequality measured as post-tax and transfer income inequality, increased between 1994 and 2004 from 0.308 to 0.317 (Paci et al., 2008). In the following years the income inequality was lowered owing to the increase in pension transfers.

Thus, we can derive the following conclusions regarding the functionality of fiscal policy. Firstly, although it had some counter-cyclical properties in single years, fiscal policy seems to have been pro-cyclical during most of the years of an economic slowdown. This has certainly delayed the economic recovery. Secondly, although reduced since 2004, income inequality, both measured as Gini index of market and disposable income has been higher in Poland than in the EU-members.

Conclusions

This paper had the aim to explore the economic development of Poland and to assess the functionality of the development of its macroeconomic policy regime using a normative model briefly sketched in Section 3. According to this model, foreign economic policy and industrial policy are given major tasks of restructuring the economy towards production and exports of high-technology, high value-added products, which would serve the purpose of improving the terms of trade and the current account in a structural and more sustainable way. Foreign economic policy is furthermore, given the significant task of maintaining a relatively low volatility of capital flows, which particularly in open economies like Poland, seems to be of a paramount importance for the stability of the financial system, the stability of the domestic currency and for preserving a more stable investment climate in the country. One of the main goals of the financial system is to provide a sufficient finance for the companies, particularly operating in the targeted high-technology sectors. The second major task of this MPR element is to protect the financial system from major disturbances and maintain its stability. Providing a wage anchor and thus, maintaining the stability of the inflation rate is assigned to the wage policy. Assuming that the wage policy was able to stabilise the inflation rate and that the monetary policy was successful in providing a nominal exchange rate anchor, the stability of the real exchange rate development and thus, the competitiveness of the domestic companies can also be sustained. Caring for the financial system as well as provision of low-cost finance for the financial system by relatively low real interest rate policy stability are also tasks of monetary

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

policy. Fiscal policy has been assigned two major tasks: combating aggregate demand shocks and reducing income inequality.

The case of Poland shows that:

1. There was a tendency of rather stable net capital flows until 2006. However, after most of the capital flow restrictions were eliminated, portfolio flows became more attractive and with that capital flow volatility increased. Thus, the task of foreign economic policy in maintaining the capital flow stability was relatively better fulfilled in the years preceding 2006, compared to the years thereafter.
2. Foreign economic policy was only occasionally able to reduce the current account deficits owing to the reductions in the trade deficits. However, the reduction of current account deficits did not occur due to structural improvements in the terms of trade, but mostly due to devaluation or as a result of a decline of imports in the periods of economic downturn. Throughout the years, income account deficits have been accumulating, which necessitated even bigger efforts to achieve a balanced current account.
3. Industrial policy did not seem to play an active role in the process of restructuring the economy towards production and exports of high value-added products. In the 1990s, the former was mainly concentrated in the area of privatisation and transformation of the large public-owned companies and banks. After 2004, the EU-accession seems to have played a crucial role in restricting industrial policy in the sense of 'vertical' or 'sectoral' policy.
4. In most of the years was the financial system able to provide the needed amount of finance. However, during the years succeeding the Russian financial crisis (from 2000 until 2005), there seems to have been a higher credit rationing towards firms, while the households were still able to receive the loans needed.²⁶
5. Owing to the various and very importantly, pre-emptive regulatory measures, the financial system was able to prevent the occurrence of asset-price bubbles, prevent capital flight during the economic downturns and thus, relatively maintain the financial system stability.
6. Monetary policy supported the financial system in securing its stability. But, with regards to providing low-cost finance to the financial system, monetary policy until 2003 was restrictive. Real interest rates were

²⁶ We do not mean here that there has not been any credit rationing towards households. But, households, which met the prevailing standards of creditworthiness, were most likely to receive a loan (compared to the firms).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

higher than the GDP growth rate, which speaks of a failure of the central bank to provide a low-cost finance during these years. After 2004, monetary policy turned expansionary. The reason for this development is the attempt of the central bank to meet several goals with one instrument: the nominal short-run interest rate: fighting inflation, combating asset-price increase, while following an exchange rate peg and monetary targeting (and later on inflation targeting) as a strategy.

7. The central bank was not able to secure a more stable development of the exchange rate because of the shortage of foreign exchange reserves and a relatively open capital account.
8. Decentralised wage bargaining, weak trade unions and employers' associations and low collective bargaining coverage (because of the limited impact of the collective agreement extension mechanisms and of the minimum wage) disabled the conduct of a functional wage policy in Poland. Wage policy was not able to provide a stable wage anchor and thus, to prevent a volatility of the inflation rate.
9. Fiscal policy was often pro-cyclical. Especially during the economic downturns of 2000/2001 and 2012/2013, the government decided to consolidate the budget and cut public expenditure, which postponed the economic recovery.
10. Income redistribution policies as a part of fiscal policy were able to reduce income inequality; however, the effects of these policies seem to be less impressive than in the EU-countries.

Hopefully, this analysis of the MPR development in Poland is going to stimulate further theoretical modelling of MPR of emerging countries, as well as empirical research of the development of MPR in other CEECs or other emerging countries.

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
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Disclosure of Risk Information in the European Banking Sector

JEL Classification: *E44; E52; E58; F33; G18; G21; G28*

Keywords: *risk disclosures; financial statements; accounting standards; GAAP; IFRS*

Abstract: The debate on the scope of bank information disclosures seems to be an essential issue, especially after the 2007-2010 financial crisis. The adequate number of data provided to the public domain is the condition of transparency of the banking sector, which should assure the optimization of market participants' decisions. There is also a tendency to unify the global accountancy standards and they are expected to ensure the same scope of disclosed information for the global financial market. The aim of the study is to check if the accounting standards required by the European countries influence the number of risk disclosures and if more stable banking sectors tend to report wider scope of data. Finding out the nature of disclosures' determinants is an important aspect in terms of working out the procedures increasing the transparency and stability of the financial markets.

Introduction

For the sake of the specific role that the banking sector plays in the economy, there are applied strict disclosure requirements in relation to financial institutions. A wide range of disclosures required by banking authorities is due taking care of to not only the interests of the stakeholders, but also the stability and security of the financial system.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The turbulences in the financial markets are real threat to the entire economy because of the occurrence of the so-called contagion effect. Therefore it is important to introduce the early warning systems based on the ongoing monitoring of the banking sector and providing data analysis of the risks arising from the activities of banks and external conditions.

The proper functioning of early warning systems is subject to access to information about the various risks associated with the operations of financial institutions. Thus, the role of transparency and fulfilling the information requirements is often emphasized as the key issue in this sector. The relevance of disclosures was intensively discussed after the 2007 financial crisis, especially the risk and corporate governance data that appear to be essential when the banks transparency is concerned. It is important to notice that the quality and quantity of disclosures is directly related to the quality of corporate governance. This fact is emphasized, for example, by Bhimani (2009, pp. 2-5), Power (2009, pp. 849-855) and Harney (2010, pp. 14 – 17) in their research regarding risk accounting.

This paper examines the nature of risk disclosures of European banks with special consideration of the risks data required under International Financial Reporting Standards (IFRS) and local Generally Accepted Accounting Principles (GAAP). The article presents arguments supporting the importance of disclosures in the financial system. Then there will be characterized the various kinds of risks in banking sector and the reporting requirements resulting from the application of different accounting standards. Finally the author will present the results of research based on data submitted by banks in accordance with the COREP standard, which is a technical reporting instrument designed to harmonize reporting in accordance with the Capital Requirements Directive (CRD).

Methodology of the research

The aim of the study is to find out if the number of disclosed risk data depends on the applied accountancy standards. The author will also check whether more stable bank sectors tend to disclose wider scope of risk information.

The database which is the subject of analysis has been developed on the basis on the information published on the website of the European Banking Authority (European Banking Authority, EBA) - publication date: 10/03/2010,last updated: 02/18/2014 - and the data from the database SNL Financial. It includes aggregated information about 30 European banking

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

markets regarding the range of disclosures of the capital adequacy, values of own funds established for the purposes of calculating the capital adequacy ratio, capital requirements for particular risks and data on the values of exposure subject to various risks, with taking into account the risk mitigation methods.

The database has been supplemented with qualitative variables, ie. the value of risk-weighted assets (RWA) and capital adequacy ratios (CAR) of each country capital sector (aggregated data). Asset value usually determines the size of the banking sector, while CAR may be considered as a measure of banking system stability.

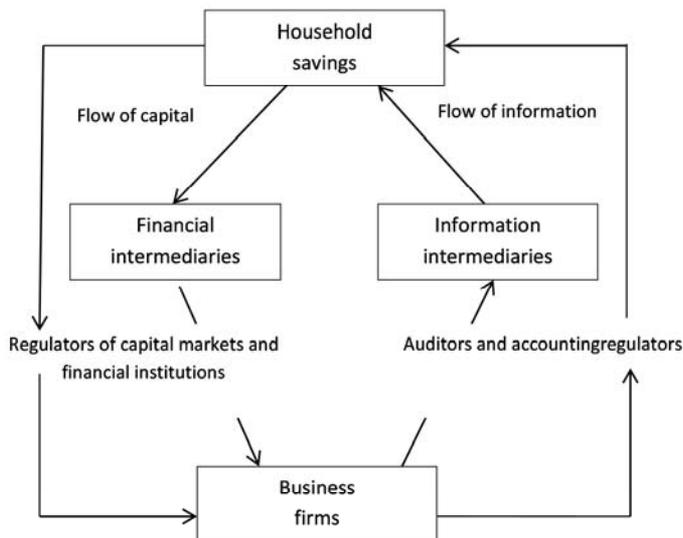
The author used the SPSS software package to evaluate the above mentioned issues. The influence of accounting standards on the number of disclosures was assessed with the analysis of variance (Welch and Brown-Forsythe tests). To simplify the calculation the author constructed the disclosure index and confirmed its reliability with the Cronbach's alpha coefficient. There was also used the linear regression analysis to check if the scope of the disclosures depends on the bank sector stability.

The importance of disclosures in the financial statements

The objective of financial statement is to provide information about the financial position, financial performance and cash flows of an entity that could be useful to a wide range of market participants in making economic decisions (Świdarska, 2010, p.15). In addition, it proves the managers' diligence in managing the entrusted to them resources and thereby reduces the information differences and conflicting incentives between entrepreneurs and savers (Healy, Palepu, 2001, p.407).

The problem of asymmetric information may be solved with the high transparency of managers' decisions and activities. The transparency and honesty of information is expected to be guaranteed by the capital markets intermediaries, such as financial analysts and rating agencies. Figure 1 provides a scheme of flow of capital (left side) and flow of information (right side) within the capital markets.

Figure 4. Financial and capital flow in the capital markets



Source: Healy, Palepu (2001, p. 407).

As it is shown at the scheme, the investor is not an identical entity as the entrepreneur. That implies the existence of so called agency problem, which is a result of unbundling of ownership and management. Savers usually do not intend to engage in managing and delegate all the business decisions to their agents (managers) responsible for taking care of the proper dealing with the entrusted capital. It may cause two major kinds of conflicts - insufficient managers' motivation to look for the business opportunities and the 'moral hazard' meaning the inventiveness to put the interest of managers instead of company first.

One of the possible solutions reducing the agency problem is the disclosure policy providing market participants with the adequate data that enable to monitor and make up decisions and actions involving:

- buying, maintaining or selling the securities,
- assessing the efficiency of management,
- assessing the company's ability to pay wages and other employee benefits,
- assessing the quality of collaterals and loans,
- evaluating the tax policy,

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

- determining the proportions of profit-sharing and dividends,
- preparing statistic data regarding the GDP,
- regulating the business activities (Świdarska, 2010, p.15).

Types of risk in the banking sector

Providing the financial services by banks implies the existence of various kinds of risk that should be carefully recognized and analyzed. The proper risk measurement and management seem to be the most important issues when the functioning of financial institution is concerned. Table 1 presents the risk characteristics specified by Santomero (1997), Pyle (1997) and Frenzel et al (2011).

Table 1. Types of banking risk characterization

Type of risk	Santomero	Pyle	Frenzel et al.
Market risk	See: systematic risk	the change in net asset value due to changes in underlying economic factors such as interest rates, exchange rates, and equity and commodity prices	The volatility of the fair value of the financial instruments or the future cash flows due to changes of the market prices.
Credit risk	Risk arising from either an inability or an unwillingness of a borrower to perform in the pre-committed contracted manner.	The change in net asset value due to changes the perceived ability of counterparties to meet their contractual obligations.	The risk of loss resulting from the inability to fulfil the contractual obligations by the counterparty.
Operational risk	Risk associated with the problems of accurately processing, settling, and taking or making delivery on trades in exchange for cash. It also arises in record keeping, processing system failures and compliance with various regulations.	Risk resulting from costs incurred through mistakes made in carrying out transactions such as settlement failures, failures to meet regulatory requirements, and untimely collections.	-
Performance risk	-	Risk encompassing losses resulting from the failure to properly monitor employees or to use appropriate	-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

		methods (including "model risk").	
Systematic risk	The risk of asset value change associated with systematic factors. It is sometimes referred to as market risk.	-	-
Counterparty risk	Risk coming from non-performance of a trading partner. The non-performance may arise from a counterparty's refusal to perform due to an adverse price movement caused by systematic factors, or from some other political or legal constraint that was not anticipated by the principals.	-	-
Liquidity risk	The risk of a funding crisis.	-	The risk of inability of the bank to fulfil its obligations.
Legal risk	Risk endemic in financial contracting and separate from the legal ramifications of credit, counterparty, and operational risks. These are new statutes, tax legislation, court opinions and regulations as well as fraud, violations of regulations or laws.	-	-

Source: Self study.

Most of the above mentioned risks could be recognized and properly managed only on condition that the corporate governance processes are well-defined and implemented. They guarantee the transparency of bank operation and mitigate the agency conflict, which could lead to underestimating or hiding the risk to stakeholders in order to enable some moral hazard actions. There should be noticed, however, that several kinds of risk are hard or even impossible to predict and measure. These are for example systematic, counterparty and legal risk which mostly depend on the external

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

circumstances. The other risk factors are usually identifiable if two preconditions are performed – the full disclosure and proper measurement.

Risk disclosures literature review

The risk disclosure research has been initiated with the studies performed by the Institute of Chartered Accountants in England and Wales (ICAEW, 1997) and the Basel Committee on Banking Supervision (BCBS, 1998). They discussed a role of transparency and risk information that should be included in the financial reports or other additional documents released by the companies. A kind of theoretical debate, based on BCBS survey was presented by the Linsley and Shrives (2005, pp. 205-214) who collated the risk disclosure requirements with the bank reporting practices.

Linsley and Shrives (2005, pp. 292-295) conducted also a research taking into account UK public companies listed in the FTSE 100. Their study found that in most entities the risk disclosures are not quantitative but qualitative. Similar conclusion was driven by Lajili and Zeghal (2005, pp. 125-142), who analyzed 300 listed Canadian companies stating that the usefulness of reported risk information is limited by the lack uniformity, clarity and quantification. This is consistent with the Woods, Dowd and Humphrey's (2004) statement that the institutions "want to signal that they have state-of-the-art (or at least adequate) risk management systems, but they don't want to give real risk information away, as such information is commercially sensitive. Thus, 'risk disclosure' might be more apparent than real".

Presently, a great number of studies use the disclosure indexes that may be treated as an important information about the quality of corporate governance practices. Their construction involves on gathering answers to the questions if specific company data is disclosed to the market.

Brazilian Corporate Disclosure Index built by Lopes and de Alencar (2008) is based on the answers to 47 questions relating to the general information about the company, compensation policy, non-financial market data, sales, cash flow and earnings forecast, financial and other data analysis. Cheung, Connely and Limpaphayon (2007, pp. 313-342) used the information about disclosures for the construction of disclosure index for Thailand and Hong Kong. It includes the "poor/fair/excellent" answers regarding the disclosures of stakeholders' rights protection, equality of investors' treatment, the role of stakeholders in corporate governance practices, company's transparency and the role of board of directors. Lopes and

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Rodrigues (2007, pp.25-56) used the financial instruments disclosure index as a dependent variable trying to evaluate the disclosure determinants in Portugal. They analyzed 54 elements regarding the information on accountancy policy, fair and market values, securitization, derivatives, interest rate risk, credit risk, collaterals and others. Cheung, Jiang and Tan (2010, pp. 259-280) presented the disclosure measures divided to the obligatory and facultative ones in terms of the reporting practices of the largest publicly traded Chinese companies. There also exists the Polish Corporate Disclosure Index (Świdorska, 2010) which is a weighted average of disclosures taken from the company's financial statement (66%), operating statement (24%) and the report of relationship with the business environment (10%).

Disclosure requirements according to GAAP and IFRS

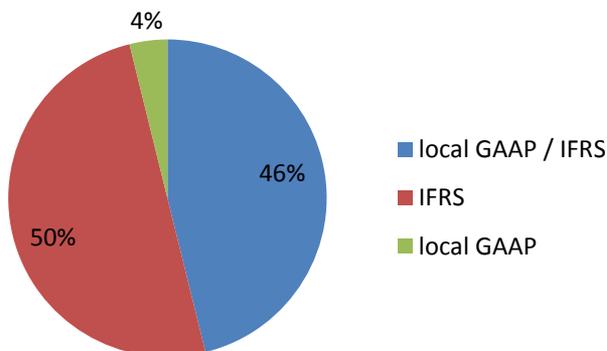
In the late 1990s companies in several EU member states were allowed to voluntarily apply International Financial Reporting Standards rather than local Generally Accepted Accounting Principles. Presently, however, after 1st January 2005, the International Accounting Standards (IAS) regulation requires publicly traded companies to present consolidated financial statements in conformity with IFRS adopted by the European Union (IFRS-EU) for each financial year. Member states may permit companies to defer the application of IFRS-EU when:

- only their debt securities are admitted to trading on a regulated market of any member state; or
- their securities are admitted to public trading in a non-member state and, for that purpose, they have been using internationally accepted standards since a financial year that started prior to 11 September 2002 (for this purpose, internationally accepted standards are generally understood to include only US GAAP).

In practice, the IAS Regulation allows jurisdictions to prohibit any specific type of company from using IFRS in their legal entity financial statements, and, in the case of non-publicly traded companies, their consolidated financial statements (Financial Reporting Faculty, 2007, p.19). Thus, only a part of European countries apply IFRS to all bank entities, most of them allow using both IFRS and local GAAP regulations (see: Figure 2).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Figure 2. The accountancy standards requirements (European banks)



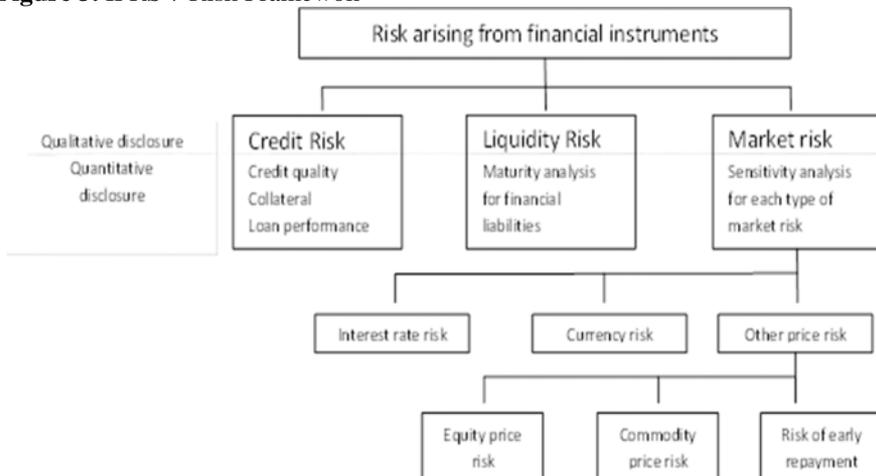
Source: own calculations based on COREP statistics

According to the IFRS 7 - the standard relating to financial instruments disclosures - entities should disclose both qualitative and quantitative data concerning the market risk, credit risk and liquidity risk (see: Figure 3). The objective of IFRS 7 is “to require entities to provide disclosures in their financial statements, that enable users to evaluate (1) the significance of financial instruments for the entity’s financial position and performance; and (2) the nature and extent of risks arising from financial instruments to which the entity is exposed during the period and at the reporting date, and how the entity manages those risks” (International Accounting Standards Board, 2009) .

The IFRS 7 requires information including a complex but not too highly aggregated data about the risk factors. The risk report may be a part of the financial statement, another business report or may be published as a separate document. European financial institutions deliver the risk data using COREP and FINREP reports which are standardized formats provided by European Banking Authorities (EBA) in the XBRL (Extendable Business Reporting Language).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Figure 3. IFRS 7 Risk Framework



Source: Redaelli (2007).

Local GAAP regulations are not standardized with the risk disclosure requirements. In particular, they do not include the obligation to literally specify the various kinds of risk as it is in the case of IFRS. The US GAAP standards, for example, concentrate rather on fair value disclosures and require the disclosure of valuation techniques and inputs used to measure fair value (PricewaterhouseCoopers, 2011, p. 61). It should be mentioned, however, that calculating the fair value requires, among other elements, concerning the credit risk, market risk, off-balance sheet risk, significant estimates and their uncertainty.

By contrast, the NL GAAP standards do not have a fair value option. They invoke the previous requirements of IAS 32 that established principles for presenting financial instruments as liabilities or equity and for off-setting financial assets and liabilities (International Accounting Standard 32) . But similarly to the US GAAP, there is no demand of disclosing the exact level of specific risks.

Although the local GAAP allow not to cautiously define the specific risk types, the COREP standard, which is mandated by the Committee of Banking Supervision (CEBS) as obligatory format since 2014, includes the detailed disclosures regarding credit, market and operational risk. A complete set of COREP risk disclosures is presented in the Table 2.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 2. Types of risk disclosures included in the COREP template

Credit Risk	Market Risk	Operational Risk
Credit and counterparty credit risks and free deliveries: Standardised Approach to Capital Requirements	Market Risk: Standardised Approach for Position Risks in Traded Debt Instruments	Operational Risk
Credit and counterparty credit risks and free deliveries: Internal Rating Based Approach to Capital Requirements	Market Risk: Standardised Approach for Position Risks in Equities	Operational Risk: Gross Losses by Business Lines and Event Types in the last year
Credit risk: Equity: Internal Rating Based Approaches to Capital Requirements	Market Risk: Standardised Approaches for Foreign Exchange Risk	Major Operational Risk Losses recorded in the last year or which are still open
Credit risk: Securitisation: Standardised Approach to Capital Requirements	Market Risk: Standardised Approaches for Commodities	
Credit risk: Securitisation: Internal Rating Based Approach to Capital Requirements	Market Risk: Internal model	
Credit risk: Detailed information on securitisations by originators and sponsors	Market Risk Internal Model Details	
Settlement/Delivery Risk in the Trading Book		

Source: European Banking Authority.

Using the COREP template, however, doesn't mean that all entities report every piece of information listed in table 2. Some of them are fully reported, some are reported partially and some are not disclosed because of various reasons. For example, if one concerns the Standardized Approach and Internal Rating Based Approach measures, it should be noticed that they do not always need to be calculated using both methods. In the standard method banks use the regulatory risk weight coefficient, that is based on the quality of the loan quantified by external ratings. The IRB method assumes that the bank is able to calculate the risk using the internal models instead of relying on the outside rating agency.

Data and statistics

The common statistics for the capital adequacy ratio are presented in the table 3. The results shows that European banks on average 12,4% of risk-weighted assets cover by equity, the value of coverage deviates from the mean average of 3,7 percent points. There is quite large gap between the minimum (0,56%) and maximum (18,49%) level of CAR. Distribution is skewed left, thus it should be assumed that more countries have a higher than average rate. Kurtosis is positive, which leads to the conclusion that more observations are concentrated around the center of the distribution.

Table 3. Common statistics for the capital adequacy ratio

	descriptive	value	st. error
CAR	mean	12,39	0,81
	median	12,89	
	variance	13,73	
	standard deviation	3,71	
	minimum	0,56	
	maximum	18,49	
	skewness	-1,45	0,50
	kurtosis	4,38	0,97

Source: Self study based on SNL Financial Database.

Taking into account the aim of the study, that is finding out if the accounting standards influence the number of disclosures, there will be conducted the analysis of variance. It allows to examine whether countries using different accounting standards differ greatly in terms of risk disclosures.

The variable "accounting standards" was simplified by giving it two values: 0-meaning the countries in which both the national and international standards are used and 1-meaning countries where only international standards are required. To create a variable aggregating disclosure range on all listed in the database areas (a kind of risk disclosure index), there were set up the "disc_..." variables, which take a value of 1 for those categories which are disclosed and 0 in the other case (disclosed partially or non-disclosed). Then there was created a new variable "discl.index", which is the sum of the above discrete variables and indicates how much information the individual countries disclose in the reports sent to the European Banking Authority.

For the evaluation of the reliability of the constructed index the Cronbach's alpha coefficient was used. It informs about the degree to which

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

a set of variables describes one hidden in them construct. It can also be interpreted as a measure of the internal consistency of the scale. The Cronbach's alpha coefficient falls within the range between 0 and 1. The high reliability of the scale indicates values greater than 0,7, but a scale for which Cronbach Alpha > 0,6 is considered as acceptable.

In case of the sum of the variables concerning disclosures (discl.index) Cronbach's alpha coefficient is 0,94, which indicates the high reliability of the scale and confirms that the index constructed on the basis of the above data relatively well describes the scope of disclosures. Removal of certain items would give only a very slight improvement in the coefficient.

The next step is checking the assumptions of normal distribution and homogeneity of variance of studied variables (accounting standards and disclosure index). The results are presented in the Table 5.

Table 5. Tests for the normality of distributions

Variable	Shapiro-Wilk		
	Statistic	df	Sig.
IFRS	0,932	6	0,598
local GAAP/IFRS	0,933	12	0,413
discl.index	0,833	5	0,147

Source: Self study based on COREP template of European Banking Authority.

The research uses the Shapiro-Wilk Test, wherein:

H_0 : the dependent variable has a normal distribution

H_1 : $\sim H_0$

In the Shapiro-Wilk tests the sig. value is greater than the significance level of 0,05, so the variables can be regarded as normally distributed.

Then it is allowed to use the Levene's Test for Equality of Variances which verifies the assumption of the homogeneity of variance of the dependent variable within a subpopulation. The hypothesis that the variances of disclosure index are homogeneous is considered to be met if Levene's test $p > 0,05$. In this case $p = 0,032$, thus one have to reject the assumption of homogeneity of variance.

If this assumption turns out to be broken, the Brown-Forsythe and Welch options will display alternative versions of the F statistic which means it can be still verified if there is a difference in the mean of disclosure index within the two subpopulation (divided by taking into account the

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

accounting standards requirements). Table 6 shows results of the Brown-Forsythe and Welch tests.

Table 6. Robust Tests of Equality of Means

	Statistics	df1	df2	Sig.
Welch	0,000	1	18,067	0,992
Brown-Forsythe	0,000	1	18,067	0,992

Source: Self study based on COREP template of European Banking Authority.

For the above tests the hypothesis take the form of:

H_0 : average in the populations are equal

H_1 : $\sim H_0$

In both Welch and Brown-Forsythe tests the significance is at the level of 0,992 ($p > 0,05$). Thus one can accept the H_0 and assume that two independent groups come from populations with the same distribution. Therefore, the accounting standards do not differentiate the scope of disclosures.

It may be also checked whether the scope of the disclosure of information depends on the bank sector stability. In other words– it is an attempt to find an answer to the question whether more stable banking systems are more likely/more demanding in terms of information requirements.

To verify the above mentioned statement the linear regression analysis is used. Table 7 and 8 present the output of the regression coefficients estimations. The results indicate a very weak positive correlation ($R = 0,11$), the variability of disclosure index is explained with the CAR only 0,012%, which means that the model fits the data poorly. The values in Sig. column for both variables are above 0,05. Therefore, there is no evidence to reject the null hypothesis which states that the impact of the variable is not significant. It must be assumed that the variable CAR does not significantly affect the disclosure index.

Table 7. Model summary

Model	R	R-square	Adjusted R-square	St. error of the estimate
1	0,108 ^a	0,012	-0,043	5,95036

a. Predictors: (Constant), CAR

Source: Self study based on COREP template of European Banking Authority and SNL financial Database.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 8. Coefficients, dependent variable: disclosure index

Model	Unstandardized coefficients		Standardized coefficients	t	Sig.
	B	St. Error	Beta		
1 (Constant)	12,543	6,968		1,800	,089
CAR	-,242	,527	-,108	-,460	,651

Source: Self study based on COREP template of European Banking Authority and SNL financial Database.

Summarizing, on the basis of the tests presented, we can conclude that the selected countries do not differ from each other in terms of disclosed data according to accounting standards. Also the level of their solvency measured by the capital adequacy ratio does not affect the scope of disclosures.

Thus, for the purposes of identifying the factors affecting the transparency in the banking sector one should focus on the analysis of the legal regimes of individual countries belonging to the transnational financial safety net organizations, as well as historical and cultural factors related to the transparency of economic activity, particularly in the area of financial markets.

Conclusions

The Basel Committee on Banking Supervision defines the transparency as ‘the public disclosure of reliable and timely information that enables users of that information to make an accurate assessment of a bank’s financial condition and performance, business profile, risk profile and risk management. This definition recognizes that disclosure alone does not necessarily result in transparency’ (Basel Committee on Banking Supervision, 1998, p.4).

That is a crucial notice when the above presented results are concerned. It should be emphasized that although the accounting standards do not differentiate the number of disclosed data, they may affect the quality of the information given to the public. It seems then that the debate on risk disclosures should concentrate not on their scope which is quite standardized, but on the credibility of the data.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The information put in the public domain should be reliable to fulfill the function of mitigating the information asymmetry problem. The 2007 financial crises proved that the quality of information – both given directly by banks and by market intermediaries, such as credit rating agencies – is poor and misleading. If the data credibility is provided, then the authorities may concern the problem of the scope of disclosures.

There are several arguments for increasing the number of released information (Linsley, Shrives, 2005, p. 206). Firstly, the relevant information about the risk policy and management enables the market participants to sanction banks with unsatisfactory risk profile. On the other hand, well managed banks may benefit by decreasing their cost of finance, because of the greater confidence of the investors. Secondly, the requirement of disclosing the risk level obliges the managers to work out the adequate early warning systems, which may be useful not only to estimate the level of presently undertaken risk, but also to predict some threats and plan prudential procedures. Eventually, the competition within the banking sector forces the banks to fight for the trust of depositaries, stockholders, investors and contractors. The specific role of the financial institutions causes that they earn trust not only with the increasing profitability but also with the better prudential policy. If they are require to disclose this kind of information they would probably improve the risk management to enhance their economic standing and competitiveness.

Taking all this arguments into account it seems to be essential to take care about the scope of risk disclosures and find the determinants of the number of disclosed data. The presented study proves that if the European banking sector is concern it does not depend on the accountancy standards, nor on the stability of the sector (if it is measured with the capital adequacy ratio). It is therefore necessary to review the other determinants of disclosures (regulatory agency requirements for financial markets, the degree of development/market size, etc.). It should be remembered at the same time that the prerequisites of transparency is not only the great number of disclosed information but also: timeliness, comprehensiveness, reliability, relevance, comparability and materiality of the reported datasets (Linsley, Shrives, 2005, p. 206).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

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18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
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Health Care Systems' Evolvement and the Changing Role of the State in Selected CEEC

JEL Classification: *O57; L38; L30*

Keywords: *health care reforms; Central and Eastern Europe; financing health care; privatization of health care services*

Abstract: Despite common heritage, Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, and Slovakia (hereinafter Central and Eastern European Countries – CEEC) opted for different models while reforming their health care systems. A common (and important) component of these reforms was privatization and introduction of various market mechanisms in health care systems. The objective of the paper is to identify main challenges resulting from the health care reforms in CEEC. Review of the literature (using EBSCO and ScienceDirect databases) on the results of the health care reforms in CEEC will be followed by an analysis of the changes in health care financing in CEEC between 1995-2012 with a special emphasis on the role of the state in this process. WHO statistics (data) on national health care expenditures divided further into: total health expenditure, general government expenditure, private expenditure, and out of pocket expenditure (with various configurations) will be used. It is argued that health care reforms led (among others) to shifting the financial risk to patients and the state is slowly (and continually) withdrawing from financing health care in CEEC. This diminishing share of state financing of health care is not compensated by tax deductions and/or other forms of allowances. Also the issue of restricted access to health care is indicated here as a by-product of the health care reforms undertaken in CEEC.

Introduction

Health care systems and their functioning always attract public attention due to the universal value of good health for everybody. Democratic governments have to justify any kind of state intervention by reference to either market failure or distributive goals. As health services are commonly acknowledged as vulnerable to market failures (Arrow, 1963, pp. 941–973) and as a prototype of a merit good (Musgrave, 1959), state involvement can be justified by the public interest in guaranteeing effective, affordable, and accessible healthcare for the entire population (Culyer, 1989, pp.34–58; Barr, 1993, pp. 289–335).

States and governments act as principals in deciding on organization, service delivery and financing of the health care systems. The role of the state in this respect cannot be overestimated and one may maintain that the state's responsibility for proper functioning of health care systems is not being questioned. It seems to be interesting to analyze how is the role of the state in health care organizing, delivery, and financing in countries undertaking profound social and economic transformation. While processes of reforming health care systems in post-communist countries are comparatively well documented in the literature (Voncina et al., 2007, pp.144-157), there is a lack of sources analyzing the evolving role of the state in these processes. The paper is aimed at showing a continuous withdrawing of the state from financing health care systems.

Methodology of the research

The paper is based on a desk study i.e. metaanalysis using sources from EBSCO and ScienceDirect databases. The following keywords (in various combinations) were used: health care reforms, restructuring of health system, CEE countries as well as names of countries at hand: Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, and Slovakia. The selection process had three stages. The first step was to identify sources which titles corresponded to the topic and the goal of the paper. There were 283 results (altogether) showed, out of which 114 were classified as appropriate for further inquiry. During stage two all the abstracts were read and then only papers directly addressing issues of health care reforms in Central and Eastern European countries and the role of the state in these processes were identified (there were 14 such papers). In the end (the last stage) these 14 papers were read in full and analyzed. In addi-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

tion, publications from WHO Regional Office for Europe were used in this paper.

Empirical component of the paper is built on WHO statistics. Data Explorer available at <http://apps.who.int/nha/database/Select/Indicators/en> was used for the construction of Table 1.

State in health care system organization and functioning

It is assumed here after Foucault (1991, pp. 87-104, p. 91) that the state is not narrowly perceived as responsible first of all for legal regulation and execution, but also is seen as a creator of institutions, a driving force for creating tactics allowing for real execution of political power assuming that political power centers are located also out of governmental agencies (Miller & Rose, 1990, pp. 1-31).

Health system is understood as all the activities whose primary purpose is to promote, restore, or maintain health (WHO 2000) but in this paper it is narrowed down to those activities, which are under complete or partial control of governments. The private sector in health is not excluded from consideration, because of at least two reasons. First is because governments play an important regulatory role that can influence the performance of private providers and second because growing number of governments' tasks is delegated/transferred to private sector organizations (Kruk & Freedman, 2008, pp.263-276).

The role of the state in health care system - like in disputes on the role of the state in economy – is not commonly accepted. The essence of the controversy lies in the role of state intervention, particularly the extent to which it controls the provision, funding, and regulation of medical services. Opponents of state intervention and proponents of “privatization” contend that the deeper government becomes involved in health care, the more bureaucratic, complex, inefficient, and inferior the services (Hamowy, 2000, pp.15-86). Advocates of state intervention, on the other hand, argue that government participation is the best way to improve both cost-effectiveness and accessibility of health services (Barlett & Steele, 2004; DeBakey, 2006, pp.145-157).

The UN's Committee on Economic Social and Cultural Rights (2000) maintains that states are obligated to ensure availability, accessibility, acceptability, and quality of health services.

Following Veillard et al. (2001, pp. 191-199) six governmental tasks in respect to health care sector can be identified:

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

- setting health care system vision and strategy,
- influencing other sectors to improve public health,
- managing health care system based on shared social values,
- ensuring that health care system is constructed to achieve health goals,
- better implementation of legal and regulatory instruments available,
- collecting, gathering, compiling, disseminating and using information.

These tasks formulate the basic set of the state activities in respect to health care sector. Following Kutzin (2001, pp. 171-204) one can extend this list by insurance function according to which the state should guarantee access to health care without further financial impoverishment of households and citizens.

The role of the state in health care systems has been evolving. Nowadays, one may notice considerable less direct state involvement in health care systems. Böhm et al. (2013, pp. 258-269) using three criteria: regulation, financing, and service provision have distinguished five models of health care systems in OECD countries: National Health Service, National Health Insurance, Social Health Insurance, Private Health System, and Statist Social Health Insurance. In these models, the state retains its decisive role only in respect to regulation (and even here in four out of five models). Financing is dominated by societal and/or private actors (three out of five models) so is provision of health services (four of five models). This in turn may lead to the conclusion that the state remains to play a decisive role in just one out of these three criteria.

Smart governance for health and well-being

Even limiting its involvement in health care system, the state is responsible for ensuring availability, accessibility, acceptability, and quality of health services. Here the concept of smart governance could help. Smart governance for health defines how governments approach governance for health challenges

strategically in five dimensions, through:

- collaboration,
- engagement,
- a mixture of regulation and persuasion,
- independent agencies, and
- adaptive policies, resilient structures and foresight (Kickbusch & Gleicher, 2012, p. 53).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Smart governance can also be understood as the application of smart power, defined as the combination of the hard power of coercion and payment with the soft power of persuasion and attraction. Whereas hard power (such as using or threatening military intervention, economic sanctions) and soft power (such as diplomacy, economic assistance and communication) are wholly descriptive terms, smart power also involves evaluation. Smart governance for health and well-being means that the state is engaged in more complex relations with government and societal actors, using both hard and soft power. This does not inevitably reduce its role or power; indeed, with regard to health governance and governance for health, states have expanded their power to meet new challenges through new collaborative arrangements.

An example of a mixture of regulation and persuasion can be dual practice. Physician dual practice is a widespread phenomenon which has implications for the equity, efficiency and quality of health care provision. Some governments fully prohibit this practice, others regulate or restrict dual job holding with different intensities and regulatory instruments. The measures implemented include limiting the income physicians can earn through dual job holding, offering work benefits to physicians in exchange for their working exclusively in the public sector, raising public salaries, and allowing physicians to perform private practice at public facilities (García-Prado & González, 2007, pp. 142-152). This phenomenon is observed virtually in all CEE countries.

Health care reforms in CEE countries: main trends

Health care reforms are undertaken virtually everywhere in today's world. This is because of the growing health care costs (Hartwig, 2008, pp. 603-623) pushed by innovations, new medical technologies and innovative pharmaceuticals (Mossialos & Le Grand, 1999). Consequently, reforms aimed at increase of efficiency and cost reduction are introduced (McPake, Kumaranayake & Normand 2002).

There are certain ways and tools widely used in many countries reforming their health care systems to mention decentralization of health care delivery (Mosca, 2006, pp. 113-120), introduction of new concepts like Diagnosis Related Groups, Health Technology Assessment, or Clinical Practice Guidelines (Perleth, Jakubowski & Busse, 2001, pp. 235-250).

One of the common feature of nearly all of the health care reforms is introduction of market mechanisms in health care and private sector devel-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

opment and expansion (Peterson, 1998). Private sector expansion in health care sector is noticed in EU countries (Thompson & McKee, 2004, pp. 281-291), CEE countries including. Further expansion of private sector in health care systems is recommended even in countries where public health care system is effective and positively assessed (Janssen, 2002, pp.145-159).

As stated by Uplekar: „ During the last decade there has been considerable international mobilisation around shrinking the role of States in health care” (Uplekar, 2000, pp. 897-904, p. 897). It is worth to notice that recommendations aimed at further private sector development in health care systems were formulated despite some negative consequences of such attempts documented in the literature (Brockmann, 2002, pp. 593-608; García-Prado & González, 2007, pp. 142-152; Horton, 2006, pp.2702-2714).

The six common features of health care reforms undertaken in Central and eastern European countries were as follow:

- introduction of an insurance model/scheme (social insurance). According to the new model only insured individuals are entitled for health care services (enumerated in the law) free of charge. Insurance is obligatory with just a few exceptions.
- provider-purchaser split. This means that financing health care services was separated from their delivery.
- empowerment of independent public health units. Public health care units were given more scope of decisions (i.e. more discretion in respect to operational and strategic decisions) but at the same time were obliged to cover possible debts.
- introduction of competition between health care providers (in respect to both public and private ones) for public funding. The payer is purchasing health services on a competitive basis, i.e. contracts are signed with these providers who offer the best prices and guarantee timely, good quality services.
- broadening the scope of private sector in the health care including provisions for the possibility to set up and run private establishments in the health care sector.
- abandonment of financing resources (i.e. beds, wages, facilities) and paying for services only (goals financing) in the form of individual contracts with the purchaser. It can be indicated that there are considerable differences in the assessment of the outcomes of the reforms undertaken. For example the results of the health care reforms in Czech Republic were very positively perceived by some Czech doctors (Antono-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

va et al. 2010, pp. 179–181) while contested by others (Oborna, Licenik & Mrozek, 2010, p. 2071).

Health care expenditures in CEEC: 1995-2012

The development of the private sector in CEE countries was accompanied by growing share of private funds in financing health care systems (see Table 1). The application of patient cost-sharing in health care is occupying political discussions in Europe, since its importance as a tool to control the increasing public spending on health is rising considerably (Baji et al. 2011, pp. 255– 262). This is also the case in Hungary, Slovakia, and the Czech Republic. In these countries, cost-sharing for commodities (e.g. pharmaceuticals and medical devices) and payments for services that fall (partly or fully) outside the health insurance funds, have long been applied, and constitute a notable share of total health expenditure (Rechel & McKee, 2009, pp. 1186–1195).

However, these countries also have experiences with user fees for primary, outpatient and inpatient services covered by social health insurance. Such user fees have been recently introduced in the Czech Republic. In Slovakia and Hungary, user fees for services were implemented and abolished shortly after their introduction (Kossarova & Madarova, 2008, pp.10-12). Experiences from these Central European countries show that the introduction of user fees for health care services meets strong opposition by political opponents and the general public (Hall, 2009). The introduction of user fees for health care services (called visit fee) was part of the reform arrangements carried out by the government in 2007 comprising the Convergence Program of Hungary (Baji et al. 2011, p. 256). The goal of the program was to decrease the deficit of the government budget and to meet the European Union criteria for countries in transition to join the Euro zone (known as “Maastricht Criteria”). The main goals of the introduction of the visit fee were to decrease unnecessary use of health care services and to convert the informal payments into formal health care charges.

The visit fee was introduced in February 2007 for GP, outpatient specialist, inpatient and dental care. The charge for co-payments was 300 HUF (1.1 Euro) for each visit to a GP and outpatient specialist with a referral, and 600 HUF (2.2 Euros) in the case of using outpatient specialist care without a referral. In inpatient care, a charge of 300 HUF (1.1 Euros) was introduced per day of hospitalization. In case of unnecessary use of emergency care, 1000 HUF (3.7 Euros) had to be paid. The beneficiary was the

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

provider institution, or the physician in case of GPs. Children under the age of 18 and users of certain health care services (e.g. emergency care, some chronic care/treatments, prenatal and preventive care) were exempted. Moreover, a limit was introduced and defined by a maximum of 20 visits/days hospitalization per year. The payments after these 20 visits/days hospitalization a year were reimbursed by the state. However, the system of visit fee worked for only one year. In April 2008, the payments were abolished as a result of a referendum initiated by the opposition. Participation in this referendum was high (e.g. higher than in the parliamentary elections in 2010). About 50.5% of the population who was entitled to vote, took part. In total, 82.4% of the voters supported the abolishment of the visit fee for physician visits, and 84.0% of voters supported the abolishment of the user fees for hospitalizations. Evidence shows that during the period of visit fee, health care utilization decreased by 15–20% in GP and outpatient services as well as days spent in hospital

(Boncz et al. 2008, pp. A368–9). However, one has to highlight that other elements of the complex reforms could have also contributed to the decrease in the number of visits and days spent in hospital. This could have included the change of the prescription system (i.e. physicians were allowed to prescribe medicine for a longer period, as a result fewer patients' visits were required) and the structural reform of inpatient care (namely the decrease of acute bed capacity by 25%, which might have also contributed to less hospitalizations). The amount of revenue generated by the user fee was estimated to be about 22 billion HUF in 2007, i.e. 4–5% of public health care expenditure (Baji et al. 2011, p. 256).

The Hungarian case with the visit fee shows only a part of the bigger picture. Table 1 below offers aggregated data on the share of private funds used in the health care sectors of Central and Eastern European countries between 1995 and 2012.

As indicated in Table 1 the share of private expenditure in the total health expenditure in 2012 varies from 15% in Czech Republic to 44% in Bulgaria. Bulgaria notices also second to the highest share of out of pocket expenditure in private expenditure on health (98%) following Romania with 98% share. Bulgaria leads also the ranking of the highest share of out of pocket expenditure in the total health expenditure (42% as compared to 14% in Czech Republic). Certainly, Bulgarian citizens bear the highest burden of restructurization of their health care sector among the analyzed countries. It is also worth to mention that the high share of out of pocket expenditure in the private expenditure on health to great extent is the result

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

of weak private health insurance schemes in vast majority of CEE countries (Hungary, Poland and Slovakia with their shares ranging from 74-77% being exceptions). Between 1995-2012 in all analyzed countries (but Romania), the share of out of pocket expenditure in the total health expenditure has doubled indicating growing financial burden imposed on households and individuals. This can be interpreted as a way of withdrawal of the state from financing health care. It should be addend that this withdrawal of the state is not compensated (at least partially) by various tax exemptions and/or any other concessions. This in turn means that the state is transferring the responsibility for financing health care to the citizens without any compensation.

Table 1. Health care expenditures in selected Central and Eastern European countries: 1995-2012

Country	Indicator	1995	2000	2005	2006	2007	2008	2009	2010	2011	2012
Bulgaria	Private expenditure on health as % of the total health expenditure	26	39	39	43	42	41	45	44	45	44
Bulgaria	Out of pocket expenditure as % of private expenditure on health	100	100	97	97	97	97	97	97	97	97
Bulgaria	Out of pocket expenditure as % of the total health expenditure	26	39	38	42	41	40	43	43	43	42
Czech R.	Private expenditure on health as % of the total health expenditure	9	10	13	13	15	17	16	16	16	15
Czech R.	Out of pocket expenditure as % of private expenditure on health	100	100	84	85	89	90	90	92	93	93
Czech R.	Out of pocket expenditure as % of the total health expenditure	9	10	11	11	13	16	14	15	15	14
Estonia	Private expenditure on health as % of the total health expenditure	10	23	23	26	24	21	22	20	20	20
Estonia	Out of pocket expenditure as % of private expenditure on health	100	89	89	96	94	95	97	92	91	92
Estonia	Out of pocket expenditure as % of the total health expenditure	10	20	20	25	22	20	21	19	18	18
Hungary	Private expenditure on health as % of the total health expenditure	16	29	30	30	33	33	34	35	35	36
Hungary	Out of pocket expenditure as % of private expenditure on health	100	90	83	80	78	78	74	75	74	74
Hungary	Out of pocket expenditure as % of the total health expenditure	16	26	25	24	25	26	25	26	26	27
Latvia	Private expenditure on health as % of the total health expenditure	34	46	43	36	39	38	41	40	43	43
Latvia	Out of pocket expenditure as % of private expenditure on health	100	97	95	90	89	89	87	86	86	86
Latvia	Out of pocket expenditure as % of the total health expenditure	34	44	41	32	35	34	35	35	37	37
Lithuania	Private expenditure on health as % of the total health expenditure	26	30	32	30	27	28	27	27	29	29
Lithuania	Out of pocket expenditure as % of private expenditure on health	87	86	99	98	98	98	97	97	98	98
Lithuania	Out of pocket expenditure as % of the total health expenditure	22	26	32	30	27	27	26	26	28	29
Poland	Private expenditure on health as	27	30	31	30	30	28	28	28	29	30

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

	% of the total health expenditure										
Poland	Out of pocket expenditure as % of private expenditure on health	100	100	85	85	83	81	81	78	76	76
Poland	Out of pocket expenditure as % of the total health expenditure	27	30	26	26	25	23	23	22	22	23
Romania	Private expenditure on health as % of the total health expenditure	25	19	19	20	18	18	21	20	21	22
Romania	Out of pocket expenditure as % of private expenditure on health	100	100	96	98	97	98	98	98	98	98
Romania	Out of pocket expenditure as % of the total health expenditure	25	19	19	20	17	18	21	19	20	22
Slovakia	Private expenditure on health as % of the total health expenditure	11	11	26	32	33	32	34	36	29	29
Slovakia	Out of pocket expenditure as % of private expenditure on health	100	89	88	80	79	77	74	72	77	77
Slovakia	Out of pocket expenditure as % of the total health expenditure	11	9	23	25	26	25	25	26	23	23

Source: Health expenditure series, World Health Organization, Geneva. Units of expenditures % General Government Expenditures (GGE). Retrieved from <http://apps.who.int/nha/database/Select/Indicators/en> (8.03.2015).

Conclusions

Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, and Slovakia have been proceeding with health care reforms over the last quarter of the century. Changes in health care systems were implemented according to liberal ideologies aimed at introduction of market mechanisms into health care systems accompanied by the development of private sector in health. Market and private sector development in health resulted in diminishing public funding and health care delivery. The growing share of private expenditure in the total health expenditure shows that the state is slowly but continually withdrawing from the health sector, shifting financial risk on the shoulders of individuals. Citizens are not compensated for growing financial burdens neither private health insurance is promoted and developed. This in turn means that the share of out of pocket payments both in private health expenditure and the total health expenditure is exceptionally high in CEE countries.

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18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
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**Monetary Valuation of Intellectual Human
Capital in Innovative Activity**

JEL Classification: *O31; M52; J33*

Keywords: *intellectual human capital; value; valuation; innovation activity*

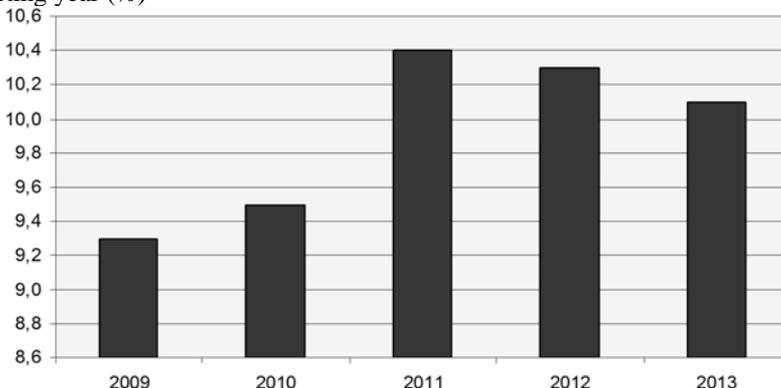
Abstract: The article views the structure of an organization's intellectual human capital, which integrates both employees' intellectual, professional and personal abilities to perform innovation activity and their results achieved in the process of this activity. The authors prove the role of intellectual human capital in improving an organization's innovation activity. Basing on the cost, income, expert and psychological approaches, the article develops the intellectual capital monetary valuation model focused on an increase in the objectivity of measuring its value by means of the individual intellectual and performance report. The application of this model is aimed at activating the innovative development of social and economic entities by increasing the quality and efficiency of intellectual human capital.

Introduction

In the light of the recent external political challenges, the increase in the efficiency of Russia's innovative activity is one of the necessary conditions to transit to a new economic policy focused on accelerating socio-economic development, on technological renovation and knowledge economy.

In the present time, the problem of organizations' low innovation activity is extremely urgent. According to the official statistical data, the percent of organizations that implement technological, organizational and marketing innovations is 10.5% and tends to decrease (fig.1).

Figure 5. The share of organizations that implement technological, organizational and marketing innovations in the total number of surveyed organizations in the reporting year (%)



Source: In accordance with the official statistical data of the Rosstat, "Science and innovations" (2014).

This situation mostly deals with the unsatisfied condition of intellectual human capital integrating two interrelated elements – intellectual potential and the results of the innovation activity of labour resources. As evidenced by the Global Competitive Report 2014-2015, Russia is ranked 53rd out of 144 countries, in part due to its weak positions based on the human factor-related indicators: Quality of the educational system – 83; Quality of management schools – 104; Availability of scientists and engineers – 70; Country capacity to retain talent – 103; Country capacity to attract talent – 92; Reliance on professional management – 85; Cooperation in labor-employer relations – 89; Firm-level technology absorption – 98; Capacity for innova-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

tion – 66. This generally shows the Russian society's weak capacity to efficiently use the existing knowledge and create some new knowledge.

Thus, it is of high priority to change to the human-oriented concept of innovative activity management to increase the competitive power of the Russian economy in the global market. This suggests applying a new model of integrated intellectual human capital measurement, which would reconcile the interests of both the employee and the manager in distributing earnings from the use of individual intellectual capital, and which would foster the motivation of the personnel to innovation activity, thus increasing the innovation activity of the organization.

A distinctive feature of this model must be associated with not only personnel cost accounting but also the estimation of such parameters as the contribution of each employee in an innovative product, the degree of implementation of intellectual and personal potential in the process of innovation, the harm from the absence of a worker.

The objective of this research is to develop the intellectual human capital model of monetary evaluation focused on intensifying the innovation activity of an organization. The aforementioned objective has defined the following tasks of the research:

- To expand the terms of “innovation activity” and “intellectual human capital” from the standpoint of the human-oriented management concept;
- To prove a significant role of intellectual human capital in increasing the innovation activity of an organization;
- To propose the intellectual human capital model of monetary evaluation, taking into account employees' social and psychological characteristics;
- To determine the areas of application for the proposed model.

Methodology of the research

Many research works have been devoted to the issues on how human, social and intellectual capital influences innovation activity (Wu, Wann-Yih, 2006; Teo, Stephen T. T., 2014; Ugalde-Binda, Nadia, 2014; Lu, Wen-Min, 2014; Carraro, Carlo, 2014). This article gives the authors' view on the structure of an employee's intellectual capital and on its monetary valuation as a key factor of the efficiency of a company's innovation activity.

We suppose that the employee's intellectual capital contains two interrelated elements; the one is a genetic or natural component (intelligence) and the other is a manmade component that has been obtained in a development

process (the results of intellectual and innovation activity). These components ensure the employee's success and, as a result, the organization's efficiency, which is reflected in achieved social and economic benefit in respect of an individual or a business in general (promotion at work, competitive advantages, bonuses, yields from implemented items of intellectual property, a higher business value, etc.).

To achieve social benefits (recognition of his true value by colleagues, satisfaction with the quality of work), the employee should demonstrate his intellectual abilities, personal qualities, professional knowledge, and position-related skills. Here, only non-financial evaluation based on socio-psychological methods and expert evaluation techniques seem to be possible. But these must be accounted for as a special coefficient in the monetary evaluation of an employee's intellectual capital. This coefficient is defined as the arithmetic mean of two indicators – i.e., the indicator of the employee's intellectual potential and the indicator showing the employee's personal contribution in the organization's innovative development.

The integral indicator of the employee's IPI (*Intellectual potential of an individual*) is proposed to calculate by formula 1:

$$IPI = \sum_{i=1}^6 k_i A_i, \quad (1)$$

Where A_i ($i = 1..6$) – point-based valuation of the types of intellectual potential (sensorial, emotional, thinking and logical, creative, socio-cultural, and economic); k_i ($\sum k_i = 1$) – weight coefficient.

In determining weights, it is recommended to use the simplified approach - all types of intellectual potential are equal – and the expert approach - weight depends on the importance degree of intellectual potential determined by experts in respect of each separate position and/or situation), which ensures the adjustment of the indicator to various evaluation objectives.

The procedures of valuating the types of individual intellectual potential (A_i) are based on applying the authors' personality questionnaire (O. Loseva, 2014, pp 91-107).

To make the IPI integral evaluation with formula 1, all types (A_i) must have a similar range of changes. To meet this goal, it is recommended to apply the approach from quality statistics (V. Vasilyev, 2004, pp. 153-168). Each type of intellectual potential is described as a set of attributes (X_j);

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

e.g., concerning the content-related field of sensorial intellect perception, such attributes include integrity, constancy, apperception, and emotional overtones.

To determine the quality of each property, it is necessary to set a quality standard taken as a number of quality categories. In this case, it is suggested to choose five categories corresponding to the degree of manifestation of this or that attribute that belong to a definite type of intellectual potential: “low” – 1; “below average” – 2; “medium” – 3, “above average” – 4, “high” – 5.

Each type (A_i) is estimated as the arithmetic mean of the values of definite attributes:

$$A_i = \frac{\sum_{j=1}^m X_j}{m}, \quad (2)$$

Where X – value of an attribute; m – number of attributes.

In turn, the attribute (X) is also estimated as the arithmetic mean of the points gained in answering those test questions that serve to determine a degree of manifestation of the attribute (X) in the respondent. Thus, all types of intellectual potential receive quality-related valuation ranging from 1 to 5.

Analogically, the indicator (At) is calculated by the following formula based on the expert approach:

$$At = \sum_{i=1}^p k_i J_i, \quad (3)$$

Where p – number of key indicators that reflect the non-financial results of an employee’s labour activity influencing his success in achieving social benefits ($p \leq 20$ is recommended); J_i – point-based valuation of a definite indicator, which is made by experts on the basis of attestation or testing (it is recommended to apply the same grades as for the structural components of the intellect - from 1 to 5); k_i – weight coefficients set by experts in respect of the importance of a definite indicator for a definite position at the current stage of the organization’s development in accordance with the principle “the higher the importance, the higher the range”, while $\sum k_i = 1$.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The indicators can be associated with the following groups:

- 1) Position-related characteristics: length of employment and education degree; professional competence; quality of work; responsibility and discipline; initiative;
- 2) Personality-related characteristics: educational activity (capacity for learning, self-education and training of other people); communication abilities; leadership skills; observance of both social standards and principles of corporate culture; level of work motivation; loyalty; commitment to an organization, its values, interests, aims, etc.;
- 3) Contribution to an organization's innovative development: number of experiences of participation in innovative projects, seminars and presentations over the period (t); number of rational proposals and novelties made over the period (t); number of applications for patent made over the period (t); number of instructions, technologies, methods developed over the period (t), etc.

The indicator's number and content can vary from the type of an organization's activity. The period (t) is determined by the frequency of attestation and is, as a rule, 1 year.

As the indicators (IPi) and (At) are calculated via expert valuation techniques, it is necessary to determine the degree of consistency of experts' opinions in choosing the indicators and weights using the concordance coefficient by formula 4. Experts' opinions are concordant if $w \geq 0.75$.

$$w = 1 - \frac{\sum_{i=1}^m \sum_{j=1}^m \sum_{k=1}^n |x_{ik} - x_{jk}|}{nm(m-1)(K-1)}, \quad (4)$$

Where m – number of matrix lines (number of experts); n – number of matrix columns (attributes); K – number of chosen levels of quality; x – qualitative analogue of a quantitative indicator that is determined by interval scaling.

Economic benefit deals with earning income by an employee from his intellectual activity. First of all, it is necessary to highlight two interrelated roles of an employee – a holder and an owner of intellectual capital. Being only an owner of intellectual capital, the employee is entirely a functional element of the system, whose status doesn't deal with the possibility to participate in management, including a special influence on distributing income from using his intellectual capital. The employees' labour is an intellectual and routine process that produces information on already

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

known knowledge. In this case, the employee himself is considered entirely as a hired worker and receives wage compensation for his labour with no claims as to a part of profit. The employee as an owner of intellectual capital directs it to generating new knowledge and practices his unique experience, thus being capable of claiming to receive monopoly earnings. The only difficulty deals with the fact that in executing innovative projects one and the same employee with definite intellectual abilities and professional and personal qualities can be both an owner of intellectual capital (a generator of ideas, a holder of unique experience) and a hired worker implementing the ideas and experience of other people.

We think that the valuation of an employee must take into account both his value as a hired worker and his profit from using his own intellectual capital despite the risk of double-counting because this valuation is intended primarily for managing purposes (the formation of the mechanism for motivating and encouraging innovation activity, for improving HR-management, etc.).

In practice, an organization's management staff should trace investments (expenses) in the elements of intellectual human capital, on the one hand, and the profit which has been gained by it from such investments, on the other hand. This may evidence the reason to use the financial models based on both the cost approach and the income approach in evaluating the economic benefit of an employee.

The aforementioned approaches are a methodological basis for developing the human intellectual capital model of valuation.

The intellectual human capital valuation model in innovation

Measuring human intellectual capital is an integral part of the process of innovation activity management. We suppose that the human-oriented concept is the most adequate technique for managing innovation activity; its peculiar features can be formulated, analyzing both the evolution of the concepts as a result of social development and the changes of the prevailing type of economy: industrial economy → information economy → knowledge economy (Table 1).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 1. Evolution of innovative activity management concepts

Characteristics	Tech-oriented	Information-oriented	Human-oriented
Economic prerequisites:			
Stage of social/economic development	Industrial	Postindustrial (information economy)	Postindustrial (knowledge economy)
Main productive force	Technics, objects of labour	Technology, tools of labour, sciences	Human intellect, knowledge
Main types of innovative resources	Material, financial	Informative and communicative	Intellectual, human
Prevailing type of innovative behavior	Passive	Passive and active	Active
Prevailing types of innovations	Product-related, technical	Technological, managerial, informative	Social, cognitive
Theoretical approaches to management:			
- Name of approach	Factor-related, functional	Functional, systemic	Systemic, situational
Characteristics of management providing the interrelation “Human being ↔ Innovative process”:			
- Innovative activity of employees	Low	High in high-tech industries	High in all spheres of activity
- Prevailing methods of motivation	Material	Material, organizational	Moral and psychological
- Priorities in employee valuation	Professional skills, knowledge	Social and psychological peculiarities, needs, motives	Intellectual abilities, satisfied quality of labour
- Employee development management	Professional training	Professional training, social and psychological development	Development of intellectual and innovative potential
- Accounting of innovative activity results	Not performed	Performed at the level of groups, communities	Performed at the level of individual
Characteristics of management providing the interrelation “Human being ↔ Human being”:			
- Prevailing style of management	Authoritative	Democratic	Democrtic and delegating
- Character of interrelations	Superior - inferior	Collegial and collective	Collaborating and personal
- Forms of activity organization	Individual	Group	Team
- Involvement of innovative activity in management	Practically no involvement	Executors are involved in management	Participative management

Source: own work.

The application of the concept of human-oriented innovative activity management needs a broader meaning of the term “innovative activity” and a different understanding of the term “human capital” as a part of an organization’s intellectual capital.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

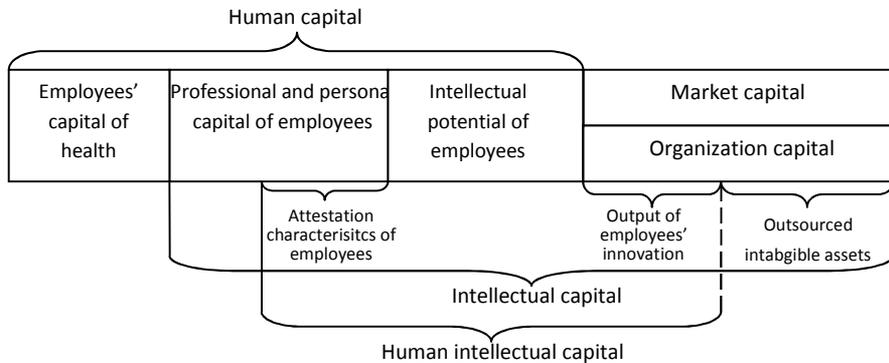
We propose to consider innovative activity as a set of actions done by the participants of not only an innovative project but also any process related to the use of the human intellect for the development of the socio-economic system. Basically, we mean intellectual and innovative activity.

To encourage employees' innovative activity and to use their intellectual potential to the full extent for the development of an organization, it is reasonable to extend the understanding of an employee's intellectual capital. We suppose that this concept should include not only the employee's intellect, gained knowledge, abilities and skills (i.e., inalienable capital) but also the products of his intellectual and innovative activity – formalized knowledge and information as well as developed productive relationships with his colleagues and the organization's outer environment (i.e. alienable capital). As a result, the organization oriented to innovative development is recommended to consider intellectual human capital (human IC) as an independent type of capital that will contain the components of an organization's human and intellectual capitals in their traditional understanding (fig.1). In the figure, the dashed line means that, together with the traditional approach referring created and legally registered intangible assets to an organization's intellectual capital, it is proposed to use the approach characterizing the belonging of both the given objects and other intellectual results, which haven't been legally registered, to an employee (a group of employees), i.e., to intellectual human capital. Such an approach enables one to evaluate the performance efficiency of employees, creative teams and divisions and to determine return on their intellectual potential, thus developing more accomplished mechanisms of motivation, encouragement and controlling in respect of innovative activity.

Thus, human IC integrates both the intellectual and attestation characteristics of human capital and the results of its innovative activity that, after their formalization and alienation, are incorporated in corporate and market intellectual capital.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Diagram 1. Intellectual human capital in the structure of human and intellectual capitals of an organization.



Source: own work.

This understanding allows considering human IC as the main factor of a higher innovative activity of an organization. Innovation is a result of idea transformation into research projects, new and upgraded hi-tech or socio-economic solutions that are recognized after being in every-day use. Therefore, innovation (idea) is one of the forms of the intellect of a person/a group of people with a further implementation in the results of intellectual and innovative activity and their use in practice. A significant role of human IC is determined by the nature of the innovative process itself. Moreover, at the different stages of the life cycle of an innovative product, a major role is played by the different types of intellectual human capital:

- 1) The intellectual capital of an employee (a group of employees) is the most important for generating innovative ideas;
- 2) The condition of the intellectual capital of an organization (including small business entities) defines the success of implementing and commercializing innovations;
- 3) The quality of the intellectual capital of a region (a country in general) and the level of the development of innovative culture significantly influence the frequency of the occurrence of new innovations and the duration of the innovation cycle.

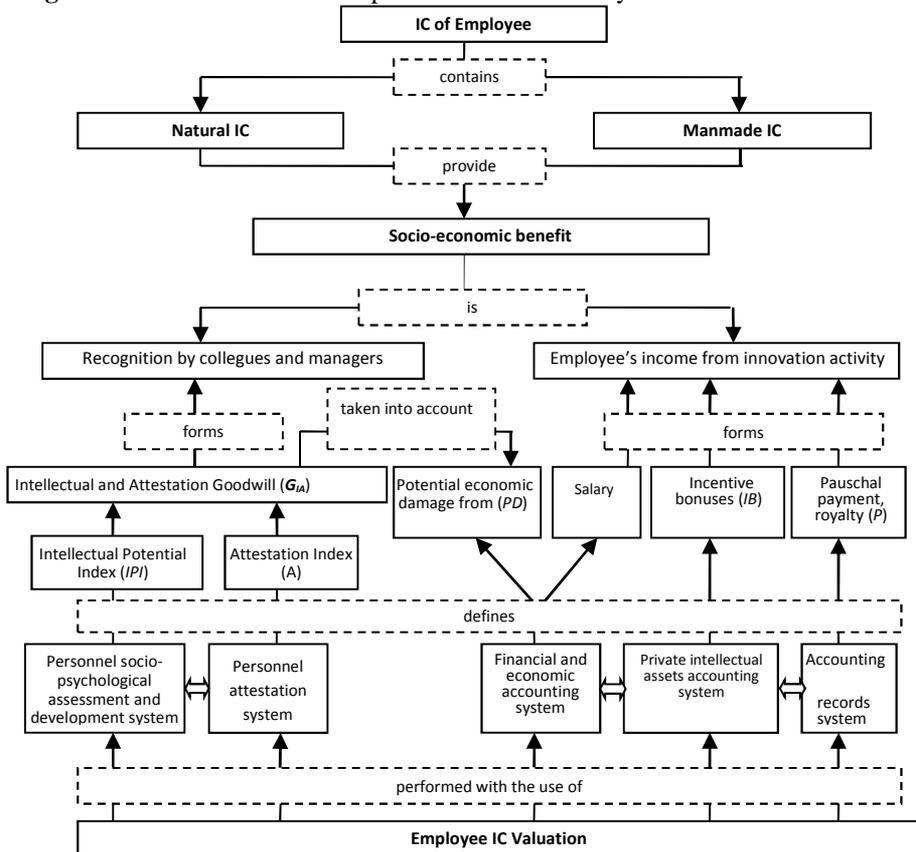
On the basis of the foregoing, the level of the innovation activity of an organization can be expressed by the value of intellectual human capital, which will also be the integral indicator of this organization.

The model for evaluating an employee's intellectual capital is given hereinafter (Diagram 2).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

In order to increase benefits from individual intellectual capital, this model should be primarily applied in respect of specialists-innovators being idea generators and unique experience holders as well as top managers and intellectual workers. The value of individual intellectual capital will be characterized by the value of an employee, which is variable and depends primarily on his efficiency within a definite period of time (as a rule, per year). On the other hand, these are the achieved results that influence the readiness of the managers of an organization for expenditures with the aim of not only retaining a valuable employee but also creating conditions to develop their creativity potential.

Diagram 2. Intellectual human capital model of monetary valuation



Source: own work.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

If fact, for the organization, the value of the intellectual capital of the employee (i) is the aggregate amount of expenses (real and potential) and is determined within the period of time (t) by the following formula:

$$V_i(t) = ED + S + IB + P + PD \cdot G_{IA} \quad (5)$$

Where:

ED – expenses for the development of an employee per period (t), including as follows:

- Expenses for professional advanced training, career promotion programs;
- Expenses for the socio-psychological assessment of an employee's intellectual potential;
- Expenses for the development of an employee's intellectual abilities (training courses, intellectual potential development programs, coaching).

S – Salary of an employee for executing his job-related duties per period (t). It includes a basic rate of compensation in accordance with an employee's qualification and education level, status allowance for position-related difficulty, individual bonuses (premiums) for efficient work in accordance with position-related instructions, and excludes social benefits and subsidies, collective allowance following the results of an organization's work, allowance for labour conditions and risks;

IB – Incentive bonuses and payments to an employee for his contribution in the development of an organization, including innovations (participation in innovation projects, rational proposals, formalization of knowledge by methodological development, etc.), the amount of which can be determined on the basis of an employee's share participation in the distribution of an organization's benefits per period (t);

P – Profit of an employee from items of intellectual property legally alienated and created individually or in a team;

PD – Potential damage, i.e., valuated aggregate costs borne by an organization in case of an employee's possible termination of service as of the end of the period (t):

- Expenses of an organization for the search of the equivalent employee (expenses for independent search, recruiting agencies, advertisements, etc.);
- Economic damage experienced by an organization per period related to the replacement of an employee, who has left, to a new one (a decrease in product volume and quality, expenses for a new employee's training and adaptation, re-training of another employee);
- Economic damage from changes in the systemic impacts of synergy and the emergence of the members of a group, which an employee has belonged to;
- Damage from an employee's move to competitors related to the possibilities of the loss of a part of market segments, a competitor's higher sales and his stronger influence in the market (valuation of damage from transferring formal-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

ized intellectual projects and copyright in items of intellectual property to a competitor, from disclosing commercial secrets, etc.).

Potential damage must be adjusted for the coefficient (G_{IA}), which depends on the intellectual and attestation index (IA):

$$IA = \frac{1}{2}(IPI + At) \quad (6)$$

Determining the indexes (IPI) and (At) is given hereinabove in the research methods section.

As a result, $G_{IA}=0.5$ if $IA < 2.5$; $G_{IA}=1$ if $2.5 \leq IA < 3.5$; $G_{IA}=1.5$ if $3.5 \leq IA < 4.5$; $G_{IA}=2$ if $IA \geq 4.5$.

The most challenges deal with valuating payments to an employee (P) for creating items of intellectual property (IPI). They must account for IPI creation and implementation expenditures, on the one hand, and for the prospective value of income from IPI commercialization, on the other hand.

At the first stage, the analysis is conducted in respect of expenditures on creating, registering and protecting an employee's items of intellectual property:

$$ET = T \cdot p \cdot k_d, \quad (7)$$

Where ET – expenditures of an employee's toil;

T – expenditures of time for IPI development, creation and registration expressed as hours;

p – price for an employee's working hour related to either producing or other activity performed by him;

k_d – coefficient of intellectual product complexity based on public, industrial or corporate standards.

In a second stage, it is necessary to calculate an anticipated production volume for those innovative products that have been created with the use of IPI , taking into account return on the investments of both an organization and employee. As a rule, the availability of the share of an employee's expenditures in overall expenditures for IPI creation increases the market cost of a product, which should be accounted for in planning production volume [**Błąd! Nie można odnaleźć źródła odwołania.**, p.123].

In a third stage, it is necessary to calculate the sums of anticipated earnings from IPI selling in royalty form, using the following formula:

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

$$P_R = \sum_{i=1}^t c_i \cdot q_i \cdot \frac{R}{100}, \quad (8)$$

Where:

P_R – anticipated royalty income (the fixed portion of sales value);

c_i – IPI market cost in the year (i) (with regard to price indexation);

q_i – quantity traded in the year (i);

R – royalty rate, % (remuneration of an invention stipulated in a contract with an organization, based on existing standard rates in a definite industry and for a definite type of products;

t – period of contract validity (IPI useful life).

In a fourth stage, it is necessary to calculate an employee's income from royalty payment measured as the difference between royalty income and an employee's expenditures:

$$NP = PR - ET, \quad (9)$$

Where NP – earnings from royalty payment (total net profit (P)). This can be paid to an employee as a lump sum; nevertheless, the necessity to pay a significant amount prior to the receipt of real profit as well as a higher risk related to the IPI commercialization result in an organization's possible refusal to make a lump-sum payment to its employee. Also, an employee has no access to the information on implementing his invention/know-how). A more preferable payment is periodical discounted cash flows calculated as follows:

$$PR_i = NP_i \cdot D_i, \quad (10)$$

Where PR_i – profit of an employee given as royalty in the year (i);

D_i – coefficient of discounting in the year (i) calculated with the following formula:

$$D_i = \frac{1}{(1 + 0.01 \cdot r)^i}, \quad (11)$$

Where r – discount rate in % measured via the cumulative method:

$$r = Rf + Rp, \quad (12)$$

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

R_f – risk-free rate of return for an innovative project, which is usually given as the safe-deposit rate of the most reliable banks;

R_p – premium paid by an organization for IPI implementation and commercialization risks (from 1 to 10%);

The quantitative evaluation of the component (R_p) shows the probability of both unfavorable dynamics in the innovation process and negative results of innovation activity; and this is determined via the expert approach as the sum of probabilities in each group of risk factors:

- Scientific and technical risks;
- Project regulatory support risks;
- Commercial offer risks;
- Entrepreneurial activity risks that deal with the probability of lower earnings insufficient to defray entrepreneurial expenses.

Thus, in formula (5) the component (P) is either a single lump-sum payment or a series of payments to an employee as royalty over the period (t).

The coefficient (G_{IA})

Formula (5) contains the indexes characterizing the value of an employee as an organization's hired worker and as an owner of intellectual capital (P , IB). We suppose that the ratio of these two index groups allows defining the efficiency of an employee's innovation activity:

$$K = \frac{P + IB}{S + ED}, \quad (13)$$

If this value exceeds 1, this means that payments to an employee as to the owner of intellectual capital are higher than expenses for this employee as for a hired worker, thus his innovation activity being efficient.

Conclusions

Thus, the valuation of an employee's intellectual capital is associated with element-by-element monetary evaluation of his innovation results by means of combining the cost model and the income model accounting for innovation activity risks as well as intellectual and attestation characteristics.

This model should be used for determining effects from an employee's intellectual and innovation activity and, as a result, for proving stimulating bonuses, and for taking management decisions aimed to increase both the

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

efficiency of an employee's performance and development as well as to develop the system of his motivation. Moreover, the model is recommended for use in further valuation of an organization's intellectual human capital. The development of methodology and intellectual human capital valuation practice at the micro-level is oriented to the possibility to implement his intellectual potential by each employee, to provide a growth of innovation activity to an organization, thus improving a personal competitive power in the conditions of knowledge economy. At the mezzo-level, this method allows creating a scientific and methodological basis for the development and monitoring of programs to increase the quality of human capital performance in the regional system of innovation and to encourage small and medium-sized businesses in innovative activity.

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
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Global Competitiveness and Economic Growth: A One-Way or Two-Way Relationship?

JEL Classification: *O40; O57; C23; F43*

Keywords: *Global Competitiveness Index; economic growth; panel Granger causality test*

Abstract: The Global Competitiveness Index is treated as a standard to measure the competitiveness of countries. Leaders look at it to make policy and resource allocation decisions because global competitiveness is expected to be related to economic growth. However, studies which analyze the empirical relationship between these two economic categories are very rare. It is still an open question in the literature whether economic growth can be used to predict future global competitiveness or the other way round. This paper empirically tests the relationship between the GCI and the economic growth rate by using a panel Granger causality analysis based on annual data for 114 countries divided into five groups by income criteria and covering the period 2006-2014. We confirm a strong unidirectional causality among the countries analyzed, i.e. GDP growth causes global competitiveness. Additionally, we find that the GCI is not successful in predicting economic growth for the majority of the 114 counties, with the exception of few large economies such as China, India, the United States and Russia.

Introduction

National competitiveness is one of the most central preoccupations for both advanced and developing countries (Porter, 1990) and "many policy makers express serious concerns about it" (Lall, 2001, p.1501). Much has already been written about competitiveness, and today many economic phenomena are described as competitive or non-competitive issues. Nevertheless, both the definition and the analysis of the competitiveness of an economy still pose many problems. First of all, one may be surprised not only by the multitude of definitions of national competitiveness but also by the diversity of approaches to determining what competitiveness actually is at the macro level. Even such an expert as M. Porter in his book "The competitiveness advantage of nations" does not define it explicitly, despite using the term very often (Olczyk, 2008). Berger identifies four main but very different theoretical constructs for national competitiveness, and they show large divergences. National competitiveness can be understood as the "ability of a nation to sell its goods to another nation", as the "ability of a nation to earn", as the "ability to adjust to changes in the external environment" and as the "national ability to attract scarce mobile resources" (Berger, 2008, pp. 378-392). Each approach implies the use of different indicators to assess country competitiveness.

According to Berger, another fifth concept of national competitiveness exists based on Porter's diamond model and its extended versions. Porter proposed a national diamond model, which identifies four classes of country attributes that determine national competitive advantage: factor conditions; demand conditions; related and supporting industries; and company strategy, structure and rivalry. He also indicates two other factors – government policy and chance (exogenous shocks) – that support the system of national competitiveness but do not create it (Porter, 1990). A key feature of Porter's proposal is that it integrates many different theories into the one concept, i.e. "factor conditions" relate to classical/neoclassical economics, "demand conditions" are connected to product cycle theory and Rostow growth theory, "related and supporting companies" derives from polarization theory and Marshall's industrial districts, and "firm strategy, structure and rivalry" refer to Schumpeter's works. Although the diamond model has been widely applied to studying the competitiveness of different countries, it has met with some criticism. According to Smit (2010, pp.105-130), the weak aspects of Porter's model have been pointed out both by scholars of management (Dunning, 1992; Dunning, 1993; Rugman, 1990; Rugman,

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

1991; Rugman and Verbeke, 1993) and economics (Waverman, 1995; Boltho, 1996; Davies and Ellis, 2000). Management experts accuse Porter of not considering multinational activities in his model, so Dunning (1993) extended Porter's original model by adding the following variables: foreign direct investment, government policies and pro-competitive policies. In turn, economists indicate a lack of *ex ante* prediction ability as a weak point of the model.

Nevertheless, the national diamond model was a breakthrough in the study of country competitiveness due to Porter and his followers' complex approach to macro-competitiveness analysis. It opened a discussion about the determinants and indicators of national competitiveness and became a basis for the creation of two leading indices of country competitiveness: that published in the World Economic Forum Report and that in the IMD's World Competitiveness Yearbook. In particular, the methodology used by the World Economic Forum (WEF) is very closely related to Porter's diamond model. It defines country competitiveness as the "*set of institutions, policies, and factors that determine the level of productivity of a country*" (Schwab, 2015, p.4). Porter also states that competitiveness has a set of microeconomic determinants (like, e.g., firm strategies, rivalry), macroeconomic conditions (like, e.g., demand) and factors determining government power. Thus, the methodology proposed by the WEF is based on the assumption that competitiveness is such a multidimensional phenomena that the most appropriate approach to assessing country competitiveness as a single indicator involves a compilation of many individual competitiveness indicators.

The WEF constructs a Growth Competitiveness Index (GCI) which includes a weighted average of 112 different components. These components are grouped into 12 pillars of competitiveness and each of them measures a different aspect of it. They are: (1) institutions, (2) infrastructure, (3) macroeconomic environment, (4) health and primary education, (5) higher education and training, (6) goods market efficiency, (7) labour market efficiency, (8) financial market development, (9) technological readiness, (10) market size, (11) business sophistication, and (12) innovation (Global Competitiveness Report 2015-2014, pp. 4-8). These 12 pillars are organized into three groups: basic requirements (pillars 1-4), efficiency enhancers (pillars 5-10) and innovation and sophistication factors (pillars 11-12). The WEF puts a different weight on each of the three groups and divides countries according to their stage of development, because developing countries are competitive in the field of basic requirements, the competi-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

tiveness of emerging countries is based on the efficiency enhancers, and at least most developed countries compete thanks to their innovations.

Although the GCI is one of the most accepted and recognized indicators of national competitiveness in the literature, it is not exempt from criticism. Lall (2001, pp.1501-1525) indicates many methodological, quantitative and analytical problems, and dubs the index "misleading" due to its arbitrary weighting of variables and use of subjective indicators. Other researchers also question the high correlation among its pillars (Carvalho et al., 2012, pp. 421-434), the lack of a good theoretical basis for the selection of its variables (Berger & Bristow, 2009, pp. 378-392), and even methodological errors and data manipulation which may lead to undesirable results (Freudenberg, 2003, pp. 1-29). Van Stel indicates two of the most serious problems with the GCI (Van Stel et al., 2005, pp. 311-321): the index is not even stable over short time periods for developed economies (the USA was ranked 6th in 2007 and 1st in 2008); and it is not successful in predicting short- and long-term economic growth because it combines so many other variables, such as entrepreneurial activity (Xia et al., p. 47). However, the authors of the latest Global Competitiveness Report state that "the concept of competitiveness thus involves static and dynamic competitiveness and ... can explain an economy's growth potential" (Schwab, 2015, p.4). Because studies which evaluate the validity of the GCI for economic growth prediction are very rare, the aim of this paper consists in empirically evaluating the effect of global competitiveness on economic growth. In addition, we have decided to go further and check the predictive validity of the inverse relationship, i.e. whether economic growth predicts global competitiveness.

The paper is organized as follows. The next section contains a theoretical discussion on the possible impact of global competitiveness on economic growth and *vice versa*. Section 3 opens up the methodological part of the paper, i.e. it introduces the data and the panel Granger causality test methodology. Section 4 presents the results of the analysis and the last section gives our conclusions.

**Economic growth driven by the Global Competitiveness Index
or *vice versa* – theoretical aspects**

As mentioned, the WEF-constructed Growth Competitiveness Index (GCI) includes a weighted average of 112 different components grouped into 12 pillars of competitiveness, and the pillars are classified into three compo-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

nents: "factors", which determine a better environment for high productivity (Bai, 2009, pp. 257-275), "efficiency", which is connected with the labour, goods and services markets and their influence on production efficiency (Qin et al., 2009, pp. 291-315), and "innovations", which are necessary for growth sustainability (Koong et al., 2011, pp. 181-196). In reality, the majority of these pillars are taken from six main economic theories: classical, neoclassical and Keynesian economic theory, development economics, new trade theory, and the most important new economic growth theory – endogenous growth theory (see Table1). Since the GCI measures "the level of productivity of an economy, which determines its long-term growth potential" (Schwab, 2015, Appendix A), endogenous growth theory becomes more significant.

Table 6. Keys driving factors of competitiveness in main economic theories

Theory	Keys driving factors of competitiveness
Classical	<ul style="list-style-type: none"> • investment in capital (i.e. improved technology) enhances the division of labour (specialization) and, hence, raises productivity. • trade (moving from autarky to free trade) provides an engine for growth (static gains from trade).
Neoclassical	<ul style="list-style-type: none"> • trade (moving from autarky to free trade) provides an engine for growth (static gains from trade).
Keynesian economic theory	<ul style="list-style-type: none"> • capital intensity. • investment . • government spending, such as investment in the public domain and subsidies/tax cuts for enterprises.
Development economics	<ul style="list-style-type: none"> • moving from agriculture to higher value added sectors. • openness to trade. • foreign direct investment (FDI). • (foreign) development funds.
New economic growth theory	<ul style="list-style-type: none"> • R&D expenditure. • innovativeness (patents). • education level . • spending on investment in human capital (schooling, training). • effective dissemination of knowledge (knowledge centres).
New trade theory	<p>Factors influencing "first mover" advantage, e.g.</p> <ul style="list-style-type: none"> • skilled labour • specialized infrastructure • networks of suppliers • localized technologies

Source: own elaboration based on Garden, Martin (2005, pp.10-16)

Endogenous growth is long-run economic growth at a rate determined by forces that are internal to the economic system, and particularly those forces governing the opportunities and incentives to create technological

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

knowledge. This theory attempts to explain the sources of productivity growth and emphasizes the crucial roles of human capital (Lucas 1998), innovations (Romer, 1990; Aghion & Howitt, 1992), infrastructure (Barro, 1990), institutions (Romer, 1986), competition and openness (Grosman & Helpman, 1991). In Table 2, the determinants of selected endogenous growth models are assigned to some of the pillars of the GCI.

Table 7. The inspiration for the pillars of global competitiveness from models of endogenous growth

Pillars of competitiveness	Pillar 1	Pillar 2	Pillars
Endogenous growth model inspirations	Romer (1986): institutions Barro (1990): infrastructure Lucas (1988): health and primary education	Lucas (1988): health and primary education Pagano (1993): sophistication of financial markets Grosman and Helpman (1991): opening to technology and size of the market	Romer (1990) and Aghion et Howitt (1992): sophistication of firms and innovations

Source: Ben Amar, Hamdi (2012, p. 126).

Because the determinants of growth in endogenous growth theory are often simultaneously key drivers in the GCI pillars, we decide to check the following hypothesis: the GDP growth rate can predict the Global Competitiveness Index.

We also decide to verify the opposite hypothesis: that the GCI can be a good predictor of GDP growth. The authors of older versions of the Global Competitiveness Report themselves claimed that the GCI can "determine the aggregate growth rates of an economy" (Lopez-Claros et al. 2007, p. 3). In the latest WEF Report on Global Competitiveness we can also find the argument that "a more competitive economy is one that likely grows faster over time" (Schwab, 2015, p.4).

Data and Methodology

The empirical analysis presented in this paper is based on the Global Competitiveness Index Historical Dataset for 114 countries over the years 2005-2014. The historical data in the dataset are not updated but correspond to the data that was originally published in nine past editions of the WEF Global Competitiveness Report¹. The list of countries analysed is

¹ editions: 2006-2007, 2007-2008, 2008-2009, 2009-2010, 2010-2011, 2011-2012, 2012-2013, 2013-2014, 2014-215

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

limited from 144 to 114 due to either a lack of a Global Competitiveness Index or of GDP PPP values for some countries in part of the period analysed.

We use two variables: the Global Competitiveness Index (GCI) and the GDP PPP annual growth rate. GDP PPP is gross domestic product converted to international dollars using purchasing power parity rates². GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products (World Bank, 2015). An international dollar has the same purchasing power over GDP as the U.S. dollar has in the United States. The data are in current international dollars. For most economies, the PPP figures are either extrapolated from the 2011 International Comparison Program (ICP) benchmark estimates or else imputed using a statistical model based on the 2011 ICP report³.

The GCI is a composite competitiveness index combining "hard data" on various national characteristics and "soft data" compiled from the WEF's annual Executive Opinion Survey. To ease the calculation of indexes, the WEF converts all hard data items onto a 1-7 scale using a min-max transformation⁴. The theoretical maximum of GCI is 7. Computation of it is based on successive aggregations of scores from the indicator level. At the most disaggregated level, an arithmetic mean within a category is used to aggregate the individual indicators, while for the higher aggregation levels fixed weights for each category are applied (Schwab 2015, Appendix B). At the highest aggregation level – i.e. at the three sub-indices level – the weights applied are not fixed and depend on each country's stage of development.

To analyze the relationship between global competitiveness and the economic growth rate, we decide to divide all 114 economies into homogeneous groups according to their gross national income (GNI) per capita⁵,

² The Purchasing Power Parity (PPP) between two countries is the rate at which the currency of one country needs to be converted into that of the second country to ensure that a given amount of the first country's currency will purchase the same volume of goods and services in the second country as it does in the first.

³ The International Comparisons Program (ICP) is a global statistical initiative that produces internationally comparable Purchasing Power Parity (PPP) estimates. See http://siteresources.worldbank.org/ICPEXT/Resources/ICP_2011.html.

⁴
$$\text{min-max formula} = 6 \cdot \frac{\text{country value} - \text{sample minimum}}{\text{sample maximum} - \text{sample minimum}} + 1$$

⁵ As of 1 July 2014, low-income economies are defined as those with a GNI per capita, calculated using the *World Bank Atlas* method, of \$1,045 or less in 2013; middle-income

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

calculated using the World Bank Atlas method⁶. The purpose of the Atlas conversion is to reduce the impact of exchange rate fluctuations in the cross-country comparison of national incomes. Each of the economies analysed belongs to one of five groups: low-income, lower-middle-income, upper-middle-income, high-income non-OECD countries, and high-income OECD countries.

In this paper, the relationship described above is assessed by means of a Granger causality test. In accordance with Granger (1969), causality means that a series x can be said to cause a series y if and only if the expectation of y given the history of x differs from the unconditional expectation of y :

$$E(y | y_{y-k}, x_{t-k}) \neq E(y | y_{t-k}). \quad (1)$$

The question is whether lagged values of series x bring additional information to predict series y or if series y can be better predicted only using its past values.

For T periods and N individuals, the time-stationary VAR model adapted to a panel data context is as follows:

$$y_{i,t} = \sum_{k=1}^p \gamma^{(k)} y_{i,t-k} + \sum_{k=0}^p \beta_i^{(k)} x_{i,t-k} + v_{i,t}, \quad i=1,\dots,N, \quad t=1,\dots,T, \quad (2)$$

where v_{it} is the sum of individual effects α_i and random disturbances ε_{it} .

The concept of Granger causality for panel data can be considered in two ways. The first approach, proposed by Holtz-Eakin et al. (1985, p.12), uses Chamberlain's investigation (1984, pp. 1247-1318) and allows all of the parameters in regression two to be time-varying. Following this, Hsiao (1989, pp.565-587) and in a similar way Weinhold (1996, pp.163-175),

economies are those with a GNI per capita of more than \$1,045 but less than \$12,746; high-income economies are those with a GNI per capita of \$12,746 or more. Lower-middle-income and upper-middle-income economies are separated at a GNI per capita of \$4,125. See <http://data.worldbank.org/news/2015-country-classifications>.

⁶ The Atlas conversion factor for any year is the average of a country's exchange rate for that year and its exchange rates for the two preceding years, adjusted for the difference between the rate of inflation in the country and international inflation. <https://datahelpdesk.worldbank.org/knowledgebase/articles/378832-what-is-the-world-bank-atlas-method>.

Weinhold (1999) and Nair-Reichert & Weinhold (2001, pp.193-171) use a Mixed Fixed and Random Model to evaluate Granger causality. A different approach is used by Hurlin & Venet (2001, pp.3-19), who assume that the parameters of the regression are fixed and propose a wide procedure for testing causality. In this paper, the Hurlin and Venet approach is applied.

When using panel data, we expect heterogeneity between individuals to be for two reasons. The first reason is a natural cross-sectional difference between panel units. This type of heterogeneity is taken into account by separating individual fixed effects α_i from random disturbances v_{it} .

Applying this to equation 2, we treat v_{it} as the sum of individual effects α_i and random disturbances ε_{it} and impose the following assumptions on α_i and ε_{it} :

$$\begin{aligned} \alpha_i &\sim IID(0, \sigma_\alpha^2), \quad \varepsilon_{it} \sim IID(0, \sigma_\varepsilon^2) \\ E(\alpha_i \varepsilon_{it}) &= 0 \\ E(\alpha_i \alpha_j) &= E(\varepsilon_{it} \varepsilon_{js}) = 0, \text{ for } i \neq j \text{ and } t \neq s \\ E(\alpha_i x_{it}) &= E(\varepsilon_{it} x_{it}) = 0. \end{aligned} \tag{3}$$

The second reason for heterogeneity among panel units follows from there being two subgroups within the whole group – a subgroup where causality between x and y exists ($\beta_i^{(k)} \neq 0$) and a subgroup where the causal relationship is not observed ($\beta_i^{(k)} = 0$). The assumptions concerning the model coefficients are as follows:

- the autoregressive parameters $\gamma^{(k)}$ and coefficient slopes $\beta_i^{(k)}$ are constant for all lags;
- the autoregressive coefficients $\gamma^{(k)}$ are identical for all individuals but the regression coefficient slopes $\beta_i^{(k)}$ may vary between individuals.

The strategy for testing Granger causality proposed by Hurlin & Venet (2001) is presented in Table 3.

The procedure consists of 3 steps. First, the Homogeneous Non-Causality (HNC) hypothesis is tested. When the null cannot be rejected, it means that no individual Granger causality is observed. Otherwise, the second step of the procedure is needed. This step consists in checking whether the group analysed is homogeneous or not. The last step allows the question of there being a subgroup of individuals for which causality is observed and a subgroup for which the causal relationship does not exist to be answered.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 8. Hypotheses and test statistics in Granger's causality test for panel data models

Hypotheses	Test statistics
STEP I	
$H_0 : \beta_i^{(k)} = 0 \forall i = 1, \dots, N \forall k = 1, \dots, p$ $H_1 : \exists(i, k) \beta_i^{(k)} \neq 0$	$F_{HNC} = \frac{(RSS_2 - RSS_1) / Np}{RSS_1 / (NT - N(1+p) - p)}$
STEP II	
$H_0 : \forall k = 1, \dots, p / \beta_i^k = \beta_i \forall i = 1, \dots, N$ $H_1 : \exists k \in [1, p], \exists(i, j) \in [1, N] / \beta_i^k \neq \beta_i$	$F_{HC} = \frac{(RSS_3 - RSS_1) / (N-1)p}{RSS_1 / (NT - N(1+p) - p)}$
STEP III	
$H_0 : \exists i \in [1, N] / \forall k \in [1, p] \beta_i^k = 0$ $H_1 : \forall i = 1, \dots, N \exists k \in [1, p] / \beta_i^k \neq 0$	$F_{HENC} = \frac{(RSS_{2,i} - RSS_1) / p}{RSS_1 / (NT - N(1+2p) + p)}$

Source: Own elaboration based on Hurlin and Venet (2001).

Results

The procedure for evaluating Granger causality is based on a time-stationary VAR model. For the purpose of evaluating unit-root presence we use two panel unit root tests: the Harris-Tzavalis test (Harris & Tzavalis, 1999, pp. 201-226) (HT) and the Im-Pesaran-Shin test (Im et al., 2003, pp. 53-74) (IPS), which are chosen in the light of the sample size. Additionally, in the HT test a small-sample adjustment to T is made. Both tests are applied for each of the five income groups: low-income countries (LI), lower-middle-income countries (LMI), upper-middle-income countries (UMI), high-income non-OECD countries (HnOECD) and high-income OECD countries (HOECD). The results of the tests are presented in Table 4.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 9. Results for panel unit root tests

	GDP growth				
	LIXXn	LMIXXn	UMIXXn	HnOECD	HOECDn
HT	-0.016 *	-0.179 ***	-0.080 ***	0.314 ***	0.007 ***
F-ADF	75.733 ***	126.166 ***	176.151 ***	45.314 **	188.401 ***
	Global Competitiveness Index				
	LI	LMI	UMI	HnOECD	HOECD
HT	0.174 *	0.218 *	0.268	0.605	0.605 **
F-ADF	47.373 **	73.294 **	76.285 **	42.083 *	80.110 *

* significant at 0.1%, ** significant at 0.05%, *** significant at 0.01%

Source: Own preparation

For GDP growth, both the Harris-Tzavalis and the IPS test allow the null hypothesis that the GDP growth time series contains a unit root to be rejected. For the Global Competitiveness Index, the IPS test is significant for all the groups as well, but the HT test for UMI and HnOECD countries does not reject the null.

Finally, we can treat both variables as time-stationary and start the procedure for Granger causality evaluation, which is based on two regressions, estimated for each income group separately:

$$\Delta GDP_{i,t} = \sum_{k=1}^p \gamma^{(k)} \Delta GDP_{i,t-k} + \sum_{k=0}^p \beta_i^{(k)} GCI_{i,t-k} + v_{i,t}, \quad (4)$$

$$GCI_{i,t} = \sum_{k=1}^p \gamma^{(k)} GCI_{i,t-k} + \sum_{k=0}^p \beta_i^{(k)} \Delta GDP_{i,t-k} + v_{i,t} . \quad (5)$$

Due to the shortness of the time series, the number of lags in regressions 4 and 5 are limited to k=2. A LSDV estimator is used to estimate the above models⁷.

⁷ As Hurlin & Venet (2001) note, the results of F statistics obtained with consistent estimators like the Anderson and Hsiao estimator or the GMM estimator are lower than those with a FE estimator, but in fact the differences are relatively small. In our case, it means that we will have an upward bias and we should not reject the null in some cases.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Following Table 3, first we explore whether in the homogeneous sample we can observe bidirectional causality, unidirectional causality or we cannot reject the null. Taking each income group individually, we can strongly reject the homogeneous non-causality hypothesis (Table 5). A causal relationship from the Global Competitiveness Index to GDP growth exists and it also works the other way round for all the lags tested apart from the relation $GCI \rightarrow \Delta GDP$ assessed for high-income non-OECD countries and the first lag.

Table 10. Results for the Homogenous Non-Causality hypothesis

Global Competitiveness Index \rightarrow GDP growth					
lag	LI	LMI	UMI	HnOECD	HOECD
1	18.289 ***	2.265 ***	69.553 ***	0.929	9.659 ***
2	2.309 ***	3.394 ***	1.423 *	26.243 ***	14.982 ***
GDP growth \rightarrow Global Competitiveness Index					
lag	LI	LMI	UMI	HnOECD	HOECD
1	9.697 ***	5.617 ***	7.255 ***	3.563 ***	10.917 ***
2	4.97 ***	6.104 ***	4.236 ***	2.675 ***	12.88 ***

* significant at 0.1%, ** significant at 0.05%, *** significant at 0.01%

Source: Own preparation

The next step is to examine whether the relationship between the competitiveness measure and GDP changes is strictly homogeneous or not in the countries which belong to each income group. The results are reported in Table 6. We reject the Homogeneous Causality hypothesis, which is in line with our expectations. The pattern of rejection is similar to the first step. As previously, for the relation from GCI to GDP growth with one lag for HnOECD countries we cannot reject the HC hypothesis. In addition, it cannot be rejected for the second lag and the relation in the opposite direction. Except for these cases, in general we observe a differentiation in respect of causality according to the group that the countries analysed belong to.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 11. Results for the Homogeneous Causality hypothesis

Global Competitiveness Index → GDP growth					
lag	LI	LMI	UMI	HnOECD	HOECD
1	17.731 ***	2.347 ***	69.755 ***	0.992	9.256 ***
2	2.302 ***	3.500 ***	1.372 *	25.026 ***	14.864 ***
GDP growth → Global Competitiveness Index					
lag	LI	LMI	UMI	HnOECD	HOECD
1	10.390 ***	3.803 ***	4.040 ***	1.814 **	2.972 ***
2	5.325 ***	5.178 ***	2.665 ***	1.453	3.869 ***

* significant at 0.1%, ** significant at 0.05%, *** significant at 0.01%

Source: Own preparation

Given the rejection of the HC hypothesis, the HENC hypothesis should be tested. We are interested in the subgroup of countries among each income group for which the causal relationship does not exist, neither from GDP growth to GCI nor from GCI to GDP growth, both for which we can observe a one-way relationship and for which the relationship is bidirectional. The results are reported in Tables 7,8,9,10 and 11 for LI countries, LMI countries, UMI countries, HnOECD countries and HOECD countries respectively.

Table 12. Results for the Heterogeneous Non-Causality hypothesis – low-income countries

LI	Global Competitiveness Index → GDP growth		GDP growth → Global Competitiveness Index	
	lag 1	lag 2	lag 1	lag 2
Bangladesh	213,6 ***	5,214 ***	4,327 **	1,648
Burkina Faso	0,194	0,114	3,717 *	0,425
Burundi	0,001	0,211	21,12 ***	7,320 ***
Cambodia	4,372 **	0,844	10,48 ***	7,762 ***
Chad	0,018	6,181 ***	0,713	0,314
Ethiopia	7,359 ***	0,954	3,785 *	2,425 *
Gambia	0,031	0,024	4,000 **	1,575
Kenya	0,199	1,537	7,476 ***	2,410

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Madagascar	0,028	0,479	0,301	0,335
Mali	0,046	0,102	3,783 *	1,423
Mozambique	4,213 **	0,101	4,978 **	0,889
Nepal	2,220	0,438	6,723 **	5,420 ***
Tanzania	2,088	2,736 *	1,258	0,532
Uganda	8,723 ***	2,885 *	4,002 **	1,474
Zimbabwe	10,59 ***	0,529	45,64 **	14,26 ***

* significant at 0.1%, ** significant at 0.05%, *** significant at 0.01%

Source: Own preparation

Table 13. Results for the Heterogeneous Non-Causality hypothesis – lower-middle-income countries

LMI	Global Competitiveness Index → GDP growth		Global Competitiveness Index → GDP growth	
	lag 1	lag2	lag 1	lag2
Armenia	0,000	0,019	88,33 ***	28,45 ***
Bolivia	0,005	0,071	12,03 ***	3,347 **
Cameroon	0,002	0,004	0,199	0,612
Egypt	0,113	1,567	9,653 ***	5,466 ***
El Salvador	0,000	0,016	2,170	1,885
Georgia	0,000	0,037	0,003	3,670 **
Guatemala	0,001	0,013	0,438	0,789
Guyana	0,000	0,006	0,597	0,925
Honduras	0,000	0,061	2,726	3,608 **
India	46,66 ***	47,89 ***	0,077	0,283
Indonesia	2,102	12,60 ***	3,561 *	2,375 *
Kyrgyz Re- public	0,000	0,002	2,979 *	4,831 **
Lesotho	0,000	0,001	0,358	8,016 ***
Mauritania	0,000	0,001	3,450 *	3,611 **
Mongolia	0,000	0,011	5,503 **	7,190 ***
Morocco	0,016	0,149	1,092	1,062
Nicaragua	0,011	0,088	6,847 ***	2,713 *
Nigeria	0,365	2,853 *	8,538 ***	3,847 **
Pakistan	0,253	1,698	1,450	1,368
Paraguay	0,007	0,075	2,963 *	3,177 **

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Philippines	0,538	17,63 ***	11,21 ***	9,366 ***
Sri Lanka	0,046	0,557	1,785	3,459 **
Timor-Leste	0,005	0,159	1,427	1,155
Ukraine	0,134	4,771 **	1,500	1,204
Vietnam	0,308	5,460 ***	2,418	4,383 **
Zambia	0,000	0,005	1,225	3,372 **

* significant at 0.1%, ** significant at 0.05%, *** significant at 0.01%
Source: Own preparation

Table 14. Results for the Heterogeneous Non-Causality hypothesis – upper-middle-income countries

UMI	Global Competitiveness Index → GDP growth		Global Competitiveness Index → GDP growth	
	lag 1	lag2	lag 1	lag2
Albania	0,000	0,000	12,49 ***	4,486 **
Algeria	0,014	0,003	17,97 ***	7,761 ***
Argentina	0,523	0,400	4,183 **	1,718
Azerbaijan	0,011	0,014	9,721 ***	5,439 ***
Botswana	0,002	0,003	23,25 ***	6,838 ***
Brazil	1,245	1,289	9,021 ***	1,271
Bulgaria	0,005	0,025	7,614 ***	3,475 **
China	1579 ***	15,96 ***	2,628	0,810
Colombia	0,255	0,952	2,971 *	1,548
Costa Rica	0,007	0,000	2,133	1,236
Dominican Republic	0,028	0,032	1,266	0,511
Hungary	0,020	0,049	6,440 **	1,435
Jamaica	0,003	0,001	4,222 **	1,241
Jordan	0,004	0,002	2,464	1,986
Kazakhstan	0,006	0,054	9,833 ***	4,882 ***
Macedonia	0,000	0,000	10,28 ***	1,803
Malaysia	0,357	0,331	3,002 *	2,234
Mauritius	0,001	0,000	5,027 **	3,778 **
Mexico	1,456	1,276	2,349	1,795
Namibia	0,002	0,001	7,462 ***	2,119
Panama	0,000	0,004	4,102 **	3,536 **

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Peru	0,023	0,065	6,551 **	2,470 *
Romania	0,069	0,114	2,620	0,397
South Africa	1,894	0,042	1,290	0,575
Thailand	1,173	0,465	1,837	0,811
Turkey	1,131	1,903	2,288	6,540 ***
Venezuela	2,266	0,667	0,327	1,587

* significant at 0.1%, ** significant at 0.05%, *** significant at 0.01%

Source: Own preparation

Table 15. Results for the Heterogeneous Non-Causality hypothesis – Non-OECD high-income countries

HnOECD	Global Competitiveness Index → GDP growth		Global Competitiveness Index → GDP growth	
	lag 1	lag2	lag 1	lag2
Bahrain	0,023	0,102	1,228	0,996
Barbados	0,001	0,005	3,047 *	0,493
Croatia	0,105	0,707	3,963 *	2,508 *
Cyprus	0,084	0,990	7,870 ***	6,528 ***
Hong Kong	0,056	2,057	1,025	1,749
Kuwait	1,568	0,498	0,682	0,572
Latvia	0,021	0,138	3,619 *	2,309
Lithuania	0,060	0,464	1,153	0,510
Malta	0,097	1,171	2,066	0,783
Qatar	0,545	1,599	6,191 **	1,570
Russian Fed.	6,828 **	235,4 ***	0,110	2,706 *
Singapore	2,074	5,325 ***	2,787 *	2,236
Trinidad and Tobago	0,000	0,040	1,116	0,410
UAE	0,453	8,486 ***	8,929 ***	1,343
Uruguay	0,001	0,071	0,137	0,742

* significant at 0.1%, ** significant at 0.05%, *** significant at 0.01%

Source: Own preparation

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 16. Results for the Heterogeneous Non-Causality hypothesis – OECD high-income countries

HOECD	Global Competitiveness Index → GDP growth		Global Competitiveness Index → GDP growth	
	lag 1	lag2	lag 1	lag2
Australia	0,338	0,157	0,708	1,288
Austria	0,118	0,221	4,464 **	2,256
Belgium	0,090	0,203	1,573	3,694 **
Canada	0,009	3,081 **	0,236	2,363 *
Chile	0,122	0,511	1,064	1,483
Czech Rep.	0,022	0,026	1,112	5,491 ***
Denmark	0,011	0,044	6,691 **	13,086 ***
Estonia	0,006	0,010	0,605	2,020
Finland	0,073	0,134	3,468 *	2,807 *
France	1,392	4,005 **	0,601	2,699 *
Germany	4,257 **	14,569 ***	1,062	0,824
Greece	0,555	0,435	4,976 **	4,510 **
Iceland	0,000	0,001	3,666 *	13,840 ***
Ireland	0,040	0,226	5,601 **	4,409 **
Israel	0,289	0,053	8,795 ***	3,576 **
Italy	0,993	4,814 **	0,660	1,830
Japan	2,494	17,291 ***	0,369	0,309
Korea, Rep.	0,166	1,878	38,68 ***	3,968 **
Luxembourg	0,001	0,002	10,83 ***	5,700 ***
Netherlands	0,075	0,651	2,847 *	4,000 **
New Zealand	0,003	0,020	8,265 ***	8,531 ***
Norway	0,041	0,173	2,490	3,678 **
Poland	0,181	0,178	8,775 ***	3,485 **
Portugal	0,040	0,025	0,644	1,376
Slovak Rep.	0,019	0,058	2,495	4,699 **
Slovenia	0,011	0,017	13,53 ***	10,416 ***
Spain	6,470 **	4,312 **	7,103 ***	5,616 ***
Sweden	0,220	0,483	2,094	1,784
Switzerland	0,058	0,150	1,851	2,555 *

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

United Kingdom	2,589 *	8,208 ***	3,979 **	3,186 **
United States	218,56 ***	251,9 ***	10,45 ***	12,22 ***

* significant at 0.1%, ** significant at 0.05%, *** significant at 0.01%

Source: Own preparation

The results suggest that regardless of the income group, the relationship from GDP growth to the Global Competitiveness Index is more often observed than the opposite one. It is interesting that only for large economies like India, China, Russia, Germany, the United Kingdom and the United States there is a strong significant influence of the GCI on the growth rate of GDP. For the majority of these countries the relationship is unidirectional only, but a two-way relationship between competitiveness and economic growth is observed for the United Kingdom and the United States.

In this research we use a LSDV estimator, which, in light of dynamic regression (2), has an upward bias in comparison with the Anderson-Hsiao estimator or the GMM estimator, but the values of the F statistics obtained for the countries mentioned above are large enough to reject the null.

Conclusions

This paper has tested whether the GCI is a reliable predictor of economic growth or whether the growth rate can be believed to predict the global competitiveness of a country. Our empirical study, first done at the country group level, indicates a quite strong bidirectional causality between the Global Competitiveness Index and the economic growth rate for all the lags tested. The exception is the group of high income non-OECD countries, where a relation from the GCI to GDP growth is significant for one lag and the opposite relation for the second lag only.

We have also examined the kind of causality. The results were in line with our expectations. All the groups analysed turned out to be heterogeneous.

The last step of our investigation was to assess the direction of the relationship between the GCI and the growth rate of GDP at the level of individual countries within each of the five groups of countries. The results of our estimations confirm that economic growth affects global competitiveness in the case of 70% of the countries in our sample. Most often this relationship exists among low income countries (in 12 out of 15 economies i.e.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

for 80% of the countries analysed). In turn, it is relatively rare among high-income non-OECD countries (in 53% of the countries).

Finally, we have confirmed that the GCI can predict the dynamic of a national economy, but only in some particular cases. We can support the WEF's claim that the GCI can "determine the aggregate growth rates of an economy" for the group of low-income countries. For almost 8 of the 15 countries with a lower income level we can justify the contribution of their global competitiveness level to their economic growth during the last decade. This evolution is probably due to a large number of economic reforms in these countries and good political stability, which affect capital accumulation and finally economic growth. Among the countries with a higher level of income, the causal relationship from the Global Competitiveness Index to GDP growth only exists for seven countries and they are all big economies, such as China, India, the United States and Russia.

Our study has a preliminary character, but its results imply that the WEF should refine GCI so that it can be a better predictor of economic growth.

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18-19 June 2015, Economics and Finance**

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18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
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**The Modern Challenges of Regional
Development and Socio-economic Potential of
Town Districts Belonging to North
Macro-region of Poland**

JEL Classification: *E62; E65; G28; H70; H71; H72; H76*

Keywords: *macroregion, town districts, development, socio-economic potential*

Abstract: Today, however, the concept of capital strongly focuses on intellectual capital, understood as the current or potential creative resource, or the increase in the wealth of a community. In this context, it is worth to examine the legitimacy of thesis about the expansive reality of Polish town districts.

Over the past 10 years, in North macro-region, there has been a significant improvement of characteristics relating to intellectual capital. At the same time, gross domestic product per capita in the macro-region annually increased its value. It is, therefore, necessary to maintain and multiply the rate of change in the socio-economic sphere, based on a coherent, harmonious and innovative development strategies, evaluating intellectual potential of the communities.

Introduction

Both in the context of identification of opportunities and threats to contemporary functioning organizations, and determining changes occurring in the management of any organization, capital, apart from land and work, is one of the three fundamental factors. During the evolution of this concept,

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

the concept of social capital originated. It stressed the role of individuals and social ties. (Wielka encyklopedia PWN, 2003, pp. 254; Antczak, 2013, pp. 21-; Sierocińska, 2011, pp. 69-86) Today, however, the concept of capital strongly focuses on intellectual capital, understood as the current or potential creative resource, or the increase in the wealth of an enterprise, community, or nation. (Erstad & Sefton-Green, 2012, pp. 146 -162; Herman, 2008, pp. 38-47)

The issue of intellectual capital, as well as the issue of the development of local communities, are relatively young fields of economics and spatial management, which do not yet have their own autonomous theory. Nonetheless, local communities play a crucial role in the economic and social system of the country. They are the places of concentration of the essential economic activity, initiating the potential associated with economic development, employment, and consumption patterns and all other aspects of specific economic reality.

Economic development, which is a part of the process of economic evolution means going higher and higher, on more diverse and more complex levels. It is the result of quantitative and qualitative progress and changes in the economic, social and natural systems. (Strzelecki (Ed.), 2008, p. 13) It is based in the space formed by political, economic, social and demographic events and processes, and phenomena concerning population are a special factor in economic transition because the population is the principal means and the ultimate goal of economic activity. As a result, human resources play a fundamental role in economic development. A special role in this field is played by human capital, which is the potential of knowledge, skills, health and vitality in the community. (Domański, 1993, p. 16) It is the knowledge and skills acquired by individuals as a consequence of investments in education and training affecting the quality of human resources, and the costs spent on the protection of health, environment, development of culture, etc. Therefore, human capital consists of all efforts and all the achievements of current and past generations of a given area. (Pająk (Ed.), 2009, p. 137) Thus, human capital development is a key explanatory variable in relation to competitiveness and regional differentials. At the same time, there is a feedback loop between human capital and the level of socio-economic development. (Nyce & Schieber, 2005, pp. 212 - 231; Moss et al., 2008, pp. 333-352)

Evaluation of the role of human capital (both social and intellectual) in the development of the region, can be done by means of two types of circumstances: demographic factors and social determinants. (Madej &

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Zasadzki, 2001, pp. 117-118) Demographic determinants relate to population structure, diversification of capital resource and its development. Social conditions refer to the overall social infrastructure and living conditions of the population, forming a material basis for the services to meet the social, educational and cultural needs of the population. (Chirot, 2014, pp. 657-663)

Understanding the development of local communities, therefore, requires the analysis of all reciprocal characteristics. (Szewczuk et al., 2011, pp. 30-)

Interaction between entities within the specified district would be a catalyst to the formation of local governance, i.e. local communities involving particular entities of the territory. (Ostrom, 2008, pp. 61 – 110; Porras & Collins, 1996; Dolnicki (Ed.), 2014, pp. 44-57)

In turn, the notion of the region in economic sciences is seen in a triple sense: an important subject of research, object of cognition and object of action. The involvement of researchers in this complex area has created the theory of the region, which is assigned cognitive research and application functions. Within the research function a methodical basis for multidisciplinary research in regions and economic regional studies is created. Cognitive function deals with co-operation in the perception of the surrounding reality, in particular, individual regions. Finally, the application function concerns important strategic projects, that is making adjustments and proposals for a regional policy, as well as procedures for its correction. (Pop-Eleches & Tucker, 2013, pp. 45-68; Szewczuk et al., 2011, pp. 13-)

The subject of the article is based on the above classification. First, an appropriate research tool will be chosen, consisting of a set of statistical indexes. By using it we can prepare a characteristics of in the North macro-region. For the purposes of analysis, the national average size of indexes will also be set. However, the data relating to Warsaw were omitted, due to its specifics as the capital of Poland.¹ The conclusion of the article will be the applications, which can be further used in regional policy of the studied communities .

The test period includes past 10 years of the functioning of Polish local authorities, i.e. years 2004-2013.²

¹ The value of statistical indexes achieved by Warsaw, in each year, and in all respects, far exceed the index values by other cities grodzkie. Their omission raises the readability of both analytical comparisons and charts.

² For some indexes it was possible to get the data from shorter time periods.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

For the article subject structured in this way, the thesis is stated about expansive reality of Polish district communities. However, over the past 10 years, largely thanks to the funds from the EU, there has been a significant improvement in the values of characteristics relating to intellectual capital.³

Research area

The activities in the programming of Polish economic development policy for the period 2007-2013 and 2014-2020 have been oriented in such a way that the majority of priorities was and still is associated directly with the influence on the various dimensions of intellectual capital, and the other, indirectly to create favourable conditions for its accumulation. Noteworthy is the fact that the activities revolve around the dimensions that are particularly important in the relation between intellectual capital and competitiveness. They concern human and structural capital, but also care about the development of social capital. It is proved by the priorities concerning the innovation and growth of the economy, the efficient use of human resources and building social capital. What is more, these initiatives for the period 2007-2013 were the activities carried out within the framework of the two operational programmes: innovative economy and human capital, directly addressing the human and structural dimension of intellectual capital. In the period 2014-2020 a new instrument of European cohesion policy will be also used, which is the local development led by the community.

However, compared to other developed countries, Poland belongs to the countries with the lowest level of GDP per capita and the lowest values of the KI index (Knowledge Index), which can be treated as an approximate to intellectual capital.⁶ It is commented that the reasons are too slow dynamics of making technological upgrading, but also too slow process of changes on institutional, social and cultural level of Polish economy. The current level and structure of intellectual capital are a significant barrier to development.

When it comes to the Polish government structure, based on the concept of self-government contained in the European Charter of local self-

³ See: <http://www.funduszeuropejskie.gov.pl>, access on 28. 11.2014

⁴ More: *Strategia Rozwoju Kraju 2007-2015*, Ministerstwo Rozwoju Regionalnego, Warszawa 2006.

⁵ Further: *Krajowa Strategia Rozwoju Regionalnego 2010-2020*, Ministerstwo Rozwoju Regionalnego, Warszawa 2009.

⁶ More information can be obtained on the web portal: <http://www.oecd.org/poland/>

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

government⁷, at the local level there are three types of communities⁸: land districts⁹, town districts and municipalities¹⁰. The results of the statistical analysis of the situation of Polish local communities show their little optimistic financial situation. (Koza, 2013) However, town districts (i.e. the districts formed by big cities) display a very pro-development approach. This is the reason why these organisms will be subjected to further analysis in the following article. It is worth considering what factors have an impact on this state of affairs. (Strzelecki Z. (Ed.), 2008, p. 222)

Test area of this article will be a North macro-region of our country. It includes the voivodenships: Kuyavian-Pomeranian, Pomeranian and Warmian-Masurian. The macro-region is characterized by a high potential of dynamic economic development.

Research tool

Local and regional development is a relatively young field of economics and spatial management, which does not yet have its own autonomous theory. This specific type of activity, serving to develop and improve the organization of activities for spatial development as well as the structure and functioning of local government and social system, is based in the sphere of the theoretical considerations on a general theory of economic development or economic theory and the theory of spatial management. (Klasik, 1996, pp. 11-)

Research techniques relating to local communities can be divided into descriptive and quantitative ones. Descriptive test methods of territorial communities are generally characterized by a meticulous analysis of the facts. On the other hand, by using these methods, we get the results that are imprecise and incomparable in the wider scale, which create a large possibility of obtaining extremely subjective evaluations. Quantitative methods, on the other hand, do not have some of the shortcomings of descriptive methods. First of all, they give you very specific (measurable quantitatively), relatively unbiased results. This is, in turn, one of the conditions for the

⁷ Europejska Karta Samorządu Terytorialnego, Dz.U.1994.124.607 as amended.

⁸ *Ustawa z dnia 24 lipca 1998 roku o wprowadzeniu zasadniczego trójstopniowego podziału terytorialnego państwa*, Dz.U. z 1998 roku nr 96, poz. 603 as amended.

⁹ *Ustawa z dnia 5 czerwca 1998 roku o samorządzie powiatowym*, Dz.U. 1998 nr 91 poz. 578 as amended.

¹⁰ *Ustawa z dnia 8 marca 1990 roku o samorządzie gminnym*, Dz.U. 1990 nr 16 poz. 95 as amended.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

application of the time-spatial comparisons, which are significant in the regional studies.

The research on the regularities occurring in mass phenomena and processes is done, in particular, with the use of taxonomic methods.

Taxonomic method was first taken from the field of anthropological research to zone farming systems by J. Fierich. (Fierich, 1957, pp. 73-100) The first successful attempt to zone agricultural production by means of taxonomic method became the impulse for the creation of many studies of this type. The most popular, taxonomic method of averages differences (named after its creator, Czekanowski) is based on connecting into groups the elements of a larger part. The elements that are connected, in comparison with other elements, are characterized by smaller average differences in terms of number of simultaneously included features. In other words, it is a classification of units (spatial in this case) of a group due to several intentionally selected characteristics. (Fajferek, 1966, p. 48; Bywalec & Rudnicki, 2002)

Taxonomy¹¹ is a discipline dealing with the rules and procedures of organization and classification. The taxonomic method is to group a set of elements of any nature into more statistically homogenous. (Kwiatkowski (Ed.), 2008, pp. 269-294; Czermińska, 2002, pp. 149-157)

In order to be able to use taxonomic method, two conditions must be met: first, the phenomenon chosen as a feature must be quantitatively measurable, secondly, reliable statistical data must be guaranteed that represent the values in the appropriate territorial section.

To assess the specificity of the intellectual capital of the local communities, based on the data from the Central Statistical Office¹², the following, grouped into subsets, characteristics will be applied:

1. Economic development:

- Investment in enterprises (current prices; without the entities with fewer than 9 employees) per capita in the working age population
- Entities of the national economy newly registered in REGON per 10 thousand inhabitants in the working-age population

¹¹ The term "taxonomy" is derived from two Greek words: taksis-"cleanings" + nomos, "law", "rule"(Kendall & Buckland, 1986, p. 194).

¹² Obtaining data from a local data Bank of the main statistical office, http://stat.gov.pl/bdl/app/wskazniki_zr, was completed on 25.11.2014, in addition to the index relating to the turnout in local elections, which didn't appeared on the website of the State Electoral Commission, <http://wybory2014.pkw.gov.pl/pl/frekwencja/wojewodztwa/index>.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

- The value of companies with foreign capital per capita in the working age population
- 2. Employment: Natural persons running their own business per 100 people in working age
- 3. Consumption Patterns: The number of passenger cars per 1000 inhabitants
- 4. Social inclusion :
 - The average gross monthly salary (entities of more than 9 employees)
 - Share of long-term unemployed (more than 1 year) in the total number of registered unemployed people
 - Registered unemployment rate
 - Graduates share (not working yet) in the total number of the unemployed
- 5. Demographics :
 - Birth rate per 1,000 population
 - The balance of migration for permanent residence of people in working age to 10 thousand inhabitants in working age
- 6. The adequacy of income during old age: Share of long-term unemployed (more than 1 year) in the 55-64 age group in the total number of all unemployed people aged 55-64
- 7. Health factors: Clinics per 10 thousand inhabitants
- 8. Climate change and energy: Electricity consumption per capita
- 9. Transport :
 - Length of public roads with hard surface per 100 sq. km
 - The length of cycle paths
- 10. Openness and participation :
 - The number of registered foundations, social associations and organizations per 10 thousand inhabitants
 - Turnout in the local elections
- 11. Economic instruments :
 - Funds from the European Union for the funding of programmes and projects of the EU obtained by the municipalities and districts per capita
 - Expenditure budgets of municipalities and districts for public debt to 1,000 PLN of total revenue budgets of municipalities and districts
 - Share of capital expenditure of municipalities and districts in total expenditure.

These characteristics allow to estimate the level of socio-economic development of local communities. (Ostrom, 1998, pp. 1 – 22; Woźniak (Ed.),

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

2014, pp. 276-295; Woźniak (Ed.), 2013, pp. 331-; Ranking miast powiatowych, 2014)

To describe the statistical structure of the above characteristics of the local communities will be used such measures as the arithmetic mean of the values achieved in individual years, dynamics chain indices, counted annually, and geometric mean presenting the increase in the values in the last year compared to the first year. (Forlicz (Ed.), 2008, pp. 219-232; Zeliaś, 2000, pp. 37-77)

Selected analytical methods allow for reliable insight into development processes. (Strzelecki, 2008, p. 15, 39) The above measurements, understood statistically, are relative numbers characterizing the alterations in the level of the phenomena occurring in a given time, i.e. indexes. (Timofiejuk et al., 1997, pp. 176-178; Nowak (Ed.), 1970, pp. 247-)

Taking into account the time (Sierpińska & Jachna, 1997, p. 17) , which will apply to the analysis, it will be a retrospective analysis (ex post), containing an assessment of the results of the actions taken in the past, which is the starting point for the current and future objectives.

Due to the established test method (Dylewski et al., 2004, p. 14), the author has chosen an analysis based on the comprehensive evaluation of reality from the point of view of the connections and dependencies between economic phenomena. It contains a comprehensive look at the activities of an enterprise and is a tool for understanding and evaluation of economic phenomena. It provides a structured observation, expressed in terms of points, along with the cause and effect relationships between these phenomena.

Analytical research will end with the presentation of results, in numerical, graphic and descriptive form. Numeric form will help sort out the information about the investigated phenomena in time and in space.¹³ Graphic form will show the changes observed in the studied characteristics by means of radar charts.¹⁴ Finally, the descriptive form will serve to express assessments and opinions and formulate diagnoses and proposals.

Socio-economic development

The level of development of the local community is the starting point to the characteristics of the factors supporting the construction of sustainable

¹³ Because of the editorial requirements, the figures will not be presented in the body of the article.

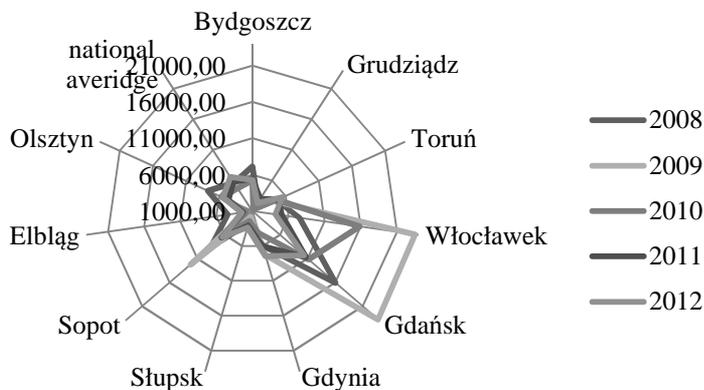
¹⁴ In the body of the article will be placed only the most charts.

development. Development is a fundamental concept in the functioning of economies. A high level of economic development usually creates the conditions to ensure a higher level of life of the inhabitants, understood as the degree to which the needs of all kinds are satisfied with goods, including material ones, cultural, educational, related to health and security. At the same time, economic development may be accompanied by a range of negative effects, such as environmental degradation, high levels of pollution. In addition, one of the key tasks of sustainable development is smooth economic development of all regions. (Grabowski et al., 2013, pp. 3-55; and Pawłowska, 2013, pp. 17-70)

In the North macro-region during the period of research when it comes to investment per capita in the working age population, after the initial decline, there was an annual growing trend, which was visible especially in Gdynia, Włocławek and Gdańsk.

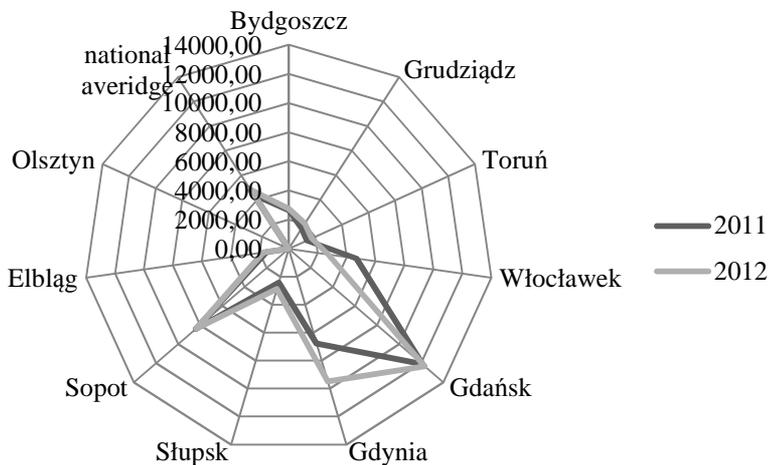
When it comes to the number of entities of the national economy registered in REGON, in most cities there was a growing trend. Similarly, the value of companies with a foreign capital, calculated per capita in the working age population, every year was getting higher. In this context, the outstanding results were achieved by Gdynia and Gdańsk.

Figure 1. Investment in companies per capita in the working age population



Source: own elaboration based on data from local data bank of the main statistical office, http://stat.gov.pl/bdl/app/wskazniki_zr

Figure 2. The value of foreign capital companies per capita in the working-age population



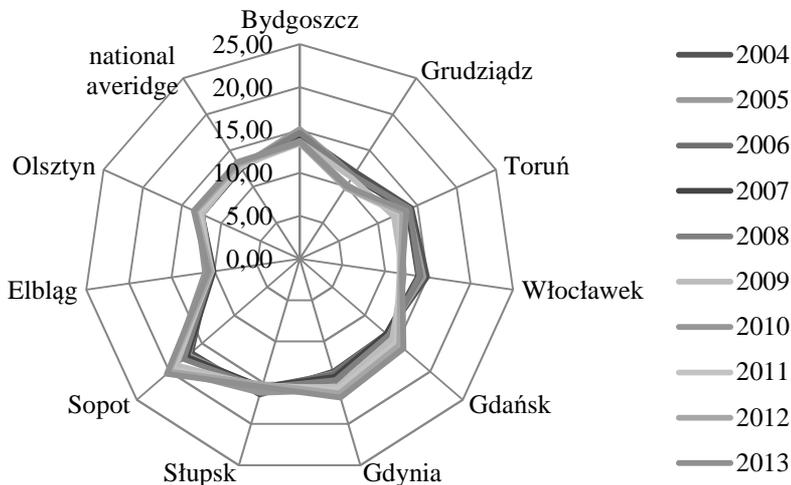
Source: as above.

Employment

An important factor in the development of the regions are labour resources and related human capital. In sustainable development it is one of the elements of interrelated conditions for wealth creation, alongside traditional resources as land and capital, as well as factors, such as, the level of resources and the environment. One of the objectives of sustainable economics is employment for all people in working age. (Markowski, 2009, p. 13; Kwiatkowski (Ed.), 2008, pp. 25-38; Grzega, 2012, pp. 220-268)

Employment in each of the cities of North macro-region, is annually increasing. This was especially visible in Sopot.

Figure 3. Natural persons running their own business per 100 inhabitants in working age



Source: as above.

Sustainable consumption and production

Changing production and consumption patterns towards sustainable, as well as the promotion of such behavior is one of the key challenges of the modern world. Separating economic growth from environmental degradation is a condition for sustainable development. (Markowski, 2009, p. 13; Kwiatkowski (Ed.), 2008, pp. 25-38 and Grzega, 2012, pp. 220-268)

The determinant of the above changes is the number of passenger cars per 1000 inhabitants. In the North macro-region, this quantifier is every year higher.

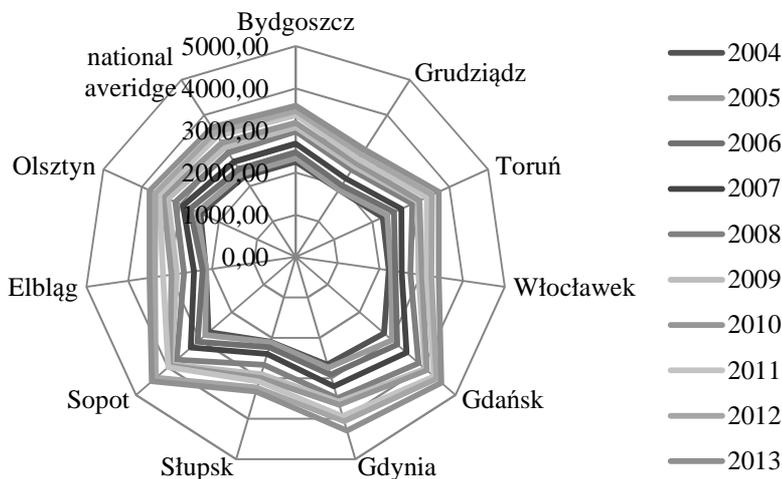
Social inclusion

Exclusion and social inequality is a situation that prevents (or at least makes it difficult) an individual or group from performing social roles (family, professional, civil, social), making the use of public goods and social infrastructure, collecting resources and earning income in a worthy manner. The problem of social exclusion is a major barrier to economic

growth and sustainable development. On the contrary, the concept of social inclusion implies the creation of a society based on social inclusion, taking into account the solidarity between the generations and within the generations, as well as to ensure the improvement of the quality of life of citizens, which is the basis of social welfare. (Lew-Starowicz & Lorecka, 2013, p. 16; Kotowska, 2014, CD-ROM)

The index that provides statistical information in this field is the average gross monthly salary. As far as the cities of the North macro-region are concerned, in the last decade, as in all Polish cities, every year there was an increase in this value. In particular, there was the Tricity, including Gdańsk, Gdynia and Sopot.

Figure 4. The average gross monthly salary (entities of more than 9 people)



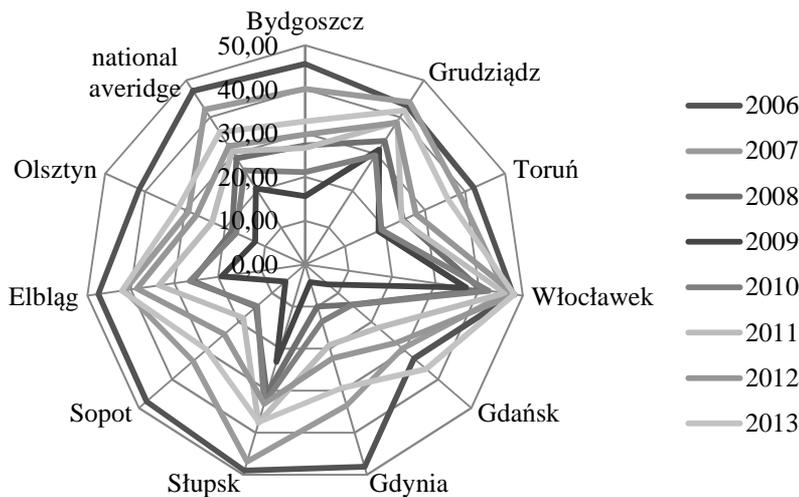
Source: as above.

Access to the labour market in the context of social inclusion also means that every citizen showing willingness to work should be able to find a job corresponding to their professional qualifications. The place occupied on the labour market decides not only about material, but also social status. (Barteczek & Rączaszek (Ed.), 2014, p. 34; and Kotowska, 2014, CD-ROM; Pająk, 2009, pp. 19-32)

In the macro-region, the share of long-term unemployed increases every year, even though to a less extent than in other town districts in our coun-

try. Similarly, the registered unemployment rate increased every year. A positive sign is that the share of unemployed graduates in general was decreasing over time but that was the effect of the high rate of migration of young people abroad.

Figure 5. Share of long-term unemployed (more than 1 year) in the total registered unemployed



Source: as above.

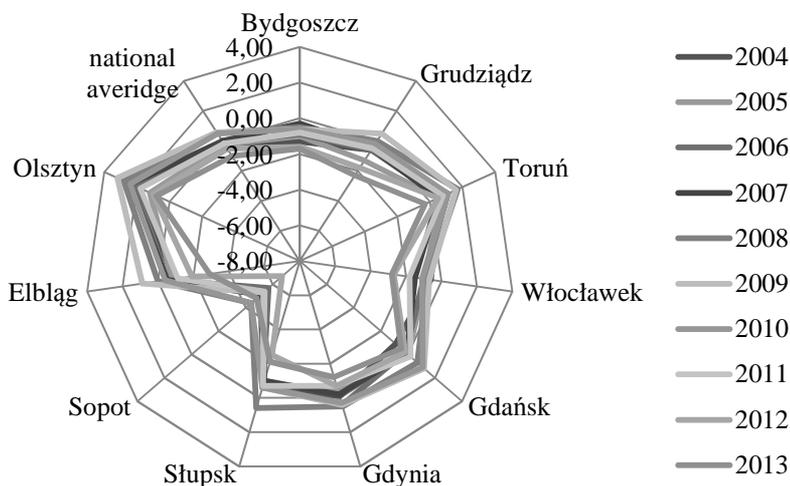
Demographic changes

In Poland there is a further intensification of the process of aging of the population. This situation may result from more conscious family planning, improved availability and quality of medical services, improvement of the material situation of the population and the pursuit of a healthier lifestyle. Progressive aging process requires planning and organizing such activities of social welfare which will meet a variety of needs of people belonging to the older age group and provide them with adequate health care and access to the labour market. It is a big challenge for the social policy of the state in maintaining the sustainable level of public finances. Demographic changes are therefore of vital importance for economic and social development. (Pająk (Ed.), 2009, p. 173; Gwiazda, 2011, p. 56-67) At the same time, fair distribution of income, solidarity between generations, as well as the in-

crease in the level of life, reduction of poverty and social exclusion among older people are classified as priority objectives of sustainable development. (Grzega, 2012, pp. 7-158) The primary gauge group of demographic changes are those indicators that serve to diagnose the situation and the trends of aging in the population, which is influenced by many factors including, among others, the level of total fertility rate, life expectancy, the phenomenon of migration.

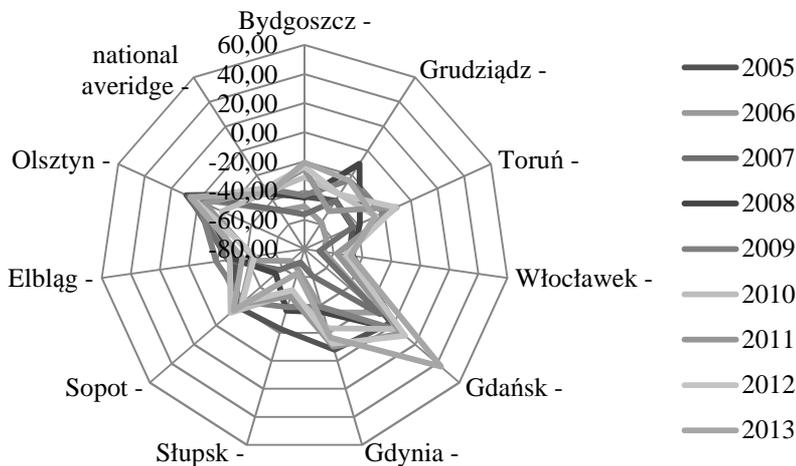
In the North macro-region during the period considered, the birth rate was definitely decreasing, especially in Sopot, and there was a positive balance of migration. At the same time, with the exception of Włocławek and Gdynia, the share of the long-term unemployed in the 55-64 age group in a total number of the unemployed people aged 55-64 increased.

Figure 6. Birth rate per 1,000 population



Source: as above.

Figure 7. The balance of migration for permanent residence of people in working age to 10 thousand inhabitants in working age



Source: as above.

Public health

Access to health care and the health status of the population are included in the basic quality of life factors, apart from, among others, material resources, a feeling of security, recreational activities, etc. Links between health and the concept of sustainable development are multidimensional and manifest themselves in many ways, among which may be mentioned, in addition to improving the quality of life, the effectiveness and the costs of the functioning of the economy and the impact of the environment on the health of the public. Health factors were taken into account by the impact of environment and the environment on the health status of the population and the access to health care. Even low levels of long-term exposure to complex mixtures of pollutants in the air, water, soil, consumer products and buildings can have a significant impact on health. The factor that affects health is also working conditions associated with: working environment, discomfort and mechanical factors. (Pasowicz (Ed.), 2013, pp. 15-84)

The number of clinics per 10 thousand residents was nearly constant in the cities of the North macro-region.

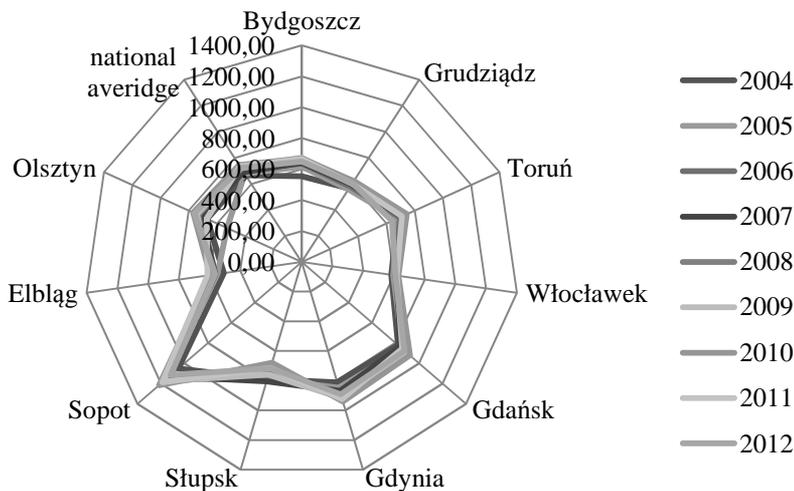
Energy demand

Limiting climate change, the cost of these changes and the negative effects on the environment and society is the primary determining factor for preserving our planet for future generations.

The demand for energy, growing with the development of civilization, which is running out of its traditional resources, mainly fossil fuels (coal, oil, natural gas), accompanied by environmental pollution, increases consumption, 2014, t. 1, pp. 11-; t. 2, pp. 34-; Sułkowski (Ed.), 2011, pp. 25-66; Swora & Woszczyk (Ed.), 2011, pp. 23-)

Electricity consumption per capita in the North counted during the period had been declining. Particularly positive results in this regard achieved Sopot.

Figure 8. Electricity consumption per capita



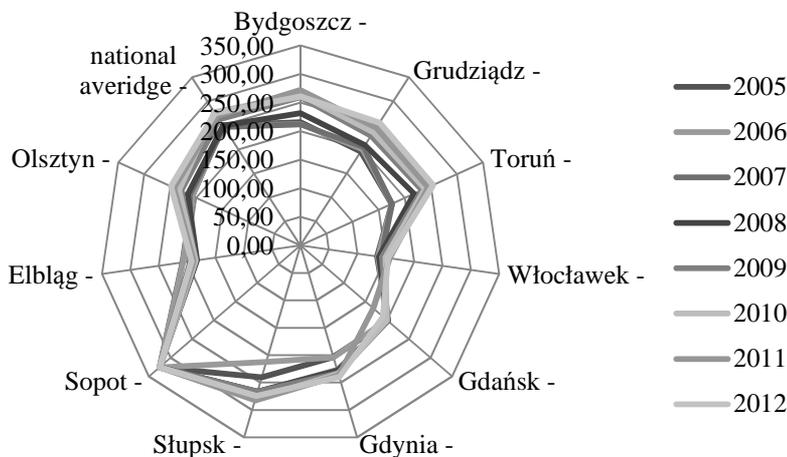
Source: as above.

Transport

Transport is a key sector for sustainable development due to the social and economic benefits that can be achieved while minimizing its adverse effects on society, the economy and the environment. Sustainable transport takes into account the criterion of access to transport services in accordance with the requirements of health and ecological safety (influence on ecosystems), taking into consideration the principle of inter-generation fairness, the criterion of cost-effectiveness and the criterion of control over the impacts on environment (negative external effects) and usage of space (land). In today's world, ensuring sustainable mobility and access to public goods and services is one of the key challenges to the achievement of the objectives of development. Sustainable transport system is the determining factor of the attractiveness of the site for its residents, but also for people visiting. (Grzega, 2012, pp. 7-158)

In the North macro-region, both the length of local public roads, as well as the length of cycle paths, increased annually. Again, the very positive results in this regard achieved Sopot.

Figure 9. Length of public roads with hard surface per 100 sq. km



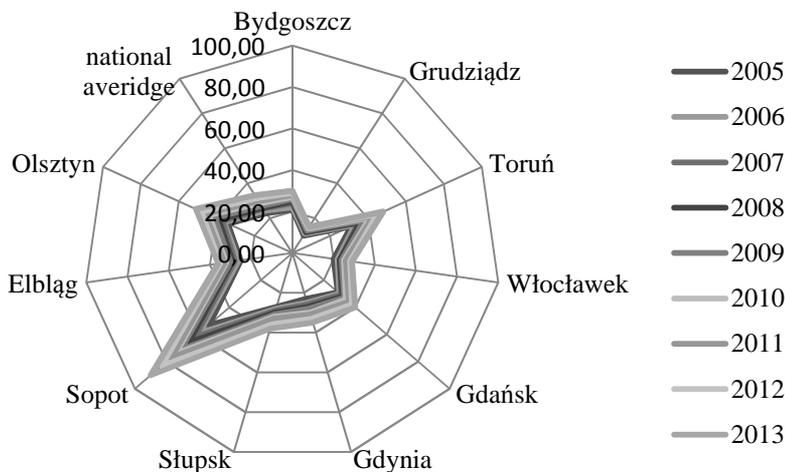
Source: as above.

The quality of governance / openness and participation

One of the primary goals in the pursuit of sustainable development is to achieve political and institutional order, known as good government—seen in terms of economy, politics or environment. Its manifestation is, among other things, the involvement of citizens in resolving social problems, prevention by the self-government from excessive exploitation of the environment, the effective financial management of local government units. (Wilkin (Ed.), 2013, pp. 11-; Ministerstwo Rozwoju Regionalnego, 2011, pp. 2-) Moreover, good governance is characterized by such features as openness, or access to public institutions and decision-making processes and participation, leading to an increase in social trust to institutions and public participation in political processes. The participation of local communities in solving social problems (socialization of the decision-making process) is the determinant of a civil society. (Glinski et al., 2010, pp. 23-)

In the macro-region, especially in Sopot, the number of registered foundations, social associations and organizations annually increased. Similarly, increased the turnout in local elections.

Figure 10. The number of registered foundations, social associations and organizations per 10 thousand inhabitants



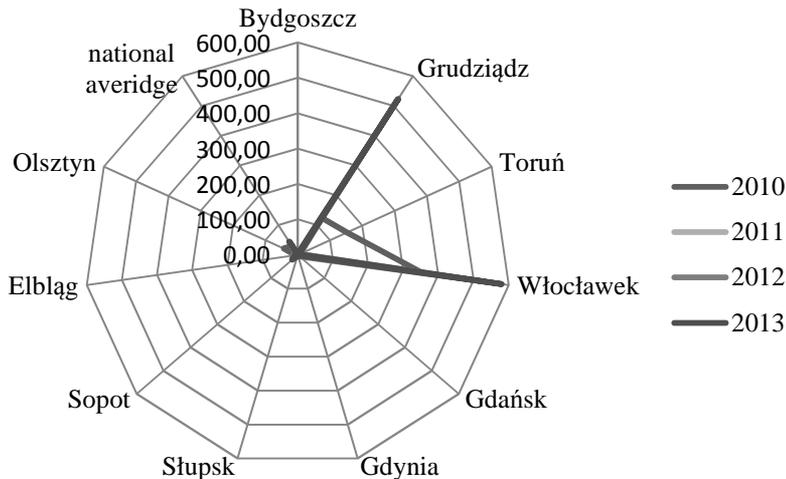
Source: as above.

Economic instruments

Among the tools used to support sustainable development there are such that aim at preventing excessive exploitation of the environment and exerting influence on local government to stabilise finances. Important in this respect is the rational management of the funds by government entities, as well as using environmental and operational charges. (Czternasty (Ed.), 2011, pp. 59-; Wojciechowski & Rabinowitch (Ed.), 2014, p. 47; Bryx (Ed.), 2014, pp. 5-)

Funds from the European Union for the funding of programmes and projects of the EU acquired by town districts of North macro-region were high, though not necessary increasing each year, contrary to what took place throughout the country. At the head were Grudziądz and Włocławek. At the same time, in most towns' budgets increased expenditure for debt, and decreased shares of investment expenditure in total expenditure budgets of towns.

Figure 11. Funds from the European Union for the funding of programmes and projects of the EU acquired by the cities per capita



Source: as above.

Conclusions

To sum up, over the past 10 years, in North macro-region, after the initial decrease in the values of the differential characteristics relating to intellectual capital, a significant improvement can be seen. At the same time, gross domestic product per capita in the macro-region annually increased its value.¹⁵ In addition, analyses prove positive forecasts for the values of the above characteristics.

Understanding, knowledge and creation of new social or economic values are innovations. (Gollin, 2008, pp. 115-128) They are caused by the fact that people are feel as a society a need to change the world for better. (Rogoziński & Panasiuk (Ed.), 2012, pp. 207-217) What is more, from the point of view of management theory, the collection of information by an individual (as well as financial, physical and human resources) belongs to the power supply, together with, first and foremost, planning, and organizing, conducting and controlling. (Błaszczuk, 2008, pp. 95-105) The management operations are carried out in the planning (development plans), plans implementation and monitoring their implementation. They concern processes and decisions, whose purpose is to define the measures, put them into practice and finally check their effectiveness. The evidence of the work carried out in these areas are regional development strategies in various regions.¹⁶ (Ekiert & Ziblatt, 2013, pp. 90-107)

¹⁵ Compare with: http://stat.gov.pl/bdl/app/dane_podgrup.dims?p_id=114370&p_token=0.771679934688904

¹⁶ Development strategies macro-region, provinces and towns:
http://www.kujawsko-pomorskie.pl/index.php?option=com_content&task=view&id=346&Itemid=138,
www.pomorskie.eu/res/strategia2020/pomorskie_srwp2020.pdf,
[strategia2025.warmia.mazury.pl/](http://www.warmia.mazury.pl/strategia2025),
http://www.bydgoszcz.pl/miasto/urząd_samorząd/Strategia_Rozwoju_Bydgoszczy_do_2030_roku.aspx,
<http://www.bip.grudziadz.pl/strony/menu/105.dhtml>,
<http://www.torun.pl/pl/rozwoj/miejskie-programy-rozwojowe/strategia-rozwoju-miasta-torunia-do-2020>,
www.wloclawek.pl/g2/2013_08/7368_fileot.doc,
<http://www.gdansk.pl/strategia>, <http://www.gdyniaprzedsiebiorcza.pl/x.php/1,649/Strategia-rozwoju-Gdyni.html>,
www.slupsk.pl/gospodarka/dokumenty/263.html,
www.sopot.naszemiasto.pl/tag/strategia-rozwoju-sopotu.html,
http://www.elblag.eu/index.php?option=com_content&view=category&id=118&layout=blog&Itemid=156,
www.bip.olsztyn.eu/bip/index.php?t=210&id=297135.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

They realize the clauses of the Treaty of Lisbon 17, in which a matter of the territorial dimension is of particular importance to the EU cohesion policy. As a consequence, the intervention is to a greater extent adjusted to the needs of different types of territories.

In addition, a characteristic feature of modern market economy, which determines all the activities and relationships within it, is competitiveness. One of the most important ways to increase this competitiveness is to create, and then consistently implement, a promotional strategy. (Białecki, 2006, pp. 70-) Nowadays, I attach particular importance to the process of innovation, which is crowdsourcing, which is drawing on the expertise and capacities of a given community. (Rupnik & Zielonka, 2013, pp. 3-25)

It seems that the best summary for this article, will be an encouragement to maintain and increase the momentum of described changes, as well as relying on coherent, harmonious and innovative development strategies, evaluating intellectual potential of their communities.

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¹⁷ Compare with: <http://eur-lex.europa.eu/legal-content/PL/ALL/?uri=OJ:C:2007:306:TOC>

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015
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Banking Concentration in the Baltic and Western Balkan States – Selected Issues

JEL Classification: *G10; G20; G21*

Keywords: *banking market consolidation; banking market concentration; the Baltic States; the Western Balkan states*

Abstract: In a rapidly changing economic environment companies deepen their cooperation, which entails in all sectors of the economy. The progressive increase in market concentration, especially in the banking sector, has a purpose, which is to increase the benefits from the operation of various enterprises, e.g. credit institutions. The purpose of this article is to compare the tendencies within market structures in various countries which origin from similar political systems and which have got experience in transformation of banking sectors. The research concerns the Baltic and Western Balkan states. The study revealed a distinct change in the growth rate of market concentration and the number of banks.

The article is divided into two main parts. The first part consists of an analysis of the literature on the concentration of the banking market. It presents a discussion on the effects of changes in market structures, leading to an increase in its consolidation. The second part is devoted to empirical research in relation to changes in the degree of concentration of the banking sectors (using concentration ratios) and the number of banking institutions operating there. These sectors are divided into two groups: selected member states of the European Union (Lithuania, Latvia, Estonia) and the Western Balkan countries (Croatia – new member of the EU, Serbia, Bosnia and Herzegovina). In this section there are detailed descriptions of the banking markets' structures.

Introduction

In a rapidly changing economic environment companies deepen their cooperation, which entails changes in all sectors of the economy. The progressive increase in market concentration, especially in the banking sector, is driven by many factors, with an increase of the benefits resulting from operations of enterprises such as credit institutions as the most essential.

The purpose of this article is to present the changes taking place in the area of the banking sector consolidation, both in the EU member countries and these which are just applying for its membership. The research concerns economies from the East and Central Europe: the Baltic and Western Balkan countries. It is believed that similar changes in banking sector consolidation must have been recorded in the countries which had to transform their economies, including their financial systems. The study revealed a distinct change in the growth rate of market concentration and the number of banks in different groups of countries concerned.

The article is divided into two main parts. The first part contains the review of Polish and foreign literature on the issue of banking sector concentration. It presents a discussion on the effects of changes in market structures increasing their consolidation. The second part is devoted to empirical research in relation to changes in the degree of concentration of the banking sectors (using concentration ratios) and the number of banking institutions operating there. These sectors were divided into two groups: selected member countries of the European Union (Lithuania, Latvia, Estonia) and the Western Balkan countries (Croatia, Serbia, Bosnia and Herzegovina). This section also contains a detailed description of changes in the banking sector structures.

Methodology of the research. Content and Methods

The first part of the article reviews the literature on the subject of markets consolidation, including the banking sectors. It presents the discussion carried out among the scientists, concerning the changes taking place in the practice of banking. The second part considers the situation in banking sectors of the researched countries with reference to the transformation and redeveloping the sectors, as well as the current condition of the banking markets' consolidation. Further, a method of analysis is presented. The author compares the changes within the sector concentration and changes in the number the credit institutions. Basing on the above facts differing group

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

were selected. Despite the common history and experience of transformation, the researched countries cannot be considered as the homogenous group. The reasons for it are discussed further in this subchapter. The following research methods were used to gather and to analyze the qualitative and quantitative data: document review, literature review and international study. Various documents were collected: reports, financial statements covering the performance and structure of the studied economies. The theoretical part of the article consists of publicly available literature and legal acts review. The empirical part of the article is based on comparative analysis and studies of various reports for the period up to 2013. Data are provided by Eurostat, European Central Bank and the central banks of the selected countries.

Literature review – definitions

The issue of market consolidation has been discussed in the literature for a long time, providing various definitions. Poteraj (Poteraj, 2004, p.25) notes the difficulty in defining the concept of consolidation. He sees a discrepancy between Polish and English nomenclature, which makes it difficult to clarify the term. Discrepancies arise while trying to define the term more precisely. The most general and the least precise definition presents the term as the consolidation of union, fusion, the combination into a single whole, strengthening, consolidating. (Dunaj, 2001, p.406) Consolidation is not any combination, but is designed to strengthen economic performance of formerly separate entities.

Sector consolidation results from acquisitions which may have either friendly or hostile nature, as it was presented by Frackowiak. (Frackowiak, 2009, p.95) The author adds that the friendly acquisition is associated with a prepared program, common understanding of preliminary findings, and, above all, with exact explanation of reasons. Any decision in the case of such acquisitions must be commonly understood, discussed and communicated even to the smallest shareholders. Company operations, including suitability of employees is reviewed and adapted to the new conditions of its operation. In a friendly takeover, the evaluation of its effects will follow. In other types of purchase transactions, a company may be taken over with a use of one of two procedures. The more difficult one involves the gradual buyout of shares. The less risky procedure assumes submission of an offer directly to shareholders of a company. It can also be used to take over con-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

trol, and to transform the company itself - mainly its board of directors. (Frąckowiak, 2009, p.102)

Among the authors there is a significant discrepancy as to the hierarchy of various types of transactions. Helin and Zord (1998, p.3) distinguish between two types of transactions which result in sector consolidation. These are mergers and acquisitions. The first one is defined as a combination of similarly sized entities, which establish a new corporation with evenly weighted shares. If this method is not applicable, the deal is recognized as an acquisition.

Sudarsan (1998, p.1-5) explains that merger and acquisition is a combination of two different organizational systems, with different cultures and values. Through this union of companies the expansion of an entity and, hence, its development is possible. The main objective is to connect companies to increase value of assets, sales and market share and to raise the value for shareholders. The merger is defined as the merging companies while sharing their combined resources, in order to achieve positive results of cooperation. As a result of the merger a new organization based on both united entities is created. The acquisition is a contract that gives one company an advantage and greater self-reliance. An acquired company becomes subordinated to a company making the acquisition. This view remains in accordance with definitions presented earlier by Bannock, Baxter, Davis (1992).

Poteraj, following Frąckowiak, divides purchase transactions into acquisitions and mergers. Acquisitions may take a form of share purchase, purchase of assets, powers of attorney, privatization, lease and joint ventures (Poteraj, 2004, p.30). Czekaj considers the consolidation as a form of fusion, in addition to mergers and acquisitions (Czekaj, Dresler, 2008, p. 244). According to his definition a fusion is a combination of companies, resulting in complete absorption of one company by the other, followed by the acquisition of assets and liabilities. Following the transfer, the acquiring company retains its name and legal entity, in contrast to the acquired company which ceases to exist as a separate legal entity (Poteraj, 2004, p.32). Consolidation is different from the merger because it forms a completely new legal entity. This means that participating companies lose their independence and cease to exist. An acquirer and an acquiree have a similar status and are in the same situation. Frackowiak uses another term to determine this case, which is the concept of incorporation. In his opinion, the acquisition can be considered as a loss of company control by one group of owners to another individual or to a group of people managing the compa-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

ny. It distinguishes the acquisition from the merger and consolidation that does not result in total loss of the acquired institution dependency. Poteraj adds that the acquisition may be a phase of the process of a complete fusion of interests by means of a merger or a consolidation. (Poteraj, 2004, p.31) In this way, he shows them as two separate processes. However, the author also presents distribution, in which the merged and the holding companies are elements in the consolidation processes. (Poteraj, 2004, p.34). Lich-tarski recognizes the concept of holding as a concentration form. (Lich-tarski, 1999, p. 372) They are characterized by many restrictions of a company independence.

The above considerations show that there are many types of transactions resulting in an increase of a sector consolidation. Their features should be discussed, without taking into account their mutual dependence. It is considered to be reasonable to focus on the characteristics of different types of mergers, based on a few basic criteria. Each type of consolidation depending on legal form brings benefits for the involved companies. This may mean weaker market competition, takeover of the whole sector, smaller risk of growth of external company or opportunity to increase the market share while maintaining appropriate independence. For each acquisition method, however, there is an advantage which is highlighted at the beginning of this section. Consolidation in its assumptions is to improve the situation of the acquired business. Relations among enterprises may be of a more or less correct. Generally speaking, the process of market consolidation is related, on the one hand, to the need to achieve a high level of equity and the acquisition of skills (know-how), on the other hand – it is aimed to increase its market share in a short period of time.

Literature review – the case of banking sector

In the field of finance a prevailing view is that only large banking institutions have a chance to grow and compete in the global banking sector. (Kowalewski, 2003) This view is based on several assumptions. Only large institutions are able to finance the construction of a modern system of distribution of financial products and services, taking into account the current technological development. Banking institutions can benefit from the scale only by achieving a certain operating level. In addition, modern banking groups, due to demand or benefits of specialization and synergies, need to be able to offer a very wide range of financial services and products. At the same time, changes in the environment of the financial sector force banking

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

institutions to go out of local markets and build international presence. The increase in the scale of operations of banking groups increases demand for equity. Consequently, banks of the future will have a universal character, and will operate in international markets, offering all possible products and financial services to their customers using new distribution channels. (Freedman, Goodlet, 1998, p. 8-17)

Market concentration refers to the degree of dominance by large companies and their activities in the market. (Sathyam, 2002, pp. 7-20) The rise in the level of concentration may be caused by either growth of a parent company and / or by fall of the capacity of non-dominant firms in the market. The decrease in concentration can result from decrease in the size of a parent company and / or increase the size of non-dominant firms. (Athanasoglou et al., 2008, pp. 121-136) In the literature this problem is widely discussed. The effects of the research result in the emergence of various theories in relation to the banking sector. These theories can be grouped into these in opposition and the ones that support the sector concentration .

Opponents to the sector concentration show that there is a correlation between the degree of its concentration and credit supply. Berger (1995) on the basis of the US banking system, demonstrated that the liberalization of the geographical limitation of bank asset growth in the banking market can be considered as a partial cause of the credit crisis in 1989 - 1992. In addition, a higher level of the local banking sector concentration results in higher profits of the entire sector, which is achieved through higher prices of products and services. This is due to the fact that in a less competitive environment, banks can levy higher interest rates on their customers. The first study on the degree of concentration and competition in the banking sector was conducted in 1954 by Alhadef. With regard to the banking model based on SCP (Structure-Conduct-Performance) he argued that a higher degree of market concentration leads to higher prices. (Sharma, Ball, 2010, p. 95) If market concentration is positively correlated with market power of banks, the market concentration will increase the expected rates of return on assets (ROA). A relatively higher level of concentration is associated with lower level of socio-economic well-being and for this reason it is not desirable for the economy as a whole. Studies show that a monopolistic market power of banks, due to the increase of market concentration, increases the cost of capital and thus contributes to the increase in financing costs. And, in consequence, the lack of proper competition in the banking sector may negatively affect economic growth.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Another argument against the increase in sector concentration is the fact that more concentrated banking sector exposes banks to financial problems. Advocates of this view point out that larger banks are more likely to receive state support as a result of policy described as "too big to fail", which is not applied to small institutions. (Boyd, Runkle, 1993, s.47-67) On the other hand, supporters of the concentration of the banking sector indicate that thanks to effects of scale achieved through consolidation transactions, the efficiency of bank performance is improved (Demirgüç-Kunt, Levine, 2000, pp. 1-32).

A part of the literature expresses the view that too much competition can destabilize financial markets and credit institutions although competition itself does not create instability. Systemic risk may appear independently from competition and in various market structures. Therefore, the relationship between stability and competition has been studied in the context of the consolidation of the financial sector by a Ferguson group. In the chapter of the Report on the consolidation of the financial sector, entitled "The impact of consolidation on financial risk", it is concluded that the only effective banks can survive in a competitive environment. It also indicates that the increase in competitive pressure may adversely affect the stability through the excessive increase of the risk by inefficient banks which are focused on maximizing their profits. There is a view that less concentrated banking sectors with a large number of relatively small banks are more vulnerable to financial crises in contrast to the highly concentrated markets where several large banking institutions operate. This is partly due to the fact that lower concentration is accompanied by stronger competitive struggle. Proponents of this opinion also add that larger banks can take advantage of diversifying their activities, which protect against potential financial perturbations (Allen, Gale, 2004, pp. 1-33).

Concentrated bank sectors achieve higher profits, with a higher level of resistance to the crisis. Relatively higher profits can create a specific financial buffer which can be used during potential problems in the market and which can contribute to the increase in the bank value, reducing the need to incur unnecessary risks in business. In addition, it is easier to monitor several large institutions than many small ones, therefore more effective market control is a characteristic feature of the strongly concentrated sector (Beck, Demirgüç-Kunt, Levine, 2003, pp. 26-27). Based on the empirical analysis of 47 banking crises in 70 countries Beck, Demirguz-Kunt and Levine showed that the concentration of the system is a stabilizing factor, and crisis probability is much lower in a concentrated banking system. In

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

addition, more institutionalized market is also better integrated and it is associated with a lower vulnerability to a crisis. It proves the stabilizing effect of theories concerning competition in the banking sector.

Gelos and Roldós (2002), analyzing the level of competition in economies in transition (1994-2000), said that despite the decline in the number of banks in the analyzed period, "the level of concentration did not increase, but did not decrease either." According to the authors, in the researched countries (including Poland), the negative effects on competition related to the consolidation, were offset by the increase of market-share of foreign capital. In this study, the authors point out, however, that the process of consolidation, especially in the Central Europe, was not completed then and therefore it was difficult to form definite conclusions. (Gelos, Roldós, 2003, pp. 1-28)

This review of the literature shows how important it is to study the level of concentration of the banking sector. The consolidation processes on the one hand can contribute to increased safety of the banking system by improving efficiency, but on the other hand - the effect of these operations may be opposite – it can increase the risk of doing business, and thus reduce safety. The final result depends on the concept of managing the process of mergers and acquisitions, and the condition of the business profiles of participants, along with individual decisions taken by operational managers. (Iwanicz- Drozdowska, 2002, pp. 29-36) As the degree of concentration of the banking sector and the competition affect its efficiency, it can be said that the degree of concentration can be recognized as a starting point for any analysis of the sector.

The banking industry in transition

The analyzed countries, namely the Baltic States and the Western Balkan States, have got a rather similar history of economy. Before declaring their independence all were parts of bigger federal countries: Lithuania, Latvia and Estonia were republics of the USSR and Serbia, Croatia and Bosnia and Herzegovina were Yugoslavia. They could not decide about the growth of their economies, as most state institutions were underdeveloped. It also refers to their banking sectors. The centrally planned economy, introduced at the end of the 20s by Stalin and functioning for the next six decades, as well as particular socialist market economy in Yugoslavia (so called the Third Way put into effect in the 1960s) had common features. The state banking sectors were based on large institutions, which assisted

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

by three or four special purpose entities, namely banks for agriculture, foreign trade and savings banks, with branches all over the country. The objectives of such financial institutions were limited to monitoring, facilitating and fulfilling credit plans. It meant that they could not run any independent policy and strategies since local politicians intervened in credit policies.

The first decisions during the process of transformation were: strengthening, widening and liberating financial sectors. The intention of such steps was to remove state from administration and distribution of capital, develop the banking sectors and allow them to accomplish their basic objectives. A common feature of the banking sectors in transition is that they are prone to crises. These crises are not caused by the liberalization of the legal environment, but its weakness and underdevelopment. The liberalization was demonstrated by a rather liberal policy towards formation of new banks. Another factor influencing the outbreak of the banking crisis was macroeconomic instability. It should be noted that the major reform - the privatization of the self-governed and the stated owned enterprises at the beginning of the 90s - was intended to contribute towards the development of capital markets as a source for raising new capital. Throughout the 90s a weak banking system was recognized as one of the reasons behind the decline of the a production sector, which, without a possibility of raising investment capital, could not restructure to face new market challenges. Although the causes of the crises differ between countries, two factors were common: the accumulation of bad, non-performing loans and inadequate system of regulation and supervision of the banking sector. This type of crisis was observed in Estonia in 1992, Lithuania and Latvia in 1995.

The same happened in the Balkan region. The crisis of the banking sector (by the state) first coincided with the civil war. Inefficiency of the banking sector was due to the civil war and the collapse of former Yugoslavia followed by vicious conflicts. During the war, the banking sectors and larger banks in particular, closely co-operated with governments in order to maintain functioning of the economy in relatively regular way. At the end of the war, the banks were reformed in various aspects : financially restructured, released from "bad debts" and capital-enhanced to be able to deal with forthcoming open market competition.

In Croatia, the first crisis, dating back to the early 90s, was the result of political, economic and legal instability as reminiscences of the vicious conflicts . It was caused by low responsibility level, meaning over-lending and low capital adequacy. In such a situation the government had to intro-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

duce the recovery plans based on "*consolidation*" programs to restructure the banking systems. While some banks went bankrupt others were turned around e.g. Zagrebačka and PBZ. (Jankov, 1999).

What is common for the economies in transition is the fact that all suffered from some kind of crisis. The reasons for another crisis are explained by typical market economy problems and loopholes in legislation, characteristic of developed countries and manifested in lack of capital adequacy. Literature presents a number of reasons for outbreak of the crisis. The first factor is insolvency in the sector, measured by the percentage of non-performing loans. The recent problem is lack of financial discipline, to some extent resulting from unpaid state debts, and the costs incurred on restructuring the financial sectors. A key role in the outbreak of the crisis was played by a whole series of elements such as low quality of the management of banking institutions, ineffective interest rates, underdeveloped capital market, no privatization of the banking sector leading to ineffective control of banks, as well as high costs of their operation.

In 1998 Croatian banking sector was hit by the second wave of crisis. Sonje and Vujcic (1999) emphasized that the problem had appeared as early as 1989 when the value of loans exceeded the capital value of the sector. In 1991 almost half of the banks were insolvent (CNB, 1992). Because of deteriorating general economic conditions, the economy had to deal with problems of low-liquidity and generally not enough free capital to support restructuring and investment processes in the production sector. (Jankov, 2000) Three big banks, including Privredna banka, underwent government restructuring programs, in four basic steps. Non-performing loans were transferred from banks to government agencies. The second step was *recapitalization of the selected institutions*. Step three: the government took over the control and became their major shareholder, immediately announcing its intent to privatize the restructured banks, which was understood as selling them to foreign strategic investors. The last one was introducing new management in these institutions.

Fries and Taci point out that common features of the reforms in banking sectors in transition economies result from recommendations of the International Monetary Fund and World Bank along with so called Washington consensus that forced liberalization, restructuring and privatization of the banking sectors (Fries, Taci, 2002). Zoli (2001, p. 11-13) explained that government bailouts were performed to lift the burden of non-performing loans inherited from the socialist era, and worsened by the hyperinflation at the beginning of the 90s. She estimates that the fiscal costs of the banking

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

sector reforms in some transition countries, namely Bulgaria (1991-94), Czech Republic (1991-93) and Hungary (1992-93) accounted respectively for 58%, 67% and 40% of GDP. Because of the weaknesses of early 90. consolidation programs, Zoli estimates the total costs are actually higher. In case of Croatia, these costs are estimated for around 30% of GDP (Škreb, Šonje, 2001 and Jankov 2000).

The main element of recovery programs was to strengthen legislation and by-laws to improve quality of the banking sector supervision. Having introduced new banking law, the central banks issued a number of decisions regarding methodology of measuring capital adequacy and risk-weighted assets, classification of balance sheet items, off-balance sheet items and the bank risk exposures. Liberalization of laws enabling increase of foreign investors engagement in local banking sectors led to a very high share of foreign capital in these sectors. This situation allowed to consider the foreign strategic investors as a remedy for several problems. Foreign investors were to compensate budget deficit problems and provide a new flow of investment capital to support economic growth and technological know-how (and owners' control) to the finally efficiently restructured banking industry.

The concentration of the banking sector in Europe

A measure of market concentration includes not only the number of companies but primarily examines their relative size. In the literature a whole range of indicators can be found, which confirms that a comprehensive measure has not been established yet. The selection and their use depend on the needs and availability of data. This concerns mainly the concentration ratio (CR) and Hirschman-Herfindahl index, Grossack concentration dynamics, the Gini coefficient or the rate of entropy. As the further part of the study is based on the first two indicators, they will be explained in detail.

One of the basic indicators for the banking sector concentration is involvement of the largest credit institutions in the market (CRN), in relation to the size of assets or deposits. For this paper 5 major sector participants are considered – CR5. The main disadvantage of this indicator is that it excludes the participation of other institutions in the market, so that the indicator shows the degree of monopolizing the supply in the sector. O.Herfindahl and J.Hirschman Index (HHI) is a measure of the concentration expressed as an index for an aggregate of the squares of the share val-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

ues of individual companies in the market. The index can range from 0 to 10,000 (100%²). The closer the market to monopoly, the higher the concentration ratio. In monopoly, the company owns 100% of the market, so the HHI index reaches 10,000. HHI decreases with growing diversity in market share and growing number of entities. [Rogowski, 2001, p. 43-44] The entities whose market share is much higher than the arithmetic mean for that sector have larger impact on the index value. The HHI index illustrates the strength of the market, however - to estimate the HHI value requires the data about all entities operating in the sector, which often are unavailable to the public. [Hirschman, 1964, p. 761]

The dynamics of the consolidation process in the years 1985–1999 is shown by a decrease in the number of banks by 40% in the US, and by 25% in the EU. At the end of the 80s takeovers of the largest British and American investment banks by commercial banks were considered crucial. It should be added that at the same time the process of consolidation of European banks was believed to remain at the development stage and was stimulated by establishing of the Monetary Union and the Common Market. European integration forced European financial institutions to fight for the dominant position in a new, expanded market. [White, 1998, pp. 3-13] Summary data for 2013 for Member States of the European Union show a big diversity in banking sector concentration. The CR5 index in the sector for the EU (15) ranged from the lowest level of approx. 33% in Germany and Luxemburg to 80% and more in Finland and the Netherlands, with the 2013 average 52%. The concentration measured with HHI confirms the above results. The average value of HHI for the EU (15) was 909 points, while in 2013 the highest score was noted in the Netherlands (over 3000 points) and the lowest in Germany (approx. 300 points). What shall to be stressed is the upward tendency of the sector's concentration in most member states, excluding only Denmark and Austria. The situation in the countries which joined the EU after 2004, seems rather different. Although in most new member states the concentration level of this sector is decreasing, there is lower diversity in concentration levels, comparing to the EU (15). In the analyzed period, the level of concentration of banking sectors in the countries of the "new EU" clearly decreased: 6% for the CR5 and 20% for HHI. Only in three countries - Slovakia, Bulgaria and Latvia, concentration ratios showed slightly increasing values.

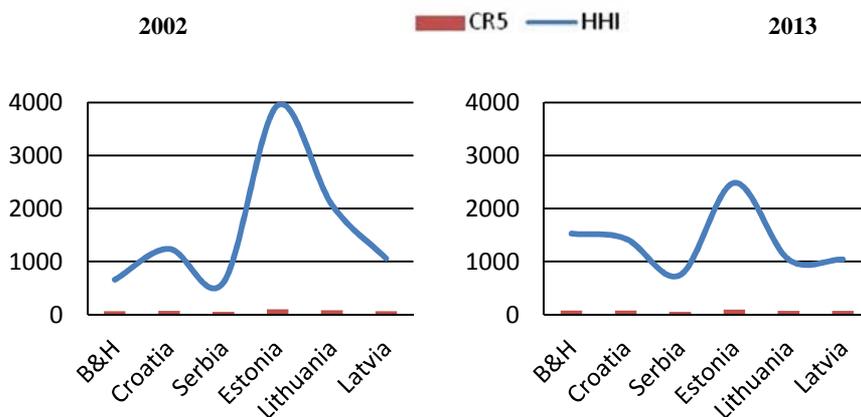
Comparing to other member states from the Baltic region, Lithuania and Estonia achieve the highest concentration level, measured with HHI and CR5 (see Figure 1). The highest share of the 5 largest credit institutions

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

was recorded in Estonia, where in the studied period the ratio reached 96% of its assets (in 2013 - 89.6%) and HHI - 3,434 pts. (in 2013 – 2,483 pts.). This proves the model of banking industries in these countries became closer to the oligopolistic competition, and concentration of the sector was much higher than in other EU member states. The sector concentration in Lithuania does not vary much for the one in Estonia. Latvian banking sector is much less concentrated, both in terms of HHI (1,038 pts.) and CR5 (64%) which remains much closer to the results of the averages in the EU (15) with rather stable situation in 2002-2013.

In Western Balkan region, a relatively high level of concentration of the banking sectors was observed. After the chaos of the 90s the situation began to stabilize in the transformation process. Due to a successful use of tools, such as: separation of commercial activities from central banks tasks, the central bank interest rates liberalization, restructurization and privatization of state-owned banks, and opening the sector to foreign capital. This contributed not only to substantial inflow of foreign capital, but also to high concentration in these markets. Only in Serbia the level of sector concentration measured by CR5 did not exceed 50% in 2013. In other countries, it ranged 70-80% of total assets. Moreover, it must be stressed that the concentration level in the region kept increasing, as presented in the figure 1.

Figure 1. Change of CR5 and HHI in the analyzed countries from 2002 to 2013*

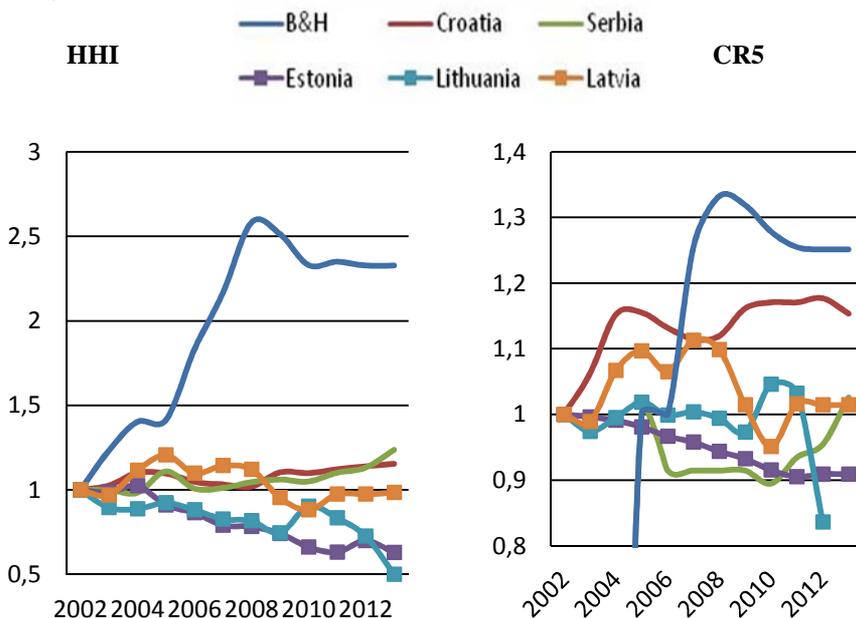


*The left axis presents HHI, the right – CR5

Source: author's elaboration, based on data from ECB and central banks of the non-EU countries

In the analyzed period, both groups of countries experienced diverse changes in concentration of their banking sectors. Sector concentration measured with HHI in the Baltic States decreased, but it rose in Western Balkans countries. In case of CR5 the general outlook is unclear and ambiguous. (Figure 2)

Figure 2. Changes of indices of CR5 and HHI in the analyzed countries (2002 = 100%)



Source: author's elaboration, based on data from ECB and central banks of the non-EU countries.

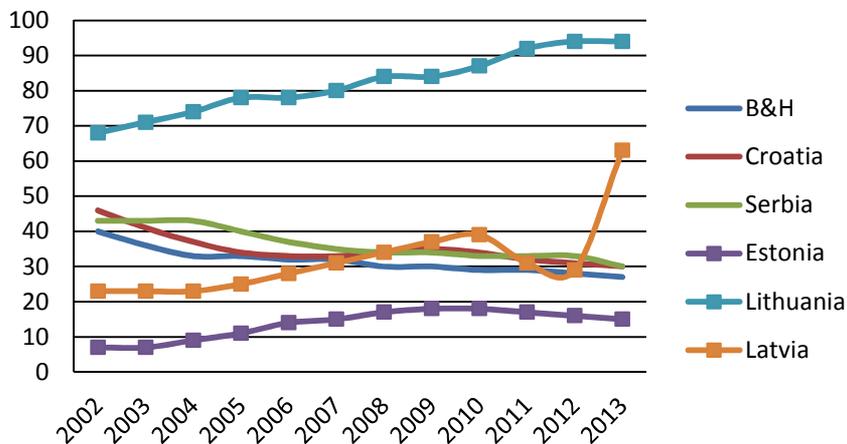
The Figure 2 depicts the differences in concentration processes in both analyzed groups. Firstly, the concentration level of the banking sectors in the Baltic States definitely decreased, both in terms of HHI and CR5. Latvia is the only example where the concentration level fluctuated and returned to the level achieved in 2002. In other countries in the region the concentration indices significantly decreased. Within the period of 11 years, the HHI dropped in Estonia by 38% and in Lithuania – almost by 50%. The decrease measured with CR5 is considerably lower: 9% in Estonia and by 20% in Lithuania.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The characteristics of concentration in the Western Balkans were radically different. Due to ongoing transformation of the banking sectors in these countries, the indices were increasing. The strongest rise was recorded in Bosnia and Herzegovina, where HHI more than doubled, while CR5 rose by almost 33%. In Croatia both concentration indices rose by 24%, while in Serbia HHI rose by 15%, and CR5 remained at the same level.

Another characteristic feature of the banking sectors were considerable variations in the number of institutions operating in the sector - Figure 3. It must be emphasized that the evolution of the banking sector in the Baltic States led to structural change in the number of active market institutions. It should be noted that previously in EU (12) the number of banks increased in 6 out of 12 member states as a consequence of the consolidation of the sector. In the recent years, new technologies, introduction of different types of innovation and changes in distribution channels had a great impact on the sector. In the Baltic States (like in another 3 new member states: Malta, Slovakia and Poland) the number of credit institutions increased. In Lithuania the number rose by over 25, while in Latvia and Estonia – by 10 and fewer entities. In the Western Balkan region the number of banks operating there dropped, from over 40 to fewer than 30 entities.

Figure 3. Number of credit institutions from 2002 to 2013



Source: author's elaboration, based on data from ECB and central banks of the non-EU countries.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The Fig.3 shows the data for Western Balkan countries on the left, the data for the Baltic States on the right side.

Next these countries were divided into groups, depending on the direction of changes in the level of concentration and the number of credit institutions. Table 1 shows the groups classified by the direction of the changes, for example, the A group includes countries where an increase in the concentration was accompanied by a decline in the number of institutions, and the I group, with countries where the concentration decreased in the absence of changes in the number of credit institutions.

Table 1. The groups classified by the direction of the changes

Concentration	Number of institutions	Group
↑	↓	A
↓	↓	B
↑	↑	C
↓	↑	D
↔	↔	E
↔	↑	F
↔	↓	G
↑	↔	H
↓	↔	I

Reference: author's elaboration.

Table 3 compares directions of changes in the number of participants in the banking sector and its level of concentration . It also presents dynamics of the above factors in 2013 compared to 2002. Table 2 shows the individual countries classified into appropriate groups, as shown in Figures 1-3.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 2. Change of sector situation in 2013 in comparison to 2002

	CR5	HHI	Number of institutions	Concentration	Number of institutions	Group
B&H	2,33	1,26	0,68	↑	↓	A
Croatia	1,15	1,15	0,65	↑	↓	A
Serbia	1,24	1,03	0,70	↑	↓	A
Estonia	0,63	0,91	2,14	↓	↑	D
Lithuania	0,50	0,82	1,38	↓	↑	D
Latvia	0,98	1,01	2,74	↔	↑	F

Reference: author's elaboration, based on data from ECB and central banks of the non-EU countries.

In the group of countries that joined the EU in 2004 (Estonia, Lithuania and Latvia), dominated examples of a decline in the concentration with simultaneous increase in the number of institutions (D group). This meant new institutions weakened the sector concentration - as observed in Estonia and Lithuania. An increase in the number of institutions in the Baltic countries shows that there is still room for new institutions in the market. Within only one year in Estonia there were opened new banks: AS LHV Bank and Bank Snoras branch - the first foreign branch of the Lithuanian bank. New licenses were issued to the SEB Bank and Handelsbanken Bank branches in Lithuania.

In Latvia, the level of concentration remained unchanged despite an increase in the number of credit institutions (F group). The number of credit institutions changed only in 2013 as a consequence of the global financial crisis. The crucial fact is that such an increase did not impact negatively the level of concentration. It proves that new institutions were either small or their influence on the market was not significant. At the beginning of the transition period Latvia, comparing to other Baltic states, had the smallest foreign capital participation and liberal licensing policy. Licences were granted to Latvia Post Bank and the branch of Balti Pank Investeerigute group. It led to changes in the number of banks in the market. After a strong rise in 1993-1995, number of banks dropped by 20 only within two years as a result of consolidation processes, number of liquidation and bankruptcies. It should be noted that the largest banks in Latvia were established by consolidations. Latvijas Banka was recapitalized in 1995 by the Danish Unibank and adopting the name A / S Latvijas Unibanka. Later it became a member of consolidated SEB group in the Nordic market. In

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

1999 Rigas Komercbanka was taken over by Prima Bank, creating Pirma Latvijas Komercbanka PLC. In 2003 Prima Bank was taken over by the German NORD / LB Latvija, and later in 2006 - by DnB NORD Banka (Markiewicz, 2011, p. 153-154). The number of banks in Latvia began to increase again, mainly due to the entry of foreign banks, as this market attracted Scandinavian investors. SEB took over the majority stake in Latvijas Unibanka, and Swedbank in Hansabanka. Foreign investors to Latvian banks came from Germany, Estonia, Finland and Russia.

In the early years of transition in Lithuania, thanks to the liberal licensing policies, many new banks appeared. In 1992-1994, there were 28 banks, which was a very large number for such a small country, therefore the number of them fell by half, including two out of three biggest banks. An important problem for the Lithuanian banking sector was too little confidence of among clients that had to be slowly, gradually rebuilt. Lithuania was the last Baltic State, where foreign banks emerged, only after 1996. However, due to further expansion of foreign investors, their participation in the total banking assets grew significantly, reaching 90% of sector assets in 2006. The most important credit institutions in the Lithuanian banking sector are related strongly to Scandinavian capital, and were formed as a result of consolidation. Two biggest banks - Vilniaus Bankas and Hansabankas – were taken over in the process of privatization, respectively by Skandinaviska Enskilda Banken (SEB Bank) and Swedbank. In 2011 their share in sector assets amounted to over 47%. Another bank with over 16% of total assets –Bank Nord/LB Lietuva – belongs to a DNB Bank ASA - the largest financial services group in Norway.

In the first stages of the transformation in Estonia the number of banks fell while the banking sector faced an increase in regulatory requirements, new rules of prudence and growing competition in the banking sector. Smaller banks with insufficient capitals were liquidated or merged with other entities in order to increase their capital base. For many years only seven banks operated, out of which two largest: Hansapank and Eesti Ühispank were originally private banks, and belonged to Waldenberg family from Sweden. The number of banks in Estonia started to increase only after the European Union accession. Estonian banks also experienced several consolidations. Eesti Ühispank as the first bank which entered the banking sector after transformation merged with North Estonian Bank (1997), with Talinna Pank (1998) and then was taken over by the financial group SEB (2005). Another bank - Sampo Pank, which in 2008 was acquired by Deutsche Bank, had undergone various M&A transactions. First, in 1996

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Estonia Forexbank incorporated Raepank, and after two years it merged with Estonian Investment Bank, creating a new group called Optiva Bank. Then it adopted a new name Sampo Pank. In 2007 a new bank Unicredit Tallin appeared, resulting from merging Estonian branches of Unicredit and HVB. In 1998 Hansapank merged with Eesti Hoiupank, later in 2005 privatized by Swedish investor Sparbanken Swedbank, which after 4 years became a sole owner. A few years later it was renamed for Swedbank AS - now it holds the biggest market share in the Estonian banking sector.

In Western Balkan countries, a deeper analysis shows their similarity to the countries of the "old" EU in reference to the direction of changes in the level of concentration and the number of banking institutions. Similarly to EU (15) countries, among the studied countries from the south a rise of concentration index prevails over a decline in the number of banks operating in the sector (A group). Such changes took place in all countries from this region. In Bosnia and Herzegovina, a decrease in the number of banks is due to the mergers of banks to meet capital requirements or license withdrawal by the central bank.

While the Baltic States banking sector is dominated by Nordic foreign investors, in the Western Balkan countries Greek and Italian banks are most active (Bastian, 2003, p. 81-107). Austrian and Italian banks were strongly engaged across the region (Breyer, 2004, p. 63-88). A high level of sector concentration coincided with high involvement of foreign inventors from neighboring countries. In Croatia, banking groups gradually developed during the 90s as a part of the process of sector consolidation and development. For the last decade the sector consolidation has been increasing through involvement of foreign capital in the national banking industry including the acquisitions of two biggest banks: PBZ (1999) and ZABA (2001) by two Italian bank groups: Grupo IntesaBCI and UniCredito Italiano. Before 1999 foreign banks access was allowed only in form of opening new branches. Acquisitions, both cross-border and domestic became dominant factors in forming sector structure after the second wave of turbulences. Since 2004, over 90% of the Croatian banking industry capital has been under control of eight foreign banking groups. Privredna banka and Zagrebačka banka are two biggest banks operating in Croatia. Together, counted by assets their sector share accounts for over 40%.

The Bosnian banking sector should be described not only by changing number of banks, but also by engagement of foreign investors. M&A transactions were main way of FDI in financial sector in this country. Looking at numerous foreign banks operating in B&H market, we can see that most

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

of them chose acquisitions to start their operations. Very important motive for acquisitions, instead of new ventures, was the fact that all acquired domestic banks had a strong wide network of branches and appropriate workforce which a new venture could never get in the short term. This trend, together with the legal requirement of minimum level of bank capital, forced small domestic banks to seek for foreign investors, which through mergers and acquisitions would allow to achieve the required level of capital and to survive in a highly competitive market.

While arguably still overbanked, by 2004 the number of banks in Serbia was cut to 43 - about one third of the 1995 peak (EBRD, 2005). Over the next few years, state ownership of the banking sector decreased and foreign banks increased their dominance. Through privatization, the share of state-owned banks declined to 15% of total assets in mid-2009. Privatization of banks resulted in foreign ownership of approx.75% of the banking sector, with subsidiaries of Austrian (27%), Greek (16%), and Italian banks (15,4%) keeping largest shares. Foreign ownership and presence in the banking sector became a crucial part of bank privatization in transition countries (Bonin, Hasan and Wachtel, 2005, p. 31-53). There was a particular need to reestablish public confidence in banks in Serbia. Serbia started late with fully fledged bank privatization. EBRD support encouraging foreign banks to enter and the presence of foreign banks provided such strong signals to the economy and investors that helped to restore confidence (Bastian, 2003). In 2006 the EBRD acquired a 25% stake in Komerciljalna Banka and National Bank of Greece bought Vojvidjanska Banka. Consequently, the market share of foreign banks rose. So far growth has been driven more by private consumption and FDI in Serbia than by domestic financial intermediation, but strong presence of foreign banks is likely to change this trend. In addition to the provision of financial services at market standards, foreign banks play a special role in meeting expectations by market participants, sending visible signals of change (Vives, 1996). For banks to fully reach their potential in bringing about healthy economic growth in Serbia, it was imperative to find a solution to the highly sensitive territorial issues, overcome the legacy of workers self management system and still pending enterprise restructuring.

Conclusions

Concentration of the banking sector, as measured by both HHI and CR5 indices changed during the quoted period, as a result of the consolidation of the sector. Also the number of institutions operating in this sector changed. In EU member states, trend of decreasing sector concentration is observed, accompanied by increases and decreases in numbers of credit institutions. The situation in banking sectors in the Western Balkans differed significantly, which could be explained by strong economic ties, particularly with Germany and Austria. It should be noted that the organizational integration of the Western Balkan banks with banking groups from Western Europe has not been accomplished to date. In terms of strategic decisions, acquisitions of local banks by foreign investors can be considered a harvesting strategy aimed at the benefits available in the sector which has not been fully developed yet. The relations between parent companies and their subsidiaries may evolve depending on the development of the general market conditions.

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18-19 June 2015, Economics and Finance**

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Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
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**Export Specialization in Services
of the Visegrad Countries**

JEL Classification: *F14; F15*

Keywords: *international trade; services; specialization; comparative advantage; Visegrad countries*

Abstract: The importance of services and the international trade in services is growing systematically. There are some reasons for that, especially the rapid development of IT technologies. This increase in the international trade in services is a global phenomenon, however there are some other specific issues, other than economic or technological, that might influence the trade in services in particular countries. As for the countries of the Central and Eastern Europe such a factor could be the accession to the European Union (EU).

The objective of the paper is to analyse the export specialization of the Visegrad countries in the international trade in services and how it changed over seven years after the EU accession. The service sector comprises of a variety of highly heterogeneous economic activities and the diversity of services is also reflected in the international trade of particular countries. Generally the trade theories deal with trade of goods, but there are some attempts already to apply these theories for services. To find out the export specialization based on the comparative advantage in particular services, the main categories of services are analysed based on the adjusted RCA index assumptions. Analysis prepared in the paper is based on the balance of payment statistics provided by the WTO.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The article is concluded by discussing the questions about the export specialization of particular countries and how it changed after the accession to the EU.

Introduction

The importance of services in the economies is growing over the years. Services are also the growing component of the international trade worldwide. This same phenomenon applies to the economies of the Czech Republic, Hungary, Poland and Slovakia. These four Central European countries constitute the Visegrad Group - an alliance established in 1991 for the purposes of cooperation and furthering their European integration. In the last two decades those countries experienced significant changes in their political and economic development. The first change was a shift from the socialist planned economy to the market economy at the beginning of the nineties followed by signing the CEFTA agreement on the gradual creation of a free trade area between the Central European countries. And the second major change was the accession to the European Union in 2004. All those changes enabled the Visegrad countries to open to new markets and take advantages of the international trade not being bound to the previous agreements and boundaries of the Council for Mutual Economic Assistance (COMECOM). For all four states this freedom has resulted in increase of international trade, both in goods and services.

The basic objective of the paper is to analyse the export specialization of the Visegrad countries in the international trade in services using the Revealed Comparative Advantage (RCA) index and how it changed over time. The special emphasis is put on the period of accession to the European Union to find out if there was any influence of it on the Visegrad countries' international trade in services.

Methodology of the research.

Services are a very specific economic category. There are some discussion in the literature how to define services and how to measure the trade in services. In the paper there are two concepts of services tradability presented. Trade theories based on a concept of comparative advantage are widely used to analyse the trade in goods, however it is last two decades when economists have begun to examine how these theories might be applied to trade in services. In the second part of the study the theoretical framework for the revealed comparative advantage concept is presented, followed by a

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

discussion on usefulness or criticism on the application of this concept to the interpretation of patterns in the trade in services. The RCA index was constructed for the trade in goods purposes, but with setting two assumptions it might be used for analyzing the international trade in services as well.

The theoretical part of a study is followed by describing results. Firstly, the international trade in services if the Visegrad countries is analysed as for a volume and the share in the world's exports of services for years 1993-2011. Analysis is based on the balance of payment statistics provided by the WTO. The core part of the study starts with a calculation of RCA indices for each of the Visegrad countries corresponding to main types of services, such as: transportation, travel, communication services, construction, insurance services, financial services, computer and information, royalties and license fees, other business services, and finally personal, cultural and recreational services. The government services are not included. For the given RCA indices the trend analysis is made and time trend coefficient checked for significance at the 5% level. Then the tests of series are carried to examine whether the values of RCA for the Visegrad countries before the accession to the European Union were significantly statistically different from the values after the accession. The year 2004 is taken as a first year of the European Union membership. Test of series was used to verify if the RCA index values were random (null hypothesis) or if a country's accession to the EU has resulted in statistically significant changes in the RCA values (alternative hypothesis). The level of significance was set at 0.05. The paper is concluded with a summary of achieved results.

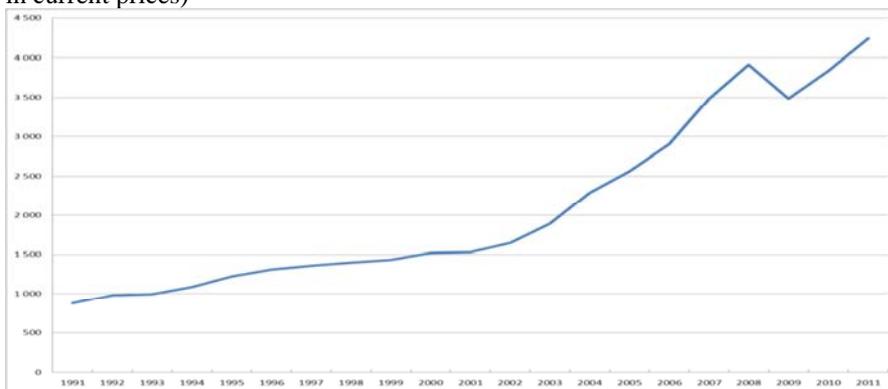
International Trade in Services.

Services in recent decades have come to play an increasingly important role in national economies (compare Francois & Hoekman, 2010, 642-692). Their share in GDP as well as in the creation of jobs is increasing. However, the growing importance of the services sector for the economies and economic growth does not correspond to the same extent on international trade in services. For many years, services have been considered as non-tradable due to specific features such as invisibility, non-storability, requirement of the physical contact between suppliers and consumers, close ties to movement of production factors (labour, capital), high level of specialisation and high trading costs (Grunfeld & Moxnes, 2003; Markusen, 2005). But recent years brought a significant change and services became

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

internationally traded to much higher extent. This phenomenon is noticeable especially since the beginning of XXI century (Fig.1). That resulted from two main factors: firstly due to the progress in communication technology and, secondly, due to the emergence of “new economy services”, such as e-commerce, software production and other services (IMF, 2003). With the development of technology the perception of services has changed. The possibilities provided by modern information and communication technologies have allowed for a relatively high degree of "independence" of services. In some cases, the usage of telecommunication or ICT networks has eliminated the proximity constrains. This allowed for breaking some ties between providers and consumers of services. Also an increase in the production of intermediate services and the growing importance of the outsourcing processes are largely responsible for the growth of international trade in services (Lennon, 2009).

Figure 6. Volume of world's export of services in years 1993-2011 (billion USD in current prices)



Source: own calculations based on WTO database (TsExports04564917).

Discussing international trade in services one has to be concerned with a problem of how to measure it. In the literature there are two definitions of international mobility of services: first one used by IMF or WTO and another one used by GATS. The first definition assumes that international trade occurs only when the two parties involved reside in two different states. These transactions are covered by balance of payments statistics and consist of the following categories of services: transportation, travel and other services: communication services, construction services, computer and information services, insurance, financial services, royalties and license

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

fees, other business services, personal, cultural and recreational services, government services.

Much wider definition was accepted in GATS, where four modes of supply were recognized:

- mode 1 - cross-border supply
- mode 2 - consumption abroad,
- mode 3 - commercial presence (foreign direct investments),
- mode 4 - presence of natural persons (compensation of employees and workers' remittances as approximate indicators of the mode).

This concept of mobility of services identifies all services as tradable (they can be provided and consumed under one mode or another) and covers all possible ways they can be delivered internationally (Kužnar, 2007).

The data collected by IMF or WTO based on the balance of payments that apply to the first definition do not correspond with the GATS's modes of supply. For this paper purpose we are using the nomenclature of trade in services used by the WTO, although we will not consider government services in this study.

Revealed Comparative Advantage – Theoretical Framework

The concept of comparative advantage was introduced by David Ricardo in 1817. Since then many economists have expanded the basic theoretical framework developed by Ricardo. They also tested the extent to which the theory of comparative advantage can be used to explain existing patterns of trade, however it is only in recent years that they have begun to examine how the existing theories could be applied to services (Feketekuty, 1988).

Comparative advantage means that every country can gain from trade if it concentrates its energies in the industries that make the best use of its resources and skills (Feketekuty, 1988). Therefore according to trade theories countries usually tend to specialize in exports of those services where they have a comparative advantage (Balassa, 1965; Deardoff 1985).

Generally trade theories deal with trade in goods, but considering the growing importance of services in the international trade, there are some discussions on trade theories for services going on (Deardoff, 1985; Stern & Hoekman, 1987; Snape, 1990; Stibora & De Vaal, 1995; Markusen, 2005). Although services in their characteristics differ significantly from goods, it might be assumed that to some extent the general ideas of trade theories for goods can be also applied to services and they can give some

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

useful insights about trade in services (Hindley & Smith, 1984; Stern & Hoekman, 1987; Feketekuty, 1988). The problem with trade in services is that it is largely invisible and it is tied to the international flow of persons, information, capital and good, and it is closely tied to foreign investments in the importing country. Therefore it is difficult to identify precisely what is being traded. But Feketekuty (1988) underlies that the unique characteristics of trade in services do not invalidate the application of existing international trade theory, but the existing theory will have to be expanded to deal with the unique aspects of trade in services.

There is also some criticism on the applicability of the concept of comparative advantage to international trade in services. Prieto (1989) argues that to extend to which markets become increasingly globalized, the concept of comparative advantage ceases to be relevant as in the theory it is valid only when there is no mobility of production factors. He also points out that more than endowment of physical resources (land and capital) there are few other key elements that determine comparative advantage in trade in services. These are: information resources, country's telecommunication infrastructure, orientation and volume of funds spent on investment and development, level and skill of labour, and the reliability projected by a given service supplier. The importance of other factors than physical endowment is also recognised by Daniels (1993) and Langhammer (2004). Daniels in case of trade in services sees the importance of finance capital, political and cultural factors, characteristics of human capital, the pattern and level of existing development in a country. While in the opinion of Langhammer (2004) comparative advantage for service trade cannot be compared to comparative advantage for goods trade because it follows other determinants such as existences of different modes of supply, domestic policy factors and specifics of factor movements.

Although all the discussion for and against it, the concept of comparative advantage has already a permanent place in the economic literature. But the question of how to measure it is still discussed. Attempts to quantify the comparative advantage has been taken by many economists: eg. Liesner (1958), Balassa (1965), Donges & Riedel (1977), Bowen (1983), Vollrath (1991), Dalum et al. (1998), Laursen (1998), or Proudman & Redding (2000).

Initial work on the determination of the strengths of the economy by analysing the structure of exports was carried by Liesner in 1958. Similar approach was adopted by Bela Balassa in 1965 by publishing a formula that allows the identification of areas of the economy, where a country has a

comparative advantage. Index Revealed Comparative Advantage is currently the most commonly used indicator to measure the competitive position in international trade (Mongiało, 2007; Lee, 2010). The traditional formula for this indicator was the subject of much criticism and attempts were made to modify it (Laursen, 1998; Yeats, 1985; Proudman & Redding, 2000). However, the primary version of the index remains popular and is widely used in the literature.

Originally the RCA index was concerned with trade in goods (OECD, 2003). This was a consequence of the development of the theory of international trade. But a stable growth in international trade in services as a result of globalization, technological changes, stronger international economic relations, especially between developed countries, was the impetus for the theoretical and empirical analysis explaining the issues of international trade in services (Wróbel, 2009). This index was created for international trade in goods, however with setting up two assumptions it might be used for analysing international trade in services (Deardoff, 1985; Mongiało, 2007). Those assumptions are as follow: 1. trade model reflects relative costs and differences in elements other than prices, 2. trade emerges between countries as a result of differences in endowments of economic resources, not as result of differences in technologies.

Revealed Comparative Advantage (RCA) index is defined as (Balassa, 1965):

$$RCA_{ij} = \frac{X_{ij} / \sum_i X_{ij}}{\sum_j X_{ij} / \sum_i \sum_j X_{ij}}$$

X_{ij} – exports of sector i from country j

$\sum_i X_{ij}$ – total exports from country j

$\sum_j X_{ij}$ – exports of sector i from the reference group

$\sum_i \sum_j X_{ij}$ – total exports from the reference group

The RCA index is a key indicator that measures the degree of export specialization in a particular product or industry. The equation defines export specialisation in terms of country j 's share in relevant group of countries exports of product i in relation to country j 's share of total services exports in reference group total services exports. In other words it expresses if the country possess a comparative advantage in the international ex-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

ports of goods or groups of goods in relation to the share of the country's total exports in exports of countries taken as a benchmark. As a reference (benchmark) group, it can be taken a set of countries which provides a sufficient information on trade. Traditionally there are two sources of data used: OECD and World Trade Organization (WTO). Therefore choosing one of those two sources the reference group is defined. For this paper the WTO database was used.

The RCA can range from 0 to infinity. When RCA index equals 1 for a given sector in a given country, the percentage share of that sector is identical with the reference group average. When RCA is above 1 the country is said to be specialized in that sector exports, while the RCA is below 1 then there is no specialization. The closest to 0 the less important is that given sector in the country's export. And vice versa – the higher result the domination of particular sector in the country's exports is greater.

International Trade in Services of the Visegrad Countries

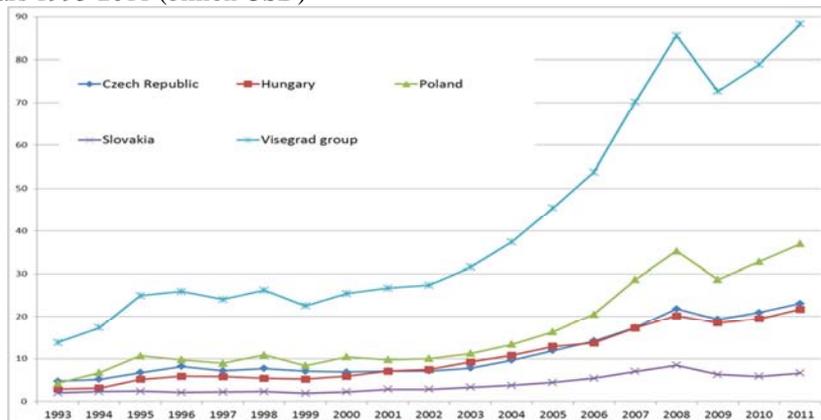
The world's international trade in services in 2011 accounted for 4 243,3 billion USD. The major players in terms of their export share were developed countries: The United States (13,96% of world's trade in services), the United Kingdom (6,75%) and Germany (6,08%). The total export of the Visegrad group amounted to 88,2 billion USD (2,08%). And individually Poland was placed on the 31 position among 185 countries that had reported to the World Trade Organisation (with 0,86% of share in the world trade in services), the Czech Republic placed 36 (0,53%), Hungary 37 (0,50%) and Slovak Republic 62 (0,15%).

Taking into account changes over time after the increase in the first half of nineties the share of the Visegrad countries in the world's trade in services decreased and stayed around the level of 1,6% for few years. The accession to the European Union had a positive impact on international trade in services for all four Visegrad countries what resulted in significant increase in volume of service trade for the Group (37 billion USD in 2004 up to 88 billion USD in 2011) and in increase in its share in the world's trade (1,63% in 2004 up to 2,19% in 2008 and 2,08% in 2011) (Fig. 2 and 3).

Specialisation in Exports of Services.

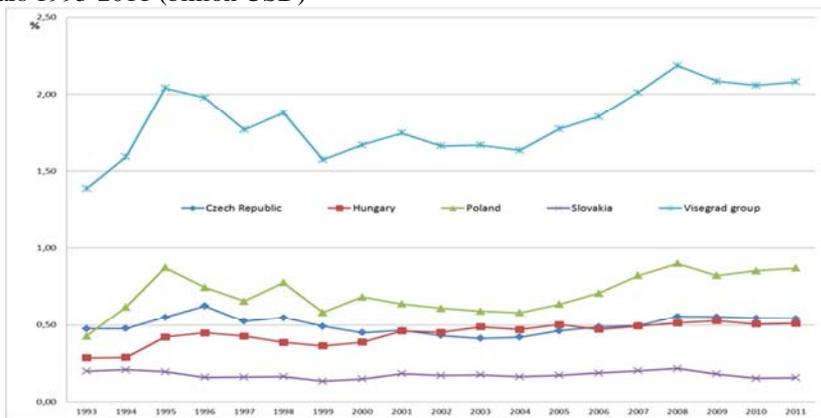
The service sector comprises of a variety of highly heterogeneous economic activities. This diversity of services is also reflected in the international trade of particular countries (Table 1).

Figure 2. Volume of international exports of services for the Visegrad countries in years 1993-2011 (billion USD)



Source: own calculations based on WTO database (TsExport04564917).

Figure 3. Volume of international exports of services for the Visegrad countries in years 1993-2011 (billion USD)



Source: own calculations based on WTO database (TsExport04564917).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 10. The RCA Indices for the Visegrad Countries.

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Transportation												
Czech Republic	0,90	0,96	1,13	1,30	1,29	1,11	1,11	1,18	1,08	1,23	1,18	1,17
Hungary	0,39	0,37	0,44	0,52	0,56	0,75	0,88	0,88	0,86	0,94	0,94	1,03
Poland	1,04	1,24	1,51	1,68	1,43	1,51	1,55	1,46	1,36	1,53	1,30	1,41
Slovakia	1,97	1,63	1,92	2,01	1,83	1,63	1,61	1,45	1,51	1,51	1,49	1,56
Travel												
Czech Republic	1,38	1,42	1,40	1,59	1,55	1,50	1,59	1,59	1,46	1,44	1,37	1,31
Hungary	2,01	1,92	1,68	1,54	1,30	1,18	1,19	1,10	1,20	1,22	1,12	1,03
Poland	1,73	1,55	1,44	1,27	1,54	1,42	1,35	1,46	1,35	1,24	1,18	1,14
Slovakia	0,61	1,10	0,88	0,91	0,86	1,01	1,07	1,15	1,24	1,48	1,55	1,51
Communications services												
Czech Republic	0,81	1,31	1,11	0,59	1,01	1,43	1,28	1,46	1,11	1,07	1,05	0,92
Hungary	0,53	0,59	0,78	1,01	1,20	1,15	1,19	1,07	1,08	0,95	0,98	0,73
Poland	1,02	0,90	0,76	0,97	0,99	0,82	0,79	0,74	0,70	0,84	0,69	0,65
Slovakia	1,04	0,89	0,95	1,03	0,98	1,11	1,92	1,53	1,47	1,29	1,33	0,71
Construction												
Czech Republic	1,20	1,06	0,80	0,69	0,60	0,91	0,67	0,77	0,80	0,89	1,89	1,53
Hungary	0,80	0,66	1,13	1,03	0,76	0,62	1,23	1,24	1,11	0,94	0,84	0,88
Poland	1,40	2,12	2,56	3,14	2,41	2,41	2,56	2,29	1,93	1,83	1,64	1,68
Slovakia	1,49	1,17	0,85	1,25	1,49	1,22	0,68	0,71	0,77	0,71	1,14	1,46
Insurance services												
Czech Republic	0,02	0,06	0,05	0,01	0,03	0,28	0,25	0,26	0,46	0,53	0,62	0,63
Hungary	0,16	0,13	0,07	0,12	0,15	0,03	0,05	0,06	0,07	0,05	0,07	0,08
Poland	1,19	1,04	0,79	0,68	0,19	0,22	0,22	0,03	0,19	0,04	0,26	0,55
Slovakia	0,32	0,16	0,21	0,18	0,21	0,11	0,09	0,15	0,23	0,50	0,31	0,26
Financial services												
Czech Republic	0,84	0,44	0,41	0,35	0,66	0,51	0,36	0,20	0,11	0,05	0,04	0,05
Hungary	0,38	0,37	0,31	0,32	0,35	0,16	0,15	0,17	0,16	0,13	0,12	0,12
Poland	0,15	0,28	0,21	0,22	0,18	0,19	0,14	0,16	0,20	0,20	0,24	0,18
Slovakia	0,25	0,15	0,37	0,27	0,36	0,45	0,35	0,46	0,31	0,67	0,10	0,07
Computer and information services												
Czech Republic	0,43	0,50	0,56	0,24	0,35	1,31	1,52	1,21	1,25	1,22	1,07	1,32
Hungary	0,64	0,72	0,74	0,66	0,74	0,71	0,83	1,06	1,09	1,12	1,09	1,04
Poland	0,18	0,25	0,27	0,30	0,35	0,29	0,44	0,50	0,52	0,55	0,83	0,97
Slovakia	0,73	0,70	0,69	0,63	0,74	0,63	0,70	0,65	0,70	0,81	1,04	1,43
Other business services												
Czech Republic	0,96	0,97	0,94	0,78	0,70	0,76	0,75	0,81	1,05	0,98	0,99	1,04
Hungary	0,65	0,62	0,83	0,95	1,07	1,09	1,10	1,13	1,16	1,08	1,13	1,22
Poland	0,58	0,57	0,53	0,59	0,61	0,69	0,76	0,77	0,94	1,01	1,16	1,07
Slovakia	1,05	0,74	0,83	0,72	0,72	0,74	0,70	0,69	0,69	0,51	0,57	0,53

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Royalties and license fees												
Czech Republic	0,12	0,10	0,12	0,12	0,07	0,06	0,04	0,04	0,05	0,08	0,08	0,07
Hungary	0,34	0,25	0,86	0,64	0,87	1,11	0,72	0,97	0,78	0,72	0,88	0,77
Poland	0,06	0,09	0,06	0,05	0,04	0,07	0,03	0,06	0,12	0,06	0,12	0,12
Slovakia	0,13	0,13	0,25	0,28	0,28	0,29	0,30	0,39	0,35	0,24	0,13	0,01
Personal, cultural and recreational												
Czech Republic	1,72	1,57	1,57	0,99	1,48	0,61	0,66	0,96	0,52	0,60	0,78	0,89
Hungary	2,25	5,90	4,82	6,44	7,75	7,93	6,25	6,77	4,62	4,99	5,52	4,91
Poland	0,31	0,47	0,41	0,36	0,49	0,46	0,58	0,57	0,54	0,42	0,81	1,16
Slovakia	1,55	1,69	1,61	1,48	2,36	2,24	2,29	3,92	1,38	1,05	1,03	1,67

Bold

- RCA above 1

Source: own calculations based on WTO database (TsExport04564917).

For the given RCA indices time trend analysis was made and time trend coefficient check for significance at the 5% level. There were also tests of series carried to examine whether the values of RCA for the Visegrad countries before the accession to the EU were significantly statistically different from the values after the accession in 2004 (the year 2004 was taken as a first year of the European Union membership). Test of series was used to verify if the RCA index values were random (null hypothesis) or if a country's accession to the EU has resulted in statistically significant changes in the RCA values (alternative hypothesis). The level of significance was set at 0.05.

Table 2. The Estimated Time Trend Coefficient of RCA Indices.

<i>Services</i>	<i>Czech Republic</i>	<i>Hungary</i>	<i>Poland</i>	<i>Slovakia</i>
Transportation	0,014	0,065	0,012	-0,042
Travel	0,008	-0,044	0,035	0,044
Communication	0,008	0,023	-0,026	0,025
Construction	0,043	0,012	-0,044	-0,023
Insurance	0,063	-0,007	-0,007	0,010
Financial services	-0,061	-0,027	-0,001	0,000
Computer and information	0,095	0,048	0,061	0,041
Royalties and licence fees	-0,004	0,035	0,004	-0,003
Other business services	0,010	0,048	0,057	-0,034
Personal, cultural and recreational	-0,095	0,046	0,048	-0,015

bold - statistically significant at the 5% level

- test of series – statistically significant change in 2004

Source: own calculations based on WTO database (TsExport04564917).

Transportation services

Transport is usually one of the biggest sub-sectors of services in terms of its share in the national economy and in employment. It is also very heterogeneous itself, consisting of sea, air and other including land, internal waterway, space and pipeline transport services that are performed by residents of one economy for those of another, and that involve the carriage of passengers, the movement of goods (freight), rentals (charters) of carriers with crew, and related supporting and auxiliary services (WTO, 2013). The significance of that sub-sector depends on few factors whether the most important ones are geographical location and transport infrastructure.

The country with the highest RCA in transport services is Slovakia. In the pre-accession time the share of exports of transport services in the total Slovakia's exports was very high. The accession to the European Union in 2004 resulted in decrease of the RCA values to 1,5 level, however it is still the highest RCA in this sub-sector amongst the Visegrad countries. Also Poland specialises in exports of transport services – the RCA values are above 1 and there were no significant changes in the level of RCA during the analysed time, however after accession to the EU the situation in the exports of this sub-sector was stabilised. For the Czech Republic and Hungary there was an increase in specialization in transport services (both has statistically significant trends). Especially Hungary has noticed a very positive trend towards the specialisation in exports of transport services.

For all four countries the accession to the European Union had an impact on their exports specialisation in transport services, although it was different for different countries. The impact on the Czech Republic and Hungary was positive and the exports specialization in transport services was improving, in Poland the level of exports specialization stabilized, whether Slovakia was losing its dominance.

Travel services

Travel services are a broad category that includes goods and services acquired by personal travellers, for health, education or other purposes, and by business travellers. Unlike other services, travel is not a specific type of service, but an assortment of goods and services consumed by travellers. The most common goods and services covered are lodging, food and beverages, entertainment and transportation (within the economy visited), gifts and souvenirs (WTO, 2013).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

At the beginning of the analysed time three out of four Visegrad countries specialised in exports of travel services: Hungary, Poland and the Czech Republic. Since 2004 all four countries had RCA above 1, although only for Slovakia the RCA values show a statistically significant upward trend and in 2011 Slovakia was specialized in exports of travel services in the highest extend. For other three countries time trend coefficient was negative. The largest decrease was noted for Hungarian exports specialisation, however accession to the EU had slowed down the decline. For the other Visegrad countries the accession to the European Union had no significant importance for their exports specialisation in travel services.

Communication services

Any of the four Visegrad countries had a permanent exports specialisation in communication services, which is a very broad category and encompass the transmission of sound, images or other information by telephone, telex, telegram, radio and television cable and broadcasting, satellite, electronic mail, facsimile services etc., including business network services, teleconferencing and support services. Also included are cellular telephone services, internet backbone services and on-line access services, including provision of access to the internet (WTO, 2013).

Before 2004 values of the RCA indices varied significantly for all countries. After the accession to the EU in 2004 there was firstly an increase in exports specialisation in the sub-sector for Slovakia, the Czech Republic and Hungary, but since 2006/2007 there was a downturn in RCA values. There is no export specialisation in communication services for Poland and calculations show that revealed comparative advantage in this sub-sector for Poland was characterised with statistically significant negative trend. The accession to the EU had no a significant impact on exports specialisation for any of the Visegrad countries.

Construction services

In the exports of construction services, which cover work performed on construction projects and installation by employees of an enterprise in locations outside the territory of the enterprise (WTO, 2013), the Visegrad countries are differentiated. The highest level of specialisation was recorded in Poland, however since 2003 there was a significant slowdown in the exports share (from 3,14 in 2003 to 1,63 in 2011). For the other countries

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

RCA indices did not indicate a specialisation in exports of construction services, although after 2009 the exports in this sub-sector revealed increase in comparative advantage for the Czech Republic and Slovakia. For all Visegrad countries the test of series shows that the accession to the EU had no significant statistical effect on their exports specialisation in construction services.

Insurance services

Insurance services are the very specific ones. They might be traded internationally, however traditionally customers prefer direct contact with insurers, especially when claims procedures are being proceeded. None of the Visegrad countries revealed exports specialisation in insurance services. Only for Poland prior to 2003 RCA indices in exports of insurance services achieved levels above or close to 1. After 2003 the share of these services in Poland's exports significantly dropped down.

Low RCA indices for exports of insurance services might be explained twofold. First that most of the insurance services might be internationally traded in the form of foreign direct investments. And secondly, since the end of nineties the ownership structure in insurance companies operating in the Visegrad countries was changing significantly towards the greater share of foreign capital (e.g. in Hungary insurance companies are nearly 100% foreign owned) what influenced the level of exports and imports of insurance services.

As the tests of series revealed Poland was the only of the Visegrad states that accession to the EU had an impact on exports specialisation in this sub-sector.

Financial services

In the financial services sub-sector the situation is nearly the same as for the insurance services, usually because financial services and insurance services are very closely related. Very often these same financial institution (e.g. banks) offer both financial and insurance products. Financial services as a sub-sectors cover financial intermediation and auxiliary services provided by banks, stock exchanges, factoring enterprises, credit card enterprises, and other enterprises (WTO, 2013).

Calculations of the RCA show that none of the Visegrad countries has revealed comparative advantage in exports of the financial services. More-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

over time trends are negative and statistically significant. The worst situation during the analysed time appeared in the Czech Republic where the slope was negative in the highest extent out of all four Visegrad countries.

During the whole analysed period of time the situation in the exports of financial services sub-sector was decreasing steadily and there was no significant impact of the accession to the European Union. However due to the lack of data prior to year 2000 do not allow for more in-depth analysis if the association agreements with the EU and opening of the Visegrad countries financial services markets to the foreign direct investments of the financial institutions from the European Union Member States had no a direct influence on such low levels of comparative advantage in exports of financial services in the Visegrad states.

Computer and information services

Computer and information services are subdivided into computer services (hardware and software related services and data processing services), news agency services, and other information provision services (database services and web search portals) (WTO, 2013). This type of services gains importance since the nineties as the development of new technologies is progressing.

In this services sub-sector all Visegrad countries noted statistically significant positive trends. The Czech Republic, Slovakia and Hungary noted increasing comparative advantage over analysed time reaching RCA indices above 1. Poland was the only state that was characterised by RCA below 1, however the share of computer and information services in total Polish exports was permanently increasing. The increasing role of these services in exports seems to be a natural process while test of series has not revealed any significant impact of the EU's accession except for the Czech Republic.

Royalties and licence fees

The royalties and licence fees cover payments and receipts for the use of intangible non-financial assets and proprietary rights, such as patents, copyrights, trademarks, industrial processes, and franchises (WTO, 2013). These services arise usually as effects of research and development investments as well as investments in education and technology. These investments in countries of Central and Eastern Europe tends to be rather low and as a

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

result any of the Visegrad countries specialize in exports of royalties and fees. In overall their competitive position in this category of services was very low. The best position in this sub-sector was noted for Hungary, however only in 2005 the RCA for Hungary exceeded 1. The accession to the European Union had not a special impact on exports of those services in any of the Visegrad countries.

Other business services

Other business services consist mainly of business-to-business services and they are characterised by Markusen (2005) as knowledge-intensive requiring a high initial investments in human capital. This is a sub-sector that is intensive in skilled labour and whose final products are highly differentiated. These category includes trade-related services, operational leasing (rentals), and miscellaneous business, professional and technical services such as legal, accounting, management consulting, public relations services, advertising, market research and public opinion polling, research and development services, architectural, engineering, and other technical services, agricultural, mining and on-site processing (WTO, 2013).

During the analysed period only Slovakia was constantly losing its competitiveness in other business services. Other three countries were systematically increasing exports of those services achieving in 2011 the level of RCA above 1 for all of them.

The accession to the European Union had statistically significant positive effect on exports of Hungary and Poland. In case of Poland exports of other business services accelerated to reach 1,01 in 2009 from 0,53 in 2002, whether for Hungary since 2004 the comparative advantage measured by RCA was stabilised on the level above 1.

Personal, cultural, and recreational services

Personal, cultural, and recreational services are subdivided into two categories: audiovisual services and other cultural and recreational services. The first component includes services and fees related to the production of motion pictures, radio and television programmes, and musical recordings. The second category services includes services such as those associated with museums, libraries, archives, and other cultural, sporting, and recreational activities (WTO, 2013).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The country that highly specialises in personal, cultural and recreational services is Hungary. It noted the highest level of RCA index in 2005 (7,93), and since then its competitiveness was slightly decreasing, however it still stayed above 5. Also Slovakia specialised in exports of this category of services. On the other extreme is Poland where the competitive position was quite low until recent years. The Czech Republic was losing its competitiveness and since 2004 the comparative advantage index was achieving values below 1. The Czech Republic was also the only of the Visegrad countries for which the test of series revealed a significant negative impact of the accession to the European Union on the share of this category of services in the country's total export.

Conclusions

Services are growing in importance in international trade for all four Visegrad countries. There are 10 main categories of services covered by the WTO statistics: transportation, travel, communication services, construction services, computer and information services, insurance, financial services, royalties and license fees, other business services, as well as personal, cultural and recreational services. To find out the Visegrad countries degree of specialisation in international trade in different types of services the Revealed Comparative Advantage index was calculated. We found out that in years of 2000-2011:

- The Czech Republic specialised in transportation, travel, communication services as well as computer and information services. But during that time it lost its competitiveness in personal, cultural and recreational services.
- Hungary specialised in personal, cultural and recreational services. The level of competitiveness in this type of services was overwhelming all other types of services in Hungary's exports and it was the highest level amongst all Visegrad countries. Hungary specialised also in exports of travel and communication services, and with time it gained competitiveness in computer and information services as well as in other financial services.
- Poland had the greatest comparative advantage in construction services followed by transportation services and travel services. After 2009 there was an increase in specialisation in other business services.
- Slovakian comparative advantage was the greatest in transportation services and personal, cultural and recreational services. This country

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

specialised also in exports of travel services, communication services and construction services. At the end of analysed period computer and information services were gaining a greater share in Slovakian total exports of services.

- All Visegrad countries had a very low level of comparative advantage in exports of insurance and financial services as well as in royalties and licenses fees.

In 2004 the Czech Republic, Hungary, Poland and Slovakia became members of the European Union. Based on results of test of series we noticed that the accession to the EU had some positive effects on total exports of services for the whole Visegrad group. However this influence was different for particular countries and types of services. For all Visegrad countries the influence of the membership had an effect on exports of transportation services. Although for the Czech Republic and Hungary this impact was positive, for Slovakia negative and for Poland the accession to the EU had a stabilising effect on exports of transportation services. The positive impact of the EU membership was noted in exports of computer and information services in the Czech Republic and in exports of other business services for Hungary and Poland. Also the influence of membership on the exports of travel services for Hungary should be appraised as positive while it hampered the rapid decline in the comparative advantage that Hungary experienced in the pre-accession time. On the other hand, the negative effect of the accession was noted for exports of insurance services of Poland.

Conclusions based on the calculations of the RCA and test of series are that in years of 2000-2011 all Visegrad countries experienced changes in the level of their export specialisations in different types of services, but the very moment of the accession to the European Union had not a special impact on those changes, while they rather emerged from the natural economic development and changes in the national economies deriving from the harmonisation and adaptation to the requirements of the European Union membership that started after signing the association agreements at the beginning of nineties of twentieth century.

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Monopolistic Markups in the Polish Food Sector

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Keywords: *markups fluctuations; Polish food sector; market power*

Abstract: Agri-food sectors are commonly considered as highly regulated, traditional and of strategic importance, mainly due to the food security issues. Changes in the related market structures are subject of constant interest because of their importance for competition and economic welfare of food producers and consumers. In Poland, a rising concentration among various branches of the food industry can be observed. The main objective of the article was to depict the changes of the market power execution in the Polish food sector and its branches in the period 2002-2013. As a measure of this phenomenon the markups of price above the marginal cost were applied and for their estimation two methods were used, namely the Roeger method involving primal and dual Solow residuals and the method based on the marginal cost of labor. Yearly data for 32 food sector branches and various accounting categories were used in the calculations. It was found that in the analyzed period the markup over marginal cost on average amounted to 10.4% and it was increasing over time. The labor input category seemed to be not sufficient for the markup calculation. The evolution of the monopolistic power in the Polish food sector appears to be associated not only with the business cycle, but also with the sector developments accelerated by the accession to the EU. Moreover, the differences in results for the branches indicate a considerable heterogeneity in the Polish food industry companies pricing practices.

Introduction

The market structures in the food sector are subjected to constant changes. As early as in 1966 in the report prepared by the US National Commission on Food Marketing it was admitted, that the concentration in many branches of the U.S. food sector reached too high, undesirable level, and the marketing and promotion expenses were excessive. It was also found, that through mergers and acquisitions companies are getting bigger exceeding sizes needed to maintain their operational efficiency (Sexton, 2000, pp. 1087-1104). The intensification of the concentration processes in the agro-food sector has a worldwide character and has been noticed in many countries for a long time. Figiel & Kufel (2013) proved high and statistically significant correlation between the value of the world agro-food production and the value of mergers and acquisitions in the world in the period 2000-2010.

Also in the Polish food industry concentration processes occur. In 2010 companies hiring more than 250 workers, constituting only 1.7% of all nearly 16 thousands companies operating in the sector, made 36.9% of all employment and 54.1% of all production value. Three capital groups generated 85.7% of revenues in the oil manufacturing, 78.5% in brewing manufacturing, 76.9% in tobacco industry, 75.6% in potato manufacturing and 69.6% in sugar manufacturing. In the period 2003-2010, while the production value increased from 102.7 to 158,9 billions of zł, the number of entities decreased from 19.52 to 15.97 thousands. The concentration ratio in sales in 2013 amounted to 0.79 in the food production, in the production of beverages – 0.66, and in tobacco industry – 0.37. It is also envisaged, that the process of concentration in the food sector will be continued and the role of large firms will grow (see Szczepaniak, 2012, pp. 78-87).

Potentially, a high concentration can contribute to non-competitive conduct of the main players in the industry, leading to higher markups of price above the marginal cost¹. There are plenty of research results concerning relation between concentration and market performance, e.g. (Tirole, 1988; Carlton & Perloff, 2005, pp. 263-267) and it turns out that most of the time the relation between these variables is positive and statistically significant, but weak. Therefore, increasing concentration in the Polish food sector data may be a sign of the increasing markups, what may influence competition and economic welfare of food producers and consumers. However, this

¹ This paradigm is known as Structure-Conduct-Performance (SCP) hypothesis.

may not be truth, as already in 70-ties it was proved, that the positive correlation between concentration and market performance is consistent with the increasing effectiveness hypothesis, as the company may create innovations, which decrease costs and improve quality. This makes it possible to increase markups and profits, as well as to gain dominant position in the market, what accelerates the concentration processes (compare Demsetz, 1973, pp. 1-9).

Consequently, the main aim of the article is to depict changes of monopolistic markups in the Polish food sector in the period 2002-2013. Moreover, two additional research questions were formulated. Firstly, can the markup be considered as a symptom of market power? Secondly, were labor markups changes good indicators of market power execution changes in the Polish food sector in the period 2003-2012? In order to answer the first question, the concept of markup and its estimation methods will be presented. Afterwards, the key aspects of methodology for markup estimation will be discussed, in particular the Roeger (1995) and the Rotemberg & Woodford (1999) methods. Then, the results of applications of both methods will be showed and compared in order to assess the appropriateness of the second method for the Polish food sector.

It needs to be added, that there have been no enough extensive attempts to measure market power in the Polish food sector and the main point has been rather to discover the price transmission mechanism or the power distribution among the food marketing chain actors (compare Seremak-Bulge, 2012, pp. 5-24; Urban, 2001, pp. 1-120). The only studies were carried out by Gradzewicz & Hegemajer (2007a,b). The average markup in the Polish food sector in the period 1996-2004 estimated with the Roeger method markups amounted to 0.224, what was the third highest result among all manufacturing industry branches.

The concept of markups and methods of their estimation

The markup is a gap between the price (P) that a firm charges and its marginal cost (MC): $\mu = P/MC$ (see Samuelson & Marks, 2009, pp. 118-120; Pindyck and Rubinfeld, 2013, pp. 372-373). The total revenue (TR) of the company can be written as follows: $TR = Y \cdot P$, where Y is an output, and the change in total revenue caused by production of an additional unit is: $MR = \frac{dTR}{dY} = P + Y \cdot \frac{dP}{dY}$. From the other side, a price elasticity of de-

mand can be expressed as follows: $\varepsilon = -\frac{dY}{dP} \frac{P}{Y}$. Hence we have:

$\frac{P}{\varepsilon} = Y \cdot \frac{dP}{dY}$ and $MR = P + \frac{P}{\varepsilon} = P\left(1 + \frac{1}{\varepsilon}\right)$. The optimal markup is a markup received under the profit maximizing condition: $MR = MC$. From the formula for markup we get: $MC = \frac{P}{\mu}$. Consequently we have: $P\left(1 + \frac{1}{\varepsilon}\right) = \frac{P}{\mu}$, and the optimal markup can be expressed as follows: $\mu = \frac{1}{1 + \frac{1}{\varepsilon}}$. Two main

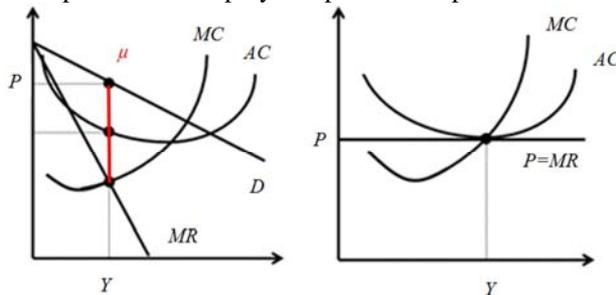
conclusions are, that the increase of price elasticity of demand (absolute value) causes the markup to fall and vice versa, and that the optimal markup calculation allows the enterprise to set the profit maximizing price:

$$P = \frac{MC}{1 + \frac{1}{\varepsilon}}$$

Olive (2002) enumerated five economic meanings of markups. Firstly, they indicate a market power. Also according to Church (2000), a market power is a firm ability to profitably rise the price above the marginal cost². Although markups are rather a realization of this ability, not this ability itself, because the markup grows along with the perturbation between a price and a marginal cost, it's commonly used as a measure of market power and this two concepts are used interchangeable. Because a firm has a market power, when it concerns rising price above marginal cost as profitable, the market power depends on the market structure. The situations of perfect competition and monopoly are presented in figure 1. We can see that while in the first situation market power of the monopoly amounts to μ , in the perfect competition a firm has no ability to exercise market power and because price equals marginal cost, the markup amounts to zero.

² This is the most common definition of market power. However, also other can be met, e.g. in the opinion of Pindyck and Rubinfeld (2013) a market power is either a seller or a buyer ability to influence a price of a product.

Figure 1. Market power in monopoly and perfect competition*



*AC – average costs

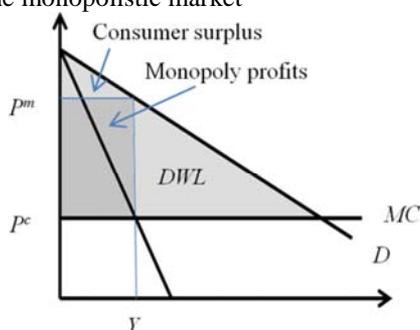
Source: own elaboration based on Marks & Samuelson (2009, pp. 436-440, 468-479).

The reason for the dependence of the markup on the market structure is its relationship with price elasticity of demand, so on the character of the demand curve. In the case of homogenous goods, the higher number of competitors, and in the case of diversified products – the higher cross-price elasticities of demand, the higher is the price elasticity of demand and the lower is the market power exercised by the company on the imperfectly competitive market (see Church & Ware, 2000, pp. 31-34). Tremblay & Tremblay (2012, pp. 328) concluded, that the market power measured by markups is growing when: there are entry barriers, what implies higher concentration on the market; there are no potential entries; products are diversified; firms compete more by quantity than by price; firms create effective cartel; firms make strategic investments in order to decrease costs or to rise prices in the future. Because these factors intensities are different depending on the market, also the markups illustrating market power are different depending on the market. What should be added however is, that while calculating market power a proper attention should be paid to the time and market boundaries. Moreover, the business cycle and technological change can matter (Church & Ware, 2000, pp. 147).

The second meaning of markups is that they represent the welfare loss for the society (see Olive, 2002, pp. 3). The common welfare measure is the total surplus, being the sum of consumer and producer surpluses. It's a value, which producers and consumers are willing to pay for the equilibrium quantity at the equilibrium price. This welfare measure is maximized in the competitive equilibrium and each departure decreases its value. The competitive equilibrium is characterised by the desired efficiency and welfare levels and according to the Pareto rule, no actor can improve its position without worsening the situation of the other one (see Carlton & Pres-

toff, 2005, pp. 69-71). In order to measure this effect of markup pricing, the so called deadweight loss (DWL) is calculated. It's a cost of inefficient market performance incurred by the society, measured by the loss in total surplus comparing to the situation of competitive equilibrium. Church & Ware (2000) highlighted, that this allocative inefficiency leading to lowering the volume of production is the main outcome of market power execution. DWL in the situation of a monopoly is presented on the figure 2. We can observe that the output in the monopoly is lower than the optimal one ($Q^m < Q^c$). The loss of welfare in the uncompetitive market structures may be an effect of: monopolistic pricing practices, achieving excessive profits, reduced production, unused production capacity, weak tendency to cost reduction and to innovate because of the lack of competitive pressure.

Figure 2. DWL on the monopolistic market



Source: own elaboration based on Church & Ware (2000, pp. 33-36).

Thirdly, according to Olive (2002) markups are incentives for investment and technological change. Yet Schumpeter (1965) noticed that market power encourages to research and development. Without the perspective of monopolistic profits companies wouldn't have enough incentives to conduct research and development. What is interesting, DWL will have positive meaning, when it enables innovation regarding products and technologies leading to growth of the economic as well as life quality standards.

Fourthly, markups at the aggregated level change along the business cycle and are used as an argument in the macroeconomists discussions on the character of cyclicity of real wages (see Olive, 2002, pp. 3). Finally, markups are used as key exogenous variables in the macroeconomics models of inflation and general equilibrium models (see Olive, 2002, pp. 3), especially in the New Keynesian dynamic stochastic general equilibrium (DSGE) models, utilized nowadays in the majority of central banks for the

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

needs of monetary policy, in which the markups level is an exogenous variable and the assumptions about their cyclicalities are used for the construction of the supply side.

The point is that high markups and their variability influence the price dynamics in the business cycle, what influences the monetary policy effectiveness. Monopolistic structures in the economy, reflected by high markups, change economy response to both demand and supply disturbances. Anticyclical markups and its positive influence on inflation imply asymmetric reaction of monetary policy and economic activity variation. During economic downturns the fact, that inflation doesn't fall as much as when markups were stable, limits the abilities of central banks to sustain the aggregated activity level through the decrease of interest rates. On the contrary, the markups decrease in the expansion phase limits the inflation pressure and enables central banks to delay introduction of an restrictive monetary policy.

What is interesting, the Keynesian models depend on countercyclical markups only since early 80-ties. Before, the leading was assumption about sticky wages (compare Taylor, 1980, pp. 1-23), but because the earlier models appeared to contradict the cyclical properties of real wages, researchers changed the assumption of sticky wages for the one of sticky prices (see Gordon, 1981, 493-530; Rotemberg, 1982, pp. 517-531). As stated Nekarda & Ramey (2013), from the Woodford model (2003), in all New Keynesian models markups fall in response to positive demand shifts. Sticky prices together with procyclical marginal cost cause, that an expansionary monetary or government spending shock decreases the average markup. This is also true in the newest models built in the New Keynesian spirit joining sticky prices and sticky wages, e.g. (Erceg et al., 2000, pp. 281-313; Smets & Wouters, 2003, pp. 1123-1175; Christiano et al., 2005, pp. 1-45). In the inspiring model of Jaimovich and Floetotto (2008), procyclical entry of firms leads to countercyclical markups, and then to procyclical TFP. Regarding inflation, Ball et al. (2003) or Steinsson (2005) in their New Keynesian models assume positive correlation between markups and inflation, and a markup change is that of the a cost nature. It's also worth highlighting, that understanding the mutual relation between markups and prices is especially important in countries, which set inflation targets, e.g. in Poland.

The above discussion show that markups are and can be regarded as symptoms of market power. Moreover, it can even be stated, that they are the only right indicator of the market power execution, and it's hardly im-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

possible to think about the better one. In practice, in order to assess the market power execution, the so called Lerner index is utilized: $\mathcal{L} = \frac{P-MC}{P}$. Its values for different structures in the static setting are presented in table 1. For diversified products and dynamic markets characterized by today's production and sales influencing future profits, e.g. those including learning-by-doing, the Lerner indexes formulations are far more complicated, see (Tremblay & Tremblay 2012, pp. 336-337).

Table 1. Lerner index in different market structures*

Market structure	\mathcal{L}
Perfect competition	0
Bertrand oligopoly	0
Cournot oligopoly	$1/(n \cdot \varepsilon)$
Cartel	$1/\varepsilon$
Monopoly	$1/\varepsilon$

* ε – the absolute value of the price elasticity of demand, n – the number of firms with perfectly homogenous

Source: Tremblay & Tremblay (2012, pp. 314).

Because the Lerner index calculation is usually problematic, mostly because of the lack of data on marginal costs (available data typically include only average cost), other market power measures have been developed. Majority of them is focused on profitability, e.g. q Tobin, rate of return, profit to sales ratio, relative profit diversification (see Tremblay & Tremblay, 2012, pp. 311-318), and they are not free from drawbacks. Firstly, price can exceed marginal cost even when profits are zero, e.g. in the monopolistic competition. Secondly, most of companies it's hard to identify share of revenue, costs and assets connected with the certain products or markets. Thirdly, they employ accounting profits being only a weak approximation of economic ones (compare Carlton & Perloff, 2005, pp. 249-252).

Consequently several methods of indirect markups estimation were developed, e.g. total cost function estimation, the price response to a change in costs, New Empirical Industrial Organization (NEIO), stochastic frontier method, game theory, overall efficiency loss estimation, single input margin (see Tremblay & Tremblay, 2012, pp. 318-326; Einac & Levin, 2010, pp. 145-162; Rotemberg & Woodford, pp. 1051-1135). The main disadvantage of them is, hard to state, which part of the difference between revenues from sales and marginal costs is a result of market power (a relationship between price and marginal costs), and which is a result of economies

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

of scale (a relationship between average and marginal costs) (compare Gradzewicz & Hagemeyer, 2007a, pp. 515-540). Then, it is assumed that there are no economies of scale.

Methodology of the research

In order to assess market power execution in the Polish food sector two methods were chosen because they are the most well-known and the most frequently applied regarding problems on micro and macro levels (compare Gradzewicz & Hagemeyer, 2007b, pp. 13-27; Nekarda & Ramey, 2013, pp. 1-47). The first one was developed by Roeger (1995), and the second one by Rotemberg and Woodford (1999).

The Roeger method is one of the methods studying the price response to a change in costs. The main idea of this group of methods is that on the perfectly competitive market each increase in costs will be completely transmitted on consumers, whereas on the imperfect one the pass-through is different from zero. Therefore, the range, in which price responds to change in costs, can be used for markup estimation. In most studies taking advantage of this broad category of methods, directly or indirectly Hall (1988) developments are used. He calculated markups from the following equation: $\Delta \ln \frac{Y}{K} = \mu \Delta \ln \frac{X}{K} \cdot \theta + \xi$, where Y is output, K is a capital input, X is a labor input, and θ is a share of labor costs in production value. The main problem with this method was that, disturbances in unobserved productivity are a part of random error of the model and therefore could be correlated with the production factors, what induces a markups estimates bias. This problem was solved by introducing instrumental variables influencing unobserved residual in the Solow model, which influence changes in employment and demand, and not in productivity, e.g. world oil price, government military expenditures, dummy variable connected with ruling party. Additionally, because data must be in real terms, there is a problem concerning the influence of products quality changes on prices. Finally, markups estimates were too high comparing with no profits in certain branches.

The great deal of these problems was solved by Roeger (1995). Whereas Hall took advantages of the primal Solow residual (SR) based on the production function, Roeger added the dual Solow residual (DSR) based on the cost function. By SR we understand a share of a technology change in the production, and by DSR a share of a technology change in the change of total costs of production. Using primal and dual Solow residuals enables

elimination of unobserved productivity variable from the regression equation (no bias under constant returns to scale), what gives more precise and closer to reality markup estimates (see Gradzewicz & Hagemeyer, 2007b, pp. 13-27). Consequently, the estimation could be performed with normal least square method. There is no need to look for instrumental variables.

Moreover, because of the assumption, that markups are constant in particular branch in particular year, data may be in nominal terms (see Gradzewicz & Hagemeyer, 2007b, pp. 13-27). Additionally, because of the assumption of constant returns to scale, if returns to scale are constant, the estimators are equally burdened in time (compare Gradzewicz & Hagemeyer, 2007b, pp. 13-27), what doesn't influence the markups dynamics. Consequently, this method is relevant to study markups dynamics, as well as the impact of exogenous variables on markups. Roeger estimates represent lower bound of markups in branches with growing returns to scale, large sunk costs and strong rigidity of adjustments over the business cycle (compare Martins et al. 1996, pp. 1-47). The assumption of constant returns to scale was however broadly criticized.

If we assume, that the production function is: $Y(X_1, \dots, X_N, K, E) = F(X_1, \dots, X_N, K)E$, where Y is an output, K is a capital input, X_i are inputs of production factors from 1 to N , and E is a neutral Hicks technology change, after logarithmic differentiation we get: $\frac{dY}{Y} = \sum_i \frac{\partial Y}{\partial X_i} \frac{dX_i}{Y} + \frac{\partial Y}{\partial K} \frac{dK}{Y} + \frac{dE}{E}$ (see Gradzewicz & Hagemeyer 2007b, pp. 13-27). Assuming perfectly competitive production factor markets, we have: $w_i = \frac{\partial Y}{\partial X_i} \frac{P}{\mu}$, and $w_k = \frac{\partial Y}{\partial K} \frac{P}{\mu}$, where w_k and w_i are prices of capital and other production factors accordingly, P is a price of a final product, μ is a markup. Assuming homogeneity of production function, we have: $TC = MC \cdot Y$. The shares of production factors costs in the total costs can be expressed as: $\alpha_k = \frac{w_k K}{Y \cdot MC}$ and $\alpha_i = \frac{w_i X_i}{Y \cdot MC}$. We get then: $\frac{dY}{Y} = \sum_i \frac{w_i X_i}{Y \cdot MC} \frac{dX_i}{X_i} + \frac{w_k K}{Y \cdot MC} \frac{dK}{K} + \frac{dE}{E}$. Because the shares of production factor costs in total revenue are as follows: $\theta_i = \frac{w_i X_i}{PY}$, we obtain: $\alpha_i = \frac{w_i X_i}{Y \cdot MC} = \theta_i \mu$, and $\alpha_k = \theta_k \mu$, accordingly. Assuming constant returns to scale, from the Euler theorem, we have: $\sum_i \alpha_i + \alpha_k = 1$. Then: $\frac{dY}{Y} = \sum_i \theta_i \mu \frac{dX_i}{X_i} + \theta_k \mu \frac{dK}{K} + \frac{dE}{E}$. After transformations we can get the

primal Solow residual: $SR = \frac{dY}{Y} - \sum_i \theta_i \frac{dX_i}{X_i} - (1 - \sum_i \theta_i) \frac{dK}{K} =$
 $(1 - \frac{1}{\mu}) \left(\frac{dY}{Y} - \frac{dK}{K} \right) + \frac{1}{\mu} \frac{dE}{E}.$

From the cost function we can obtain marginal cost: $MC = \frac{G(w_i, \dots, w_N, w_K)}{E}$. After logarithmic differentiation we get: $\frac{dMC}{MC} = \sum_i \frac{\partial G}{\partial w_i} \frac{dw_i}{G} + \frac{\partial G}{\partial w_k} \frac{dw_k}{G} - \frac{dE}{E}$. In accordance with Shepard lemma we notice that: $X_i = \frac{\partial C}{\partial w_i} = \frac{\partial G}{\partial w_i} \frac{Y}{E}$. Hence, we have: $\frac{dMC}{MC} = \sum_i \frac{X_i dw_i}{Y \cdot MC} + \frac{K dw_k}{Y \cdot MC} - \frac{dE}{E}$. Assuming constant markups in certain year in a certain branch $\frac{dMC}{MC} = \frac{dP}{P}$, we have: $\frac{dP}{P} = \sum_i \frac{\theta_i \mu dw_i}{w_i} + \frac{(1 - \sum_i \theta_i \mu) dw_k}{w_k} - \frac{dE}{E}$. After transformations we can get the

dual Solow residual: $DSR = \sum_i \theta_i \frac{dw_i}{w_i} + (1 - \sum_i \theta_i) \frac{dw_k}{w_k} - \frac{dP}{P} =$
 $(1 - \frac{1}{\mu}) \left(\frac{dw_k}{w_k} - \frac{dP}{P} \right) + \frac{1}{\mu} \frac{dE}{E}.$ Then, subtracting DSR from SR , would give us the Nominal Solow Residual (NSR), with the technological change cancelled out: $NSR = \frac{dY}{Y} + \frac{dP}{P} - \sum_i \theta_i \left(\frac{dX_i}{X_i} + \frac{dw_i}{w_i} \right) - (1 - \sum_i \theta_i) \left(\frac{dX_K}{X_K} + \frac{dw_K}{w_K} \right) = \left(1 - \frac{1}{\mu} \right) \left[\frac{dY}{Y} + \frac{dP}{P} - \left(\frac{dK}{K} + \frac{dw_K}{w_K} \right) \right].$

Using the differential calculus for two variables, we can observe that our NSR is the approximation of the following equation: $\Delta \ln(Y \cdot P) - \sum_i \theta_i \Delta \ln(X_i \cdot w_i) - (1 - \sum_i \theta_i) \Delta \ln(K \cdot w_K) = \left(1 - \frac{1}{\mu} \right) [\Delta \ln(Y \cdot P) - \Delta \ln(K \cdot w_K)]$, and estimating the expression $\left(1 - \frac{1}{\mu} \right)$ we can finally obtain μ .

The second method applied concern single input margins and it was developed by Rotemberg & Woodford (1999). Because marginal cost of increasing production by increasing any of the production factors should be equal, markups may be measured using only the one chosen. The source of such a reasoning lies in the fact, that: $MRP_i = MR \cdot MP_i$, where MRP_i is a marginal revenue of production factor i , and MP_i is a marginal product of production factor i (see Samuelson & Marks, 2009, pp. 234-235). Because profit maximization condition is: $MR = MC$, the optimal markup can be expressed as follows: $\mu = \frac{P \cdot MP_i}{MRP_i}$. Consequently, the minimizing cost firm should cover the marginal cost of increasing production, taking into account all possible margins (compare Nekarda & Ramey, 2013, pp. 1-47).

According to Rotemberg & Woodford (1999), the most appropriate measure of marginal cost concerns increasing production by changing labor

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

input, with other costs constant. In particular, they considered the number of hours per worker, which was explained by the fact, that while there are adjustment costs of hanging a number of worker and capital stocks, there are no adjustment costs of changing working hours³. If the production function is as follows: $Y = F(ZhN, \dots)$, where N is a number of workers, Y is an output, Z is a labor augmenting technology, h is a number of hours per worker, and W_A is an average hourly wage, we obtain: $MC = \frac{W_A' h + W_A}{F_1(ZhN, \dots) Z}$, where F is a derivative of production function against effective labor ZhN (see Nekarda & Ramey, 2013, pp. 1-47). We can notice, that in the numerator we have marginal revenue of increasing hours per worker and in denominator – marginal product per worker.

Assuming that production function is of Cobb-Douglas type, and marginal wage equals average wage, we get: $\mu = \frac{P}{W_A / \left[\alpha \left(\frac{Y}{hN} \right) \right]} = \frac{\alpha}{s}$, where α is an exponent in the production function (elasticity of output against labor input), and s is a labor share in production value. The change in inversed labor share indicates the change of markup. Although this method is appropriate for a situation of increasing production by increasing working hours, it was also applied to labor costs calculated with no consideration of working hours, (see Klein, 2011. pp. 1-22). Moreover, markups were approximated by the ratio of price of final product to a labor input price (see Phelps, 1994, pp. 678-711).

Few important problems are connected with labor markups (Nekarda & Ramey, 2013). The first one concerns not including overhead labor, which consists of all activities necessary for firm functioning, which can't be connected with products or services offered by the firm. In other words, these activities don't generate profits directly. Overhead expenses include e.g. costs of accounting, advertisement, insurance, legal fees, taxes, rent, repairs, telephone bills. The second problem is not allowing for elasticity substitution between production factors, whereas the third one concerns using average wages, not marginal ones. Although in the standard New Keynesian literature it was assumed, that average wage is a proper measure of marginal increase in working hours, this assumption was neglected by Bills (1987), who argued, that average wage could increase in average hours per worker because of the costs of overtime hours.

³ This choice can be also explained by the fact, that it is regarded that in the short period capital costs are stable, the cost of materials increases proportionally to the production value, and only labor costs may vary (Samuelson & Marks, 2009, pp. 278-280).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Consequently, the labor method was further developed. Rotemberg & Woodford (1999) presented corrections of their method by taking into account: non-Cobb-Douglas production function, overhead labor, marginal wage not equal average wage, costs of labor input adjustment, labor hoarding, and variable capital utilization. An attempt of omitting some of these problems and applying the results to real data was undertaken by Nekarda & Ramey (2013).

Moreover, Rotemberg & Woodford (1999) analysed three single input markups measures, alternative to labor markups. The first one was indirect inputs, like energy and materials. The conditions for its use were, that the production technology can't utilize these inputs proportionally to the primary production factors (see Basu, 1995, pp. 512-531), and that there are no adjustment costs. What is interesting, came to the conclusion, that if a production function is isoelastic with respect to labor and materials, a markup is proportional to the both labor share and materials share, so both shares should move proportionally to each other, and their sum should be a multiple of a markup (see Domowitz et al., 1986, pp. 1-17). The second one was stocks of final goods, where it was assumed, that for the firm minimizing costs, marginal cost of decreasing stocks has to be equal to marginal cost of additional production. The third one relies on cost of capital stocks including adjustment costs.

Because of a lack of data on working hours and because we have some doubts if firms in our converging economy actually equalize the marginal cost of rising output across all possible margins, the Roeger markups were assumed as the reference indicators of market power execution in the Polish food sector. Consequently, in order to answer the question if labor markups changes were good indicators of market power execution changes in the Polish food sector in the period 2003-2012, the changes in labor markups will be compared with results received with the Roeger method.

Polish food sector in the period 2002-2013

Individual or sectorial approaches may be distinguished regarding markups calculation (compare Nekarda & Ramey, 2013, pp. 1-47). The first one relies on the data from individual entities coming from the firms financial statements and the sectorial data concerns separate branches or sectors of the economy. The major advantage of the first one is their appropriateness for the impulse reaction analysis, that is monetary shocks or government spending shocks because of their higher frequency, whereas

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

the second one enables to take advantage of the instruments identifying demand and supply shocks typical for a certain branch. There is also the third option concerning aggregation of individual data to the branch level. In our analysis, because of the data confidentiality, we could only get the data of the third type. They come from the F-01 financial statements prepared by the companies hiring more than 9 workers at the end of the fourth quarter and concerning the whole calendar year on the voluntary basis.⁴

The way of calculation categories used for markup estimation are presented in table 2. The analysis covered a period 2002-2013. The yearly data were acquired from the IAFE-NRI, and the portal www.obligacjeskarbowe.pl. They cover divisions: 10 – food, 11 – non-alcoholic beverages of section C – manufacturing of the Polish Activity Classification 2007. The data from 11 main groups and 32 classes were analyzed. Regarding labor markups, because of no access to data on working hours in food sector branches, the labor share was calculated as the ratio of labor costs to production value.

Table 2. The data used in the analysis

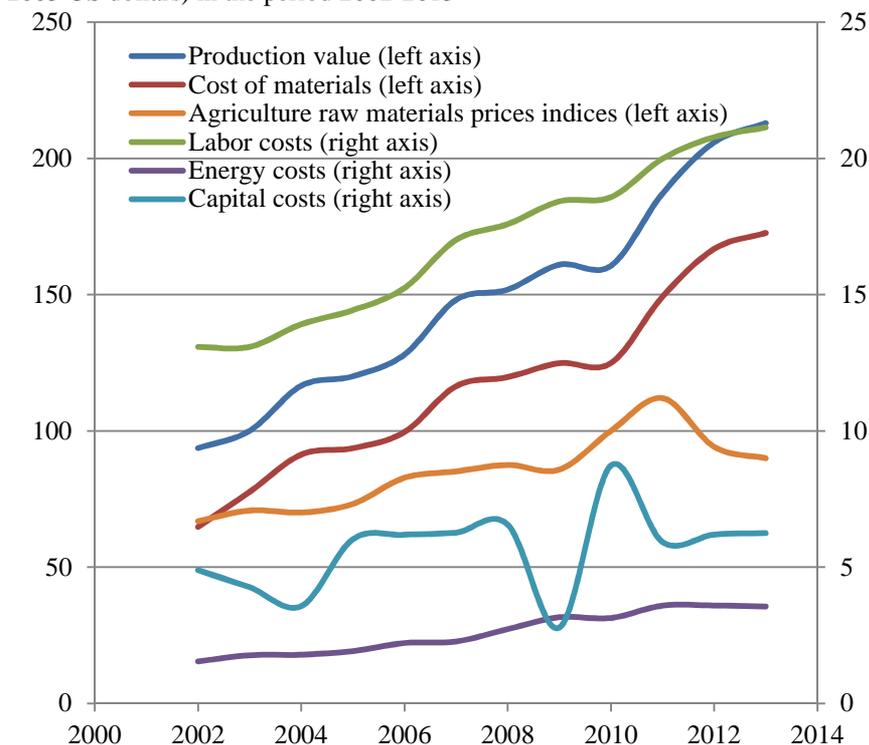
Variable	Characteristics
Production value	Sales revenue adjusted for the change in inventories and taxes levied on the company costs (excise tax, property tax, tax on means of transport and nondeductible VAT)
Materials costs	Costs of materials, external services and commodities and materials purchased for resale
Labor costs	Wages and salaries, social security contributions paid by the employer, other generic costs (staff costs – including travel expenses, death benefit, accident compensation and others, e.g. property insurance)
Energy costs	Extracted as a separate production factor
Capital costs	Instead of the assets value the following value of a flow of capital services in branch i is used: $k_i = (r - \pi + \delta_i) \cdot K_i$, where: r is the rate of return defined as expected return on capital employed in the alternative project, measured by the interest rate of government bonds; π is a value added deflator; δ_i is a depreciation rate (the ratio of depreciation to the assets value); K_i is the fixed and intangible assets value (see Jorgenson & Griliches, 1967, pp. 249-283; Oulton and Srinivasan, 2003, pp. 1-88)

Source: own elaboration based on the Gradzewicz & Hagemajer (2007b, pp. 11-27)

⁴ Because some of the needed categories are lacking in this statement, we were forced to calculate them in an indirect way.

Figure 3 presents the values of each category, as well as agricultural products prices indices. Table 4 presents main characteristics of the data.

Figure 3. Production value and costs of production factor costs (in mln zł) in the Polish food sector and prices of the world agricultural products (2010=100, real 2005 US dollars) in the period 2002-2013



Source: own calculations based on IAFE-NRI (2014), www.obligacjeskarbowe.pl.

Although food sector in Poland is often treated as traditional one and of diminishing importance, we could observe the enormous growth of the production value of analysed companies in the period 2002-2013. In 2013 it reached its maximum of 212.93 mln zł. Comparing with 2002, it was a growth by 127.22%. The main reason was undoubtedly joining the EU and export growth. It should be noticed, that in the period 1995-2013 export of the whole Polish agro-food sector increased from 3 to 14 bln euro, and for example in 2012 almost 77% of it went on the EU markets (see Łopaciuk, 2013, pp. 7-14).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 4. Main characteristics of analysed categories

Item	Production value	Cost of materials	Labor costs	Energy costs	Capital costs
Mean (in mln zl)	148.83	116.81	16.94	2.61	5.64
Minimum (in mln zl)	93.71	64.82	13.08	1.55	2.79
Maximum (in mln zl)	212.93	172.65	21.14	3.59	8.73
Coefficient of variation (in %)	25.17	27.66	16.61`	28.57	26.54
Growth (in %)	127.22	166.37	61.58	129.85	27.97
Yearly growth (in %)	7.34	8.12	4.84	8.42	3.19
Change of share in production value (in %)	-	17.23	-28.89	1.16	-43.68
Variability explained by growing linear trend (in %)	97.37	96.49	98.36	95.92	17.92

Source: own calculations based on IAFE-NRI (2014), www.obligacjeskarbowe.pl.

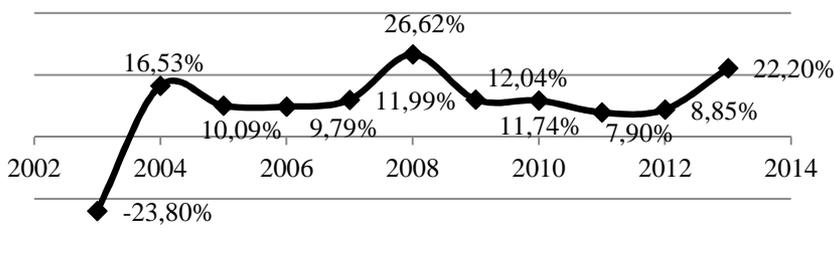
Also all the series of distinguished cost categories can be characterised by growing trends, which explained more than 90% of their variability, apart from capital, changes of which were more of the cyclical character. Comparing to the production value, materials costs were growing in the faster pace, and labor costs were growing one third slower. While energy was increasing the fastest, the weakest growing trend may be observed in capital cost data. Consequently, while the share of the cost of materials in the production value increased, the shares of labor and capital costs decreased.

Looking at the correlations between analysed data series, we can observe that the capital costs correlations with the rest of variables were the weakest (0.34-0.39), whereas correlation between other variables were between 0.95 and 0.99. The drop in capital costs in 2009 may be an effect of the world economic crisis. As early as in 2010 companies seemed to rebuild their capital costs. Simultaneously, with the high worldwide inflation of agricultural products in 2010 and 2011 (of appropriately 0.16 and 0.12), what influenced food prices, the food production value started to increase faster. Moreover, probably because of the higher market uncertainty and restructurings, the pace of rising of labor costs wasn't so high.

Roeger markups

Figure X presents the estimated Roeger markups in the period 2003-2013⁵. The average markup amounted to 1.10, what can be seen as rather moderate. The standard deviation from the mean was also relatively low – 0.12, and the coefficient of variation amounted to 0.11. What is interesting however, elimination of the first observation, which is an outlier, increases the mean to 1.14, decreasing the standard deviation to 0.06 and the coefficient of variation to 0.05. Although since the accession to the EU markups increased by 0.06 (from 2003 it was by 0.46 p.p.), no linear trend was found in the data. Particularly, its negative sign in 2003 was caused by the high increase in costs of materials (agricultural products prices) before the entrance.

Figure 4. Roeger mark-ups (over MC) in the Polish food sector in the period 2003-2013



Source: own calculations based on IAFE-NRI (2014).

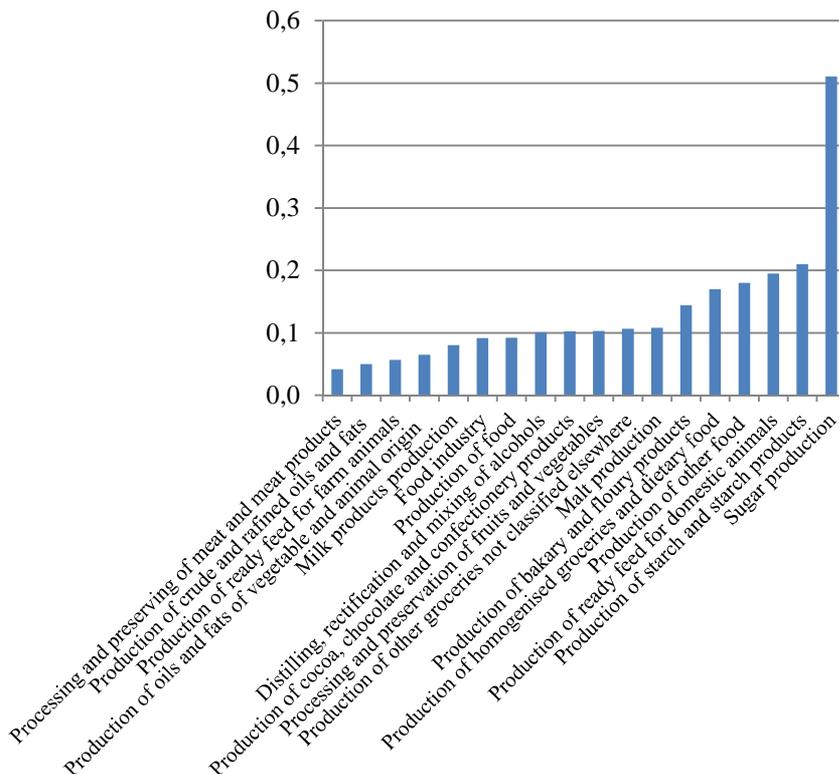
Comparing with the level of the Polish food sector markups estimated for the period 1996-2004 by Gradzewicz and Hagemeyer (2007b), the average Roeger markup over *MC* decreased (from 0.22 to 0.10), and its variability increased (from 0.56 to 1.18). Higher variation of markups could be related with the convergence processes taking place in the Polish economy after entering the EU, as well as with the effects of the 2007 crisis.

Additionally the average markups over *MC* in the food sector branches in the period 2003-2013 were calculated. But only for 18 out of 46 categories the results were statistically significant. They are presented in figure 5.

⁵ Although all the regression results were statistically significant (at the level 0.1), the set of explanatory variables was not always sufficient. Especially in years 2003, 2006, 2012 and 2013 some other factors mattered.

Extremely high markups were observed in the sugar production reaching 0.51. To other relatively high markup include production of starch and starch products (0.21) and ready food for domestic animals (0.20). The lowest markup food industry branches were as follows: processing and preserving of meat and meat products production (0.04), as well as production of crude and refined oils and fats (0.05).

Figure 5. Roeger markups (over MC) in selected branches



Source: own calculations based on IAFE-NRI (2014), www.obligacjeskarbowe.pl.

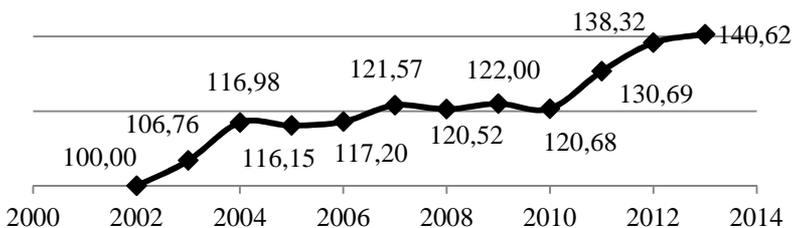
Labor input markups changes

Figure 6 presents the labor markups changes calculated for the period 2002-2013, assuming constant elasticity of output with respect to labor input. The coefficient of variation amounted to 0.09. In the whole period these indexes were increasing on average by 0.025 yearly, what means, that

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

labor markups were increasing by 2.5% yearly, and R^2 amounted to 0.88, what implies the existence of a strong growing trend. Growing labor input markups means that the share of the costs of labor in the value of production was decreasing in the analyzed period.

Figure 6. Labor markups changes in the Polish food sector in the period 2002-2013 (2002=100)



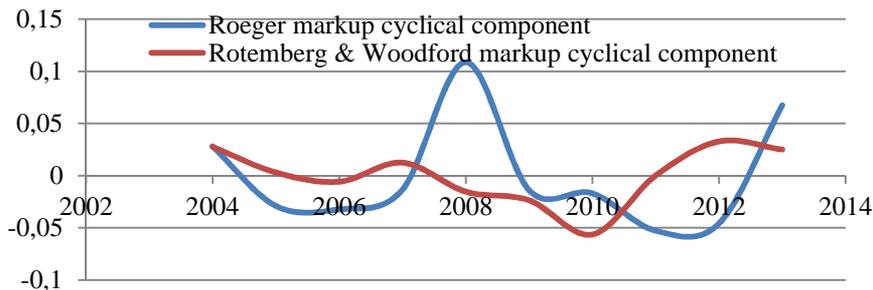
Source: own calculations based on IAFE-NRI (2014).

Three subperiods can be identified: the first one between 2002 and 2004 characterized by the fast increase, the second quite stable between 2004 and 2010, and the third from 2010 to 2013 with again faster increase in labor markups. We suppose the changes were caused by the shocks connected with the EU accession and the world financial crisis. Comparing the labor markup growth with the Roeger markup growth, we can observe, that while the Roeger markups from 2003 increased by 60.36% (and by only 4.86% from 2004), the change in labor markups amounted to 40.62% (20.21% from 2004). Excluding 2003 as the year which stands out (regarding the Roeger markups), we can state, that labor markups change was higher. Consequently, in comparison with Roeger markups, the Rotemberg & Woodford markups seem to overestimate the change in the market power execution in the Polish food sector in the period 2004-2012. This could mean that the assumption of constant elasticity of output with respect to a labor input may not be appropriate for this period (it decreased) and the positive change in labor productivity in the Polish food sector after joining the EU took place.

Moreover, in order to assess, if our labor markups changes were good indicators of market power changes in the Polish food sector, we compared their variability with the one of the Roeger markups (data in logs) in the period 2004-2013. The results are presented in figure 7. It appeared, that the correlation between the data is very weak and it amounted to 0.04. Surprisingly, it was very high until 2007 (0.96) and in the period 2008-2013 it amounted to 0.01. These results might show then, that the Rotemberg and

Woodford markups changes is quite relevant for the part of the analyzed period. The discrepancies regarding period 2008-2013 might indicate that the wages in the Polish food sector were too rigid in this period and should have grown faster, what could be a sign of unions weaknesses in the Polish food companies.

Figure 7. Detrended Roeger and labor markups in the period 2004-2013 (HP filter)



Source: own calculations based on IAFE-NRI (2014), www.obligacjeskarbowe.pl.

Conclusions

The main aim of the article was to depict changes of monopolistic markups in the Polish food sector in the period 2002-2013 as indicators of the market power execution. The theoretical background was presented in order to prove that the markup can be considered as a symptom of market power. The Roeger and Rotemberg & Woodford methods were applied. The average Roeger markup (above MC) amounted to 0.10, what can be seen as rather moderate and in 2013 it equaled 0.22. The differences in results for the branches indicate a substantial heterogeneity in the Polish food industry companies pricing practices.

Because from 2004 to 2012 the change in Roeger markups (+4.86%) was lower than in the labor markups (+40.62%), the labor markups changes seems to overestimate the change in market power execution in the Polish food sector. Also because of weak correlation between detrended series, we considered simple inversed labor input as insufficient indicator of the market power execution changes in the Polish food sector in the period 2004-2013. The application of this method for the Polish condition needs further improvements, e.g. additional data on hours per worker are needed (no adjustment cost), and the values of elasticity of output with respect to labor input will enable calculation of absolute markups values. Additionally, the

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

following possible amendments should be included: CES production function, overhead labor, marginal wage. Nevertheless, because of the restructurings in the Polish food sector and because of the crisis, the assumption that a cost minimizing firm equalizes the marginal cost of rising output across all possible margins may be too strong.

Regarding data, some drawbacks should be here highlighted. Firstly, the main obstacle was no access to data on the firm level and consequently no possibility to clean the database. Secondly, the data frequency was too low (yearly basis) to analyse the cyclical proprieties of markups.

Finally, some rather general conclusions regarding competition policy in the food sector can be formulated. It should still focus on the antitrust laws execution, but most effort should be put on creating strategic trade policy, which will contribute to broader and faster development of the Polish food sector and especially to the more intense international trade promotion. Regarding regulation and deregulation, a special focus should be put on regulations promoting vertical arrangement between firms as well as vertical integration, both in the framework of the CAP and the national agricultural policy. In particular, special attention should be paid to the concentration processes and pricing practices in the production of sugar starch and starch products, ready food for domestic animals, homogenized groceries and dietary food, as well as bakery and floury products.

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Public-private Mix and Performance of Health Care Systems in CEE and CIS Countries

JEL Classification: *I11; H51; P36*

Keywords: *health care system; public-private mix; transition economies, health status*

Abstract: The role of the public and private sector in health care systems remains one of the crucial problems of these systems' operation. The purpose of this research is to identify the relationships between the performance of health systems in CEE and CIS (Central and Eastern Europe and Commonwealth of Independent State) countries and the mix of public-private sector in the health care of these countries.

The study uses a zero unitarization method to construct three measures of health system performance in the following areas: (1) resources; (2) services; and (3) health status. The values of these measures are correlated with the share of public financing that represents the public-private mix in the health systems.

The data used is from World Health Organization's *Health for All Database* for 23 CEE and CIS countries and comprises the year 2010.

The results show that the performance of health systems in the countries investigated is positively associated with a higher proportion of public financing. The strongest relationship links public financing with performance in the area of services production. For policy makers, these results imply that health systems in post-communist transition economies could be susceptible to a decreasing role of the state and that growing reliance on the market mechanism in health care can deteriorate the operation of these systems.

Introduction

The role of the public and private sector in developed economies seems to be one of the crucial problems in both economic policy and research agenda. Health care systems are not free from dilemmas concerned with the extent to which the government and market should run their operation. The growing pressure on public finance of contemporary welfare states has led to increased importance of market mechanism in health care systems over the last 25 years. Privatization processes, introduction of managed care and internal market as well as increasing private health financing are some examples of this trend. The expectations behind these market-enhancing policies were to restrain growth in health expenditure and to introduce the vital forces of competition into health care, traditionally dominated by public economics thinking. Nowadays, it is clear that the reinforcement of private mechanism has not led to improved control over health care spending and one of the side effects of market oriented reforms is a problem of health inequities. Currently, the question of appropriate public and private roles in health care is still far from being answered and the claim of Saltman (2003, p. 24) that "...one of the most striking aspects of this public-private debate is that it never seems to be finally settled" describes the state of present policy and research debates in the area of health care.

This study attempts to contribute to the debate on the role of public and private sectors in health care by investigating whether the public-private mix in health care financing is associated with the performance of health systems. To do so, data from 23 transition economies of Central and Eastern Europe (CEE) and Commonwealth of Independence States (CIS) is used. The way the public-private mix influences the operation and performance of health system is subject to heated debates and extensive literature on the topic has been published. However, a vast majority of these contributions focus on highly developed economies, usually OECD member states (see e.g. Götze, Schmid, 2012; Holden, 2005; Rothgang, Cacace, Frisina, & Schmid, 2008; Rothgang, Cacace, Grimmeisen, & Wendt, 2005; Touhy, Flood, Stabile, 2004). The intention of this research is to shed more light on the topic by analyzing relationships between the magnitude of public/private sector and the performance of health care in transition economies context.

The paper is organized as follows. The introductory part of the paper describes the motivation behind the paper and provides context for the study. Next, in the theoretical section, the public-private dichotomy in

health care context as well as the concept of health care system performance are briefly discussed. In the third section, the results of the empirical analysis are reported and discussed. The last section concludes the paper and provides future research directions.

Theoretical background

There are two theoretical issues to be discussed here in order to clarify the concepts used in the empirical analysis. First, the problems of ownership and public-private distinction are considered; after that, a brief discussion of health care system performance is provided.

Public and private sector in health care

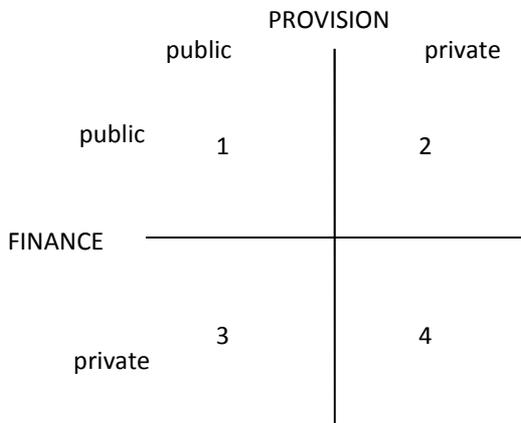
There is no single and unambiguous meaning or definition of public and private domains in health care context. The ambiguity is caused by a great complexity of health care systems that cannot be captured in a straightforward model describing ownership issues. Consequently, a reliable taxonomy of public and private spheres is difficult to construct and classifications used often do not follow the dynamics of modern health care systems.

Simplifying the reality of these complex interactions, one can use the Donaldson's and Gerard's model of the public/private mix in health care financing and provision (Donaldson & Gerard, 2005, p. 57). Figure 1 illustrates how public or private financing of health care can be accompanied by public or private provision of services.

Quadrant 1 represents the pure public sector in which public providers are publicly financed and segment 4 describes private delivery that is financed privately. The point is that in health care public finance does not match public provision in each case and private delivery does not have to be financed privately. Private provision accompanied with public provision (segment 2) as well as public delivery financed privately (segment 3) both represent the mixed sector (Donaldson & Gerard, 2005).

In fact, the public-private dichotomy in health care is not limited to the financing and provision dimensions. Maarse (2006) discerns the public and private dimensions also in the management and operation as well as in investment areas, while Rothgang, Cacace, Grimmeisen, and Wendt (2005) distinguish also a regulation aspect of the public-private mix.

Figure 1. Public-private mix in health care financing and delivery



Source: Donaldson & Gerard (2005, p. 57).

Therefore, the complexity of the ownership problem in the health care context brings conceptual confusion and makes the definitions of 'private' and 'public' ambiguous and contextual. What is private, particularly, is difficult to define as the arrangements in the private sector range from private-for-profit, through self-employment to private-not-for profit and each of the above can be extensively financed and/or regulated publicly (WHO, 2002). In fact, the phenomenon called 'melting of public-private boundaries' is increasingly observed with new schemes combining public and private elements and where the public and private domains are not easily distinguishable (Maarse, 2005; Saltman, 2003). As a consequence, the application of the public-private dichotomy to empirical analyses in health care depends on data availability and, inevitably, simplifies the complex phenomenon of ownership.

Performance of health care systems

The performance of an economic organization is usually defined in terms of achievement of some specified objectives. Thus, the performance of health care systems should refer to the goals of these systems.

According to WHO a health system consist of all the people and actions whose primary purpose is to improve health (WHO, 2000). In practical applications, this wide definition is often restricted to those activities that

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

refer to formal health care activities and exclude actions from other than health care industries.

There is ongoing debate on the objectives of health systems. Probably, the most prominent approach to the issue is the one of WHO. As it is maintained by this organization, there are three main goals of health systems: (1) health, (2) responsiveness, and (3) fairness in financial contribution (Murray & Frenk, 2000, p. 719). In other words, health systems to meet their goals should deliver effective, preventive and curative health services to a whole population, equitably and efficiently, and protect individuals from catastrophic health care expenses (Kruk & Freedman, 2008, p. 264). The defining goal of health systems is to maintain and restore health both in terms of average health status improvement and health inequalities reduction. Responsiveness, the second intrinsic goal defined by WHO, refers to respect for the people interacting with the system as well as client orientation. The third goal, fairness in financial contribution, means that the operation of health systems should not lead households to impoverishment when in need of obtaining necessary health care and that poor households ought to contribute to the health system less than rich households do.

Translating these goals into operational measures that could be applied internationally is a complex issue and it was only once when WHO approached the problem constructing a composite index of health system performance (WHO, 2000). Thenceforth, the authors aiming at assessing the performance of health care systems focus rather on single aspects of health system operation. The performance dimensions that are usually evaluated are effectiveness in outcomes (health status, patient satisfaction) and outputs (access to and quality of care); equity in outcomes (health status of disadvantage groups, fair financing and risk protection) and outputs (access to and quality of care for disadvantaged groups) as well as efficiency in outcomes (value of resources) and outputs (adequacy of funding, costs and productivity, administrative efficiency) (Kruk & Freedman, 2008, p. 267-268).

In this research, selected categories of health system performance in CEE and CIS countries are chosen, based on the data availability; the details are provided below.

Methodology of the research

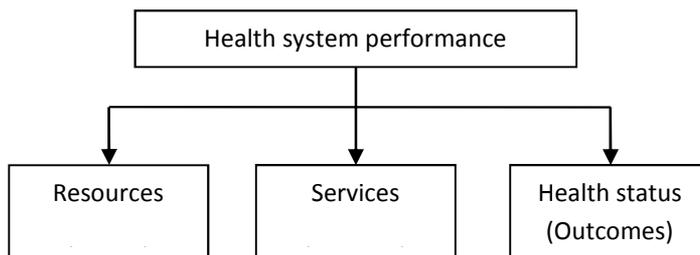
The empirical analysis in the paper consists of two stages. First, the performance of health care systems in CEE and CIS countries is assessed. In

this stage, three measures of health system performance are constructed and their values are calculated for each country. In the next step, the values of these performance indices are correlated with a variable measuring the public-private mix of health care. A detailed description of methodology (variables, methods, time span of the analysis and data source) is provided further in this section.

The performance of health care systems is described in three dimensions, namely, their inputs, outputs and outcomes. This approach draws on Donabedian's structure-process-results approach (Donabedian, 1988, p. 1745-1746) and a health production model which links health care inputs through outputs to health outcomes (Cumming & Scott, 1998, p. 55). The study follows a framework used in the recent paper focusing on health systems of OECD member states (Tchouaket, Lamarche, Goulet, & Contandriopoulos, 2012).

Figure 2 presents a conceptual approach to health system performance assessment applied here.

Figure 2. Conceptual approach to assessing performance of health care systems



Source: own work.

Three synthetic measures are constructed in order to evaluate the performance of health systems in each of the three above aspects separately. The construction of one general index that would combine all three aspects of health care seems not to be well-grounded in health policy theory.

As it is discussed above, the concept of health system performance is multidimensional and its investigation requires using appropriate methods. Here, zero unitarization method (Kukuła, 2000), which is a multivariate analysis technique, is used to incorporate the multidimensional nature of health systems.

The method allows for constructing a synthetic development measure which is characterized by some specific properties; it combines the speci-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

ficity of individual variables that it is built of, and reflects the investigated phenomena thoroughly (Młodak, 2006, p. 119). The method is based on the variables normalization procedure and is considered to be one of the simplest methods of synthetic measure construction, and one that is characterized by desired properties¹.

The method requires assigning variables to stimulants or destimulants. The former category groups those variables in which case the higher values are preferred over lower values, while in the case of the latter, lower values have preference over higher ones. For the sake of brevity, the formal procedure as well as calculation formulas are not shown here and they can be accessed elsewhere (see e.g. Kukuła, 2000; Kukuła, 2012; Młodak, 2006).

There are numerous indicators that allow to describe health care in terms of inputs, outputs and outcomes and their selection usually depends on data availability. The data for this analysis has been taken from World Health Organization's *Health for All Database* (WHO, 2014), an online database that collects information on various aspects of health systems in European countries. The analysis covers 23 countries of Central and Eastern Europe as well as some members of the Commonwealth of Independent States. The time span is limited to year 2010 solely, however, in cases of missing data, data from the nearest year (not earlier than 2007 however) is used.

The first step of the empirical procedure is to select variables according to data availability. Table 1 presents the initial set of variables selected with the use of this criterion. Potentially, more measures could be included, unfortunately, the data constraints prevented from doing so. The table also shows which of the variables are stimulants and which destimulants.

The resources employed in the health care systems were measured in physical, human and monetary terms. The physical resources were proxied by densities of hospitals and hospital beds; unfortunately the data on measures of technologically advanced equipment (e.g. magnetic resonance imaging or computer tomography scanners) is not available. The human resources were represented by two most common used indicators, i.e. densities of physicians and nurses. Of the monetary measures used, two were defined as stimulants and these were expenditure on health, expressed both as a share of GDP and in US dollars. On the other hand, two measures of out-of-pocket payments were classified as destimulants, because a higher

¹ It ignores units of measurement allowing for the comparison of diverse variables; it is characterized by equal variation range for all normalized variables [0,1]; it allows for normalizing positive, negative as well as zero values (compare Kukuła, 2000, pp. 81, 107).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

share of direct private payments puts households at greater risk of catastrophic health expenditures.

The services produced in the health care systems were measured using inpatient care discharges and outpatient contacts. These were supplemented with five disease-specific discharges adjusted for mortality rates as well as with shares of infants vaccinated against four diseases. Each of the above services indicators was classified as a stimulant.

The population health status was proxied by demographic and epidemiological measures based on mortality and morbidity data. Life expectancies, infant and maternal mortality rates and standardized death rates are considered to be the best choice in international health status comparisons (Bonita, Beaglehole, & Kjellström, 2006, ch. 2; Murray, Salomon, & Mathers, 2000), while the incidence of three ailments reflects problems caused by communicable (tuberculosis and HIV) and non-communicable (cancer) diseases. Of the health measures, all but life expectancy measures were classified as destimulants.

Table 1. Definitions of variables used in the construction of synthetic measures

HEALTH CARE RESOURCES EMPLOYED	
<u>Stimulants:</u>	
R1:	Hospitals (number per 100.000 population)
R2:	Hospital beds (number per 100.000 population)
R3:	Physicians (number per 100.000 population)
R4:	Physicians per 100 beds (number)
R5:	Nurses (number per 100.000 population)
R6:	Total health expenditure as a share of gross domestic product (%)
R7:	Total health expenditure in US dollars, adjusted for purchasing power parity (US\$)
<u>Destimulants:</u>	
R8:	Share of out-of-pocket payments in total health expenditure (%)
R9:	Share of out-of-pocket payments in private health expenditure (%)
HEALTH CARE SERVICES PRODUCED	
<u>Stimulants:</u>	
S1:	Inpatient care discharges per year (number per 100)
S2:	Outpatient contacts per year (number per person)
S3-S7:	Hospital discharges adjusted for by-cause mortality*: (S3) neoplasms; (S4) circulatory system diseases; (S5) ischeamic heart disease; (S6) <i>cerebrovascular diseases</i> **;; (S7) respiratory system diseases (number per 100.000)
S8-S11:	<i>Share of infants vaccinated against: (S8) diphtheria; (S9) tetanus; (S10) pertussis; (S11) measles (%)</i>

HEALTH STATUS ACHIEVED

Stimulants:

H1-H2: (*H1*) Female and (*H2*) male life expectancy at birth (years)

H3-H4: (*H3*) Female and (*H4*) male life expectancy at 65 years (years)

Destimulants:

H5: Difference in life expectancy between females and males (years)

H6: Infant mortality rate (deaths per 1.000 live births)

H7: Maternal mortality rate (maternal deaths per 100.000)

H8-H10: Incidence of (1) tuberculosis; (2) HIV; (3) cancer (number per 100.000 population)

H11: Standardized death rate for all causes and all ages (number per 100.000 population)

* - the study uses hospital discharges divided by mortality by cause. Raw data on discharges should not be used as it not only reflects the availability of services; it also depends on incidence of diseases.

** - *italic text format* – variables excluded from the analysis due to formal reasons (see text for details).

Source: own work.

In the subsequent step, the set of potential variables was limited according to formal criteria required to apply the method efficiently. Firstly, the variation of indicators was investigated in order to exclude the variables characterized by too low variability. For that reasons, the measures of life expectancy (H1-H4) as well as infant vaccination indicators (S8-S11) were excluded, as their coefficient of variation values were lower than 10 percent, usually accepted threshold. Secondly, to avoid duplicating information contained in the selected variables, correlations among potential variables were investigated. Based on the correlation criteria, the measure of (adjusted) hospital discharges caused by cerebrovascular diseases (S6) was excluded as it was highly correlated (over 0,8) with the circulatory system discharges. The reason for excluding the former is that it is of lower magnitude for health care operation than the latter.

In the final step of the empirical analysis, three synthetic measures constructed in the way described above were correlated with the share of public financing in total health expenditure. Public financing was the only measure that allowed for proxying the magnitude of public sector in health care in international context. Obviously this indicator is not without drawbacks, still it reflects the public-private mix in an acceptable way and is widely used in country-level analyses (see e.g. Rothgang et al., 2005). For the purpose of correlation, Spearman rank correlation coefficient is used.

Results and discussion

The results of performance analysis are reported in table 2. The values of the indicators range from zero to one and higher values are interpreted as higher performance of the systems.

The countries with the highest resources availability were Slovenia, Belarus and Russia, while the ones with the lowest performance in this aspect were Bosnia and Herzegovina, Montenegro and Armenia. When it comes to service accessibility the group of top countries includes Belarus, Lithuania and Ukraine, whereas low services production characterized Kazakhstan, Armenia and Azerbaijan. The health status synthetic measure values place Bosnia and Herzegovina, Slovenia and TYFR Macedonia at the top of the healthiest nations rank; Ukraine, Russia and Kazakhstan were characterized by the poorest population health.

The results suggest that countries differ in the way they transform their health care resources and services to health status improvement. Some countries employed relatively abundant resources and used them relatively efficiently obtaining a good health status (see e.g. Czech Republic, Poland, Slovenia and Slovakia). There were also countries, however, the societies of which benefited from good health with little resource utilization and production of services (see e.g. Croatia, TYFR Macedonia, Azerbaijan). Conversely, some countries that performed well in terms of resources and service availability failed to transform these into the health improvement of their populations; the examples are Belarus, Estonia, Lithuania, Russia and Ukraine.

Table 2. Values and ranks of synthetic measures in three dimensions of health care system performance in CEE and CIS countries

Country	Resources		Services		Health status	
	SM	Rank	SM	Rank	SM	Rank
Armenia	0,188	22	0,081	20	0,634	11
Azerbaijan	0,332	17	0,051	21	0,700	9
Belarus	0,557	2	0,907	1	0,474	18
Bosnia and Herzegovina	0,264	20	n.a.	-	0,834	1
Bulgaria	0,365	13	n.a.	-	0,642	10
Croatia	0,361	15	0,324	17	0,777	4
Czech Republic	0,494	4	0,551	5	0,751	5
Estonia	0,414	9	0,479	8	0,564	14
Georgia	0,406	10	0,396	15	0,536	17
Hungary	0,429	7	0,562	4	0,628	12

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Kazakhstan	0,364	14	0,269	19	0,306	22
Latvia	0,326	18	0,429	13	0,559	15
Lithuania	0,424	8	0,570	2	0,554	16
Montenegro	0,259	21	0,433	12	n.a.	-
Poland	0,371	11	0,525	6	0,741	6
Moldova	0,367	12	0,274	18	0,348	19
Romania	0,296	19	0,421	14	0,594	13
Russia	0,496	3	0,469	9	0,310	21
Serbia	n.a.	-	0,436	11	0,736	7
Slovakia	0,485	5	0,446	10	0,727	8
Slovenia	0,560	1	0,511	7	0,814	2
TFYR Macedonia	0,337	16	0,372	16	0,793	3
Ukraine	0,440	6	0,569	3	0,332	20
Median value	0,369	-	0,436	-	0,631	-

Notes: SM - synthetic measure.

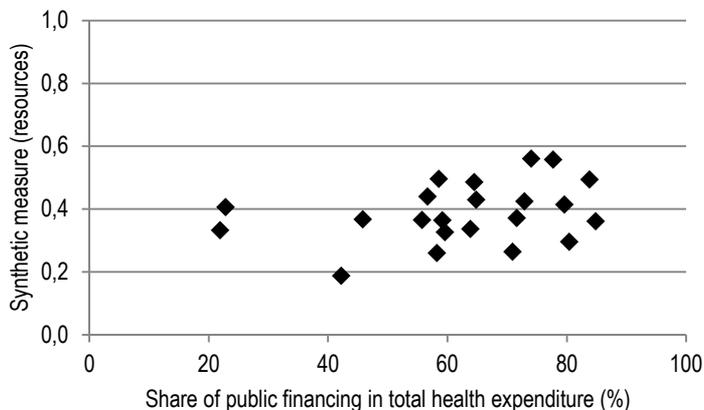
Source: own calculations based on WHO (2014).

Two conclusions can be drawn from the above differences in the inputs-outputs-outcomes transformation in particular countries. Firstly, the differences seem to reflect the efficiency variation among the CEE and CIS countries' health care systems. The countries with low (high) resources and/or low (high) services utilization that were simultaneously characterized by good (poor) health status probably are the ones with relatively efficient (inefficient) health care systems. Secondly however, good health status in particular countries may result from factors other than health care, i.e. a higher income level and lower income inequalities, a higher education attainment, health-enhancing life style, better housing and working conditions. In this research these health affecting factors were excluded from analysis, still, one can presume that the differences in efficiency of health care system among CEE and CIS countries are the case.

The final stage of the analysis shows a relationship between the performance of health care systems in the group of countries and the magnitude of public sector in these systems. The share of public financing in total health expenditures represents the public-private mix.

The three following figures (3, 4 and 5) show scatter plots illustrating the associations between the three measures of performance and the proportion of public financing.

Figure 3. The association between health care resources synthetic measure and the share of public financing

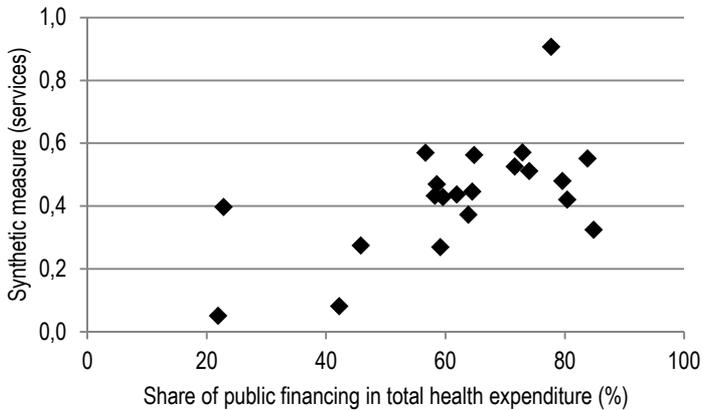


Note: The value of the Spearman rank correlation coefficient is 0,296 ($p = 0,17$).
Source: own calculations based on WHO (2014).

There is a positive but quite weak association between the resource dimension of health systems performance and the share of public financing in CEE and CIS countries ($\rho = 0,296$; $p = 0,17$). The value of Spearman rank correlation is not statistically significant, however, it still suggests that public financing could be positively associated with the performance of health system in the area of resources availability.

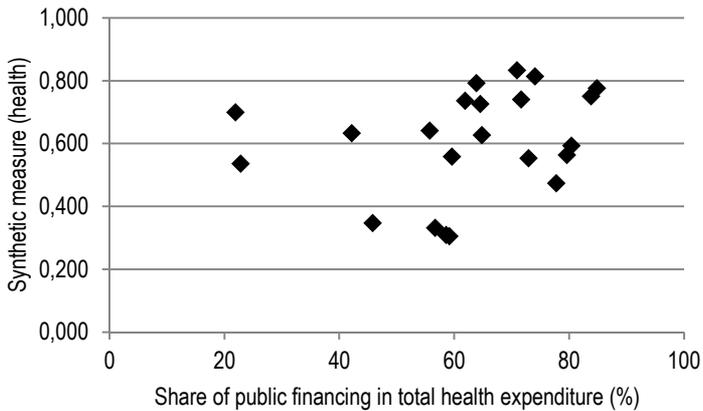
The correlation between health system performance in the area of services produced and the extent of public financing, is also positive and the association is quite strong ($\rho = 0,482$; $p = 0,03$). What is more, the value of correlation coefficient is statistically significant. The positions of marks on the scatter plot (figure 4) suggests that an increment in the share of public financing is related to a quite high improvement in the (services) synthetic measure. It remains in contrast to the previous graph (figure 3), where, there is a slight variation in the (resources) synthetic measure with a growing share of public financing.

Figure 4. The association between health care services synthetic measure and the share of public financing



Note: The value of the Spearman rank correlation coefficient is 0,482 ($p = 0,03$).
Source: own calculations based on WHO (2014).

Figure 5. The association between health status synthetic measure and the share of public financing



Note: The value of the Spearman rank correlation coefficient is 0,381 ($p = 0,08$). After removing the case with outlier value (Azerbaijan) the value of correlation coefficient grows to 0,440 ($p = 0,05$).
Source: own calculations based on WHO (2014).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The correlation between the health status performance of the CEE and CIS countries and the share of public financing is also positive ($\rho = 0,381$; $p = 0,08$) and the relationship is moderate. After removing the outlier case (Azerbaijan) the value of the correlation coefficient becomes statistically significant ($\rho = 0,440$; $p = 0,05$).

Conclusions

The purpose of the empirical analysis was to estimate the performance of health care systems in the transition economies of CEE and CIS countries and to establish possible relationships between the performance of these systems and the magnitude of the public and private sector in their operation. The performance of the health systems was assessed using three synthetic measures describing: (1) the resources employed; (2) services produced; and (3) health status achieved.

The results show that the countries differ in terms of their systems' performance. Generally, the wealthier countries are characterized by high performance in both the resources availability and health status. The other ones, however, engage less than average resources and produce quite little services, but still are able to achieve a good health status. On the other hand, the former Soviet republics are the countries that fail to achieve a good population health status, despite quite abundant resources in most of the cases.

When it comes to the relationships between the magnitude of public sector in the health systems and their performance, it was shown that the share of public financing is positively associated with the performance in all the three investigated areas. The strength of the relationships was varied, but still the correlations proved to be significant in two of the three cases. To sum the discussion up, one can conclude that public financing is positively related to the performance of the health care systems in the region of CEE. The conclusion has important policy implications, suggesting that the states should not decrease their involvement in the operation of their health systems. Otherwise, the performance of these systems would be put at the risk of malfunctioning and, consequently, deteriorate the health status of the populations.

Before concluding, a limitation of this study needs to be outlined. Here, the public-private mix of health care is described only in terms of health care financing and no other dimension of this mix (delivery, investments, and regulations) is investigated. The shortcoming is caused by data re-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

strains. No systematic and comparable data on the public-private structure of providers is available. Also, statistics concerning the investments ownership structure in the group of CEE and CIS countries are non-existent. The data on the regulation is qualitative in nature and is also uncollectable for the group of the investigated countries.

The study results suggest many possibilities for future research. The investigation of health system operation in the post-communist transition economies could be extended by e.g. efficiency analyses and grouping countries of similar characteristics.

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**Fiscal Sustainability in CEE Countries – the
Case of the Czech Republic, Hungary
and Poland***

JEL Classification: *E62; H62; H63*

Keywords: *fiscal sustainability; monetary and fiscal dominance; primary balance; debt; cointegration*

Abstract: The aim of the study is to assess fiscal sustainability in the Czech Republic, Hungary and Poland and to test for existence of fiscal dominance in these countries in the context of the fiscal theory of the price level. The empirical study is conducted using unit root tests and cointegration analysis with possible structural breaks. The approach is consistent with so called backward-looking approach for fiscal dominance testing proposed by Bohn (1998). The results suggest that in the Czech Republic and Poland fiscal dominance prevailed in the analyzed period, while in Hungary – monetary dominance. The result for Hungary may be caused, however, by a one-time reduction in debt resulting from changes in pension system.

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Introduction

During and after the global financial crisis many countries saw a significant loosening of fiscal policy. Considering that in many European countries public debt levels were already high even before the outburst of the crisis, the worsening of the public finances raised questions about the sustainability of the fiscal policy. In this context, also concerns have arisen about the consequences of fiscal imbalances for the effectiveness of monetary policy. As the “unpleasant monetarist arithmetic” by Sargent and Wallace (1981) shows, price stability requires an appropriate fiscal policy. If the public debt is too high, the monetary authorities will finally lose control over inflation. This concept has been further developed by the fiscal theory of the price level (FTPL). FTPL claims that the intertemporal government budget constraint may be satisfied (that means that the fiscal solvency condition may be fulfilled) in two ways: through adjustment of the primary surplus – which is called the Ricardian or monetary dominant regime, or through the endogenous adjustment of the price level – which is called the non-Ricardian or fiscal dominant regime. Therefore, the fiscal imbalances and the lack of adjustment of the fiscal policy may threaten the overall economic stability.

The aim of the paper is to test for fiscal sustainability and fiscal dominance in three CEE countries: the Czech Republic, Hungary and Poland over the period Q1:2000 – Q3 2013. The test consists in analyzing the statistical properties of the fiscal variables time-series and the long-term relationship between primary surplus and public debt, as described below in detail. Although the fiscal situation varied across the countries, the public debt rose in all of them substantially over the analyzed period. Therefore it seems important to test for the presence of fiscal dominance, for it may undermine the ability of the countries’ central banks to achieve their inflation targets.

The paper is organized as follows. In the next section we refer to the fiscal theory of the price level as the theoretical guidelines how to distinguish between monetary dominance and fiscal dominance. In the third section empirical methodology is described in detail. The fourth section presents the countries’ recent fiscal policy developments and results of the empirical study of the long-term relationship between governments primary balance and debt. Finally, last section offers some concluding remarks.

Theoretical background

The fiscal theory of the price level states that, in general, a proper monetary policy is not sufficient to ensure the stability of the price level. The price stability also requires an appropriate fiscal policy. This possibility first formulated Sargent and Wallace (1981) in their “unpleasant monetarist arithmetic”. They showed that if the government finances its debt from taxes and seignorage, too loose fiscal policy may force the central bank to increase seignorage, in order to guarantee the fulfillment of the government budget constraint. In consequence, this would lead to higher inflation. FTPL (Woodford, 1994, 1995, 1996, 1998, 2001; Sims, 1994, 1999; Leeper, 1991; Cochrane, 2000, 2001) develops this concept.

In order to obtain the fiscal solvency conditions, we can write the intertemporal (present-value) government budget constraint:

$$b_t = \sum_{i=0}^{\infty} \left(\frac{1+y}{1+r} \right)^{i+1} E_t s_{t+i+1} + \lim_{i \rightarrow \infty} \left(\frac{1+y}{1+r} \right)^{i+1} E_t b_{t+i+1} \quad (1)$$

where b denotes public debt in relation to GDP, s – primary surplus to GDP, y – growth rate of real GDP, r – real interest rate and E is a expectations operator. Both y and r are assumed to be constant.

Therefore, we can write the condition for fiscal solvency as:

$$\lim_{i \rightarrow \infty} \left(\frac{1+y}{1+r} \right)^{i+1} E_t b_{t+i+1} = 0 \quad (2)$$

which means that the present value of the public debt must approach zero in infinity for the fiscal policy being sustainable, or:

$$b_t = \sum_{i=0}^{\infty} \left(\frac{1+y}{1+r} \right)^{i+1} E_t s_{t+i+1} \quad (3)$$

which means that the current debt must be equal to the sum of expected future primary surpluses expressed in present value term. The two conditions are, of course, equivalent (based on Bajo-Rubio et al., 2009).

According to the FTPL to regimes may be distinguished, depending on the way the fiscal solvency is guaranteed. In the Ricardian, or monetary

dominance regime, fiscal policy adjusts in such a way, that the intertemporal government budget constraint is satisfied, regardless of the price level. In contrast, in non-Ricardian, or fiscal dominance regime, fiscal policy is conducted in such a way that the intertemporal budget constraint would not be satisfied for all possible price levels. (Christiano and Fitzgerald, 2000) In this situation the price level is endogenous and adjusts to ensure fiscal solvency. We can rewrite equation [3] to illustrate this:

$$\frac{B_t}{P_t Y_t} = \sum_{i=0}^{\infty} \left(\frac{1+y}{1+r} \right)^{i+1} E_t s_{t+i+1} \quad (4)$$

where B denotes the public debt in nominal terms, P is the price level and Y is the real GDP.

If all other variables, in particular B, s and Y, are set, the only possibility for the government budget constraint to be satisfied is the adjustment of P. Therefore, according to FTPL, even delegating monetary policy to an independent central bank with strong mandate for price stability, like in inflation targeting countries, may be not sufficient to ensure the price level to be really stable.

Methodology

The tests for the fiscal dominance conducted in the spirit of the fiscal theory of the price level may be divided into two approaches: the, so called, backward-looking approach and the forward-looking approach. The backward-looking approach, formulated by Bohn (1998) and Bohn (2007) implies that in a monetary dominant (Ricardian) regime, an increase in the past levels of the public debt would lead to a larger present primary surplus, to ensure solvency. And vice versa – in the fiscal dominant (non-Ricardian) regime we would not expect to observe such a relationship. The other approach, namely forward-looking approach introduced by Canzoneri, Cumby and Diba (2001), postulates that in a Ricardian regime a larger primary surplus today would cause a reduction in the future levels of debt.

In this study the first approach is followed to analyze the fiscal policy sustainability in the Czech Republic, Hungary and Poland and to verify whether in these countries monetary or fiscal dominant regimes prevailed. In the backward-looking approach the long-term relationship between present primary surplus and the lagged public debt is analyzed. In the most

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

empirical studies the cointegrating relationship between the primary surplus and the lagged level of debt is estimated:¹

$$s_t = \alpha + \beta b_{t-1} + \varepsilon_t \quad (5)$$

where: s_t is the primary surplus to GDP ratio at time t , b_{t-1} is the public debt to GDP ratio at time $t-1$, and ε_t is an error term. The positive and statistically significant values of β ($\beta > 0$) would indicate the prevalence of monetary dominant regime, while $\beta \leq 0$ would indicate fiscal dominant regime.

However, before getting into the cointegration analysis, the properties of the time series have to be checked. Following the methodology applied by Afonso and Jalles (2012), in the first step of our analysis we test for the existence of a unit root in the first-differenced debt time series. This is the simplest test for the fiscal policy sustainability, since an unit root in the first-difference level of debt would indicate that the debt is explosive. Next, we investigate stationarity of the debt and primary surplus time series. Non-stationary and integrated in the same order time series would allow test for cointegration. For the completeness and robustness purposes, several tests for unit root are performed: Augmented Dickey-Fuller, Phillips-Perron and Ng-Perron test. However, in the presence of a structural breaks in the series the above mentioned tests may be biased toward non-rejection of the unit root. Therefore, additionally, two tests allowing for structural break in the series are performed: the Zivot-Andrews (1992) test and the Perron (1997) test. The Zivot-Andrews test allows for one structural break and the break point is endogenously determined from the data.² The null of the test is of a unit root and the alternative hypothesis is of stationarity with structural break. The Perron test also allows for one structural break at an unknown time, but it allows for the structural break to occur under both the null and the alternative hypothesis.

If the test results indicate that the two variables are I(1) process, we can test for existence of cointegrating relationship between primary balance and lagged debt. We use Johansen procedure for this purpose. However, this test does not account for possible structural break, changing the cointegration relationship, which might occur during analyzed period. In this case the test would under-reject the null of no cointegration. Therefore, the Gregory and Hansen (1996) procedure is applied to test for the structural

¹ It is also possible to estimate the cointegrating relationship between government revenues and expenditures in order to test for the fiscal sustainability.

² The break date is selected where the t-statistic from the ADF test is at a minimum.

shift in the cointegrating relationship. The null of the test is of no cointegration and the alternative of cointegration with a break.

If the existence of cointegrating relationship is confirmed, the next step of the analysis is estimation of the parameter β in the cointegration equation. The estimation is made using Dynamic Ordinary Least Squares (DOLS). As discussed above, negative or not statistically significant β would suggest fiscal dominance regime while $\beta > 0$ – monetary dominance regime. However, the positive estimate of β may also be consistent with the fiscal dominance regime, since positive value of β may be observed, when an increase in previous period debt leads to increase in primary surplus (MD regime) but also when a decrease in expected primary surplus leads to decrease in the current debt ratio through a price increase, which is consistent with FD regime (Bajo-Rubio et al., 2009). Therefore, for positive estimates of β , the analysis is complemented by Granger-causality test. Causality running from primary surplus to debt suggest FD regime while causality from debt to primary surplus suggest MD regime.

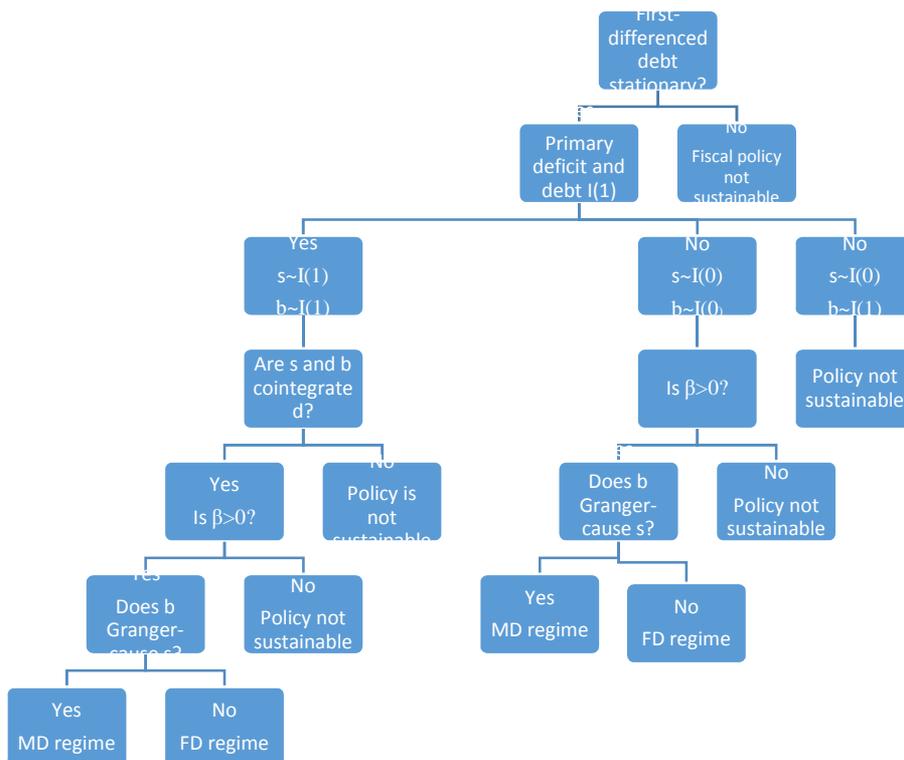
For the cases where both primary balance and the public debt prove to be $I(0)$ processes, we estimate the equation using least squares with breaks. The conclusions regarding the estimates of parameter β are the same as described above.

The procedure for analyzing the fiscal sustainability described above consist of several steps. On each stage of the analysis we can conclude that the conditions for fiscal solvency are not fulfilled. For example, if we conclude that the primary balance and the public debt are integrated of different orders, it would mean that there is no long-run relationship between these two variables (including a positive one) and the fiscal policy is not sustainable. To summarize the description of the methodology used in this study, Figure 1. presents possible results on each stage of the analysis.

The issue of fiscal sustainability in the context of fiscal theory of the price level has been addressed in several empirical studies. Taking approach described above Bajo-Rubio et al. (2009) tested the FTPL for 11 EMU countries over the period 1970-2005. They found that in the countries, with exception of Finland, fiscal policy was sustainable and monetary dominant regime prevailed. More recently, the same authors (Bajo-Rubio et al. (2014)) analyzed relationship between primary surplus and debt for Spain over the period 1850-2000. Their results suggest that although the condition of fiscal solvency was fulfilled, the whole period can be characterized as one of fiscal dominance. Afonso and Jalles (2012) assessed fiscal sustainability in OECD countries over the period 1970-2010, time-series

analysis as well as panel technics. Their results were, however, less optimistic. They found absence of public finances sustainability in the case of most countries, while the Ricardian regime was identified in 12 countries. Legrenzi and Milas (2012) analyzed fiscal sustainability in Greece, Ireland, Portugal and Spain, allowing for non-linearity in behavior of fiscal variables. Their results suggest the existence of a threshold effect: the countries seem to correct their policies only if the unbalances are large.

Figure 1. The sequence of the empirical methodology



Source: Own preparation.

There are very limited number of empirical tests for FTPL for transition economies. Notable example is a study of Komulainen and Pirttilä (2002). They used unstructural VAR models of prices, exchange rate, money and fiscal balance for Bulgaria, Romania and Russia. They stated that their

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

results do not support the existence of fiscal dominance in these countries but the method allows for no clear contradiction of FTPL.

Empirical analysis

Fiscal policy in the Czech Republic, Hungary and Poland

Among countries under consideration most serious fiscal problems experienced Hungary. The public debt ratio was rising from 2001, mostly as a result of deterioration of the primary balance. The public debt to GDP was rising continuously until 2006, when the government realized that the high primary deficit cannot be sustained any longer. Several important measures were implemented in order to improve public finances. As a result of these actions the primary balance became positive in 2008. However, severe economic slowdown caused by the global financial crisis engendered again increase in the debt ratio, magnified by the effect of significant depreciation of forint, which increased the value of debt denominated in foreign currency. Apart from these developments, two important events influenced the public finances in Hungary. Firstly, in 2008, the Hungarian government took out a loan from IMF/EU credit facility, which added 5.5 per cent of GDP to the debt. Secondly, in 2011 a reform of the pension system took place, which resulted in a transfer of 90 per cent of portfolio managed by private pension funds to the Pension Reform and Debt Reduction Fund. Important part of the portfolio consisted of government securities which were withdrawn by the debt management agency. This operation resulted in reduction of the debt by 4.9 per cent of GDP. (Magyar Nemzeti Bank, 2012). At the end of the analyzed period the public debt in Hungary amounted to about 80% of GDP, which was well above the 60% level set in the Maastricht Treaty.

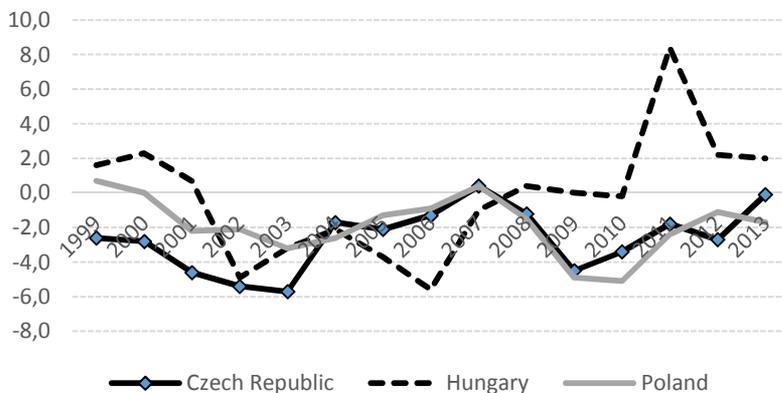
In comparison with Hungary, the public debt level in the Czech Republic may seem low. However, in early 2000s, due to loose fiscal policy and very high budget deficits, the public debt was rising. In 2004, a large Public Finance Reform took place. The fiscal consolidation, which was evenly distributed between expenditure and revenue measures, resulted in decline in fiscal deficit and stabilization of debt. However, in the following years fiscal policy started to loosen again and the outburst of the global financial crisis caused the government to implement some fiscal stimulus measures, worsening the situation further. (IMF, 2013). In 2010, fiscal consolidation started again and consisted primarily of revenue measures like increase in

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

value added tax and excise taxes and some cuts in benefit entitlements (ECB, 2010). At the end of the sample the public debt amounted however to 46% of GDP and was 30 per cent of GDP higher than in 2000.

Poland was also among countries which were running large fiscal deficits in 2000s. This policy led to significant increase in debt to GDP ratio. Several step, including tax reform, were taken in order to improve the government balance. The fiscal consolidation has been quite successful, since the budget deficit was decreasing for several years and in 2007 the public debt decreased for the first time since 2004. However, economic slowdown resulting from financial crisis and lower income tax revenues caused the public finance situation to worsen again and the budget deficit amounted to 7,9 percent of GDP in 2009. Further consolidation measures were implemented, including tightened eligibility for early retirement, a ceiling of CPI+1 o the growth of discretionary expenditures and VAT and excise taxes increase. As a result, the deficit decreased, however remained still quite high and the debt to GDP increased further. Recent changes in the pension system (transfer of funds from the pension second pillar to the general government) will improve public finance statistics but they will cause only a one-time reduction in the level of debt and the effect of this reform goes beyond the time frames of the study.

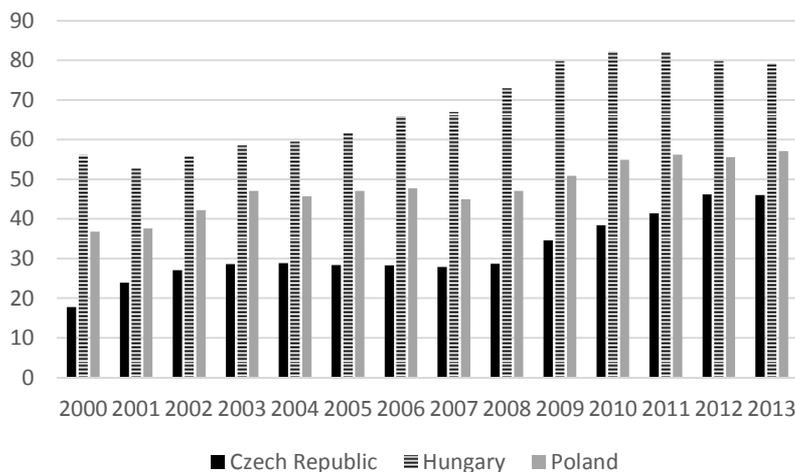
Figure 2. Primary balance as per cent of GDP



Source: Own preparation based on Eurostat data.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Figure 3. General government debt as per cent of GDP



Source: Own preparation based on Eurostat data.

Data and results

To overcome to some extent the difficulties coming from very short samples for the analyzed countries, we use quarterly data on government finance coming from the Eurostat database.³ The primary balance is the general government budget balance excluding the general government interest payments and is expressed in percent of GDP. The debt stock is the general government consolidated gross debt in percent of GDP. The data have been seasonally adjusted. The sample period begins in Q1 2000 and ends in Q3 2013.

In the first step of our analysis we test for the stationarity of the first difference of the government debt. As described above, for the robustness purposes we conduct Augmented Dickey-Fuller test, Phillips-Perron test and the Ng-Perron test. As the sample period includes the financial crisis, which created challenge for fiscal policy, we conduct also unit root tests allowing for structural breaks in the series – Zivot-Andrews test and Perron (1997) test. The tests results summarizes Table 1. The results suggest that

³ Although to the analysis of fiscal policy yearly data would be obviously preferred, short time-series for transition economies would unable such analysis. However, it is not unusual to use quarterly fiscal data in empirical studies (see for example Baldi and Staehr (2013), Haug et al. (2013), Franta (2012)).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

in all three countries the null of a unit root should be rejected, so it leads to the conclusion that this condition for fiscal solvency is satisfied. The break-type test report breaks in the series in the second half of 2008 or the beginning of 2009.

Table 1. Unit root tests for the first-difference of the public debt

	ADF	PP	NP			
			MZa	MZt	MSB	MPT
C	-3.13**	-7.10***	-11.64**	-2.35**	0.20**	2.36**
Z						
H	-8.00***	-8.12***	-26.40***	-3.63***	0.14***	0.93***
U						
PL	-6.50***	-6.50***	-26.25***	-3.61***	0.14***	0.97***
		ZA			P	
C		-2.93			-9.00***	
Z		2008Q4			2008Q3	
H		-7.01***			-10.87***	
U		2008Q4			2009Q1	
PL		-6.33***			-7.32***	
		2008Q4			2008Q3	

Source: Own calculations. **, *** denote significance at the 5% and 1% level respectively. Dates reported in the break-type tests are breaks with the minimum Dickey-Fuller statistic. In these tests breaks are allowed in the intercept and the trend.

In order to verify the relationship between primary surplus and the debt stock, first one has to check the order of integration of the analyzed series. The same order of integration would allow for testing for cointegration between the primary surplus and lagged level of public debt. The results of the unit root tests for these two variables are presented in Table 2.

The results of the standard unit root tests suggests the rejection of the null in the case of the Czech Republic and Hungary. In the case of Poland only the ADF test leads to the rejection of the unit root hypothesis, while Phillips-Perron and the Ng and Perron tests suggest that primary balance in Poland is a unit root process. The test allowing for the structural break in the series confirm the unit root in the case of Poland and add the Czech Republic to the countries where primary balance is non-stationary.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 2. Unit root tests for the primary balance and the debt stock

Primary surplus						
	ADF	PP	NP			
			MZa	MZt	MSB	MPT
C	-3.09**	-3.05**	-13.04**	-2.55**	0.19**	1.90**
Z						
H	-6.48***	-6.47**	-28.40***	-3.77**	0.13***	0.87***
U						
PL	-3.97***	-2.26	-1.96	-0.97	0.49	12.24
	ZA			P		
C		-4.41			-4.33	
Z		2003Q4			2003Q4	
H		-8.26***			-12.08***	
U		2011Q1			2011Q1	
PL		-3.25			-3.95	
		2009Q1			2008Q2	
Debt						
	ADF	PP	NP			
			MZa	MZt	MSB	MPT
C	-0.48	-0.57	1.93	2.10	1.09	96.58
Z						
H	-0.72	-0.59	-0.75	-0.41	0.54	18.37
U						
PL	-0.53	-0.58	0.89	0.60	0.67	34.68
	ZA			P		
C		-4.16			-4.10	
Z		2009Q2			2009Q1	
H		-5.98***			-6.01**	
U		2008Q4			2008Q3	
PL		-4.61			-4.70	
		2006Q4			2006Q3	

Source: Own calculations. **, *** denote significance at the 5% and 1% level respectively.

For those countries, where the public debt and the primary balance proved to be I(1) process (i.e. the Czech Republic and Poland), we analyze cointegrating relationship between those two variables, as suggested by Bohn (2007). As we use quarterly data, we check the relationship between primary surplus and the debt lagged by 4 periods. Table 3. presents results for the Johansen cointegration test.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 3. Johansen cointegration test for primary balance and lagged debt

	Hypothesized no. of CE	Trace statistic	Critical value (0.05)	Max-eigen statistic	Critical value (0.05)
Czech Republic	None	36.03	20.26	31.43	15.89
	At most 1	4.61	9.16	4.61	9.16
Poland	None	17.74	20.26	14.61	15.89
	At most 1	3.13	9.16	3.13	9.16

Source: Own calculations.

The results of the test indicate one cointegrating relationship between primary surplus and lagged debt in the case of the Czech Republic (at the 5% level), but no cointegration in the case of Poland. This would suggest that the public finances in Poland were not sustainable. However, as the previous test suggested structural breaks in the series, there may also be structural break in the cointegrating relationship. We test for the possibility using Gregory and Hansen test. We use the model with level shift and trend. The results of the test are presented in Table 4.

Table 4. Gregory-Hansen test for structural shift in cointegrating relationship

	ADF test		Phillips test	
	ADF* stat	Break date	Z _a * stat	Break date
Czech Republic	-5.21**	2008Q3	-35.11	2008Q3
Poland	-4.04	2009Q4	-12.44	2008Q3

Source: Own calculations. ** denotes significance at the 5% level. Critical values from the Gregory and Hansen (1996).

The Gregory and Hansen test confirms the results of Johansen cointegration test, since we reject the null of no cointegration for the Czech Republic, while we cannot reject the null in the case of Poland. Therefore we conclude that in the case of Poland there is no evidence of existence of the relationship between the primary surplus and lagged levels of the public debt. No such relationship suggests the prevalence of fiscal dominance regime in Poland in the analyzed period.

The last step of the analysis is the estimation of the parameter β in the cointegrating relationship in the equation [5]. The parameter is estimated using the DOLS. Positive and statistically significant β would indicate prevalence of the monetary dominance regime and sustainability of the fiscal policy, while negative β or not statistically different from zero would

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

indicate the regime of fiscal dominance. The analysis is performed for the Czech Republic, as for the country the cointegrating relationship between primary surplus and lagged debt was found, as well as for Poland to confirm the previous results of no cointegration. The estimated equation contains (beside lagged values of the debt) dummy for the year 2008, as for the most series in 2008 break in the data was indicated. In the case of the Czech Republic the equation contains also a dummy for the fourth quarter of 2001. The estimation results are presented in Table 5. In both countries the estimated parameters prove to be negative and statistically significant indicating no sustainability of public finances.

Table 5. Estimation of parameter β in cointegrating relationship between primary balance and debt

	Czech Republic	Poland
β	-1.41** (0.59)	-1.09* (0.55)
C	-1.85*** (0.54)	-1.59*** (0.46)
Dummy 2008	0.46 (1.40)	-0.62 (1.50)
Dummy 2001Q4	-6.98*** (2.53)	--
R ²	0.52	0.28

Source: Own calculations. *, **, *** denote significance at the 10%, 5% and 1% level respectively. Standard error in parentheses.

For Hungary, where the tests reported structural breaks in the series but no unit root process, the relationship between primary surplus and lagged debt stock is estimated using least squares with breaks. Estimated parameter is positive and statistically significant (Table 6.).

Table 6. Estimation results of relationship between primary balance and debt for Hungary

	Estimation result
β	0.26*** (0.09)
C	-18.06*** (6.07)
R ²	0.15

Source: Own calculations. *, **, *** denote significance at the 10%, 5% and 1% level respectively. Standard error in parentheses.

However, as already described) positive values of β may occur under MD as well as under FD regime. In order to verify if the regime in Hungary was monetary dominant or fiscal dominant, Granger causality test is performed. Somewhat surprisingly, the results (presented in Table 7.) indicate,

that the causality runs from the public debt to primary surplus, suggesting the prevalence of monetary dominant regime in Hungary.

Table 7. Granger causality test

Causality direction	F-statistic	Prob.
$B_{t-1} \rightarrow s_t$	4.18	0.007
$s_{t-1} \rightarrow B_t$	0.25	0.90

Source: Own calculations.

Conclusions

In this study we tested the sustainability of fiscal policy and the existence of monetary versus fiscal dominance in three central and eastern European economies: the Czech Republic, Hungary and Poland. The empirical methodology was based on analysis of long-run relationship between primary balance and lagged public debt (the so called backward-looking approach). Existence of positive, statistically significant relationship indicates the MD regime.

The results obtained suggest that over the analyzed period in the Czech Republic and Poland prevailed FD regime, while in Hungary – MD regime. These results may seem surprising taking into account, that Hungary is heavily indebted country, while the Czech Republic belongs to group of countries with relatively low debt to GDP ratio. However, although in the Czech Republic the public debt is relatively small, it was rising significantly over the analyzed period despite fiscal consolidation and therefore results indicate, that this policy is not sustainable in the long term. Similar situation occurred in Poland – fiscal consolidation measures aimed at reducing debt proved to be not enough to prevent debt from rising in the face of adverse developments after beginning of the global financial crisis. On the other hand, in Hungary a one-time reduction in debt caused by changes in pension system improved fiscal situation and primary surpluses generated since then helped to stabilize debt. Further fiscal consolidation measures applied in the Czech Republic and Poland may also change the conclusions about fiscal sustainability over next years, so this could be a field for future research.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

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18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
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**The Impact of Selected Variables on the VAT
Gap in the Member States of the European
Union***

JEL Classification: *H26; H32*

Keywords: *tax gap; value added tax; Corruption Perception Index; GDP growth; VTTL model; regression*

Abstract: One of the most serious problems of fiscal character is the issue of the tax gap. The tax gap is defined as the amount of tax liability faced by taxpayers that is not paid on time. The tax gap comes from three main areas of non-compliance with the tax law – firstly from underreporting of income, secondly from underpayment of taxes and thirdly from non-filing of returns. The tax evasions in the area of value added tax form one of the largest groups of tax gap. This article describes the current situation in the field of tax gap in selected countries of the European Union, namely the VAT gap. The aim of this paper is to determine a dependence of the VAT gap on three variables, the Corruption Perception Index CPI, GDP growth rate and the basic VAT rate. A method of the regression analysis has been used, performed on data in the years 2000-2011. In spite of the fact that it could be assumed that tax burden will affect the VAT gap the most, the highest dependence was shown in the case of the Corruption Perception Index.

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Introduction

Taxes began to be paid in ancient times, and since that time there is a problem called a tax gap. It is in fact a tax avoidance which creates a tax gap between what should be paid in taxes and what has really been paid. Tax authorities, not only in the European Union, are currently facing major challenges in this regard in achieving the goals that would reduce this gap.

The problem of the tax gap is considerable in the European Union countries (but stable as Ángeles Castro & Ramírez Camarillo, 2014 in the case of OECD countries in period 2001-2011 claims). Potential returns that do not end at tax collectors of individual tax administrations amount to one trillion Euros per year (in the US 345 billion dollars, according to IRS data). Significant amounts of money currently end up in tax havens, which is a major obstacle in the period when most European countries have their budgets in deficit. That is the reason why the economic statistics focus on calculation of a tax gap. In this approach, it is important to quantify the theoretical amount of tax, from which the tax gap is established.

For the purposes of analysis in this article the VAT gap has been chosen, as it is the most important part of the tax gap. The VAT gap is calculated as the difference between the theoretical VAT liability ascertained from the national accounts and the VAT revenues accrued by the financial authorities (Zidkova, 2014, p. 514).

A motivation for writing this article was to determine whether a generally accepted view of the positive relationship of the tax burden and tax gap of that tax type actually exists and whether it is statistically significant. For the comparison two other indicators namely the Corruption Perception Index and GDP growth rate have been selected.

The paper concerns three parts - theoretical, methodological, and research. The first part describes the theoretical approaches and ways of measuring the tax gap and the VAT gap through fiscal sustainability and VTTL model. The second part describes the methodology of research, where the method of regression analysis has been chosen for determining the VAT gap, depending on three variables – Corruption Perception Index, GDP growth rate and the basic VAT rate. When examining the dependence, the data from 2001 to 2011 were used. The third part is devoted to the VAT gap in selected countries of the European Union and the application of the regression model for the member countries.

Theoretical Approach to the Tax Gap and VAT Gap

Her Majesty's Revenue and Customs defines the tax gap as the difference between the selected taxes and tax, which should be selected, so the theoretical liability (HMRC, 2013). Theoretical liability is a tax that would be paid if all people and companies respected the tax law (Tyrie, 2012). Armstrong, Bloin & Larcker (2011, p. 395) defined the concept of the book-tax-gap as spread between aggregate financial statement income and aggregate taxable income.

According to Plumley (2005) or Warren & McManus (2007) there are three components of tax gap – non-lodgement (non-filing), under-reporting and under-payment. Hurst, Li & Pugsley (2014, p. 19) indicated that the self-employed systematically underreport their income in U.S. and individual income represented over half of uncollected revenue (Branham, 2009, p.1507).

Tax gap also covers evasion of participants in legal activities in the informal economy; it means that part of the economic activity that does not pass through official economic statistics (more about hidden – illegal – economy see Giles, 1999). These participants are informal contractors, domestic workers and street vendors who do not report their income and do not pay taxes. On the other hand, the tax gap does not include unpaid taxes from people who work in the informal economy, which consists of illegal activities such as drug trafficking, illegal gambling and prostitution (Todler, 2013).

A typical feature of the tax gap is financial flows, which can be divided into two categories – (legal) avoidance and (illegal) evasion (Gemmel & Hasseldine, 2014, p. 275). The first one is the legal avoidance, which is inappropriate or irregular, because it is not permitted under rules and customs. It includes the avoidance of tax liabilities. To define tax avoidance is more difficult than to define the tax evasion, because in this case there is no legal basis. Tax evasion is characterized as an effort to minimize tax assessment without deliberate deception (which would be considered as tax evasion), but in contrary to the law. Therefore it is an abuse of gaps and deficiencies in the tax system and other legislation in a way that has not been foreseen by the law.

The other category includes unlawful flows. Concerning the tax evasion it means minimizing taxes. Tax evasion may be either legal or illegal. Legal tax evasion is a condition where the taxpayer uses the shortcomings in the law in a way that was not intended by the legislature. Illegal tax evasion is

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

the case when the taxpayer receives a tax benefit in contrary to the law, ie by its violations. These tax evasions usually arise from a false tax statements denying taxes to tax authorities or stating false requirements for tax deductions.

The issue of tax evasion has been dealt with many scientific publications, for example Chiarini, Marzano & Schneider (2013) quantified the elasticity between tax evasion and average tax rate in Italy in the period 1980-2006, as well as Levaggi & Menoncin (2013). According to Di Lorenzo (2014) a lower tax rate on labour income enabling money to flow from households to companies through private consumption reduces incentives for tax evasion. Gillman & Kejak (2014) claimed that upward trend in good and human capital sectors gradually decreases tax evasion.

The tax gap is one of the most commonly used indicators of fiscal sustainability. The construction of this indicator is based on the same approach, firstly the level of sustainable fiscal variables is calculated, and then the gap is defined as the difference between sustainability and the current level of the primary deficit or tax rate. Sustainable level of fiscal variables ensures the convergence of the debt ratio to a final value and its calculation is governed by the terms of sustainability:

$$\lim_{T \rightarrow \infty} \left[\sum_{t=1}^T pd_t \left(\frac{1+r}{1+y} \right)^{-t} \right] = -b_0 \quad (1)$$

where pd is primary deficit, r is the interest rate, y represents the real GDP growth rate and b_0 is the initial debt ratio.

This condition says that the present discounted value of future primary surpluses should be equal to the initial value of the debt. Then the primary deficit may be expressed as:

$$pd^* = -b_0 \frac{r-y}{1+y} \quad \text{or with omission } (1+y): \quad pd^* = -b_0(r-y) \quad (2)$$

Calculation of the primary gap is then expressed by the following equation:

$$pd^* - pd_t = -b_t(r - y) - pd_t \quad (3)$$

b_t represents ratio of debt to GDP.

In the calculation of the primary gap is thus necessary to know the current primary deficit and debt, and it is necessary to draw assumptions of expected long-term average values of interest rates and the rate of real GDP growth. If the current primary deficit is higher than sustainable ($pd^* - pd_t < 0$), the ratio of debt to GDP will increase without any constraints and fiscal policy can be called unsustainable. Sustainable primary deficit can also be used as the target of government towards sustainable deficit. This is an attractive factor, since fiscal balance is usually the ultimate object of the interests of creators of economic policies. The primary difference is a scale of the adjustments that need to be returned to the level of fiscal balance and sustainable level. The primary deficit can be expressed as the difference between expenditures and revenues:

$$pd_t = g_t + h_t - \tau_t \quad (4)$$

where g is a consumption (including investment), h are the transfers and τ represents a current tax rate. All variables are measured as a share of GDP. It is important to calculate the sustainable level of the tax ratio:

$$\tau^* = \frac{r - y}{1 + y} \cdot \left\{ \sum_{t=1}^{\infty} \left[(g_t + h_t) \cdot \left(\frac{1+r}{1+y} \right)^{-t} \right] + b_0 \right\} \quad (5)$$

By subtracting the current tax rate from sustainable levels we get a so called indicator of the tax gap:

$$tax_gap = \tau^* - \tau \quad (6)$$

If sustainable tax ratio (τ^*) is greater than the current tax rate (τ), which means that the tax gap is positive, fiscal policy will be necessary to be ad-

justed to prevent excessive accumulation of debt. The tax gap indicator should not lead to the conclusion that the best way to correct the current policy is to raise taxes. For example Alvaiez-Martinez & Polo (2014) indicated the enormous difficulties of the government of Spain faces to close the deficit gap by raising taxes, Gemmel & Hasseldine (2012) claimed that an extra dollar in tax revenue not always reduce the tax gap by a dollar. This indicator only indicates that the current tax rate is not high enough to finance future spending and debt.

The estimation of the VAT gap can be done through the model VTTL. The Vat Total Theoretical Liability (VTTL) as a model, and VAT gap derived from VTTL are general indicators. The basic objective of measurement is to determine the overall level of the VAT gap comparing the pure theoretical tax with real revenues from the VAT. This difference is called the VAT gap. By subtracting net VAT revenues and net VTTL the VAT gap arises:

$$G_{VAT} = NR_{VAT} - VTTL_N \quad (8)$$

where G_{VAT} represents VAT gap, NR_{VAT} is the net revenue from VAT and $VTTL_N$ is the net VAT total theoretical liability. The percentage difference is further calculated by dividing the VAT gap and net VTTL:

$$D = \frac{G_{VAT}}{VTTL_N} \quad (9)$$

where %D is the percentage difference.

Methodology of the research

The aim of this paper is to determine the dependence of VAT gap on three variables; the regression analysis was performed on data from the years 2000-2011, from which the arithmetic mean was calculated. To implement the regression analysis, three independent variables explaining one dependent variable were selected. The dependent variable in the model is VAT gap, expressed as a percentage of the VTTL. The values of VAT gap for individual member states were taken from the study of CASE (2012). The exception is Cyprus, which was excluded from the analysis due to the revision of the national accounts. Three indicators as independent variables

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

were selected, namely Corruption Perception Index, GDP growth rate and the basic VAT rate.

The Corruption Perceptions Index (CPI) represents the area of socio-institutional factors. Its main task is to sort countries according to how corruption is perceived in the public sector. Each country indicates the perceived level of public sector corruption on a scale of 0 to 10, where 0 means that a country is perceived as very corrupt, while 10 means that it is uncorrupt. This index is compiled annually by Transparency International in order to control factors relating to corruption in the public sector, which can directly affect the tax compliance of taxpayers. According Liu & Feng (2015, p. 57) countries with more complex tax system tend to be more corrupted than countries with less complex tax system. In the case of the CPI (according to CASE, 2012) the expected impact is negative, which means that the increasing value of corruption index (positive perception of corruption) decreases tax evasions. Regarding the results of this index within the European Union, the Nordic countries reach the highest values in average of twelve years. Finland reached the value of approximately 9.51, followed by Denmark with the average value of 9.46 and Sweden with the mean value of 9.24. Conversely, the lowest measured value was reached by Romania with the average value of 3.23, Bulgaria with the value of about 3.82 and Latvia, which reaches the average value of 4.17.

Other selected variable is GDP growth rate which has been chosen as an indicator in the area of economic determinants. The calculation of the annual growth rate of GDP volume allows comparing the economic development dynamics both over time and among economies. For measuring the growth rate of GDP current prices recorded at prices of the previous year were used and thus calculated volume changes are kept in the values of the reference year. The used data were taken from the Eurostat statistics and then averaged over twelve years. The study of CASE (2012) expected a negative impact in this field, too, which means that the increase in economic growth reduces the VAT gap. Estonia reaches the greatest economic growth in average of the EU countries with the average growth of 4.76%, followed by Lithuania with the increase of 4.66% and Slovakia with the value of the average growth of 4.43%. As regards the countries with the lowest GDP growth rate, the worst results were achieved by Italy with the average of 0.67%, Portugal with the average growth of 0.8% and Denmark with the value growth rate of 0.9%.

The basic VAT rate has been chosen as the last independent variable representing tax factors. Regarding the expected impact, the study of Reck-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

on (2009) assumes a positive impact on the VAT gap, which means that if the basic VAT rate increases, the tax evasion grows. The basic VAT rate in the European Union member states in the monitored period ranges from 15% in Luxembourg to 23.7% in Hungary. The statistics of the four selected indicators are specifically listed in Table 1.

Table 11. The basic characteristics of regression analysis in the selected EU-Members in the years 2000-2011

Member state	CPI	GDP growth	Basic VAT rate	VAT gap, % of VTTL
Austria	8,07	1,82	20,00	11,08
Belgium	7,14	1,64	21,00	13,42
Bulgary	3,82	4,08	20,00	16,08
Czech Republic	4,45	3,36	20,17	23,42
Denmark	9,46	0,90	25,00	9,75
Estonia	6,18	4,76	18,50	15,58
Finland	9,51	2,18	22,08	13,17
France	6,96	1,40	19,60	15,42
Germany	7,83	1,37	17,25	12,58
Greece	4,22	1,53	19,08	29,50
Hungary	5,00	2,16	23,75	26,42
Ireland	7,51	3,17	21,00	7,75
Italy	4,78	0,67	20,08	26,08
Latvia	4,17	4,23	18,83	23,92
Lithuania	4,73	4,66	18,58	34,67
Luwembourg	8,53	3,05	15,00	12,33
Malta	5,98	1,81	17,00	12,67
Netherland	8,84	1,52	18,88	5,25
Poland	4,25	3,98	22,08	13,17
Portugal	6,29	0,80	19,83	8,67
Romania	3,23	3,93	19,83	41,92
Slovakia	4,19	4,43	20,17	28,83
Slovenia	6,11	2,72	19,50	6,92
Spain	6,71	2,17	16,00	11,75
Sweden	9,24	2,46	25,00	4,00
United Kingdom	8,28	1,85	17,29	12,67
EU-26 average	6,36	2,56	19,83	16,81

Source: own according Transparency International, Eurostat, European Commission (2015), CASE (2012).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Regression analysis is carried out using a method of least squares. This method has several assumptions. Firstly, spatial correlation was determined by using the Pearson correlation coefficient, further constancy variance was tested using graphical methods and based on ARCH test and finally assumption of normality was assessed using the test model Jacque-Bera (Cipro, 2008). These assumptions were tested in program EViews.

The basic equation for expressing simple linear function is the following equation.

$$y = \beta_0 + \beta_1 x + \varepsilon \quad (10)$$

where β_0 and β_1 are the values of the parameters of the regression line, ε is a random component. These values obtained estimates b_0 and b_1 , which are called the regression coefficients, and can be calculated using the least squares method. Formulas for the calculation have a following form:

$$b_1 = \frac{\overline{xy} - \bar{x} \cdot \bar{y}}{\overline{x^2} - \bar{x}^2} \quad \text{and} \quad b_0 = \bar{y} - b_1 \bar{x} \quad (11)$$

Regarding the statistical significance of the model as a whole, it is necessary to establish a zero (H_0) and alternative (H_1) hypothesis and then test these hypotheses at the significance level $\alpha = 0.05$.

H_0 : The linear regression model is statistically insignificant.

H_1 : The linear regression model is statistically significant.

Another important requirement is to perform T-test, which examines each parameter β_0 and β_1 separately, if they are not equal to zero. Even in this case null and alternative hypotheses are determined and tested at a significance level $\alpha = 0.05$

H_0 : Parameters β_0 a β_1 are equal to zero.

H_1 : Parameters β_0 a β_1 are not equal to zero.

The VAT Gap in selected EU countries and the application of the regression model

The VAT rates differ in the EU Member States, causing that tax evaders are looking to profit from the gaps and incompatibilities between different national tax systems (Sharman, 2012, p. 17).

Estimated VAT gaps have a very wide dispersion among countries, ranging from 21 million Euros in Malta, to 36,134 million Euros in Italy (in 2011). Across the European Union is the average VAT gap in 2011 (20%) expressed as a percentage of the VAT total tax liability. The estimated total amount of the VAT gap of EU-26 is approximately 193 billion Euros, or expressed as a percentage of GDP EU-26 in 2.1%. Data are shown in Table 2.

Table 12. Estimating the VAT gap in the EU Member States in 2011

Member state	VTTL 2011 (v bill. Eur)	VAT gap (in mil. Eur)	VAT gap as % of VTTL	VAT gap as % of GDP
Austria	26 915	3 468	13	1,2
Belgium	30 991	4 970	16	1,3
Bulgary	3 956	604	15	1,6
Czech Republic	15 235	4 241	28	2,7
Denmark	26 436	2 566	10	1,1
Estonia	1 664	301	18	1,9
Finland	19 746	2831	14	1,5
France	172 739	32 233	19	1,6
Germany	216 830	26 910	12	1,0
Greece	24 790	9 763	39	4,7
Hungary	12 216	3 700	30	3,7
Ireland	10 890	1 108	10	0,7
Italy	134 691	36 134	27	2,3
Latvia	2 322	954	41	4,7
Lithuania	3 795	1 352	36	4,4
Luxembourg	3 242	551	17	1,3
Malta	541	21	4	0,3
Netherland	45 622	4 012	9	0,7
Poland	35 253	5 410	15	1,5
Portugal	16 999	2 764	16	1,6
Romania	21 760	10 348	48	7,9
Slovakia	7 484	2 773	37	4,0

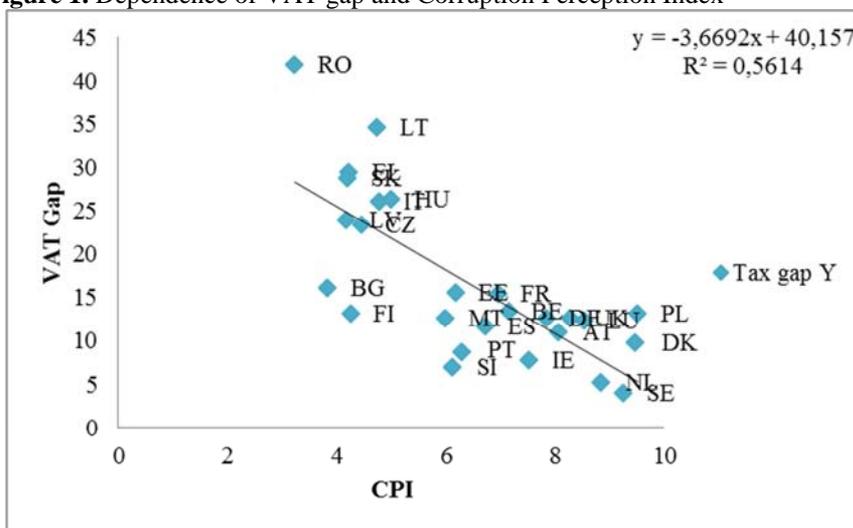
**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Slovenia	3 375	326	10	0,9
Spain	71 744	15 197	21	1,4
Sweden	37 542	932	2	0,2
United Kingdom	150 064	19 487	13	1,1
EU-26 average	1 096 841	192 957	20	2,1

Source: own according CASE (2012)

To perform regression analysis, three independent variables have been selected, that explain one dependent variable. The dependent variable in the model is VAT gap, expressed as a percentage of VTTL. The Corruption Perception Index reached the highest significance from three selected explanatory variables. Figure 1 below shows the dependence of the VAT gap and CPI.

Figure 1. Dependence of VAT gap and Corruption Perception Index



Source: own calculation

Figure 1 shows that there is a relation between the VAT gap and Corruption Perception Index in this case. Equation of line of regression analysis has thus the form:

$$y = -3.669x + 40.157 \quad (12)$$

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

From the equation of line of the regression analysis it is evident that in this case the negative relationship of examined variables is confirmed, therefore, when the value of CPI raises, the tax evasion decreases.

Some countries deviate from the established regression dependence, Romania is one of these countries. If we focus on the individual average values of Romania in both indicators in the years 2000-2011, as regards VAT gap, Romania reached the highest value, namely 41.9%, and on the contrary in the case of Corruption Perceptions Index it has the lowest value, in average 3.225. This is the highest level of corruption in examined countries of the European Union. Lithuania is another deviating state is. With the indicator of the VAT gap (in terms of size of this indicator) it ranks in the second place behind Romania with the average of 34.6%. Lithuania is reaching the value 4.72 of the Corruption Perceptions Index and it belongs to the countries of the European Union with a very low level of its value, which shows a high level of corruption in this country. Sweden achieves the best results, as it has a low rate of the VAT gap and a high level of the CPI, which indicates a confidence in the field of corruption politics. According to the average values of Sweden from 2000 to 2011, the VAT gap stands at 4% and the corruption perception index is the third highest among European Union countries, with an average value of 9.2, just behind Finland and Denmark. The following table 3 shows the concrete results of the regression analysis.

Table 13. Output of regression analysis exploring the dependence of VAT gap and Corruption Perceptions Index

Regression statistics				
Multiple R	0.749271345			
Value of reliability R	0.561407548			
Set value of rel. R	0.543132863			
Std. Error	6.474392256			
Observations	26			
ANOVA				
	Difference	SS	MS	Signif. F
Regression	1	1287.734562	1287.734562	1.05963E-05
Residues	24	1006.026122	41.91775509	
Total	25	2293.760684		
	Coefficients	Std. Error	tStat	Value P
Limit	40.15747544	4.399969179	9.126762895	2.83818E-09
Average	-3.669167634	0.661992983	-5.542608048	1.05963E-05

Source: own calculation.

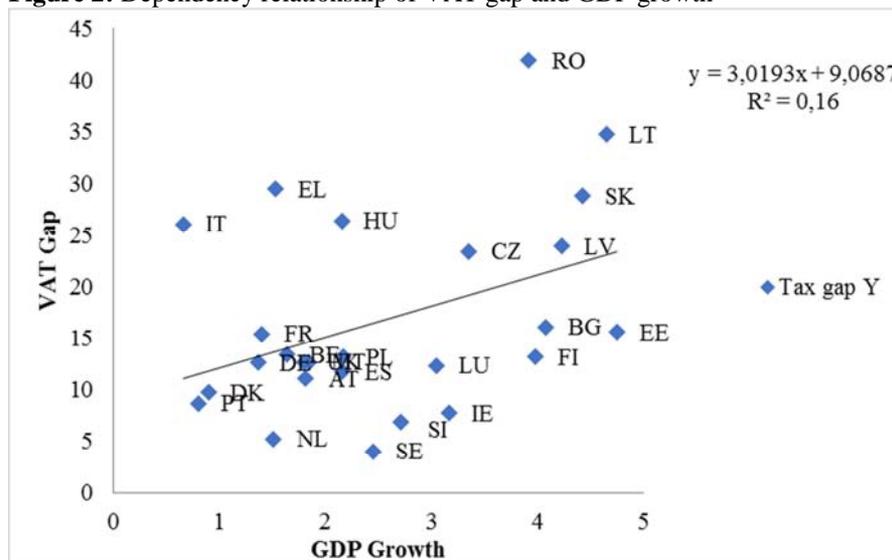
In this model, the probability value (significance F) is less than the tested significance level of 0.05, which means that the null hypothesis is rejected, and the regression model is statistically significant.

The value of correlation coefficient, which is shown in Figure as multiple R indicates the strength of dependence of selected variables. Specifically, it means that the VAT gap is approximately 75% dependent on changing of the Corruption Perceptions Index. Another value shown in the table is the value of reliability R – it is also a coefficient of determination. It indicates how much of the total variance of the dependent variable, i.e. VAT gap, is explained by the regression model. In this case it is about 56.1%.

The level of significance is compared with the value P in the table above. Thus, if P value is lower than the level of significance, as in this case ($2.83818E-09 < 0.05$), we reject null hypothesis and so the alternative hypothesis is valid, therefore, both parameters are not equal to zero.

The second examined variable is GDP growth and its impact on the emergence of VAT gap. In this case a very little dependence has been found, which is shown in Figure 2 below.

Figure 2: Dependency relationship of VAT gap and GDP growth



Source: own calculation.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Equation of line of regression analysis has thus the form:

$$y = 3.0193x + 9.0687 \quad (13)$$

There are many more countries that deviate from the established linear line in the case of the growth rate. It is Romania, which has the highest level of the VAT gap from all the EU countries, as mentioned above, and regarding GDP growth, Romania ranks among the countries of the European Union which have high GDP growth rate in average in twelve years, about 3.9%. Slovakia is another deviating country. As regards the size of the VAT gap, Slovakia ranks among the countries with the high level of gap and reaches the average value of approximately 28.8%. The GDP growth rate of Slovakia reaches high values that are the third highest among the EU countries, behind Estonia and Lithuania, with an average of approximately 4.4%. The lowest point is the result of Sweden due to its lowest rate of the VAT gap and its GDP growth rate with the average value of approximately 2.4%.

Table 4 shows the results of the regression analyzes exploring the dependence of VAT gap and GDP growth.

Table 14. Output of the regression analyzes exploring the dependence of VAT gap and GDP growth

Regression statistics				
Multiple R		0.400031345		
Value of reliability R		0.160025077		
Set value of rel. R		0.125026122		
Std. Error		8.95986759		
Observations		26		
ANOVA				
	Difference	SS	MS	Signific. F
Regression	1	367.0592	367.05923	0.042878191
Residues	24	1926.701	80.2792272	
Total	25	2293.761		
	Coefficients	Std. Error	tStat	Value P
Limit	9.068708251	4.023253153	2.254073484	0.033595657
Average	3.01930171	1.41201734	2.1382894	0.042878191

Source: own calculation.

Pearson's correlation coefficient is approximately 40% of the value in this case, ie the dependence is much smaller than in the previous case. VAT

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

gap is therefore 40% dependent on GDP growth, which is very low. The coefficient of determination shows that with the help of the regression analysis only 16% of VAT gap is explained.

By testing the statistical significance of the regression model, similarly to the previous case at a significance level $\alpha = 0.05$, the calculated probability shown in the figure is lower than the significance level α ($0.042878191 < 0.05$). The null hypothesis is again rejected and the linear regression model is statistically significant.

Furthermore, the tested value P is lower than the significance level α ($0.033595657 < 0.05$). The null hypothesis is rejected and it is valid that the test parameters are equal to zero.

However, it does not confirm the expected effect which the GDP growth should have on the VAT gap. According to the regression the expected negative impact that the VAT gap falls with the increase of the GDP growth is not valid.

The last monitored variable is the basic VAT rate and its impact on the VAT gap. Regarding this variable, the dependence is negligible, almost zero, which implies that the amount of the basic VAT rate has no effect on the size of the VAT gap. Table 5 shows the results of regression analysis, from which it is seen that the model as a whole is not statistically significant.

Table 15. Output of regression analysis exploring the dependence of VAT gap and the basic VAT rate

Regression statistics				
Multiple R	0.063507268			
Value of reliability R	0.004033173			
Set value of rel. R	-0.037465445			
Std. Error	9.756428543			
Observations	26			
ANOVA				
	Difference	SS	MS	Signific. F
Regression	1	9.251134	9.25113384	0.757922588
Residues	24	2284.51	95.1878979	
Total	25	2293.761		
	Coefficients	Std. Error	tStat	Value P
Limit	21.77969836	16.06305722	9.126762895	0.187756647
Average	-0.250762324	0.804369644	-0.311750109	0.757922588

Source: own calculation.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The correlation coefficient regarding the dependence of the VAT gap and the basic VAT rate reaches the value of just 6.3%. It indicates there is no relation between these two variables and they are not mutually affected. The determination coefficient, which indicates what proportion of the total variance of the dependent variable is explained by the regression model, reaches only 0.4%. It means that this model is not explained by the selected dependent variable.

The calculated probability, which is shown as the significance F in the table, reaches a higher value than the specified level of significance level α ($0.757922588 > 0.05$). It confirms the null hypothesis, and this model is statistically insignificant and thus could not demonstrate any anticipated impact.

Conclusions

Currently, one of the biggest problems in the fiscal area is called the tax gap. A failure of taxpayers to pay taxes creates important arrears that are subsequently missing in the budgets of individual states, which is in the period when most of the member countries of the European Union are in deficit, a major problem that needs to be solved. The tax gap arises in two ways, partly caused by tax evasion, partly by tax avoidance. The main cause is primarily omission of the tax laws by tax payers.

The European Union belongs to the areas with high tax burden. The overall tax ratio reaches 38.8% as regards the European Union. In comparison with the OECD countries, there are only two countries that exceed the 30% limit, which is Canada and New Zealand. Regarding the European Union member countries there are striking differences in the level of taxation as well - the overall tax ratio varies from 26% in Lithuania to 47.7% in Denmark.

In the article the influence of the dependence of the VAT gap and three selected independent variables, namely the corruption perception index, GDP growth rate and the basic VAT rate, were examined. Of these three variables the Corruption Perceptions Index demonstrated the highest dependence regarding the first mentioned. 75% dependence of the VAT gap on the Corruption Perceptions Index was demonstrated. According to the tests, the model was determined to be statistically significant. Regarding the GDP growth rate, the model is evaluated as statistically significant and the variable dependence is approximately 40%. Concerning the basic VAT

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

rate there has been no evidence of dependency and the model is insignificant as a whole.

In 2012 the European Commission published an action plan in the engagement against tax evasion in the European Union that proposes options for reducing and preventing tax evasion. Within the action plan, the Commission proposes several measures to reduce the tax gap, including the establishing of the Forum of the VAT. It is a dialogue between the representatives of large, medium and small enterprises and tax authorities, who can exchange their views on functioning of the VAT in the European Union. Another possibility is the introduction of a rapid response mechanism against the VAT fraud, which would allow the Commission to react very quickly to the VAT fraud and allow a Member State to deviate from the standard measures. In the following years the Taxpayer Identification Number – TIN should be implemented, as the optimal means to identify taxpayers.

But as Hamemi (2014) claims the collaboration between policymakers and citizens would be the best solution and the most effective for reducing the tax gap.

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**Revenues, Expenses, Profitability and
Investments of Potential Contenders for the
Status of a Listed Company in Poland**

JEL Classification: *O16; P44; L10; L22; L25; G10; D40*

Keywords: *SMEs; WSE; legal person; revenues and expenses; gross financial result*

Abstract: The purpose of this article is an attempt to determine the scope of Polish companies operating on the market, which could raise capital by the means of the Warsaw Stock Exchange. Therefore, a preliminary analysis is made of selected results achieved by economic entities in the years 2003-2012 as well as values and trends produced by them, with particular emphasis on the fluctuation of their number, undertaken investments, structure of revenues and expenses and financial performance, against other countries of the European Union. To illustrate the whole potential volume, the study covered all structures operating in the market: micro, small, medium and large enterprises and their results are shown on the basis of statements arising from the undeniable specificity of the entire SME sector and large companies operating in Poland.

Introduction

Since Poland's entrance to the European Union was eleven years ago, it may seem that Polish legislators have made great strides in enacting changes related to capital ownership. However, small and medium-sized enter-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

prises that produce nearly 50% of Polish GDP and form two-thirds of the Polish labour market still encounter limitations in their ability to raise capital for development (Duliniec, 2011, pp. 412-420). The gross value produced by the SME sector in 2012 is exactly 48.5% of which 29.7% was produced by micro-enterprises, 7.8% by small, 11.0% by medium-sized enterprises and 24.5% by large. According to data from the European Commission (SBA Fact Sheet, 2014), the structure of Polish enterprises more and more resembles that of the EU, systematically increasing the service sector (29.7% in 2012), and decreasing the trade and industrial sector (respectively in 2012: 25.8% and 29.6%)¹. Still, when compared with the EU, it is indeed dominated by micro-enterprises, while small companies' contribution is about half of that. Micro, small and medium-sized enterprises provide the Polish economy with the structural changes and framework for socio-economic development, at the same contributing to the global economy (Bass, 2006, pp.10-11) and affect the basic macroeconomic indicators (see: Grzywacz, 2012; Jaworski, 2010). While providing innovative potential, at the same time they are still subject to the so-called loan discrimination phenomenon and it is much harder for them than for large companies to acquire a bank loan (see: Bielawska, 2001; Duliniec, 2011; Łuczka, (2001, 2013); Łukasik 2010). Among other things, this is a reason why the most popular form of funding is from own finances, and only later do owners turn to loans and leases (Wasilewska 2007, p.454; 2006, pp.539-545). So why do so few companies look for financing through the stock exchange? The question arises of how they understand the cost of capital and the investment decisions regarding development? The qualitative characteristics of SMEs often give them an advantage over large companies, especially when it comes to the speed of adjusting to the market or bringing about change, but in some circumstances significantly discriminate against them, highlighting the existing barriers to development and expansion (Łuczka, 2007, pp.29-49; Daszkiewicz, 2004, p.61). Nevertheless, in a macroeconomic sense, the SME sector sets a trend of economic development, especially through the changes that occur in the local and regional markets (Bera, 2010, p.338; Strużyński, 2004, p.19).

In literature on the subject, and in the EU, companies are classified according to their size (Łuczka, 2013, p. 125; Cassar & Holmes, 2003,

¹ According to Eurostat data for 2010 in Poland there are definitely more trade enterprises (35.5%, 28.6% in the EU) and much less service enterprises (36.3%, 45.9% in the EU). Results for industry oscillate between 2.1% (Poland 12.5%, 10.4% in the EU). Construction is at a similar level (Poland 15.8%, EU 15.2%).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

pp.123-147; Gregory et al., 2005, pp.382-392; Art. 104-106, DZ.U. 2004 Nr 173 poz. 1807, p.54; Załącznik nr 1 Rozporządzenia Komisji (WE) Nr 364/2004, DZ.U. L 124 z 20.05.2003, p.36). The Central Statistical Office (CSO) classification used for the purposes of this article takes into account the employment criterion and ignores the values of revenues and assets. Micro-enterprises were singled out in each of the presented statistics for both readability and clarity of the results achieved by small companies operating in Poland, but also because of the currently noticeable activity and dynamism that occurs in the development of programs directed primarily to small and medium-sized enterprises and to people who are self-employed, who focus their business around innovation and modern trades in the industrial and service sectors, so-called start-ups (see: Blair & Marcum, 2015, pp.249-265; Cassar, 2004, pp.261-283; Fourati & Affes, 2013, pp.244-254).

After the mass privatization process which took place in Poland from 1990, the stock exchange first directed its actions towards large companies and is now increasingly beginning to attract new issuers among companies belonging to the SME sector. The Warsaw Stock Exchange (WSE) cooperates with the Ministry of Finance to create a system of incentives that would enable and support innovative and dynamic companies operating from this segment. Thus far they mainly supported the innovative economy, a sector that is far less likely to be financed by the banks (New Connect) (see: Kołosowska, 2013; Kordela 2013). And yet the stock market, which is the most important institution of the capital market, is not only a valid source of financing of companies, but also aids the transformation of small businesses into medium and large enterprises (Wasilewska & Jankowska, 2005, p.36), thus it would best fulfil its mission by supporting the financing of private Polish companies (Jaworska at al., 2013, pp.249-265). In order to do this it seems to be necessary to create a whole system of activities that encourage the use of such sources of funding, not only for entrepreneurs seeking the development of their own companies, but also for future investors. The concept of the stock exchange should be better understood and the existing tools described in a more accessible way so as to encourage Polish entrepreneurs to restructure their own companies, to introduce corporate governance and transparent accounting and the use of analytical indicators in the current management of the company (Bień, 2008, pp. 98-127). There would be a significant diversification of the role of banks as a source of capital for development, and a part of the capital accumulated would be transferred to the capital market, including the stock exchange, which

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

would significantly affect the development of the economy. Worth mentioning is the work currently being done by the WSE along with the Polish Agency for Enterprise Development (PARP), on developing projects with funding from the EU in the years 2014-2020 to support the SME sector, including micro-entrepreneurs, wishing to debut on the WSE, as well as young people, planning to establish an innovative business (PAP, 2014). The money will come from the Operational Programme "Intelligent Development" and will gather experts who can help claimants evaluate their chances and help prepare the appropriate documentation. The goal is activating companies in the SME sector, which currently insufficiently use external sources to finance their investment through capital markets (PAP, 2014). This program is designed to be the successor of the Innovative Economy Operational Programme, which operated in 2007-2013 and the budget is to reach more than EUR 8.6 billion, of which research and development projects carried out by companies and scientific and industrial consortia, are expected to receive approx. EUR 3.45 billion, while innovative initiatives in companies will receive approx. EUR 2.63 billion. According to data obtained from PARP on 12 February 2015, information regarding the program has already been established with the European Commission. This joint initiative of PARP and the WSE, serving the popularization of the stock exchange, seems the more important for the Polish economy, the more opinions are published that there is an insufficient number of IPOs successfully debuting on the WSE after the Treasury stopped introducing large companies to the exchange (Tychmanowicz, 2015). The belief is that this bad streak, which affects the IPO market, is not a matter of economic crisis, but only a lack of interest from sufficiently large and structured companies (Adamczyk, 2014).

It should be noted that the entry of the company on the WSE is determined by its legal form. According to Polish legislation, this status can be claimed only by joint-stock companies and limited joint-stock partnerships whose conditions for admission are regulated by the Stock Exchange regulation and the regulation of the Council of Ministers from 14 October 2005, on determining the conditions that must be met by official listings on the stock market and by issuers of securities admitted to trading on the market (see: DZ.U. nr 206, poz.1712). According to the classification of the CSO these companies are recognized as legal persons. With the objective of proper verification of data, the analysis conducted and presented in the article, was constructed on the basis of a division of business entities, which is in accordance with the classification of the CSO. It includes legal

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

persons, entities without legal personality and natural persons who were carrying on business in Poland in the years 2003-2012, where a collection of natural persons is understood as natural persons as well as persons who work in companies formed on the basis of a contract made based on the Civil Code (private partnerships), and a group of entities who have legal personality (legal persons) is presented together with the organizational entities without legal personality (CSO, 2012). In order to determine the scope of companies that can seek to acquire sources of financing through the stock exchange, the study has included all stakeholders, detailing among them the legal persons, and examining their number and market share as well as their financial condition, each time taking into account Poland's place in macroeconomic terms obtained from various indicators against the current performance of countries of the European Union.

Methodology of the research

The study involved 10 years of Polish entrepreneurship, trying to distinguish in the most precise way those business entities which could apply for the status of a listed company in Poland. Joint stock companies and limited joint-stock partnerships were classified as legal persons, along with other commercial companies². This collection has been analysed in individual

² In Poland commercial companies include:

- commercial partnerships and capital companies with a legal personality (joint-stock companies and limited liability companies)
- partnerships without a legal personality only with legal capacity (professional partnerships, general partnerships (unlimited), limited partnerships, and limited joint-stock companies).
- These figures do not include companies classified according to the Polish Classification of Activities 2007 section A, K and O, that is, according to the Polish division:
- companies of the administrative law (water companies and the common land)
- pan-European companies (European companies and European economic grouping investors)
- self-government organizations and foundations
- universities
- autonomic public health centers
- units from chapter 94 PKD 2007.

The division is made on the basis of legal form (1, 2, 9). Units that are natural persons engaged in economic activities (Code 9) CSO assigns to natural persons. Entities that are legal persons (code 1) are allocated to legal persons. Organizational units without legal personality (code 2) also to legal persons. Specific legal forms, which are included in the personal scope of the publication of CSO codes are: 15, 16, 17, 18, 19, 20, 21, 23, 24, 40, 79, 99..

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

obtained economic indicators and then depicted as compared to other businesses and the results of the EU, with a particular emphasis on entities belonging to the SME sector. For clarity and precision, always from the small enterprises sector highlighted were micro-enterprises³.

For the purposes of calculation and tabular or graphical presentation of the obtained results, mathematical analysis tools were used which allowed for determining:

- average value of capital expenditures, revenues and expenses for one company
- percentage increases
- trend analysis based on linear regression analysis methods (Freedman, 2009)
- profitability ratios

It is worth noting the difference between the results published in this article and the generally provided data by the CSO in 2005-2011. The difference stems from the CSO's use of different formulas during this studied period. To calculate the gross profitability rate in some years CSO used the formula:

$$\text{Gross turnover profitability rate} = \frac{X}{Y} \times 100\%,$$

where: X - gross profit (for entities achieving a positive financial result); Y - total revenue.

For the purpose of enabling analysis of comparative data in the ten-year period, for all the years of 2003-2012 the following formula was used:

$$\text{Gross turnover profitability rate} = \frac{(Y - X)}{X} \times 100\%,$$

where: X – total expenses; Y – total revenue.

³ Art. 104-106, DZ.U. 2004 No. 173 Item. 1807; Annex No. 1 Regulation of the Commission (WE) No. 364/2004, DZ.U. L 124 of 20.05.2003 r.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Potential contenders for the status of a listed company in Poland

Considering the operation of the stock exchange to focus on attracting new issuers also among the SMEs, the survey covered a period of 10 years of achievements of Polish entrepreneurship. Assuming the year 2003 as the base, it turned out that the number of companies in Poland increased by 4.0%, of which natural persons increased by 1.7%, and legal persons who are in light of the problem the most important group by 36.2%. For the sector of micro, small and medium-sized enterprises the statistics take the following values, respectively: 3.9%, 1.7% and 36.6%. Although their numbers cannot be called comparable (small enterprises increased from 42 770 in 2003, to 57 071 in 2012, microenterprises respectively from 1 666 696 to 1 784 603), among all segments surveyed the largest growth was recorded by small firms (33,4%), the smallest by micro-enterprises (3.1%).

Table 1. Number and growth rate of enterprises divided into legal forms and size sector in Poland in the years 2003-2012; 2003 = 100.00.

YEARS	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
TOTAL										
Total	1 726 536	1 714 983	1 676 775	1 714 915	1 777 076	1 862 462	1 673 527	1 726 663	1 784 603	1 794 943
Natural persons	1 615 163	1 593 255	1 550 317	1 587 268	1 641 220	1 730 041	1 539 073	1 594 332	1 641 635	1 643 288
Legal persons	111 373	121 728	126 457	127 647	135 856	132 421	134 454	132 331	142 968	151 655
SME										
Total	1 723 834	1 712 228	1 673 940	1 711 934	1 773 830	1 859 210	1 670 414	1 723 496	1 781 414	1 791 742
Natural persons	1 615 054	1 593 140	1 550 210	1 587 152	1 641 100	1 729 923	1 538 971	1 594 218	1 641 523	1 643 186
Legal persons	108 780	119 089	123 729	124 782	132 730	129 287	131 443	129 278	139 891	148 556
TOTAL. GROWTH RATE. YEAR 2003=100,00										
Total	100,00	99,33	97,12	99,33	102,93	107,87	96,93	100,01	103,36	103,96
Natural persons	100,00	98,64	95,99	98,27	101,61	107,11	95,29	98,71	101,64	101,74
Legal persons	100,00	109,30	113,54	114,61	121,98	118,90	120,72	118,82	128,37	136,17
SME. GROWTH RATE. YEAR 2003=100,00										
Total	100,00	99,30	97,11	99,31	102,90	107,85	96,90	99,98	103,34	103,94
Natural persons	100,00	98,64	95,99	98,27	101,61	107,11	95,29	98,71	101,64	101,74
tabela 1	100,00	109,48	113,74	114,71	122,02	118,85	120,83	118,84	128,60	136,57

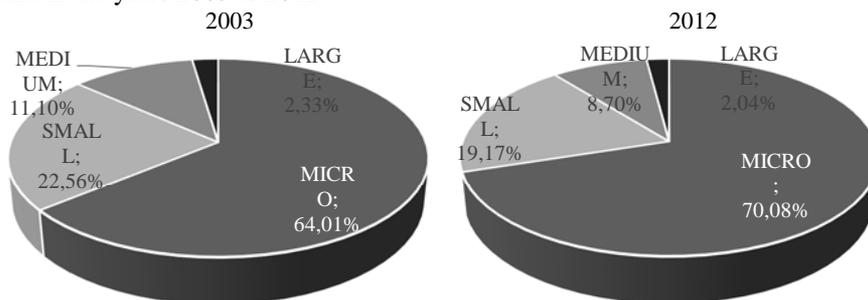
Source: own elaboration based on data from the CSO.

When analysing the sectors examined, it turns out that among natural persons the greatest appreciation was recorded by small enterprises (58.7%) and the smallest by large (-6.4%). Among legal persons, the highest growth was achieved by the segment of micro-entrepreneurs (49.1%), while the smallest by medium-sized enterprises (6.7%). There was, therefore, a strong increase in the number of companies with legal personality among all the structures observed on the market (micro: 49.1%, small: 15.7%, medium: 6.7%, large: 19.5%), which reached respectively in 2012 the

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

number: 106 287, 29 075, 13 194, 3 099, which gives 151 655 companies having legal personality in Poland. SMEs therefore represent 98.0% of the entire collection, which has the ability to consider the stock exchange as a potential source of funding, with the specific involvement of micro-enterprises: 70.1%, small businesses: 19.2%, medium-sized entities: 8.7%, large companies: 2.0%.

Figure 1. Quantitative participation of companies having legal personality in Poland in the years 2003 to 2012.



Source: own elaboration based on data from the CSO.

In relation to 2003, among potential entities that may express interest in raising capital for development through the WSE there is a noticeable increase in the participation of micro-enterprises (by 6.1% in 2012) and a decrease of participation in other sectors: small (by 3.4%), medium (by 2.4%) and among large enterprises (by 0.3%), which take specific values presented in Tab.2.

Table 2. Number and growth rate of legal persons divided into sectors in Poland in the years 2003-2012; 2003 = 100.00

YEAR	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
NUMBER OF LEGAL PERSONS										
MICRO	71 288	81 805	86 701	87 535	94 822	86 765	90 105	87 799	97 672	106 287
SMALL	25 127	25 352	24 944	24 802	24 949	28 732	27 883	27 985	28 739	29 075
MEDIUM	12 365	11 932	12 084	12 445	12 959	13 790	13 455	13 494	13 480	13 194
LARGE	2 593	2 639	2 728	2 865	3 126	3 134	3 011	3 053	3 077	3 099
GROWTH RATE. YEAR 2003=100.00										
MICRO	100,00	114,75	121,62	122,79	133,01	121,71	126,40	123,16	137,01	149,10
SMALL	100,00	100,90	99,27	98,71	99,29	114,35	110,97	111,37	114,37	115,71
MEDIUM	100,00	96,50	97,73	100,65	104,80	111,52	108,82	109,13	109,02	106,70
LARGE	100,00	101,77	105,21	110,49	120,56	120,86	116,12	117,74	118,67	119,51

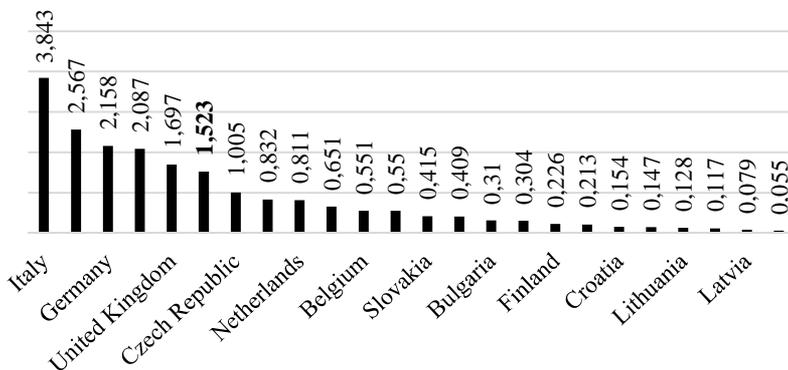
Source: own elaboration based on data from the CSO.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Compared to the average of the European Union, in Poland the SME sector is dominated by micro-enterprises, while small companies record a participation which is half of that of the EU. However, since 2008 their structure strongly increasingly resembles that of the EU (with a gradual decrease among micro-enterprises and increasing participation in other sectors) (PARP, 2014).

In 2011 the total number of companies in the EU-28 was 22 million. Most companies worked then in Italy, France and Germany (respectively, 3.8 million, 2.6 million, 2.2 million). Poland was in the sixth place in the EU before the Czech Republic, Portugal and Spain (respectively 1.0 million, 0.8 million, 0.8 million) with the number of 1.5 million enterprises (Eurostat, 2011)⁴. Striking is the number of companies registered in Italy, which exceeds the number of Polish by two and a half times.

Figure 2. Number of enterprises in countries of the EU in 2011 [in million]



Source: own elaboration based on data from PARP and Eurostat.

In the EU in 2011, 99.8% of enterprises were made up of micro, small and medium-sized enterprises, a result identical to Polish statistics (Eurostat, 2011)⁵. The difference can be seen in the individual segments, as micro-enterprises in the EU are 92.5% and 95.9% in Poland (among them

⁴ According to data from the CSO in Poland in 2011 the number of registered and active companies was 1 784 603, of which 142 968 companies were with legal personality, including 139 891 in the SME sector.

⁵ According to CSO data, in 2012 the number of companies increased by 10 340, of which 10 328 were in the SME sector, of which 8 665 are legal persons. Simultaneously there was an increase of 1 663 natural persons.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

legal persons make up 68.3%). Small companies have almost twice the share in the EU (6.2%) than in Poland (3.2%, including legal persons 20.1%) and only medium sized have a structure of comparable size (EU 1.0%, Poland 0.9%, legal persons making up 9.4%). The resemblance nearing the structure of the EU is seen throughout the whole studied period of 10 years and is very slow. Comparing the results from 2012 to 2003, there can be observed a decrease in the participation of micro-enterprises from 96.5% to 95.8% and an increase in the participation of other sectors creating the structure of SMEs: small from 2.5% to 3.2%, and medium from 0.8% to 0.9%. At the same time, large enterprises have increased their participation from 0.16% in 2003 to 0.18% in 2012 (PARP, 2014).

**Investments of potential contenders for the status of a listed
company in Poland**

Capital expenditures during the period considered in Poland have increased by 100%, while in the SME sector by 101.2%. Legal persons, who are the point of interest, spurred their financial contributions particularly among micro-entrepreneurs (145.7%), followed by medium-sized enterprises (103.2%) and small (47.9%). Large companies in the same period doubled their investments. The involvement of entrepreneurs in their own business noted a three times decrease, like those who represented the SME sector. However, two years are identical: in 2009 and 2012 the entire sector including micro, small and medium-sized enterprises reduced their investments accordingly to: PLN 69.1 billion and PLN 74.5 billion⁶.

When examining legal persons a sequence of declines was observed in consecutive years and receiving respectively values for all legal persons studied in 2009: PLN 125.8 billion, in 2010: PLN 123.2 billion, growth was not registered until 2012: PLN 133.9 billion⁷. The SME sector recorded a negative growth in the years 2005, 2009 and 2012, reaching, respectively: PLN 34.4 billion, PLN 51.5 billion and PLN 54.0 billion. When analysing this period in terms of companies' potential, which is a determinant of the possibility of cooperation with the WSE, worth mentioning are the achievements of small and medium-sized enterprises, as in 2010-2011

⁶ At the same time, the sector noted: PLN 143.7 billion in 2009, and PLN 154.8 billion in 2012. SME noted a third decline in capital expenditures in 2005, reaching a value of PLN 44.158 billion, and the whole sector in 2010 with a value of PLN 141.9 billion.

⁷ The value of capital expenditures in Poland in 2011 amounted to PLN 139.8 billion.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

their investment exceeded the commitment of large companies (by 1.0% and 0.5% respectively). This trend is not, however, reflected in the group of legal persons from this sector.

Figure 3. Capital expenditures by entities with a legal personality divided by sector in Poland in the years 2003-2012 [million PLN]

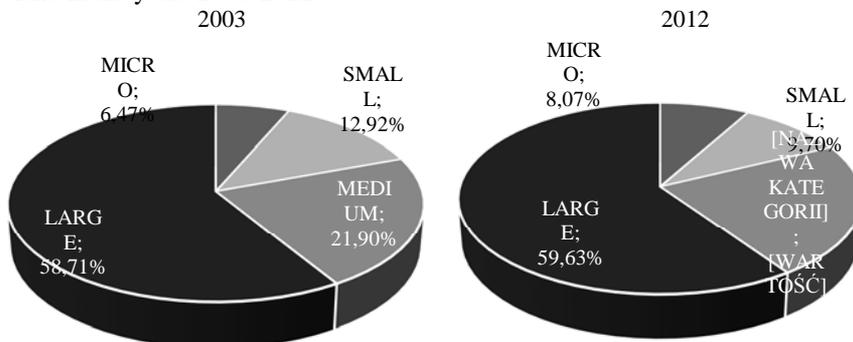


Source: own elaboration based on data from the CSO.

Comparing the initial and final results of the examined 10 years, it can be noted that only small companies among legal persons reduced their capital expenditures (by 3.2%). Other sectors increased their financial commitment to self-development (micro by 1.6%, medium by 0.7%, and large by 0.9%).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Figure 4. The share of capital investments in companies with legal personality in Poland in the years 2003-2012



Source: own elaboration based on data from the CSO.

In summary, all sectors recorded an increase in financial involvement into their own investments. The most stable in this evaluation parameter is the micro-enterprise sector, which recorded a decline only in 2012 (by 26.5% to PLN 10.8 billion). Perhaps this is also due to so much interest in start-ups, which are currently recorded on the market (see: PARP, 2014; WSE, 2014). Other sectors decreased by three times the value of investment in relation to the previous year. Small businesses in the years 2005, 2009, 2012, by 11.5%, 15.0%, 9.0%, to the respective values of PLN 8.3 billion, PLN 12.8 billion, PLN 12.9 billion. Middle-sized enterprises in 2005, 2009 and 2010 by 1.0%, 11.7% and 2.2%, reaching values of PLN 19.9 billion, PLN 28.4 billion and PLN 26.8 billion. Large companies reported all decreases after 2008: in 2009, 2010 and 2012, by 13.3%, 5.7% and 0.1%, with the respective values of PLN 74.2 billion, PLN 70.0 billion and PLN 79.8 billion. The most obvious difference is provided by the results of medium-sized companies, achieved in one registration among legal persons by a company (Tab.3).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

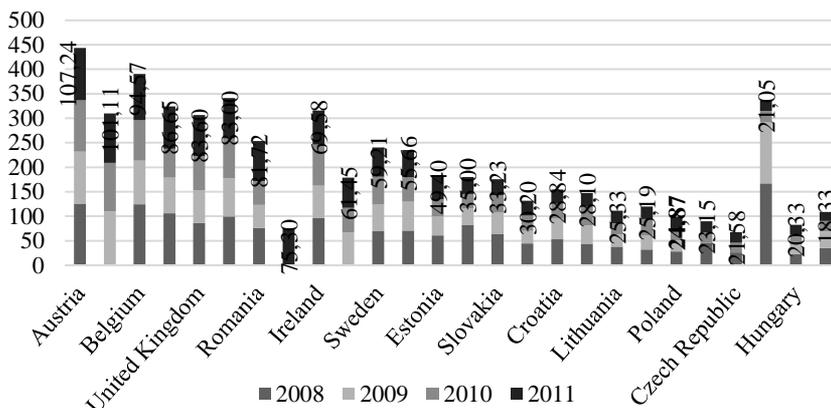
Table 3. Average monthly value of capital expenditures for one company with legal personality among enterprises divided by size in Poland in the years 2003-2012 [million PLN]

YEARS	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
AVERAGE MONTHLY VALUE OF CAPITAL WITH LEGAL PERSONS										
MICRO	0,06	0,07	0,07	0,08	0,09	0,10	0,11	0,15	0,15	0,10
SMALL	0,35	0,37	0,33	0,41	0,51	0,53	0,46	0,47	0,50	0,45
MEDIUM	1,20	1,69	1,65	2,08	2,46	2,33	2,11	1,99	2,29	2,29
LARGE	15,39	16,95	20,28	20,50	23,89	27,34	24,65	22,94	25,97	25,76

Source: personal elaboration on basis of information from CSO.

Comparing capital expenditures across the SME sector, noticeable is the much lower involvement of Polish entrepreneurs than that achieved in the EU. The best result for the EU-26 was achieved in 2011 by Austria of EUR 107.2 thousand, and the weakest by Portugal EUR 18.3 thousand. Poland was ranked sixth place again, but this time from the end (EUR 24.9 thousand), ahead of Bulgaria, the Czech Republic, Slovakia and Hungary.

Figure 5. Capital expenditure on fixed assets for one company in the EU-26 in the years 2008-2011⁸



Source: own elaboration based on data from the PARP (PARP, 2014).

⁸ Lack of data concerning Malta and Greece.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

For comparison, it is worth noting that in the same period in Switzerland, investments in fixed assets amounted to EUR 275.3 thousand and in Norway EUR 118.5 thousand.

**The structure of revenues and expenses of potential contenders
for the status of a listed company in Poland**

Analysing the structure of revenues it is tempting to theorize about the effectiveness of Polish entrepreneurship in the period considered. Despite the change in the number of enterprises by 4.0%, revenues increased by 192.9%, of which the SME sector reached a 170.8% increase and large companies 229.7%. However, further analysis shows that the structure and percentage trend of expenses is almost the same as that of revenues, especially among a selected group of legal persons whose revenue increased by 201.9% and expenses by 200.8%, reaching revenues of PLN 3.028 trillion and costs PLN 2.904 trillion⁹ (Tab.4). Thus, legal persons' revenues represent 80.4% of revenue of all registered enterprises in 2012, and the expenses 82.0%.

Table 4. Increase in revenues and expenses across sectors in Poland reached in 2012, in relation to 2003 [in %].

SPECIFICATION	INCOMS						COSTS					
	TOTAL	SME	MICRO	SMALL	MEDIUM	LARGE	TOTAL	SME	MICRO	SMALL	MEDIUM	LARGE
TOTAL	192,9	170,8	153,5	184,4	181,5	229,7	190,9	168,7	149,0	183,1	180,5	226,9
Natural persons	163,1	163,8	152,0	218,5	176,7	125,0	156,0	156,7	144,3	209,9	170,2	123,9
Legal persons	201,9	174,8	156,8	174,9	182,0	231,0	200,8	175,1	158,7	175,6	181,4	228,0

Source: own elaboration based on data from the CSO.

By submitting a detailed analysis of the data on these trends a higher growth rate of revenue of legal persons can be observed. The only exception is 2012, which reached a lower rate, however the values which stand behind these percentages show a pronounced difference, at 411.5% (revenues of natural persons in 2012 amounted to PLN 753.9 billion while legal persons PLN 3.028 trillion). Expenses tend to behave like revenue, reaching in 2012 a value of PLN 637.2 billion for natural persons and PLN 2.904 trillion for legal persons¹⁰.

⁹ Value of revenues of legal persons in 2003 amounted to PLN 1.499 trillion, and expenses PLN 1.447 trillion

¹⁰ Ibidem.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 5. Growth rates of revenues and expenses in Poland in the years 2003 to 2012; 2003 = 100.00

YEARS	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
INCOMS										
TOTAL	100,0	112,4	116,1	131,1	148,0	164,7	157,8	169,0	187,9	192,9
Natural persons	100,0	108,8	114,3	125,9	135,8	156,1	139,5	142,9	159,9	163,1
Legal persons	100,0	113,5	116,6	132,7	151,7	167,3	163,3	176,8	196,3	201,9
COSTS										
TOTAL	100,0	110,0	113,9	128,3	143,4	161,8	154,8	164,2	184,6	190,9
Natural persons	100,0	106,9	111,2	121,8	129,4	145,6	133,8	135,5	152,2	156,0
Legal persons	100,0	110,9	114,7	130,2	147,4	166,4	160,7	172,3	193,8	200,8

Source: own elaboration based on data from the CSO.

In the analysed period, among legal persons a continuous upward trend was observed only among large enterprises. Larger entities of the SME sector registered two drops (small businesses in 2005, reaching a value of PLN 245.7 billion and in 2009 reaching a value of PLN 317.6 billion; medium-sized enterprises in 2009, reaching a value of PLN 601.9 billion and in 2012 reaching a value of PLN 705.8 billion). Micro-enterprises recorded negative growth three times: in 2005, with revenue of PLN 163.7 billion, and in 2011 and 2012 with the respective values of PLN 244.6 billion and PLN 241.4 billion. This is another one of the main reasons that should be taken into account when attempting to construct programs to encourage owners of companies from this sector to attempt to raise capital for development and opportunities to increase revenue through the stock exchange.

The expense structure is identical to that in the case of large companies, which systematically increase their commitment. Their decline is noticeable, with a halt at one level in 2008-2009 (respectively: PLN 1.241 trillion and PLN 1.229 trillion), however, since 2010 parities of this sector are constantly growing. Micro and small companies had a two times decrease in tendency in the years 2005 and 2009, reaching an expense value of respectively PLN 152.4 billion, PLN 219.9 billion, PLN 233.7 billion, PLN 301.6 billion. Medium-sized enterprises reduced expenses only in 2009 to PLN 574.0 billion.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

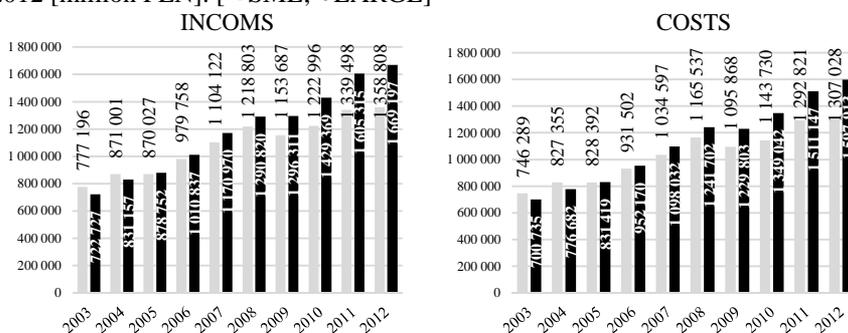
Table 6. Growth rate of revenues and expenses of legal persons in Poland in the years 2003-2012; 2003 = 100.00

YEARS	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
INCOMES OF LEGAL PERSONS										
MICRO	100,0	113,4	106,4	132,6	139,4	150,6	152,1	166,2	158,9	156,8
SMALL	100,0	105,6	104,4	110,4	124,1	145,4	135,0	142,6	164,7	174,9
MEDIUM	100,0	115,4	118,7	133,0	154,0	166,2	155,2	162,8	182,4	182,0
LARGE	100,0	115,0	121,6	139,9	162,0	178,6	179,4	197,8	221,1	231,0
COSTS OF LEGAL PERSONS										
MICRO	100,0	110,8	102,9	130,4	134,3	150,5	148,5	156,4	157,2	158,7
SMALL	100,0	105,8	104,6	111,4	121,9	145,0	135,1	141,6	170,0	175,6
MEDIUM	100,0	113,9	118,0	130,6	150,3	165,1	153,2	158,9	181,5	181,4
LARGE	100,0	110,8	118,6	135,9	156,7	177,2	175,5	192,5	215,7	228,0

Source: own elaboration based on data from the CSO.

Generally, revenues and expenses for large enterprises among legal persons grow. Only one decrease in expenses has been observed in 2009 at 1.0% to the prior year. Therefore, their financial results are much more predictable and the tendency of the financial result can generally be called as growing. Companies in the SME sector in their structure are more difficult to prognose, but the volume of their revenue rivals that of large companies. In the studied decade the revenue realized by micro, small and medium-sized enterprises, was even higher than in large enterprises (2003 and 2004). This trend has also been observed in the expense structure (Figure 6).

Figure 6. The revenues and expenses of legal persons in Poland in the years 2003-2012 [million PLN]. [●SME; ●LARGE]



Source: own elaboration based on data from the CSO.

Distinct differences were observed when comparing the values converted to one company in each sector. On average, each of the 3 099

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

legal persons among large companies had in 2012 a revenue of PLN 538.6 million, each of the 13 194 legal persons among medium-sized enterprises generated a revenue of PLN 53.5 million, every small company out of 29 075 legal persons on average recorded PLN 14.2 million in revenue, and micro-enterprises (106 297 companies) PLN 2.2 million. Accordingly the expenses amounted to PLN 515.6 million, PLN 51.5 million, PLN 13.5 million and PLN 2.2 million. Despite the glaring difference in values, noticeable is the systematic growth among small and medium-sized entities (except for 2009). Micro-enterprises do not maintain a uniform structure of revenue, even though the number of legal persons in the SME sector has the largest share, amounting to 71.5%.

Table 7. Average revenues and expenses of one company with legal personality in Poland in the years 2003-2012 [million PLN]

YEARS	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
INCOMS										
MICRO	2,2	2,1	1,9	2,3	2,3	2,7	2,6	2,9	2,5	2,3
SMALL	9,4	9,8	9,8	10,5	11,7	11,9	11,4	12,0	13,5	14,2
MEDIUM	31,4	37,5	38,1	41,4	46,1	46,8	44,7	46,8	52,5	53,5
LARGE	278,7	315,0	322,1	352,8	374,6	411,9	430,5	468,2	521,7	538,6
COSTS										
MICRO	2,1	2,0	1,8	2,2	2,1	2,6	2,4	2,6	2,4	2,2
SMALL	8,9	9,3	9,4	10,0	10,9	11,3	10,8	11,3	13,2	13,5
MEDIUM	30,3	35,8	36,6	39,3	43,5	44,9	42,7	44,1	50,5	51,5
LARGE	270,2	294,3	304,8	332,3	351,3	396,2	408,4	441,9	491,1	515,6

Source: own elaboration based on data from the CSO.

In accordance with data from Eurostat and the European Commission developed for the needs of the SBA Fact Sheet 2012 they show clear differences in the growth rate of turnover of Polish companies and the average in the EU. The years 2005-2008 were much more favourable for Poland, because the dynamics of company turnover was 40.2% higher than in the European Union (Poland 162.1%, EU 121.9%) (EC, 2012). The years 2009-2012 showed the same trend, however, the proportion was reduced to the difference of 7.0% (Poland 126.0%, EU 119.0%) (Eurostat, 2011).

Gross financial result and the profitability of business entities in Poland

In 2012, the gross financial result of Polish companies increased in relation to 2003 by 207.9% to amount to PLN 275.8 billion earned by all registered and active business entities operating in Poland. Natural persons

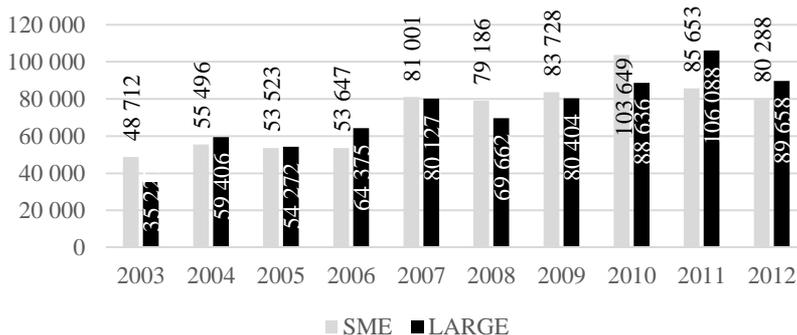
**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

reached a 217.3% increase compared to the base year, with a value of PLN 105.8 billion. Legal persons a 202.5% increase and the amount of PLN 169.9 billion.

The SME sector in 2012 developed a result of 191.2% higher than in 2003 (PLN 185.5 billion in 2012.), among which legal persons increased their result by 164.8% (PLN 80.2 billion in 2012). Simultaneously large enterprises reached a 253.4% increase (PLN 90.2 billion), among them legal persons a 254.5% increase compared to 2003 (PLN 89.6 billion in 2012).

Examining the gross financial result achieved by SMEs and large companies in the years 2003-2012 an unambiguous trend cannot be determined, as in the years 2003, 2007-2012 micro, small and medium-sized enterprises achieved better results than large enterprises (respectively by: 38.3% 1.1%, 13.7%, 4.1%, 16.9%). In the years 2004-2006, this sector has reached values that are much lower (by 6.6%, 1.4%, 16.7%), as in the last two studied years 2011-2012 (by 19.3% and 10.5%).

Figure 7. Gross financial result achieved by legal persons in Poland in years 2003-2012 [million PLN].



Source: own elaboration based on data from the CSO.

The results of the entities included in the analysis, with each year reach a more heterogeneous structure. Small companies present themselves as most stable; in the analysed period they reached only two drops among legal persons: in 2004 and 2009 by respectively 13.6%, 12.7%, yielding values: PLN 15.3 billion and PLN 21.2 billion. Further subjects according to this criterion are large companies, which recorded three decreases: in 2005, 2008 and 2012 by respectively 8.6%, 13.1%, 15.5%, yielding values: PLN 54.2 billion, PLN 69.6 billion and PLN 89.6 billion. Micro-enterprises

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

in relation to the previous year recorded four drops: in 2005, 2008, 2011 and 2012 by respectively 1.3%, 13.0%, 36.2%, 21.4%, yielding values: PLN 15.2 billion, PLN 18.8 billion, PLN 23.6 billion, PLN 18.5 billion. The least stable among them are medium-sized companies whose gross financial result during the 10 years studied reached negative growth six times: in the years 2005-2006, 2008-2009 and 2011-2012, by respectively 7.3%, 9.7%, 3.8%, 1.6%, 12.3%, 4.8%, yielding values: PLN 22.9 billion, PLN 20.7 billion, PLN 36.0 billion, PLN 35.4 billion, PLN 37.2 billion, PLN 35.4 billion.

Table 8. Gross financial result and its increase among legal persons divided by sector in Poland in the years 2003-2012 [million PLN]

YEARS	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
GROS FINANCIAL RESULT FOR LEGAL PERSONS [IN BILLION PLN]										
MICRO	10 950	15 462	15 259	16 349	21 719	18 891	27 072	37 100	23 667	18 592
SMALL	17 700	15 289	15 323	16 578	21 855	24 291	21 216	24 062	24 735	26 221
MEDIUM	20 062	24 745	22 941	20 720	37 427	36 004	35 440	42 487	37 251	35 475
LARGE	35 227	59 406	54 272	64 375	80 127	69 662	80 404	88 636	106 088	89 658
GROS FINANCIAL RESULT FOR LEGAL PERSONS YEAR IN YEAR OUT [IN %]										
MICRO	base year	141,2	98,7	107,1	132,8	87,0	143,3	137,0	63,8	78,6
SMALL	base year	86,4	100,2	108,2	131,8	111,1	87,3	113,4	102,8	106,0
MEDIUM	base year	123,3	92,7	90,3	180,6	96,2	98,4	119,9	87,7	95,2
LARGE	base year	168,6	91,4	118,6	124,5	86,9	115,4	110,2	119,7	84,5

Source: own elaboration based on data from the CSO.

Performing a study allowing for comparison of obtained values of gross financial results, based on one company in a particular sector, it appears that since 2010 micro-enterprises on average achieve lower and lower results. Comparing the last three years studied, it was shown that negative growth occurred from year-to-year: in 2011 by 42.7% compared to the previous year, and another 27.8% in 2012. In fact, in 2012 micro-enterprises among legal persons increased their gross financial result compared to 2003 by PLN 0.02 million. Small enterprises have on average an (much larger than small companies) upward trend, but the results do not exceed 5.0%. Medium-sized enterprises showed the same trend as micro-enterprises, reducing their results by 12.2% in 2011 in relation to the previous year and a further 2.7% drop in 2012. Large enterprises, in terms of gross profit per company registered and operating actively in Poland in the years studied sequentially, also did not show a strong trend. Comparing the average gross financial results, of one company per sector examined in 2012, it appears that in relation to 2003 they reached a further increase of 13.9% by micro, 28.0% by medium, 65.7% by small, and 113.0% by large.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 9. The average gross financial result per company with legal personality divided by sector size in Poland in the years 2003-2012 [million PLN]

YEARS	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
GROS FINANCIAL RESULT PER ONE ENTERPRISES FOR LEGAL PERSONS [IN BILLION PLN]										
MICRO	0,15	0,19	0,18	0,19	0,23	0,22	0,30	0,42	0,24	0,17
SMALL	0,70	0,60	0,61	0,67	0,88	0,85	0,76	0,86	0,86	0,90
MEDIUM	1,62	2,07	1,90	1,66	2,89	2,61	2,63	3,15	2,76	2,69
LARGE	13,59	22,51	19,89	22,47	25,63	22,23	26,70	29,03	34,48	28,93

Source: own elaboration based on data from the CSO.

Table 10. The gross turnover profitability rate divided by sector in the years 2003-2012 [in %]

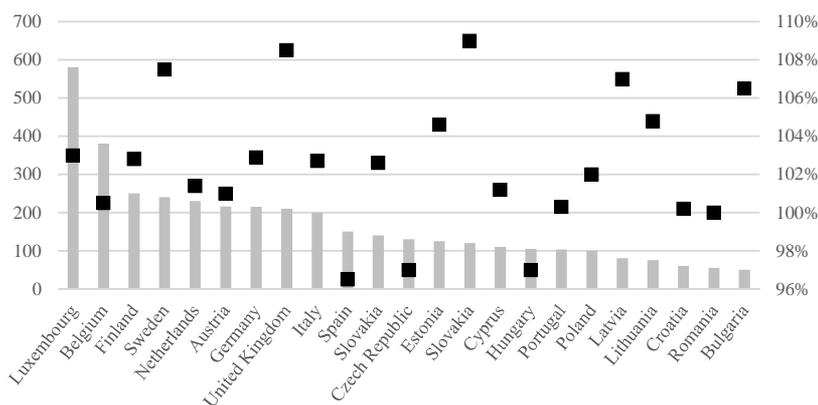
YEARS	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
TOTAL										
TOTAL	4,9	6,9	6,6	6,9	7,9	6,6	6,7	7,6	6,6	5,9
Natural persons	9,5	11,0	11,9	12,4	13,8	15,5	13,2	14,2	13,9	13,4
Legal persons	3,5	5,8	5,1	5,4	6,3	4,1	5,1	6,0	4,8	4,1
SME										
TOTAL	6,0	7,2	7,5	7,7	9,0	8,5	7,9	9,2	7,1	7,2
Natural persons	9,6	11,1	12,0	12,5	13,9	15,7	13,3	14,3	14,0	13,5
Legal persons	4,0	5,0	4,8	4,9	6,3	4,4	5,0	6,5	3,5	3,8
MICRO										
TOTAL	8,8	10,4	11,5	11,0	12,8	13,5	12,1	14,1	12,7	11,5
Natural persons	11,1	12,5	13,4	13,7	15,3	17,8	15,1	16,7	16,4	15,6
Legal persons	3,8	6,1	6,9	5,4	7,3	3,9	6,0	9,5	4,8	2,6
SMALL										
TOTAL	5,0	5,5	5,7	5,3	7,5	6,6	5,8	6,4	3,6	5,7
Natural persons	4,8	7,4	8,2	9,1	10,0	10,4	8,6	8,5	8,4	8,5
Legal persons	5,0	4,9	4,9	4,2	6,7	5,3	5,0	5,7	2,0	4,7
MEDIUM										
TOTAL	3,4	4,8	4,2	5,3	5,9	4,4	4,8	5,7	4,0	4,0
Natural persons	3,7	5,9	6,0	7,4	8,4	8,0	6,7	6,4	6,2	7,2
Legal persons	3,4	4,7	4,0	5,1	5,7	4,1	4,6	5,7	3,9	3,7
LARGE										
TOTAL	3,1	6,5	5,4	5,8	6,2	3,8	5,1	5,6	5,9	4,3
Natural persons	4,2	5,9	6,0	6,4	6,1	5,7	5,9	6,6	5,5	5,1
Legal persons	3,0	6,6	5,4	5,8	6,2	3,8	5,1	5,6	5,9	4,3

Source: own elaboration based on data from the CSO.

The productivity of enterprises in Poland, measured as results attributable to one employee or one company is significantly lower than the EU average (PARP, 2014). Polish companies, in accordance with the criterion of turnover per one employee occupy the 21st place in the EU-26. It has a similar position in the rankings for production or value-added services. Until 2008, Polish firms' productivity grew faster than in the EU, but in 2009 there was a significant decline in turnover per employee, which in subsequent years was again visible in trends, but to a much lower extent (2010 = 16.0%, 2011 = 7.4%, 2012 = 1.9%). The year 2010 was special for Poland, because its growth rate achieved 5th place among the EU countries (in 2011 it was 12th and in 2012 15th place in the ranking). Among the conducted analyses of

Poland against the EU it is also worth noting Poland's 7th place in the ranking of productivity of the EU-26¹¹ (Eurostat, 2011; PARP, 2014)¹².

Figure 8. The turnover per employee (in 2012 in thousand EUR) and growth rate (2011-2012) of turnover per employee in the enterprise in Poland and in selected European countries



Source: own elaboration based on estimated data from PARP, 2014, p.34.

Conclusions

The article attempts to answer the question of estimating the number of Polish enterprises that match the conditions to potentially debut on the WSE concerning their financial condition, with a particular emphasis on legal persons from the SME sector as well as to show the results achieved in Poland against the results of the EU.

Analyses show that the number of legal persons in Poland is steadily growing. The number of potential contenders to gain the status of a listed company and in this way to obtain financing to develop their own business among micro, small and medium-sized enterprises is 98.0% of the total collection. Among them, in relation to 2003, there was a systematic increase in micro-entrepreneurs (70.1% of the total in 2012), which may be a direct reflection of the increase in the number of start-ups observed in the

¹¹ Productivity is defined as the ratio of performance to expenses incurred.

¹² Paragraph applies to CSO data involving enterprises belonging to sections B-J, L-N, P-S of PKD 2007 (Polish Classification of Activities), Eurostat: B-N and S95 NACE Rev. 2 (section K is covered only partially and concerns insurance services, credit institutions and pension funds), European Commission (SBA Fact Sheet): B-J, L-N NACE Rev. 2.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

capital market. In the remaining sectors, a decrease was observed in this legal form, thus it can be concluded that not too many transformations occurred from micro to small enterprises, small to medium-sized and medium to large enterprises. At the same time it was noted that the structure of these companies is becoming more like the EU, which bodes optimistically. In order to formulate more detailed conclusions, data taking into account the survival rate of companies with legal personality that are registered and actively operating in Poland should be subjected to analysis.

Capital expenditures for the same period increased among both small and large entities with legal personality, respectively by 192.5% among SMEs and by 200.0% among large enterprises. Entities of a legal personality from the SME sector contributed 40.4% of all finances involved in this respect in 2012, while increasing their commitment in this area by PLN 25.9 billion as compared with 2003. At the same time, however, they recorded a decline in the share, which in 2003 was 41.3%. Therefore, there are notable efforts to promote activation, with a parallel reduction of involvement among small companies (micro and medium-sized companies increased their shares, respectively, from 15.7% to 20.0% and 53.0% to 56.0%, and small decreased from 31.3% to 24.0%). This is another statistic which confirms an increased intensification of activities of micro-entrepreneurs, who gain thanks to the growing interest in the stock exchange. It is not determined, however, whether the result is reached by entrepreneurs with an established position in the market, or mainly the effect of newly established businesses, in the ranking of which Poland takes the leading place among the countries of the European Union.

Revenues of legal persons since 2003 are steadily growing among large entities, while maintaining variable trends in the SME sector. On the expenses side, significant for both sectors are the years 2008-2009, during which management reduced expenses, while at the same time worthy of note is the fact that for the whole sector of micro, small and medium-sized enterprises, there has been a direct impact on the value of the average expenses achieved by one company of the studied set, and among large enterprises expenses increased (in 2009 there was a decline in the number of legal persons among large enterprises by 3.9%). Simultaneously the best gross financial result was achieved by businesses in the years 2007 and 2010, and a clear trend was not seen among any of the studied sectors, each of them in relation to 2003 achieved growth on a minimum by 1.5 times (respectively by 169.8%, 148.1%, 176.8% and 254.5%).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Therefore, increasingly important are the results achieved by the SME sector, which increases its investments, revenues, expenses and profitability, consolidating its increasingly strong position and significantly affecting the macroeconomic size of Poland's economy. Precise determination of the volume of businesses that could raise capital for development through the WSE involves selecting from a set of legal persons enterprises registered as joint-stock companies and limited joint-stock partnerships of a survival rate of more than five years. The crucial problem is in fact the lack of official data and statistics dealing only with joint-stock companies and limited joint-stock partnerships, which is making it impossible to select and to determine exactly the economic condition and volume of businesses which are the basic target audience of the stock exchange, entities for which the way to obtain financing through the WSE is the shortest.

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**Proceedings of the 8th International Conference on Applied Economics
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18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
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Doctrine of Public Good in Banking Versus State Intervention

JEL Classification: *G01; G21; H41*

Keywords: *bankruptcy; bank; crisis; financial institution; public good*

Abstract: This article has a following thesis: changes in banking and a role of banks in real economy in last years, give an argument for treating banks as public good.

Banks received a great support from governments as a result of the subprime crisis. G-20 and European Commission recommended new regulations for this sector after crisis.

As consequence of banking development more than 90% of population use banking services in many countries. New social functions of banks appeared. Doctrines about recovery and government support for banks were changed in parallel (e.g. LoLR). Presently there are some arguments for recognition of public good doctrine in banking such as: a very big area for state regulation, state banking supervision, state system of deposits insurance, realization of task delegated by the state, social responsibility of banks and others.

These arguments confirm that banks' activity has a particular importance for society and economy and would be public good.

Introduction

Presently financial services became common; for those who do not have access to them there are programs for counteracting financial exclusion.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The new considerations for banking, new risks and new dimension for potential financial crises create a question whether the banking has become a public good. State intervention on a great scale during the subprime crisis indicates that the governments and international institutions treat banking as a special good. Not a single bank went bankrupt in Europe during last crisis.

Answers to the following questions seem to be important from the point of view of a banking company: what criteria should determine the public nature of financial services; what can be treated as public good in banking; should bank assume receiving public help in the event of crisis? Presently everyone agrees: a bank was and still is an institution of public trust.

The goal of this article is to prove that present banks should be treated as a public good.

Methodology of the research

In this paper the following scientific methods were used: national and international literature analysis, statistical analysis, comparative analysis and legal analysis.

Public goods – concepts, definitions, references to banking

A good is defined, as everything to what one can assign a positive value and at the same time is a value itself. (W. Krajewski, R. Banajski 1996) Different definitions of good in the general social meaning appear in the literature: common good, public good, impure public good, global public good, regional public good – in contrary to them there are private goods and so called club goods. Common and public goods may be considered as the same.

J. Buchanan named public good as a good that has two characteristics from the economic point of view: (Buchman J.M. 1968)

- it is a non-rivalry good – meaning that from the moment it is created and available it can be consumed by others without incurring any additional cost to anyone,
- it is a non-excludable good – meaning that the potential clients cannot be excluded from its consumption.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Originally the public goods were associated with the ones financed (created) by the State; Presently junctim of terms such as subsidized, free and public goods is not justified. Some supporters of the public goods theory think that creation of public goods may successfully happen in private sector, yet the majority's opinion those goods are created thanks to the State's activity (R. A. Musgrave, P. Samuelson). (Fijor J. M. 2011)

P. Samuelson defines current shape of the public goods concepts; they mean that there is no rivalry expressed by the joint delivery of a good and ineffectiveness in attempts to exclude anyone from its consumption. (Samuelson 1954)

Public goods issue is present in economic literature for a century; national currency and stable prices are considered to be public goods. In J.K. Solarz's opinion today "there's a space for dialogue about public goods in financial sector instead ruling of the market or the State". Thesis presented already in 1992 by G. Corrigan: banks are perceived not only as public trust institutions, but even broadly as public good; therefore whole society should bear the costs associated with it (system risk is a whole society's risk) – caused lots of discussion and criticism. (Corrigan 1992)

J.K. Solarz created a typology of financial services as public and private goods. (Solarz 2008, p. 159) The purposefulness of such classification for policy towards banking is important and necessary; even though assignment of goods to particular types is questionable. However, one should consider volatility of the matter; for instance the ongoing democratization of brands. In this author's opinion blurring in practice the distinction between public and private goods in financial sphere causes theoretical disputes around that who is to blame of market or state inefficiency; therefore an intermediate category of impure public goods is growing. (Solarz 2008, p. 158)

It should be considered, what may and ought to be a public good in banking? Few options may be mentioned here:

- whole banking industry (loans and deposits institutions),
- only universal banks,
- only the safety of client deposits,
- only the retail customer's operations or selected products,
- system stability or institutional system of its protection (e.g. Financial Safety Net in the EU),
- common and small scale operations (e.g. up to the amount of 50 thousand EUR in the EU within the framework of deposit insurance).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

In W. Szpringer's opinion, the public good category may be applied to the banking system, not to the individual bank that may go bankrupt after all. (Szpringer 2001, p.11)

A. Greenspan treated financial stability as a public good. He stated that the LoLR function is and will be essential because "the markets mostly work efficiently but from time to time they collapse. When it happens the State's intervention is necessary in order to preserve stability, which is a public good". (Greenspan 1988) If one should recognize that banking is a public good only in the event of crisis – questions arise whether it should be in the event of system or individual bank's crisis; what to consider as conditions of crisis; what level of public help is allowed? It seems that the licensed banks should be treated as public good.

Banking and state intervention

W. Bagehot's doctrine (19th century) stipulated that in bank crisis - the central bank or the government becomes the essential Lender Of Last Resort (LoLR). In compliance with this doctrine central banks of many countries took the LoLR role on themselves. S. Heffernan thinks that "if LoLR judges that the source of the problem is run or bank panic, not the financial situation of the bank, it may lower its requirements concerning capital adequacy and apply smaller penalty interest rate. As a matter of fact, arguments for LoLR existence resemble nuclear bogeyman: it is a tool that is meant to prevent panic that could happen." (Heffernan 2007, p. 574) During subprime crisis FED, ECB and central banks of the EU countries broadly performed LoLR function. (Masiukiewicz 2008) The first institution to take up function of international LoLR was the International Money Fund, by granting credit line for countries affected by financial crisis in the 90'.

20th century was quite rich in banking crises. At the same time the development dynamics, social reach of banking and attempts to calculate social costs of bankruptcy (E. Altman) were undoubtedly the causes of wide spreading new doctrines. Ch. James' research indicated that liquidation of insolvent banks is more expensive than its recovery, takeover by healthy bank or even nationalization. (James 1991) E. Gardener and P. Molyneux gave much attention to the "Too Big To Fail" (TBTF) and "Too Important To Fail" (TITF) doctrines. (Gardener, Molyneux 1998) Those authors were proving that due to the importance for the system risk, some banks (so called strategic) deserve rescue by the State (not excluding nationalization), and doctrines TBTF and TITF became practice. (Gardener,

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Molyneux 1998) Opponents of such approach stated on the other hand that this certainty about public bailout would lead to strengthening moral hazard.

In the end of the 20th century a new approach appeared in the literature, treating financial stability, as well as the banks themselves as public good (G. Corrigan, S. Heffernan, P. Krugman, J.K. Solarz, J. Stiglitz); what would justify its bailout during crisis. (Masiukiewicz 2010(2))

G. Kaufman defined banking crisis as a situation that is characterized by bank run, financial institutions collapses or massive state intervention as well as broad disruption of safety of other institutions. (Kaufman 1999) This definition clearly focuses on elements of panic and state help in crisis. System risk and threat of panic epidemic – according to the S. Heffernan – are the key causes to the State for having inclination to special treatment of banks, and to central banks for serving as the LoLR or delivering, so called, lifeboat rescue operation. (Hefernan 2007, p. 41)

There are many cases – what is proved by crises history – in which central banks and system regulators were intervening to save individual bank or group of banks; protecting at the same time other entities of the financial system. (Hefernan 2007, p. 209) J.K Solarz claims that the banking crisis (and social response) may even force authorities to intervene and provide significant help to this sector. (Solarz 2008, p.101) Financial crises showed how far governments can go to prevent bank from collapsing, how broadly doctrines TBTF and TITF can be applied. (Hefernan 2007, Gardener, Molyneux 1998) As a part of the fight against subprime crisis, governments and central banks of USA and Europe reached for the most radical measures, including nationalization of financial institutions and using vast funds from taxpayers. (Krugman 2008) Even D. Strauss-Kahn (former president of the IMF) sided for the interventionism: “necessity of public intervention becomes even more obvious. Government intervention – regardless whether it’s on securities or real estate market or banking industry – would act as “third line of defense” supporting the fiscal and monetary policies”. (Guha 2008) In M. Diekmann’s opinion (the then president of the Allianz Group) the debate should focus not on whether the state should intervene, but rather on how to do it. (Diekmann 2008)

Also the experience of polish banking crisis from the 90’ clearly indicate that without subsidies (as a restructuring bonds) and tax reliefs many banks would go bankrupt causing domino effect, i.e. enterprise bankruptcy.

New measures of the European Commission are introduction of CRD/CRR directives that tighten norms of banks operation and preparation

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

of draft of the resolution and recovery regime procedure for big banks – that enables scheduled liquidation; that is to not allowing a sudden collapse. (Masiukiewicz 2013(2)) A new concept is also a creation of Banking Union as a part of the EU. (Masiukiewicz 2013(3))

Also a question arises about admissibility of public aid for banks in the EU countries. W. Szpringer points out that the member countries that bailout threatened banks are not only bound by the art. 87-89 of TEC, but also by the instructions of the European Commission regarding rules of public aid for financial institutions in connection with the global financial crisis. (Szpringer 2009(2), p. 23) One of the forms of States' aid for financial sector are the government guarantees for banks' liabilities. The guarantees relate usually to all retail deposits and selected categories of wholesale deposits as well as medium term debt instruments.

European Commission announced new guidelines for recapitalizing financial institutions by governments. They stipulate that the capital aid from the State cannot affect competitive advantage of banks from one member country over institutions from another EU countries. (Szpringer 2009(1), p. 24) Implemented in 2008, the European Plan for Economic Recovery, even though it did not bind anyone was treated as additional guideline for admissibility of public intervention aid. (Szpringer 2009(1), p. 25) After sub-prime crisis many EU countries founded Recovery Funds, also in Poland, the bill on Banking Guarantee Fund (BFG) provides possibility aid for banks and credit unions in form of a long term loans for recovery programs in the event of crisis. (Masiukiewicz 2013(1))

Economics theorists recently express a need for redefining role of the State in the economy – in the circumstances of global companies and products, global shortages and global crises. G. Rae presents a thesis that the State has to return to the subjective role in the united Europe's economy; also laying out a number of arguments supporting it. (Rae 2008)

Regarding banking industry, there are opinions claiming its overregulation by the State. Basel III recommendation and CRD/CRR directives introduced a number of new limits on banks, and the regulators have rights to accept a president and vice president, to accept shareholders with more than 10% shares of the bank, to ban selling selected products, may also suspend the bank, liquidate it or compulsorily merge it with another bank as well as number of other rights. (Masiukiewicz 2013(1))

It is necessary to point out that the consequences of new banking crises may be only comparable to the costs of nuclear strike; it is estimated that

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

the medium size banking crisis costs about 15-20 % GDP – for which taxpayers will pay (Masiukiewicz 2009).

Arguments for and against recognizing banking as public good

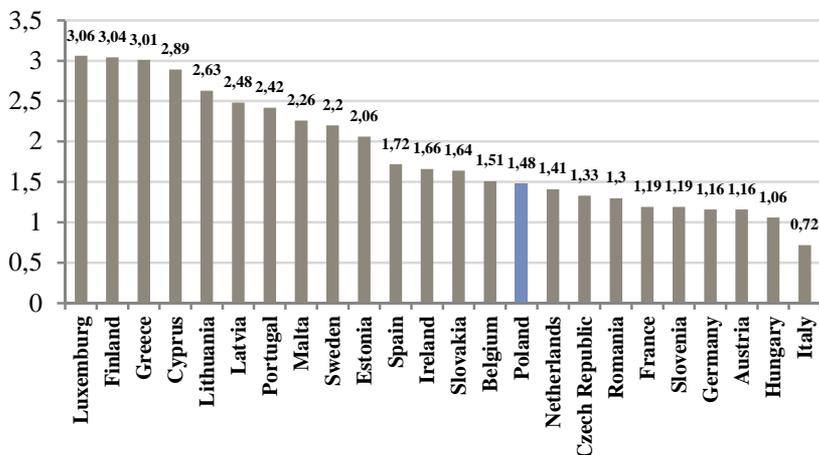
Recently in literature some researchers raise the issue of social responsibility of banks and costs related to their quasi-social mission. The following are typical costs that banks cover in this area nowadays:

- costs of restructuring bankrupting enterprises,
- risk and costs of premature deposit withdrawal by customers (bank run),
- costs of maintaining customer deposit insurance system,
- crediting endeavors in area of public procurement and public-private partnership,
- granting preferential loans (agricultural, student, environmental and other),
- costs of overdue receivables from public institutions and economic consequences of consumer bankruptcy for banks,
- costs of counteracting financial exclusion that is recommended by authorities (e.g. in EU).

A significant argument for considering banking as public good is the level of access to and use of banking services. Provided in 19th century 1-5% of society had access to financial services, presently in highly developed countries banking access indicator reaches 95% (in Poland 80%), and the number of accounts per capita surpassed 1 long ago (graph 1). Highly developed countries implement governmental programs to counteract with financial exclusion – to achieve banking access factor close to 100%. For instance, in some EU countries central bank may assign duty to open bank accounts to homeless and poor. Presently broad access to financial services, assurance of funds safety, and facilitations in performing transactions and cash flows cause that in highly developed countries it is nearly impossible to function without bank.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Graph 10. Amount of bank accounts in the EU per capita in 2011



Source: ECB Statistical Data Warehouse (2014, November 14) retrieved from: <http://sdw.ecb.europa.eu/>.

New, characteristic functioning circumstances of modern banking indicate its risks and its role in maintaining financial stability, therefore also indicate a need for public protection. New opportunities and threats for banking industry are presented in the table 1.

Table 17. Opportunities and threats of modern banking

#	New threats	#	New opportunities
1	Widespread of banking services – amounting to 90% of population determines possible scale of crisis consequences to citizens,	1	Rebuilding trust towards banks
2	Globalization of operations causing easier transmission of crisis threat,	2	Increasing demand from SME's for credits and possible opportunities (especially in developing countries)
3	Range increase of electronic banking, creating new areas of threats,	3	Creating Financial Safety Net – FSN, including repair funds for financial institutions
4	Increase of importance of financial advisory and rating institutions, and at the same time lack of sufficient supervision and scope of their liability,	4	Expanding tasks for national financial regulators and creating European Banking Authority
		5	
		6	

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

5	Insufficient pace of improving regulations to follow market changes and financial innovations, Dynamic development of so called parallel to traditional banking, financial system; it is very poorly regulated, Many interbank connections in global scale and cross-border operations that favors the panic contagion effect (domino effect), Part dependence of banking system stability on behavioral factors (lack of social crisis auto regulation system, customer susceptibility to panic etc.), Authorities' alienation towards ownership in banking corporations Increase in fiscal burdens – new banking tax.	7	Project of creating Banking Union within EU Increasing financial customer's protection (e.g. MIFID directive in the EU, ombudsman's activity etc.) Implementing stage increasing of equity capitals and permanent stress tests (Basel III), New information technologies Implementing CSR concept in banking Changing rules of motivational systems for top managers and executive staff selection Increasing role of ethics in banking
6			
7			
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9			
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11			
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10			

Source: Own.

Growth financing, safety of citizen and corporate savings, development of international exchange are served by banks and therefore dependent on bank's standing and more broadly on credit-depository institutions' standing.

Elementary arguments for treating banks as public good are the following (Masiukiewicz 2010(1), Masiukiewicz 2010(2)):

- functions of banks that assure economy and households growth,
- special legal regulations and licensing of banking activity (de Larosiere report that was accepted by the European Commission recommended increasing regulations after subprime crisis),
- public trust as the operation attribute (strengthened institutionally by the State),
- public deposit insurance system,
- setting many market parameters for banks by the State (reference interest rates, reserve ratio, maximal interest rate for consumer credits etc.),
- broad supervisory rights for regulators; broadened even further towards banks in critical situation (orders and bans for banks),

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

- performing by selected banks state delegated functions and function of restructuring overdue liabilities of enterprises and households,
- operations openness, mass media access to the information – what may in special cases used against the bank,
- banks' high sensitivity for crises and contagion effect (therefore a possible influence on destabilization of whole financial system),
- system of public institutions appointed to protect financial customers (financial supervisors, deposit insurance fund, bank customers' ombudsman, compulsory administration and other),
- bearing costs of maintaining financial safety net as well as costs of bank bankruptcies by taxpayers – customers.

One can also lay out number of arguments against it, among others they are:

- functioning in free market,
- customer's freedom of choice of bank,
- general prohibition of public aid for enterprise in the EU (although with exceptions),
- risk of political pressure concerning scope and structure of public aid for banks,
- moral hazard of management; granting public aid to bank was not always connected with consequences for then top managers.

Problems connected with the matter of concerning banks as public good and consequences of public aid require further research and discussion. Yet in the end it will be up to national and european authorities to decide on voters' behalf about approach and policy regarding this matter.

Conclusions

Common access to banking, its role in financing country's development and at the same time experiences from the number of international crises and bank bankruptcies indicate broad social consequences of possible bankruptcies and justify applying doctrine of concerning banking as public good and state intervention connected with that.

As a consequence of treating banking as public good perhaps it ought to function in the citizen's interest, be under protection and supervision of the State. It also means limiting market influence on this industry, possibility of providing services by the State industry or nationalizing part of the banking industry in a financial crisis. Operations of banks should be based on the Corporate Social Responsibility (CSR) concept.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Treating banking as a public good creates a social and economic justification for:

- strengthening public trusts towards banks,
- state co-financing of deposit insurance system,
- using financial supervisory and regulatory instruments in the interests of the citizens,
- building national and european Financial Safety Net (FSN) and providing aid to the banks in critical situation,
- ensuring common access to financial services (elimination financial exclusion).

Further research of problems connected with the issue presented in this article should among other things answer following questions: how strongly regulated banking industry should be, what instruments of restructuring should be used during system crisis and what are the limits of growth of big global banks and who should supervise them? Protection of financial safety of households and enterprises should be main goal and criterion of State policy in discussed matter.

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**Proceedings of the 8th International Conference on Applied Economics
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**Net Profit Distribution Policy in Companies
Using State–owned Enterprises
Against Payment***

JEL Classification: *G32; L33*

Keywords: *privatisation process; direct privatization; using state–owned enterprise against payment; net profit distribution policy; pecking order theory*

Abstract: The main objective of this paper is to present the results of empirical studies on net profit distribution in companies using state–owned enterprises against payment. The main research hypothesis states that the majority of companies using state–owned enterprises against payment waive their right to the dividend and transfer a major part of retained earnings to supplementary capital. The empirical investigation of the main hypothesis has been conducted among 21 companies based in Mazowieckie Province, which concluded privatisation agreements with the State Treasury in years 2000–2005. The analysis of net profit distribution in companies using state–owned enterprises against payment is based on data collected and processed by the author of the article from the National Court Register, for the period from the privatisation date of the surveyed enterprises to 2010, using measures of descriptive statistics. The paper consists of the following parts: the introduction, the essence of giving state–owned enterprise for use against payment, the characteristics of companies qualified to the research sample, net profit distribution policy in companies using state–owned enterprises against payment. Final-

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

ly, it is concluded that over the first three years of operation every second company using a state-owned enterprise against payment did not pay a dividend transferring all of retained earnings to supplementary capital.

Introduction

Giving a state-owned enterprise for use against payment to a company is the most employee oriented way of privatisation in Poland (see Błaszczyk, 2002, p. 193). The specific character and scale¹ of giving state-owned enterprises for use against payment to companies with employee share ownership (compare Aghion & Blanchard, 1998, pp. 96–97; Bornstein, 1997, p. 329; Lowitzsch, 2006, pp. 132–134, 160–162, 253–255; Kozarzewski, 2006, pp. 124–125) result in achieving social and economic objectives of the ownership transformation process (see Balcerowicz, 1997, p. 218; Bałtowski, 2002, pp. 17, 30; Brozi, 1993, pp. 17–18, 32–34; Prusek, 2005, pp. 5–17; Sobolewski, 2011, pp. 43–53).

Obligations to the State Treasury arising from the business activity of companies using state-owned enterprises against payment is a significant factor. The excessive burden on companies in respect of using state-owned enterprises against payment and the lack of ownership of the assets of the acquired enterprises during the agreement period with the State Treasury negatively affect their credit capacity, limiting their ability to obtain loans for the financing of development investments (see Bojar et al., 2003, pp. 89, 95, 98, 106, 109, 111; Jarosz & Kozak, 1995, pp. 118–125; Wrońska, 2004, pp. 127, 129, 135, 137, 141, 161). Therefore companies using state-owned enterprises use equity capital² as their source of financing (compare Brealey et al., 2001, pp. 508–509; Duliniec, 1998, pp. 32–34; Duraj, 2000, pp. 201–203, Frank & Goyal, 2003, p. 241; Gajdka, 2002, pp. 230–248; López-García & Sogorb-Mira, 2008, p. 133; Myers & Majluf, 1984, pp. 219–220, Serrasqueiro et al., 2011, p. 381). Moreover, the fear among employee owners of losing control over the company or a hostile takeover (compare Damodaran, 2007, pp. 872–873; Ickiewicz, 2004, p. 206; Safin, 2003, p. 45) and the conditions that must be met to obtain deferred additional fees exemption, as debt interest held by the State Treasury, may lead

¹ Poland was the only country in Central–Eastern Europe in which manager–employee buy–out pursued in the form of lease leverage employee buy–out developed on such a large scale.

² According to the pecking order theory, especially useful in understanding small and medium–sized enterprises' capital structure, companies prefer internal funds, such as retained earnings, as their source of financing.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

not only to the company being financed through retained earnings but also to allocating a substantial part of retained earnings to the company's supplementary capital.

The main objective of this paper is to present the results of empirical studies on net profit distribution in companies using state-owned enterprises against payment. The main research hypothesis of the article states that the majority of companies using state-owned enterprises against payment waive their right to the dividend and transfer a major part of retained earnings to supplementary capital. The empirical investigation of the main hypothesis has been conducted among 21 companies based in Mazowieckie Province, which concluded privatisation agreements with the State Treasury in years 2000–2005. The analysis of net profit distribution in surveyed companies is based on data collected and processed by the author from the National Court Register.

The methodology of the empirical research, the essence of using state-owned enterprise against payment, the companies qualified to the research sample are discussed further on in the study. The main research conclusions were formulated in the Conclusions section.

Methodology of the research

The empirical research on net profit distribution in companies using state-owned enterprises against payment has been carried out among companies, which concluded privatisation agreements with the State Treasury in years 2000–2008. Defining the period during which companies concluded agreements with the State Treasury was due to the following reasons:

- empirical research on companies using state-owned enterprises against payment already carried out did not go beyond 2000 (see Kozarzewski & Woodward, 2001),
- the need of analysis of net profit distribution policy in companies using state-owned enterprises against payment during at least the five-year research period after the year in which the agreement with the State Treasury was concluded³.

³ In case of companies using state-owned enterprises against payment which concluded the agreement with the State Treasury in 2008 the analysis of net profit distribution is carried out with respect to years 2008–2013.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The empirical research on net profit distribution policy has been carried out in companies using state-owned enterprises against payment⁴ from Mazowieckie Province, where most such entities were established from the beginning of the privatisation process to the end of 2010. According to the data from Central Statistical Office in Poland (GUS), 190 employee companies were established in Mazowieckie Province from 1990 to 2010 (compare Baehr, 1993, pp. 51–52; Górka, 1991, p. 91; Nadratowska, 1990, p. 54; Włodyka, 1996, pp. 657–663), amounting to 12.16% of all companies established during the period of ownership transformation in Poland (see *Prywatyzacja przedsiębiorstw państwowych w 2010 r.*, p. 59).

According to the data from the Ministry of the Treasury, from 2000 to 2008, 29 agreements of giving a state-owned enterprise for use against payment were concluded in Mazowieckie Province, none of which was concluded after 2005. From 29 companies based in Mazowieckie Province, which concluded privatisation agreements with the State Treasury in years 2000–2005, companies using state-owned enterprises against payment were excluded:

- companies in liquidation and under bankruptcy (2 entities),
- enterprises undergoing transformation of the organizational–legal form⁵ (3 entities),
- established before the implementation of the new Privatisation Law⁶ (3 entities).

Eventually, 21 Mazowieckie Province–based companies using state-owned enterprises against payment, which concluded privatisation agreements with the State Treasury in years 2000–2005, were qualified as the research sample.

The analysis of net profit distribution in companies using state-owned enterprises against payment was carried out on the basis of documentation of the surveyed companies submitted to the National Court Register, for the period from the privatisation date of the companies to 2010. The date of privatisation is the date of the agreement with the State Treasury giving rise to the submission of an application for removal of the state-owned enter-

⁴ Companies established to lease the assets of directly privatised and liquidated state-owned enterprises (lease leverage employee buy-out) are commonly referred to as employee companies.

⁵ Three limited liability companies were converted into limited partnerships during the research period.

⁶ The Act of August 30, 1996 on Commercialisation and Privatisation (Journal of Laws No. 171/2002, item 1397 with subsequent amendments) repealed the previous act in this respect as of 8 January 1997.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

prise, whose assets were given for use against payment, from the Register of Entrepreneurs (Ustawa z dnia 30 sierpnia 1996 r., DzU 2002e, Article 42 (2)). The period from the privatisation date to the end of the year in which it occurred is treated as year $t = 0$ (year of privatisation).

Measures of descriptive statistics, i.e. classical and positional measures of dispersion and measures of position were used in the empirical research of net profit distribution policy in companies using state-owned enterprises against payment.

The essence of giving state-owned enterprise for use against payment to a company

Giving state-owned enterprise for use against payment to a company is one of three direct privatisation methods consisting in the disposition of all tangible and intangible component assets (Ustawa z dnia 30 sierpnia 1996 r., DzU 2002, Article 39 (1)). The subject of the direct privatisation through giving state-owned enterprises for use against payment may be entities which fulfil the following conditions⁷ (compare Grzeszczyk, 1997, p. 231; Surdykowska, 1996, p. 39; Ustawa z dnia 30 sierpnia 1996 r., DzU 2002, Article 39 (2)):

- the sales value of goods and services in the year preceding the year of issuing a privatisation order is not higher than the PLN equivalent of EUR 6 million,
- the sales value of goods and services in the year preceding the year of issuing a direct privatisation order is not higher than the PLN equivalent of EUR 2 million⁸.

Giving state-owned enterprise for use against payment to a capital company may take place if (Ustawa z dnia 30 sierpnia 1996 r., DzU 2002, Article 51 (1, 2)):

- more than half of the employees of the privatised state-enterprise joined the company,
- shareholders are only to natural persons, unless the Minister of the Treasury will allow the participation to legal persons in the company,
- paid-up share capital of the company shall not be lower than 20% of the

⁷ The direct privatisation through giving state-owned enterprise for use against payment is designed for small and medium-sized enterprises.

⁸ The PLN equivalent is calculated by the purchase rate announced by the Polish National Bank on 31 December of the year preceding the year of issuing a direct privatisation order.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

founding capital and the enterprise capital at the date on which balance sheet for the financial year, preceding the year of issuing the direct privatisation order, was drawn up,

- at least 20% of the shares have been acquired by persons not employed in the privatised state-owned enterprise⁹.

Giving state-owned enterprise for use against payment shall be effected by the agreement between the State Treasury and the established company for a period not exceeding¹⁰ 10 years (compare Ustawa z dnia 5 grudnia 2002 r., Article 2 (15), Article 25). In the agreement of giving the state-owned enterprise for use against payment, the parties may decide that the ownership of the enterprise is transferred to the transferee after the period for which the agreement was concluded and upon fulfilment of the conditions specified in the agreement. The ownership of the enterprise may be transferred before the expiry of the period for which the agreement was concluded after the payment by the transferee at least one-third of liabilities to the State Treasury and the approval of the financial statement for the second financial year from the date of the conclusion of the agreement. The remaining part of the liability, bearing interest at¹¹ the price index of investment goods¹² lowered not less than a half percentage points¹³, is paid in instalments (compare Rozporządzenie Rady Ministrów z dnia 16 października 1997 r., §8 item 3; Teluk & Wojnowicz, 1999, p. 38–39; Ustawa z dnia 12 maja 2006 r., Article 1 (12), Article 11; Ustawa z dnia 30 sierpnia 1996 r., DzU 1996, Article 52 (2–4)).

The contractual value of the state-owned enterprise given for use against payment is the basis for determining the commitments for using the enterprise (Rozporządzenie Rady Ministrów z dnia 16 października 1997 r.,

⁹ The Minister of the Treasury may consent to give the state-owned enterprise for use against payment to a company which does not fulfil the requirements of the acquisition of 20% of shares by persons not employed in the privatised state-owned enterprise

¹⁰ From 15 January 2003 the agreement between the State Treasury and the company established to use the state-owned enterprise against payment may be concluded for a period not exceeding 15 years.

¹¹ From 28 July 2006, in the event of the transfer of the enterprise before the expiry of the period for which the agreement was concluded, the remaining part of the liability to the State Treasury bear interest at not less than the price index of investment goods.

¹² The price index of investment goods is published on a quarterly basis by the President of the Central Statistical Office of Poland in the Official Journal of the Republic of Poland “Monitor Polski”.

¹³ The reduction of the price index of investment goods depends on the degree of implementation of non-price commitments consisting of commitments in terms of investments, environmental and cultural protection and job protection.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

§2). In agreements concerning giving the state-owned enterprise for use against payment, in which transfer of the ownership to the company is provided for, the commitment for the use of the business assets cannot be lower than the total sum of (Rozporządzenie Rady Ministrów z dnia 16 października 1997 r., §3):

- the value of the enterprise paid in capital instalments – the quotient of the value of the enterprise and the numbers of year quarters, for which the agreement was concluded,
- the sum of additional fees for the duration of the agreement – the product of the value of the enterprise reduced by paid capital instalments and an interest rate¹⁴ of 0.5 of the current lombard rate¹⁵ (compare Dodatkowe wyjaśnienia dotyczące nowej metody ..., pp. 1–2; Komunikat Komisji w sprawie zmiany metody ..., p. 8; Rozporządzenie z dnia 14 grudnia 2004 r., §7 item 1; Obwieszczenie Komisji w sprawie metody ..., p. 3; Obwieszczenie Komisji w sprawie bieżących stóp ..., p. 13; Zawiadomienie Komisji w sprawie bieżących stóp ..., p. 2).
Moreover, additional fees in such agreements can be paid¹⁶:
- in the first four quarters of the duration of the agreement in the amount of one-third of their value estimated for a given period.
- in the next four quarters of the duration of the agreement in the amount of half their value estimated for a given period,

¹⁴ From 22 December 2004 the interest rate of the unpaid part of the value of the enterprise cannot be lower than the reference rate periodically fixed by the European Commission for Poland. From 1 July 2008 the European Commission does not publish the reference rate but fixes the base rate increased by a relevant margin to provide the reference rate. The amount of the margin depends on the enterprise's rating and the offered level of assurance. The new method of the base rate determination, by adding the margin relevant to a particular company to the base rate fixed by the European Commission, reflects the method of determining the borrowing rate in market conditions. Using a lower interest rate of the unpaid value of the enterprise than the reference rate of the European Commission, treated as a market rate, may be treated as an unjustified public aid.

¹⁵ The lombard rate is determined by the President of the National Bank of Poland (NBP). If the lombard rate exceeds 40%, the amount of the liability updated at the date of the rate's change is assumed in the amount equal to 40%.

¹⁶ From 2 June 2006 deferral of capital instalments or additional fees that have not yet fallen due and the possibility of division into instalments of the payments that were due may be specified in the agreement of giving a state-owned enterprise for use against payment. The amendments to the provisions of the agreement concerning deferral of capital instalments or additional fees, or division into instalments of the payments is public aid for restructuring purposes.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The difference between charged and paid value of additional fees for these periods increases the value of the company's liability to the State Treasury and is quarterly paid without capitalizing in equal instalments from the third year till the end of the period of the agreement (compare Rozporządzenie Rady Ministrów z dnia 16 października 1997 r., §5 item 2, 3; Rozporządzenie Rady Ministrów z dnia 25 kwietnia 2006 r., §1 (3), §9).

The company may be exempted¹⁷ from the debt arising from deferral of additional fees if in the year of the agreement or in two years in total (compare Rozporządzenie Rady Ministrów z dnia 16 października 1997 r., §5 item 5, 6; Rozporządzenie Rady Ministrów z dnia 25 kwietnia 2006 r., §3 item 2):

- the net profit write-offs allocated to supplementary capital amounted to at least 80% of the profit,
 - commitment for the use of the business assets of the state-owned enterprise was paid within the maturity date,
 - the company will agree not to allocate the supplementary capital to the share capital within three years of the exemption,
 - the company will not transfer shares to the shareholders of the company.
- The value of exemption from the debt may not be higher than the net profit write-offs allocated to supplementary capital in the year of the agreement or in two years in total and it the commitments to the State Treasury (Rozporządzenie Rady Ministrów z dnia 16 października 1997 r., §5 item 4).

The characteristics of companies qualified to the research sample

The majority (17 companies) from 21 companies using state-owned enterprises against payment qualified to the research sample are entities whose value of the subject of the agreement with the State Treasury exceeded PLN 1 million.

¹⁷ From 28 October 2005 exemption in the amount of two thirds of additional fees payable in the first eight quarters of the year without its prior deferral is possible within the framework of regional aid for new investments.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 1. Companies using state-owned enterprises against payment – the characteristics of the research sample

Company using the state-owned enterprise against payment	Year of agreement conclusion with the State Treasury	Year of expiration of the agreement	Year of the ownership transfer	Year of payment of liabilities to the State Treasury	Interest rate	The value of the agreement subject with the State Treasury [PLN]	The value of deferred additional fees [PLN]	The value of redemption [PLN]
<i>PRD Sp. z o.o. Zaskórski i Wspólnicy</i>	2000	2010	2002	2010	1/2 <i>i</i> -0.1	450,000.00	47,805.00	0.00
<i>PRD Sp. z o.o. w Zwoleniu</i>	2000	2009	2004	2009	1/2 <i>i</i> -0.1	1,800,000.00	203,535.99	203,535.99
<i>PRI-D Sp. z o.o. w Grójcu</i>	2000	2010	2005	2010	1/2 <i>i</i> -0.1	2,600,000.00	216,694.56	0.00
<i>PRDI S.A. w Mławie</i>	2000	2010/2015	2005	x	1/2 <i>i</i> -0.1	3,000,000.00	298,152.84	298,152.84
<i>WCMB Sp. z o.o.</i>	2000	2010	2005	2010	1/2 <i>i</i> -0.1	1,310,000.00	129,069.11	0.00
<i>Elektroprojekt S.A. w Warszawie</i>	2001	2011/2016	2004	x	1/2 <i>i</i> -0.1	4,100,000.00	367,064.56	367,064.56
<i>PKS Sp. z o.o. w Grójcu</i>	2001	2011	2004	x	1/2 <i>i</i> -0.1	5,100,000.00	357,008.21	357,008.21
<i>Morspol S.A. w Warszawie</i>	2001	2011	2009	2008	1/2 <i>i</i>	6,100,000.00	404,647.89	404,647.89
<i>PRD-M Sp. z o.o. w Płońsku</i>	2001	2011	2004	x	1/2 <i>i</i> -0.1	3,300,000.00	262,656.52	262,656.52
<i>ZTE RADOM Sp. z o.o.</i>	2001	2011	2003	x	1/2 <i>i</i> -0.1	9,250,000.00	636,558.35	636,558.35
<i>BSiPB MSW Sp. z o.o. w Warszawie</i>	2001	2011	x	x	1/2 <i>i</i>	75,500.00	4,615.32	0.00
<i>PKS Sp. z o.o. w Grodzisku Maz.</i>	2001	2011	2004	x	1/2 <i>i</i> -0.1	3,700,000.00	217,555.13	217,555.13
<i>Tarczyn Sp. z o.o.</i>	2001	2011/2016	2008	x	1/2 <i>i</i> /ref	1,100,000.00	64,470.69	0.00
<i>Ostrada Sp. z o.o. w Ostrołęce</i>	2001	2011	2006	x	1/2 <i>i</i> -0.1	2,600,000.00	181,065.31	181,065.31
<i>Elmet Sp. z o.o. w Warszawie</i>	2001	2011	2009	2009	1/2 <i>i</i>	7,000,000.00	585,552.75	585,552.75
<i>ZFiSZE Sp. z o.o. w Warszawie</i>	2001	2011	2003	x	1/2 <i>i</i> -0.1	5,500,000.00	341,939.23	240,720.11
<i>Geokart Sp. z o.o. w Warszawie</i>	2002	2007	2008	2008	1/2 <i>i</i>	650,000.00	24,951.28	24,951.28
<i>Polmos S.A. w Warszawie</i>	2003	2013	2004	x	1/2 <i>i</i> -0.1	3,000,000.00	94,545.07	0.00
<i>Polsport Sp. z o.o. w Górze Kalwarii</i>	2004	2019	2006	2006	1/2 <i>i</i>	2,070,000.00	67,827.14	0.00
<i>Biprodzew S.A. w Warszawie</i>	2005	2020	2007	2007	ref	7,100,000.00	x	x
<i>Bipromel Sp. z o.o. w Warszawie</i>	2005	2015	x	x	ref	300,000.00	x	x

Symbols: „1/2*i*” – 1/2 of the lombard rate of the National Bank of Poland; „i-0.1” – the price index of investment goods reduced by 0.1 percentage points; “ref” - the reference rate

Source: own work based on data of the Ministry of the Treasury.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Three companies – *Geokart Sp. z o.o.*, *Polmos S.A.* and *Bipromel Sp. z o.o.* – concluded agreements of giving the state-owned enterprise for use against payment for a period shorter than the maximum allowed, whereas the other three – *Przedsiębiorstwo Robót Drogowo-Inżynieryjnych S.A. w Mławie*, *Elektroprojekt S.A.* and *Tarczyn Sp. z o.o.* – extended the duration of the agreement from 10 years to 15 years.

Two companies – *Biprodrzew S.A.* and *Bipromel Sp. z o.o.* – used state-owned enterprises against payment under the conditions determined by The Ordinance of the Council of Ministers of December 14, 2004 on terms of payment for amounts due on the use of the enterprise (Journal of Laws No. 269, item 2667)¹⁸. Additional fees were set for the companies using the reference rate without deferred payment option specified in the agreement concluded with the State Treasury.

Eleven companies using state-owned enterprises against payment from these, which concluded agreements with the State Treasury with deferred payment option, were exempted from the debt. One company – *Zakład Transportu Energetyki „ZTiSZE” Sp. z o.o.* – was partially exempted from the debt arising from deferral of additional fees because the value of the net profit allocated to supplementary capital did not cover the volume of the debt.

In the majority of cases after the prior transfer of the ownership of the enterprise, the remaining part of the commitment to repay was subject to the price index of investment goods reduced by 0.1 percentage points. Applying this interest rate resulted in public aid grant (see Ustawa z dnia 30 czerwca 2000 r.), which was devoted to improving financial liquidity or investment projects.

Four companies using state-owned enterprises against payment – *Morspol S.A.*, *Elmet Sp. z o.o.*, *Geokart Sp. z o.o.* and *Polsport Sp. z o.o.* – obtained the right of ownership of the enterprise after the payment of all commitments to the State Treasury. In case of three companies the payment was made before the expiry date of the agreement¹⁹. As of 31 December 2010, twelve agreements of giving a state-owned enterprise for use against

¹⁸ The conditions of giving the state-owned enterprise for use against payment to a company are determined by The Ordinance of the Council of Ministers of December 14, 2004 on terms of payment for amounts due on the use of the enterprise (Journal of Laws No. 269, item 2667), which repealed the previously applicable ordinance from 22 December 2014.

¹⁹ In 2007 one company – *Biprodrzew S.A.* – not only made use of the possibility to obtain the right of ownership of the enterprise before the expiry date of the agreement but also made the payment for using the state-owned enterprise.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

payment were valid. Two entities from the research sample – *Bipromel Sp. z o.o.* and *Biuro Studiów i Projektów Budownictwa Ministerstwa Spraw Wewnętrznych Sp. z o.o.* – did not own the enterprises (see table 1).

**Directions of net profit distribution policy in companies using
state-owned enterprises against payment**

In the research period, 10 of 21 companies using state-owned enterprises against payment have never paid the dividend. Seven companies of these, which did not pay the dividend, achieved positive financial results within the whole research period. Two companies – *Wyszowskie Centrum Materiałów Budowlanych Sp. z o.o.* and *Biuro Studiów i Projektów Budownictwa Ministerstwa Spraw Wewnętrznych Sp. z o.o.* – did not pay dividend as a result of generating net losses. One company – *Wyszowskie Centrum Materiałów Budowlanych Sp. z o.o.* – allocated the net profit generated in the period $t = 5$ to cover the losses from the previous years.

In period $t = 0$ (the year of privatisation) only two companies using state-owned enterprises against payment – *Polmos S.A.* and *Biprodrzew S.A.* – paid dividend. The company – *Polmos S.A.* – paid dividend every year during the research period exceeding 35% of the net profit for a given year. In the next two years following the year of privatization seven companies using state-owned enterprises against payment paid the dividend, three of them paid the dividend every year. After the period $t = 3$ eleven companies decided to pay dividend from the net profit generated in a given year.

Only one company using the state-owned enterprise against payment – *Zakład Transportu Energetyki „ZTiSZE” Sp. z o.o.* – allocated all of the net profit for the payment of dividend in the last year of the research period. In period $t = 5$ the company – *Przedsiębiorstwo Robót Drogowych Sp. z o.o. Zaskórski i Wspólnicy* – paid the dividend which constituted 99% of the net profit of the given year.

In fifteen companies using state-owned enterprises against payment which generated positive financial results the arithmetic mean of the part of net profit allocated to the payment of dividend was between 2.55% and 30.11%. The arithmetic mean systematically increased apart from the fourth period after the year of privatisation. The highest value of the arithmetic mean of the part of net profit allocated to the payment of dividend was in period $t = 3$, when the difference of the value was the biggest. In the third period after the year of privatisation every second company allocated

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

not more than 25.87% of the net profit in the given year to the payment of dividend (see table 2).

Table 2. Proportion of the net profit allocated to the payment of dividend in companies using state-owned enterprises against payment

Company using the state-owned enterprise against payment	Period					
	0	1	2	3	4	5
<i>PRD Sp. z o.o. w Zaskórski i Wspólnicy</i>	0.00	x	0.00	0.00	0.00	99.94
<i>PRD Sp. z o.o. w Zwoleniu</i>	0.00	0.00	20.00	35.00	14.90	18.43
<i>PRI-D Sp. z o.o. w Grójcu</i>	0.00	0.00	0.00	0.00	0.00	0.00
<i>PRDI S.A. w Mławie</i>	0.00	35.39	x	x	32.34	48.56
<i>WCMB Sp. z o.o.</i>	x	x	x	x	x	0.00
<i>Elektroprojekt S.A. w Warszawie</i>	0.00	0.00	0.00	77.63	53.46	34.99
<i>PKS Sp. z o.o. w Grójcu</i>	0.00	1.04	1.19	64.40	0.00	0.00
<i>Morspol S.A. w Warszawie</i>	0.00	0.00	0.00	0.00	0.00	0.00
<i>PRD-M Sp. z o.o. w Płońsku</i>	0.00	20.00	32.67	47.74	39.04	30.43
<i>ZTE RADOM Sp. z o.o.</i>	0.00	0.00	0.00	0.00	0.00	0.00
<i>BSiPB MSW Sp. z o.o. w Warszawie</i>	0.00	0.00	x	x	x	x
<i>PKS Sp. z o.o. w Grodzisku Maz.</i>	0.00	0.00	0.00	25.87	49.93	0.00
<i>Tarczyn Sp. z o.o.</i>	0.00	0.00	0.00	0.00	0.00	0.00
<i>Ostrada Sp. z o.o. w Ostrołęce</i>	0.00	0.00	0.00	0.00	0.00	0.00
<i>Elmet Sp. z o.o. w Warszawie</i>	0.00	0.00	x	x	0.00	0.00
<i>ZTiSZE Sp. z o.o. w Warszawie</i>	0.00	0.00	0.00	80.62	23.32	100.00
<i>Geokart Sp. z o.o. w Warszawie</i>	0.00	0.00	7.95	36.22	23.45	69.52
<i>Polmos S.A. w Warszawie</i>	38.24	80.60	79.50	84.22	82.49	67.27
<i>Polsport Sp. z o.o. w Górze Kalwarii</i>	0.00	0.00	0.00	0.00	0.00	0.00
<i>Biprodzrew S.A. w Warszawie</i>	35.94	15.77	x	x	38.46	0.00
<i>Bipromel Sp. z o.o. w Warszawie</i>	0.00	0.00	0.00	0.00	0.00	0.00
Descriptive statistics						
Number of entities	15	15	15	15	15	15
Arithmetic mean	2.55	6.78	9.42	30.11	19.11	21.38
Standard deviation	9.87	21.06	21.58	33.43	26.08	32.73
Minimum	0.00	0.00	0.00	0.00	0.00	0.00
Maximum	38.24	80.60	79.50	84.22	82.49	100.00
First quartile	0.00	0.00	0.00	0.00	0.00	0.00
Median	0.00	0.00	0.00	25.87	0.00	0.00
Third quartile	0.00	0.00	4.57	56.07	31.25	32.71

Symbols:

“bold” - the year of the company’s payment of all liabilities to the State Treasury for using the state-owned enterprise against payment;

“italics” - the year of transfer of the ownership of the enterprise;

“x” - net loss;

“pole” - coverage of losses from the previous years;

“pole” - transfer of a part of the net profit to reserve capital.

Source: own calculations based on date of National Court Register.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 3. Proportion of the net profit allocated to supplementary capital in companies using state-owned enterprises against payment

Company using the state-owned enterprise against payment	Period					
	0	1	2	3	4	5
<i>PRD Sp. z o.o. o. Zaskórski i Wspólnicy</i>	100.00	x	0.00	0.00	0.00	0.06
<i>PRD Sp. z o.o. w Zwoleniu</i>	100.00	100.00	80.00	65.00	85.10	81.57
<i>PRI-D Sp. z o.o. w Grójcu</i>	100.00	100.00	100.00	100.00	100.00	100.00
<i>PRDI S.A. w Mławie</i>	100.00	64.61	x	x	35.30	45.38
<i>WCMB Sp. z o.o.</i>	x	x	x	x	x	0.00
<i>Elektroprojekt S.A. w Warszawie</i>	100.00	100.00	100.00	22.37	46.54	65.01
<i>PKS Sp. z o.o. w Grójcu</i>	100.00	98.96	98.81	34.74	100.00	100.00
<i>Morspol S.A. w Warszawie</i>	100.00	100.00	100.00	100.00	100.00	100.00
<i>PRD-M Sp. z o.o. w Płońsku</i>	100.00	80.00	60.84	52.26	60.96	69.57
<i>ZTE RADOM Sp. z o.o.</i>	100.00	100.00	0.00	0.00	100.00	100.00
<i>BSiPB MSW Sp. z o.o. w Warszawie</i>	100.00	100.00	x	x	x	x
<i>PKS Sp. z o.o. w Grodzisku Maz.</i>	100.00	100.00	100.00	50.00	50.07	50.00
<i>Tarczyn Sp. z o.o.</i>	0.00	0.00	0.00	0.00	0.00	0.00
<i>Ostrada Sp. z o.o. w Ostrołęce</i>	100.00	91.87	100.00	100.00	100.00	100.00
<i>Elmet Sp. z o.o. w Warszawie</i>	80.00	95.00	x	x	0.00	0.00
<i>ZTiSZE Sp. z o.o. w Warszawie</i>	100.00	45.80	100.00	19.38	14.49	0.00
<i>Geokart Sp. z o.o. w Warszawie</i>	100.00	100.00	92.05	63.78	76.55	30.48
<i>Polmos S.A. w Warszawie</i>	8.58	0.00	0.00	0.00	0.00	0.00
<i>Polsport Sp. z o.o. w Górze Kalwarii</i>	100.00	100.00	100.00	0.00	100.00	100.00
<i>Biprodzew S.A. w Warszawie</i>	8.00	8.00	x	x	8.00	8.00
<i>Bipromel Sp. z o.o. w Warszawie</i>	100.00	100.00	100.00	100.00	100.00	100.00
Descriptive statistics						
Number of entities	15	15	15	15	15	15
Arithmetic mean	87.24	81.11	75.45	47.17	68.91	66.44
Standard deviation	33.72	35.91	40.49	39.85	38.23	40.47
Minimum	0.00	0.00	0.00	0.00	0.00	0.00
Maximum	100.00	100.00	100.00	100.00	100.00	100.00
First quartile	100.00	85.94	70.42	9.69	48.31	40.24
Median	100.00	100.00	100.00	50.00	85.10	81.57
Third quartile	100.00	100.00	100.00	82.50	100.00	100.00

Symbols:

“bold” - the year of the company’s payment of all liabilities to the State Treasury for using the state-owned enterprise against payment;

“italics” - the year of transfer of the ownership of the enterprise;

“x” - net loss;

“pole” - coverage of losses from the previous years;

“pole” - transfer of a part of the net profit to reserve capital.

Source: own calculations based on date of National Court Register.

In the research period, 2 of 21 companies using state-owned enterprises against payment – *Wyszowskie Centrum Materiałów Budowlanych Sp. z o.o.* and *Tarczyn Sp. z o.o.* – never contributed to supplementary capital. The company – *Tarczyn Sp. z o.o.* – which generated positive financial results in the research period, allocated the net profit to reserve capital.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

From the period $t = 1$ the company – *Polmos S.A.* – allocated all of the net profit to reserve capital after the payment of dividend. The company – *Biprodrzew S.A.* – allocated 8% of the net profit generated in a given year to supplementary capital as required by law (see Ustawa z dnia 15 września 2000 r., Article 396 §1).

In period $t = 0$ (the year of privatisation) seventeen companies using state-owned enterprises against payment allocated at least 80% of the net profit generated in a given year to supplementary capital. In the following two years after the year of privatisation fifteen companies allocated more than 80% of the net profit generated in a given year to supplementary capital. In each of the two years ten companies allocated more than 80% of the net profit to supplementary capital. After the period $t = 3$ eight companies using state-owned enterprises against payment allocated more than 80% of the net profit to supplementary capital.

Three companies using state-owned enterprises against payment – *Przedsiębiorstwo Robót Inżynieryjno-Drogowych Sp. z o.o. w Grójcu*, *Morspol S.A.* and *Bipromel Sp. z o.o.* – allocated all of the net profit to supplementary capital in each year of the research period.

In fifteen companies using state-owned enterprises against payment which generated positive financial results the arithmetic mean of the part of net profit allocated to supplementary capital was between 47.17% and 87.24%. The arithmetic mean successively decreased apart from the fourth period after the year of privatisation. The lowest value of the arithmetic mean of the part of net profit allocated to supplementary capital was in period $t = 3$, and the biggest difference of the value was in period $t = 2$. In the third period after the year of privatisation every second company allocated not more than 50% of the net profit in the given year to supplementary capital (see table 3).

After the payment of dividend and supplementary and/or reserve capital contribution, some companies using state-owned enterprises against payment allocated the remaining part of the net profit to the Company Social Benefits Fund (*Elmet Sp. z o.o.*) or to bonuses for management board members (*Biprodrzew S.A.*). Six of the surveyed companies covered losses from previous years from the net profit generated in a given year, including losses resulting from created provisions for employee benefits, i.e. retirement and pension benefits, jubilee bonuses (*Zakład Transportu Energetyki „ZTi-SZE” Sp. z o.o.*, *Zakład Transportu Energetyki Radom Sp. z o.o.*).

Conclusions

In the year of privatisation and in the period of two years after the year of privatisation every second company of fifteen surveyed companies using state-owned enterprise against payment did not pay dividends, transferring all of retained earnings to supplementary capital. The crucial factor determining net profit distribution in the surveyed companies was the will and/or the need to obtain exemption from the debt arising from deferral of additional fees. In the third period after the year of privatisation, which is after the period when the majority of companies using state-owned enterprises against payment was exempted from the debt arising from deferral of additional fees, every second surveyed company allocated not more than 25.87% of the net profit to the payment of dividend and not more than 50% of the net profit to supplementary capital. In the next two periods every second company using state-owned enterprise against payment did not pay dividends, transferring not more than 86% of the generated net profit to supplementary capital.

The average values of part of the net profit allocated to the payment of dividend and part of the net profit allocated to supplementary capital, characterized by opposite trends in the third period after the year of privatisation, had the greatest rate of change. In the period $t = 4$ the value of the arithmetic mean of the part of net profit allocated to the payment of dividend decreased to the level higher than in the period preceding the year $t = 3$, while value of the arithmetic mean of the part of net profit allocated to supplementary capital increased to the level lower than in the year $t = 3$.

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18-19 June 2015, Economics and Finance**

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18-19 June 2015, Economics and Finance**

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18-19 June 2015, Economics and Finance**

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Proceedings of the 8th International Conference on Applied Economics
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Statistical Analysis of Business Cycle Fluctuations in Poland Before and After the Crisis*

JEL Classification: *C14; C46; E32*

Keywords: *APC processes; subsampling; Bayesian inference; global economic crisis; business cycle fluctuations*

Abstract: The main objective of the paper is to investigate properties of business cycles in Polish economy before and after the recent crisis. The essential issue addressed here is whether there exist statistical evidence that the recent crisis has affected the properties of the business cycle fluctuations. In order to improve robustness of the results we do not confine ourselves to any single inference method, but instead use different groups of statistical tools, including non-parametric methods based on subsampling and parametric Bayesian methods.

We examine monthly series of industrial production (from January 1995 till December 2014), considering properties of cycles in growth rates and in deviations from long-run trend. Empirical analysis is based on the sequence of expanding-window samples, with the shortest sample ending in December 2006. The main finding is that the two frequencies driving business cycle fluctuations in Poland correspond to cycles with periods of 2 and 3.5 years, and (perhaps surprisingly) the result holds both before and after the crisis. We therefore find no support for the claim that features (in particular frequencies) that characterize Polish business

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

cycle fluctuations have changed after the recent crisis. The conclusion is unanimously supported by various statistical methods that are used in the paper, however, it is based on the relative short series of the data currently available.

Introduction

The global financial crisis, with its origins occurred in August 2007, has addressed the need of a major rethink in macroeconomics, changing substantially directions of the frontier research. In particular, abrupt, strong and omnipresent effects of the crisis in the US subprime market affecting the global economic growth, prompted new studies on the nature of the procyclicality of the financial system, which has existed in macroeconomics through the decades as a topic of secondary importance; see Woodford (2003). Therefore the analysis of the empirical properties of the financial cycle is one of the most important issues of the empirical macroeconomics nowadays; see Borio et al. (2011), Borio (2014) and Drehman et al. (2012).

On the other hand, the aforementioned major rethink in macroeconomics not only traced new routes for researchers, but it showed some new perspectives of problems that has been studied for decades. Just before the crisis the empirical macroeconomics was focused on the observed correlation of changes of the world economic activity. Years preceding the crisis have seen new studies focused on construction of appropriate measures of synchronization of the business cycles rather, than examining well established properties of the cycle in the most of economies; see Stock and Watson (2005); Doyle and Faust (2005); Ayhan-Kose et al. (2003); Ayhan-Kose et al. (2008); Imbs (2004) and others.

The economic growth in the 1980s and 1990s has been remarkably more stable than the eight or nine decades that preceded it. Consequently, many researchers indicated that the properties of the business cycles changed distinctly, making fluctuations of economic activity relatively weaker at the beginning of the XXI century; see Taylor (1998), Romer (1999), Stock and Watson (2003) among others. In the mid-1980s, recessions in advanced economies rarely occurred and have become less pronounced, while expansion phases have become longer lasting; see Kannan et al. (2012). The literature explains this phenomenon by the globalization processes, the organizational and technical development observed in financial markets, changes in the structure of aggregate output, with growing importance of the service sector and still important but declining contribution of manufacturing to the growth, and – more importantly - better macroeconomic policies; see Blanchard and Simon (2001) and Romer (1999).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

However the impact of the global financial crisis on the economy was definitely very strong. Hence the properties of the cyclical fluctuations in the real sector may have changed substantially. Also there is no doubt that all the explanations mentioned above for the hypothetical existence of the new era of stable economic growth that would have been initiated in 1980s, are no longer valid. Therefore the problem of renewed investigation of the empirical properties of the business cycle, especially for small open economies, is of importance nowadays. It is of crucial importance for the design of successful monetary policy. Moreover, Polish economy can be perceived as an interesting case, as it stayed resilient to the impact of the global financial crisis and seems to represent certain degree of balance between internal and external factors influencing business cycle.

The properties of business cycle in Polish economy were examined in: Skrzypczyński (2010), Gradzewicz et al. (2010), Adamowicz et al. (2008) and partially in Wośko (2009). Skrzypczyński (2010) used nonparametric band-pass filters and spectral methods; the author concludes that on a basis of Polish GDP data two lengths of business cycle were detected in the 1995 – 2007 period, namely a shorter business cycle with 3 years length and a longer one, lasting 6-7 years. The same set of tools was considered in Gradzewicz et al. (2010), but for a different set of macroeconomic data. The main conclusion formulated in the paper is that the length of the business cycle is approx. 6-8 years based on spectral analysis applied to all cyclical patterns extracted from the macroeconomic series under consideration. Only in the case of monthly industrial production index and monthly export, the business cycles with length 3-4 years were detected. Wośko (2009) considered a small set of general business indicators, and the main conclusion was that the length of business cycle is approx. 4 years. Adamowicz et al. (2008) considered a broad set of macroeconomic indicators, detecting the cycles within 2.5-4 years range. In summary, the authors have used different statistical methods, different datasets and obtained somewhat divergent conclusions.

The above overview suggest that the structure of the business cycle fluctuations in Polish economy is not fully transparent. Some of the authors focus on identification of a single most important pattern of cyclical fluctuations, whereas the observed dynamics could have been driven by different interfering components. This suggests that a potentially useful statistical method should allow for joint identification of several frequencies, and that the crucial issue is related to the uncertainty associated with statistical inference. The methods used in the literature vary with the respect to formal

advancement; some of the methods do not allow for testing significance or e.g. interval estimation of the cycle length.

The main objective of the paper is to investigate properties of business cycles in Polish economy before and after the recent crisis, using fully formal methods of statistical inference in order to shed some light on the discrepancies mentioned above. Since the last crisis in Poland was not as deep as in other European economies (Poland was called “the green island” on a red map) we suspect that formal statistical tools might indicate that the length of the business cycle have been relatively stable before and after the crisis.

Methodology of the research

We make use of two main groups of statistical methods here. In the first approach we rely on subsampling inference about discrete spectrum of the Almost Periodically Correlated (APC) stochastic processes; see Lenart (2013) and Lenart and Pipień (2013). The second approach bases on the Bayesian inference utilized for formal small sample statistical inference of frequencies (or equivalently, period lengths) in a parametric setup. We focus here on analysis of the parameters that are associated with the length of the cycle (or its frequency). Differences arising from amplitude or phase shift parameters are not of primary importance in the paper. Moreover, we compare the results with outcome of the method presented in Li and Song (2002).

We examine monthly series of industrial production index (covering period from beginning of 1995 till the end of 2014). We consider the series in levels and in growth rates (relating current month to analogous month of the previous year). The former is equivalent to analyzing a cycle of deviations, whereas the latter is equivalent to consideration of a growth cycle. The cycles are not perfectly equivalent, although it is possible to compare the resulting estimates for frequency (cycle length) parameters.

As for the first group of methods, the statistical analysis of the length of business cycle is based both on properties of APC time series and subsampling methodology. For observed real valued macroeconomic process $\{P_t; t \in Z\}$ with trend, seasonal and cyclical pattern, we build the concept on the basis on a univariate non parametric representation:

$$E(\tilde{P}_t) = f(t, \beta) + \sum_{\psi \in \Psi} m(\psi) e^{-i\psi t}$$

where $\tilde{P}_t = \ln(P_t)$ and $f(t, \beta)$ is a polynomial of order d , while $\sum_{\psi \in \Psi} m(\psi) e^{-i\psi t}$ is an almost periodic function (see Corduneanu (1989)), with unknown set of frequencies Ψ and corresponding Fourier coefficients $m(\cdot)$. The set of frequencies that corresponds to business cycle length that is greater than one and a half a year, is invariant after non-parametric differencing and $(2 \times T)$ MA filters, where T is the number of observations during a year (see Lenart and Pipień (2013)). Since $\psi \in \Psi \Leftrightarrow m(\psi) \neq 0$, the problem of testing significance of frequency ψ (in the sense that $\psi \in \Psi$) is equivalent to testing the significance of a Fourier coefficient $m(\psi)$ (in the sense that $m(\psi) \neq 0$). It is important to emphasize that the methodology is not based on the filtering methods, which is a distinctive feature of the approach. In order to test the significance of Fourier coefficients, the subsampling (see Politis et al. (1999)) is applied since the asymptotic distribution of the test statistics is too complicated to be used in practice. For more details, see Lenart and Pipień (2013).

As for the second group of the methods, for the sake of parametric analysis we assume the following structure of the time series under consideration:

$$R_t = \mu_t + v_t$$

where R_t represents y-o-y growth rates, with v_t corresponding to a stationary Gaussian autoregressive process of order p , and

$$\mu_t = \sum_{f=1}^F (\alpha_{1,f} \sin(t\phi_f) + \alpha_{2,f} \cos(t\phi_f)).$$

Parameters $\phi_f \in (\phi_L, \phi_U) \subseteq (0, \pi)$ represent frequencies of the fluctuations, whereas $\alpha_{1,f}$ and $\alpha_{2,f}$ represent amplitudes and phase shifts. With F being estimated rather than set known *a priori*, the structure of the dynamics can be modeled in a flexible way, allowing for the existence of several significant components in the overall dynamic pattern. Estimates of F can be obtained by conducting a fully formal model comparison.

Bayesian estimation of the above model requires specification of the prior densities for the parameters under consideration. We make use of the proper priors, in particular the frequency parameters (that are crucial in the analysis to follow) are assumed to be *a priori* uniformly distributed on (ϕ_L, ϕ_U) . The lower and upper boundary values ϕ_L and ϕ_U are fixed so that cycles shorter than one year and longer than 10 years are *a priori* ruled out. The idea of excluding longer cycles is related to the fact that the time series available for Polish economy are not really long, making the inference on very low frequency features very problematic. Moreover, based on posterior results for ϕ_f it is possible to induce the equivalent posterior for cycle length, which takes into account the uncertainty associated with identification of the cycle length. The resulting marginal posterior can be irregular (in particular multimodal), most likely suggesting that $F > 1$.

It must be highlighted that the crucial feature of the methods outlined above is the formal way of dealing with inferential uncertainty. Significant frequencies (or cycle lengths) can be identified based on formal tests (for subsampling approach) or e.g. highest posterior density (HPD) intervals (for the Bayesian approach). It is therefore possible to avoid *ad hoc* decisions based on point estimates only.

In order to illustrate properties of the methods used here relative to some other approaches used in the literature, we consider also the results obtained using a procedure proposed by Li and Song (2012). This method is called contraction mapping method (CM in short) and assumes that univariate time series $\{X_t; t \in Z\}$ is given by:

$$X_t = \sum_{k=1}^r \beta_k \cos(\omega_k t + \vartheta_k) + \varepsilon_t,$$

where $\{\varepsilon_t; t \in Z\}$ corresponds to stationary time series with zero mean. The objective of the method is to estimate the unknown frequency. Notice that the mean function of the time series $\{X_t; t \in Z\}$ is almost periodic. For details concerning the estimation procedure see Li and Song (2002).

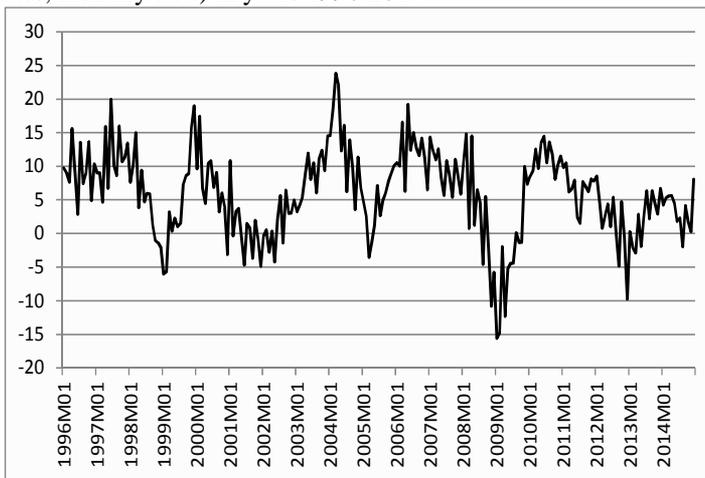
Empirical results

In order to evaluate potential influence of the recent crisis on business cycle pattern, the empirical analysis to follow is based on the sequence of expanding-window samples, with the shortest sample ending in December 2006, and the longest one ending in December 2014. In order to maintain

coherence, for the methods based on levels, the initial observation is January 1995, whereas for the growth rates it is January 1996.

The empirical results presented in the paper are founded on analysis of the time series of the industrial production index. The idea is to choose the crucial dataset and use a whole menu of various statistical methods instead of applying simple methods to a broad set of series, which makes formal pooling of the results difficult. The dataset used here is depicted in Fig. 1.

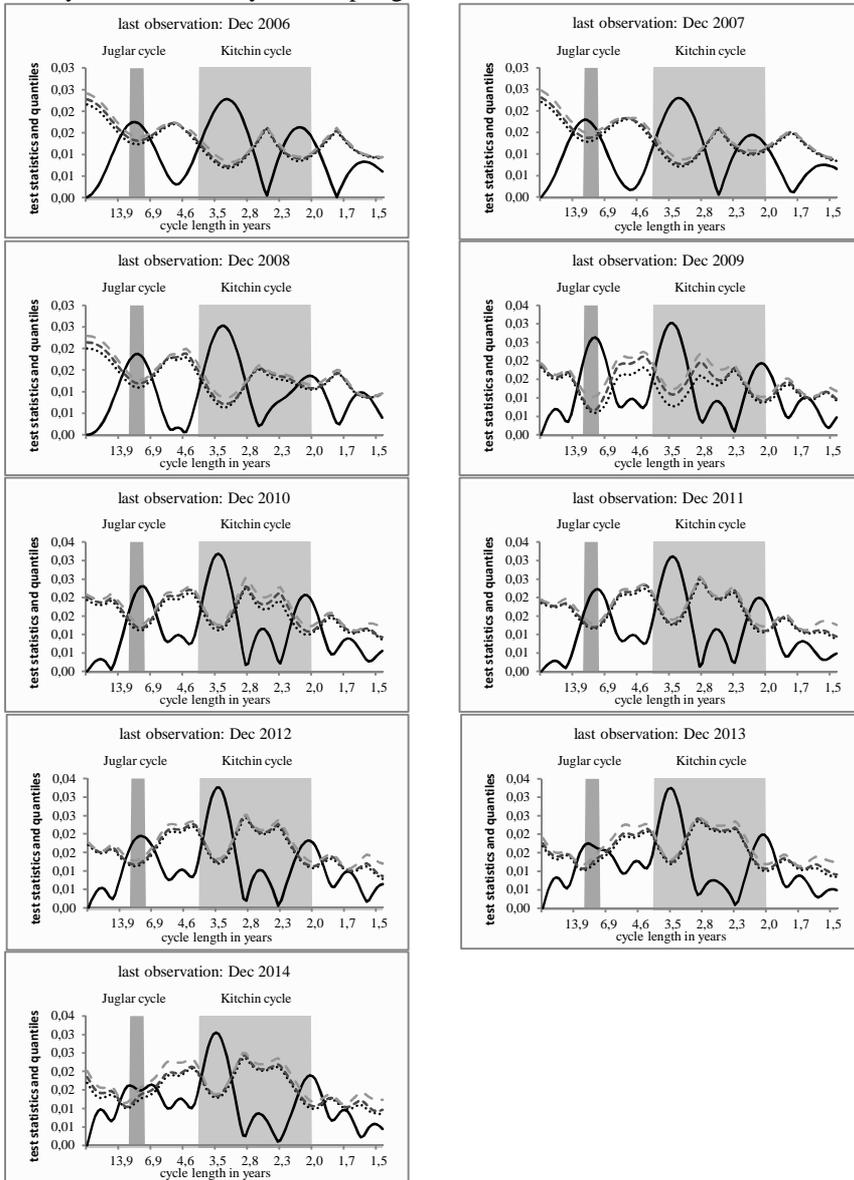
Figure 7. Dynamics of the industrial production index in Poland (y-o-y percentage growth rates, monthly data) in years 1996-2014



Source: Eurostat

Recursive analysis based on the subsampling approach applied to the data in log-levels (which amounts to analysis of the deviations cycle) revealed the results depicted in Fig. 2.

Figure 8. Polish industrial production index – significant frequencies of the deviations cycle uncovered by subsampling test.



Source: own calculations.

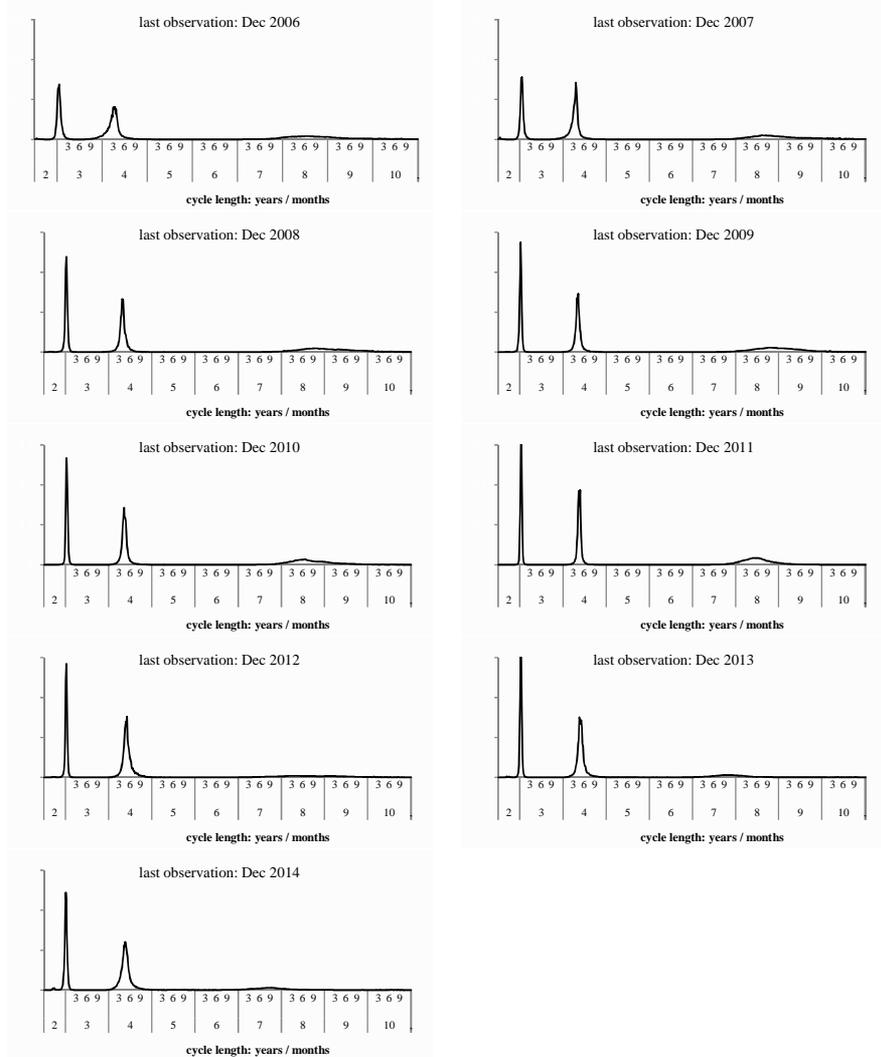
The above figure presents the test statistics for significance of $|m(\psi)|$ with subsampling quantiles at nominal levels of 0.08, 0.05 and 0.02. Solid lines in each panel correspond to values of the test statistics, with critical values represented by dotted lines. Values on the horizontal axes are associated with cycle length in years. Significant frequencies (cycle lengths) correspond to test statistics values exceeding critical values. Analysis of Fig. 2 suggests existence of three components in the dynamics of Polish industrial production data, and the highest values of the test statistics (relative to the critical values) characterizes the cycle of approx. 3.5 years. The two remaining significant frequencies correspond to cycle lengths of about 2 years and approximately 8-10 years (with quite considerable uncertainty in the latter case). The results seems to be fairly stable along with recursive expansion of the sample. One can also see that the uncertainty as for the cycle length seems higher for shorter samples, which is quite intuitive.

Results of the Bayesian parametric approach applied to the industrial production index transformed to growth rates are depicted in Fig. 3. The solid line represents probability density function of the marginal posterior distribution for the duration parameter, obtained as one-to-one transformation of the frequency parameter ϕ_f , obtained by assuming $F = 3$. The distribution has three modes, indicating existence of three different cycles. Again, there are cycles with period length of 2 years and about 3.5 years. The two-year cycle seems to be estimated very precisely in terms of length, which is also very stable over time. The second component associated with the cycle of almost 3.5 years shows more uncertainty and some instability. However, it is very moderate and as the uncertainty is taken account, the instability is by no means significant.

The analysis suggests the existence of the third component corresponding to the cycle of approx. 8 years. However, the probability mass related to the component is dispersed and it is difficult to derive decisive conclusions other than that there is visible instability in its estimates, though it is coupled with quite large dispersion. There is also a difference between the results from the non-parametric approach (Fig.2) and the results from the Bayesian approach (Fig. 3) with respect to the properties of the longest cycle. The changes in its estimated cycle length (arising from recursive expansion of the sample) in the two approaches seem to follow the opposite direction. However, the differences seem not to be significant.

On the overall, the results of the Bayesian approach within the growth cycle setup seem quite coherent with the results obtained by subsampling methods with respect to the deviations cycle.

Figure 9. Polish industrial production index - Bayesian marginal posterior for growth cycle length induced by posterior distribution of the frequency parameter.

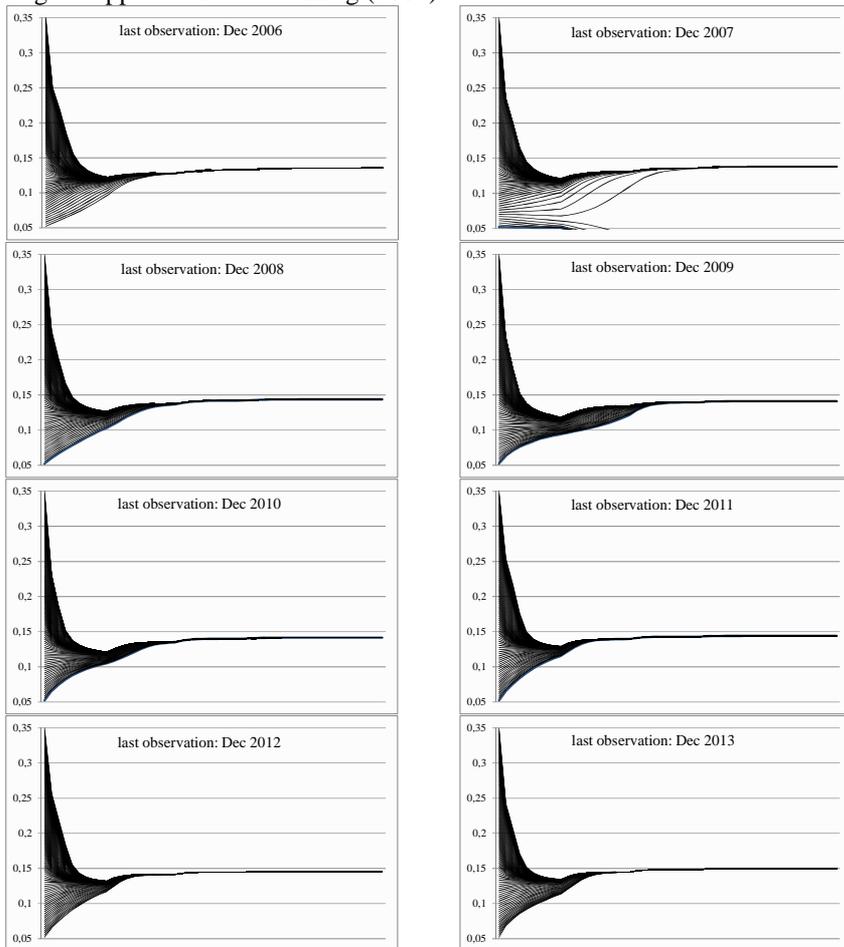


Source: own calculations.

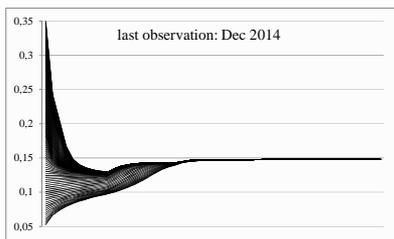
However, in order to provide a comparison to other methods used in the literature, Fig. 4 depicts the outcome obtained using the parametric procedure proposed by Li and Song (2002). CM frequency estimates ranging from 0.05 to 0.35 are depicted on vertical axes, with increasing number of

iterations on horizontal axes. The number of iteration is equal to 50. The bandwidth parameters are the same as in Lenart (2013): $\eta_1 = 0.98$ for $m \leq 8$, $\eta_2 = 0.99$ for $9 \leq m \leq 16$, and $\eta_3 = 0.995$ for $m \geq 17$.

Figure 10. Analysis of the Polish industrial production index (y-o-y growth rates) using the approach of Li and Song (2002)



**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

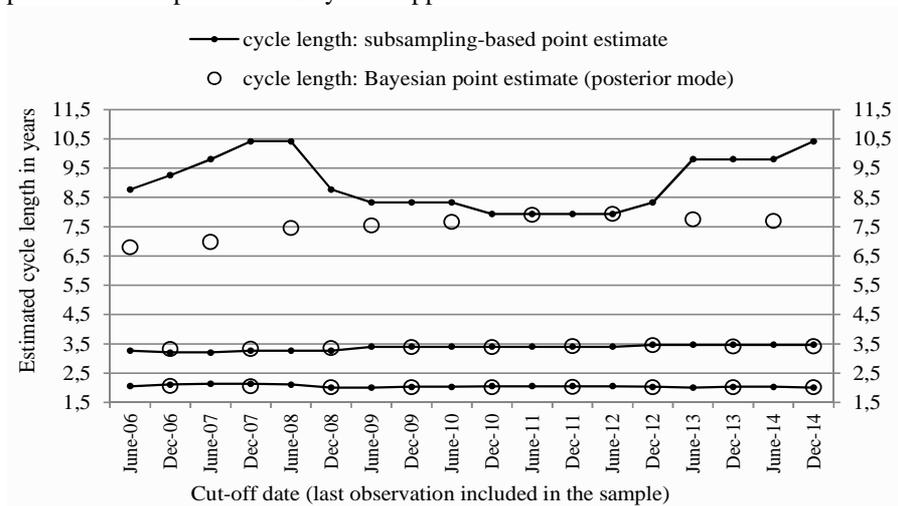


Source: own calculations.

Each frequency ψ corresponds to the cycle length of $2\pi/\psi$. Therefore for the monthly data the set of frequencies (0.05;0.35) corresponds to the length of the cycle between one and a half year and ten years. The results indicate that, contrary to the approaches used in the paper, the method of Li and Song fails to detect different periodic components that seem to be present in the Polish industrial production data. The results also reinforce the importance of the cycle of almost 3.5 years (which is associated with values of frequency parameter close to 0.15).

Summary of the point estimates of cycle lengths obtained by the non-parametric subsampling-based approach and the parametric Bayesian approach is depicted in Fig. 5. Since the non-parametric method is not computationally time-consuming, its results are updated every six months.

Figure 11. Significant cycle lengths – comparison of the results from non-parametric and parametric Bayesian approach.



Source: own calculations.

The results summarized in Fig. 5 show that Bayesian parametric method applied to growth cycle and non-parametric method used to investigate cycles in deviations from trend lead to very similar inference regarding cycles with period length of 2 and 3.5 years. As the uncertainty is taken into account, the results do not support the claim of significant changes in the business cycle pattern in Polish economy after the crisis. The results associated with longer cycles (with period of 7-10 years) are somewhat less clear. The estimates are less stable here, the uncertainty is greater and sub-sampling-based approach reveals systematically longer cycles, as compared to the Bayesian approach. Again, the instability in point estimates is small relative to the uncertainty.

Conclusions

The main objective of the paper is to investigate properties of business cycles in Polish economy before and after the recent crisis. The essential issue addressed here is whether formal methods of statistical inference provide evidence supporting the view that the recent crisis has changed the properties of the business cycle fluctuations. It is of particular interest whether considering the data representing also the after-crisis period leads to differences as for inference on crucial frequencies describing the dynamics of Polish economy.

In order to improve robustness of the results we do not confine ourselves to any single inference method, but instead use two different groups of statistical tools. As for the first group, these are non-parametric methods that rely on subsampling. The second group includes Bayesian methods employed within the parametric approach. However, all the methods used here use allow for formal quantification of uncertainty and co-existence of cycles with different periods, which is a crucial feature of our analysis. Within the non-parametric approach, a formal test is used to detect significant frequencies. Within the Bayesian approach, the uncertainty is fully described by (multimodal) posterior distribution of frequencies (or equivalently, period lengths), so the inference is fully formal.

We examine monthly series of industrial production index (covering period from beginning of 1995 till the end of 2014), taking into account levels (for deviations cycle) and growth rates (for growth cycle). Empirical analysis is based on the sequence of expanding-window samples, with the shortest sample ending in 2006. The main finding of the paper is that the two most important frequencies driving business cycle fluctuations in Poland

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

correspond to cycles with periods of 2 and almost 3.5 years, and (perhaps surprisingly) the result holds before and after the crisis. Results regarding the cycles with period length of 7-10 years are less stable, but do not support significant change after the crisis either.

We therefore find no support for the claim that cycle length that characterize Polish business cycle fluctuations was affected by the crisis. The conclusion is unanimously supported by various statistical methods that are used in the paper (given the cut-off date being the end of 2014). However, we do not consider potential changes in phase shift or amplitude of the fluctuations. It is therefore possible that with more post-crisis observations some evidence for influence of the crisis would eventually be uncovered.

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18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
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**Trends in IPOs: The Evidence from CEE
Capital Markets¹**

JEL Classification: *E44; G23; G32*

Keywords: *IPO; Going Public; Trends; Financial Markets; CEE*

Abstract: The purpose of this paper is to investigate IPO developments across five CEE countries between 2003 and 2012. Using a wider range of methods and different data sets we intend to complement the previous research. Applying descriptive statistics, relevant local developments are analysed first before being compared with leading European markets (London Stock Exchange and Deutsche Börse). We also investigated the assumption that a growing market has an explanatory power for the accelerating IPO activity. For this purpose we performed a Spearman correlation analysis. The data were evaluated at the significance level of $\alpha = 5\%$. All CEE capital markets recorded strong dynamism over the observed period. All fundamental capital market parameters increase the attractiveness of individual capital markets, although their values lag behind developed European capital countries. The unambiguous leader in the region is Poland with a flourishing IPO market. Our assumption that a growing market has a positive impact on IPO activities could not be supported by empirical evidence.

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Introduction

Substantial academic literature devotes a significant amount of research to emphasising the importance of the financial system to economic growth. Kominek (2003) summarises recent empirical research (e.g. Schumpeter, 1911; Robinson, 1952; Lucas, 1988; Demirguc-Kunt & Maksimovic, 1996; Levine & Zervos, 1998; Rajan & Zingales, 1998) and concludes that “well developed financial systems stimulate economic growth”. Although the continental financial system is traditionally focused on banking, there is increasing interest in the stock markets and initial public offering (IPO) implementation (e.g. Pagano et al., 1998; Black and Gilson, 1998; Chemmanur & Fulghieri, 1999; Ritter & Welch, 2002).

According to existing definitions an IPO refers to the fact that a company offers its securities, in the strict sense of the word shares, to the public for the first time, and also enters the public organised securities market, represented most frequently by its stock exchange. The essential thing is that an IPO can only be used by issuers whose securities are not being traded on the public securities market at that time (Jenkinson & Ljungqvist, 2001; Huyghebaert & Van Hulle, 2006). According to the origin of the shares offered in an IPO, these authors distinguish between an IPO of primary shares, with the issuing of new shares and their placement on the public primary securities market, and an IPO of secondary shares, consisting of offering previously issued shares that have been traded only on the private secondary securities market.

The IPO markets of Central and Eastern Europe (CEE) have been empirically investigated by a relatively small number of academic studies. Peterle (2013) argues that, “apart from statistical data, there is almost no available academic research of IPO characteristics covering the entire CEE region, especially in the 2000s”. She studied IPOs between 2000 and 2009 and concludes that capital market factors such as “market size, liquidity and market capitalisation to GDP do not have a decisive impact on IPO activities in the CEE region”. On the other hand, “the attractiveness of the capital market as measured by annual stock index returns and by annual market and liquidity growth” may have been an incentive for decision-makers about IPOs in the observed period. Findings by Brzeszczynski (2014) show that “decisions about IPOs in Poland are strictly dependent on stock market phases and that IPOs tend to increase when share prices are rising and to decrease when they fall. This relationship is not simultaneous, as some lag

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

effect can be observed that may be linked to the length of time taken by decision-makers”.

Institutional and historical (i.e. qualitative) factors have been assessed by “soft” indicators such as perception of the capital market by enterprises, their confidence in the capital market and the quality of national regulations and structures. Roženský (2008) explored conditions created by local CEE stock exchanges using the following indicators: cost of going public, administrative requirements of issuers, the market segmentation of the particular stock exchange and, finally, its marketing and public relations. Groh, Lichtenstein & Lieser (2010) calculated composite indices to compare the attractiveness of 27 European countries for institutional investments in venture capital and private equity. They conclude that “the investor protection and corporate governance rules and the size and liquidity of its capital market are likewise a proxy for the professionalism of the financial community, for deal flow and exit opportunities”.

Using a wider range of methods and different data sets we intend to complement the previous research (Roženský, 2008; Peterle, 2013; Brzeszczynski, 2014) by considering IPO developments across five CEE countries between 2003 and 2012. Applying descriptive statistics, relevant local developments are analysed first before being compared with leading European markets.

Methodology of the Research

We investigated five CEE capital markets – Poland, the Czech Republic, Hungary, Slovenia and Austria. Apart from Austria, all these countries share a similar historical background after World War II. All these countries turned to communism, built-up centrally planned economies and applied shock therapies in the early 1990s after the disintegration of the communist economic alliance. They all undertook different privatisation programmes during the first years of transition and a “prime example of this difference in attitudes is given by the organisation and development of the Czech and Polish stock exchanges” (Kominěk, 2003).

The nature of this study is based on the theory and previous empirical research. All IPO indicators analysed in this paper have sufficient support in the financial academic literature (Roženský, 2008; Groh, Lichtenstein & Lieser, 2010; Peterle, 2013; Brzeszczynski, 2014).

The quantitative analyses of CEE IPO developments are based on evidence over the period from 2003 to 2012. Our sample includes enterprises

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

that conducted an IPO on the Main Markets of CEE Stock Exchanges. Both the IPO and capital market data were obtained predominantly from Stock Exchange Fact Books, the Federation of European Securities Exchanges (FESE), the World Federation of Exchanges (WFE) and PwC (IPO Watch Europe).

The following steps were undertaken to analyse the quantitative data. Firstly, we performed a descriptive analysis in order to draw attention to certain specific issues existing on CEE IPO markets between 2003 and 2012. Next, we compared internal IPO characteristics on CEE markets with the empirical evidence on IPOs on the most developed EU capital markets (London SE and Deutsche Börse). We also investigated the assumption that a growing market has an explanatory power for the accelerating IPO activity. For this purpose we performed a Spearman correlation analysis. The data were evaluated at the significance level of $\alpha = 5\%$. The entire statistical evaluation was performed by Statistica.CZ, Version 9. Descriptions of variables and the sources of data used are shown in Table 1. The results are explained and discussed with the conclusions of previous studies conducted under the conditions in force on developed capital markets.

Table 1. Analysed Variables

		Data Sources	Calculation
Market Capitalisation of Equities			in EUR m (using yearly closing dates)
Index Returns			in %, annual change (using yearly closing dates)
Number of Listings (IPOs)	Stock Exchange Fact Books, PwC IPO Watch Europe, FESE, WFE		frequency
Value of IPOs			in EUR m (using yearly closing dates)
Ownership Structure of IPO companies			in %
New (Primary) Shares in IPO			in %

Source: own processing.

Empirical Results

Equity Market Capitalisation

In terms of size, the Warsaw Stock Exchange was dominant in the CEE region, holding a 39 % share of market capitalisation, followed by the Vienna Stock Exchange with a 36 % share of market capitalisation. The form and timing of privatisation fundamentally influenced market capitalisation in the 1990s. Roženský (2008) concludes that it was a positive influence in the Czech Republic and Hungary, though a negative influence in Poland because of the different manner of privatisation. In the second decade after the establishment of the local capital markets, more precisely between 2003 and 2012, the market capitalisation (in EUR) increased 2.5 times on the CEE market as a whole (see Table 2). The growth of the market was faster in comparison with established capital markets such as London, where market capitalisation increased by a factor of 1.5, or Frankfurt, where market capitalisation increased by a factor of 1.4. However, significant discrepancies can be observed in the development of individual markets (market capitalisation increased by a factor of 4.6 in Warsaw, 2.3 in Prague, 1.19 in Hungary, 0.87 in Slovenia and 1.79 in Austria). Since joining the EU (2004; Austria has been a member of the EU since 1995), all CEE capital markets amounted to 409,819 million EUR in the peak year of 2007 which represents only 16 % of the market capitalisation of the London Stock Exchange and 28 % of the market capitalisation of the Deutsche Börse. When we compare the CEE capital markets with developed capital markets in Western Europe, it must be noted that these markets are significantly smaller. Furthermore, in 2008, at the height of the financial and economic crisis, the decline recorded on this market was greater (–57 %) than on developed capital markets (UK –49 %, Germany –45 %). Changes in the value of market capitalisation were affected by three main factors – the financial and economic crisis of 2008, the appreciation/depreciation of local currencies, and the privatisation programme implemented by Polish governments (see also Roženský, 2008).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 2. Market Capitalisation – Domestic Issues (in EUR m), 2003–2012

	PL	CZ	HU	SL	A	Total CEE	London SE	Deutsche Börse
2003	29,350	12,288	13,228	5,660	44,811	107,540	1,708,260	802,224
2004	51,888	21,720	21,040	7,115	64,577	169,579	2,071,775	849,717
2005	79,354	31,060	27,586	6,697	107,036	255,461	2,592,623	1,019,171
2006	112,826	34,693	31,687	11,513	146,197	341,040	2,876,986	1,241,963
2007	144,323	47,987	31,528	19,695	161,731	409,819	2,634,577	1,439,955
2008	66,178	29,615	13,326	8,470	54,750	176,246	1,352,327	797,063
2009	105,157	31,265	21,093	8,462	79,511	249,102	2,008,188	900,772
2010	142,272	31,922	20,624	7,028	93,944	299,170	2,725,353	1,065,713
2011	107,483	29,203	14,630	4,873	65,683	226,055	2,345,927	912,420
2012	134,755	28,193	15,742	4,911	80,429	268,124	2,643,991	1,127,370
Total	973,586	297,946	210,484	84,424	898,669	2,502,138	22,960,008	10,156,368
Mean	97,359	29,795	21,048	8,442	89,867	250,214	2,296,001	1,015,637
Me- dian	106,320	30,337	20,832	7,072	79,970	252,282	2,469,275	965,796
Std. Dev.	37,434	8,590	6,753	4,193	36,514	83,296	470,868	197,730
Min.	29,350	12,288	13,228	4,873	44,811	107,540	1,352,327	797,063
Max.	144,323	47,987	31,687	19,695	161,731	409,819	2,876,986	1,439,955

Source: CEE Stock Exchange Group and its Capital Markets; Federation of European Securities Exchanges, Statistics & Market Research; Roženský (2008); Warsaw Stock Exchange, Fact Books (2003–2013); World Federation of Exchanges, Statistics; own calculations.

Index Returns

Assuming that a faster growing market promises higher subscription prices, it can be said that potential issuers will tend to go public on markets with higher rates of return. Differences in index returns can, for this reason, be essential during decision-making concerning IPOs. Spectacular annual index rate returns were recorded on all CEE stock capital markets during 2003–2012 and the Vienna, Budapest, Warsaw and Prague SEs in particular revealed significant potential for both investors and issuers (Table 3).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 3. Change in Annual Index Returns (%), 2003–2012

	WIG20 Warsaw SE	PX (CEESEG Prague)	BUX (CEESEG Budapest)	SBI Top (CEESEG Ljubljana)	ATX (CEESEG Vienna)	FTSE (London SE)	DAX (Deutsche Börse)
2003	33.90	19.22	20.30	-	34.40	13.60	37.10
2004	24.60	36.13	57.20	29.30	57.40	7.50	7.30
2005	35.40	42.73	41.00	2.80	50.80	16.70	27.10
2006	23.70	7.87	19.50	56.60	21.70	10.70	22.00
2007	5.20	14.20	5.60	71.00	1.10	3.80	22.30
2008	-48.20	-52.70	-53.30	-66.10	-61.20	-31.30	-40.40
2009	33.50	30.20	73.40	15.00	42.50	22.10	23.80
2010	14.90	9.60	0.50	-13.50	16.40	12.60	16.10
2011	-21.90	-25.60	-20.40	-30.70	-34.90	-2.20	-14.70
2012	20.40	14.00	7.10	7.80	26.90	10.00	29.10
Mean	12.15	9.57	15.09	8.02	15.51	6.35	12.97
Median	22.05	14.10	13.30	7.80	24.30	10.35	22.15
Std. Dev.	25.85	27.35	34.92	39.88	35.90	14.06	22.32
Min.	-48.20	-52.70	-53.30	-66.10	-61.20	-31.30	-40.40
Max.	35.40	42.73	73.40	71.00	57.40	22.10	37.10

Source: CEE Stock Exchange Group and its Capital Markets; Federation of European Securities Exchanges, Statistics & Market Research; Peterle (2013); Roženský (2008); Warsaw Stock Exchange, Fact Books (2003–2013); World Federation of Exchanges, Statistics; own calculations,

CEE IPO Developments

Table 4 gives an overview of market statistics of annual IPO time series. A total of 390 IPOs were listed during the period 2003–2012 on the EU-regulated CEE primary capital markets which represents a 25.34 % share of the whole EU-regulated market. The sum of the capital raised by the issuing companies was EUR 30,380 million, i.e. 11.22 % of the new money raised through IPOs in Europe. The average IPO size was EUR 77.89 million and therefore amounted to 44.28 % of the average in Europe as a whole. Prior to the financial and economic crisis (2008–2009), there was a remarkable boom in the annual number of IPOs which increased from 12 in

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

2003 to 90 in 2007. The sharp decline in the number of IPOs in 2008 and 2009 was followed by a slight recovery of the market between 2010 and 2012.

Table 4. CEE IPO market statistics and a comparison with the EU-regulated markets, 2003–2012

	2003	2004	2005	2006	2007	2008	2009
Number of IPOs	12	39	42	51	90	36	15
Value of IPOs (in EUR m)	1,290	3,306	2,971	2,767	7,109	3,976	1,721
Average IPO Value (in EUR m)	107.5	84.8	70.7	54.3	79.0	110.4	114.7
Capitalisation of Equities (in EUR m)	107,540	169,579	255,461	341,040	409,819	176,246	249,102
	2010	2011	2012	Total CEE	CEE, % of EU regulated		
Number of IPOs	41	48	16	390	25.34		
Value of IPOs (in EUR m)	4,117	2,305	819	30,380	11.22		
Average IPO Value (in EUR m)	100.4	48.0	51.2	77.89	44.28		
Capitalisation of Equities (in EUR m)	299,170	226,055	268,124	2,502,138	-		

Source: CEE Stock Exchange Group and its Capital Markets; Warsaw Stock Exchange, Fact Books (2003–2013); PWC – IPO Watch Europe (2003–2013); Federation of European Securities Exchanges, Statistics & Market Research; World Federation of Exchanges, Statistics; Peterle (2013); Roženský (2008); Sieradzki (2013); own calculations.

Table 4 further shows the market capitalisation of CEE stock exchanges over the last ten years. The sum of market capitalisation is EUR 2,502,138 million which is still a significantly small value in comparison with the leading European markets. The market capitalisation of the CEE primary capital markets amounted to 25 % of the Deutsche Börse market capitalisation and only 11 % of the London Stock Exchange market capitalisation.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Warsaw's share of the EU-regulated market by number of issues increased to 21 % in 2012 from 9 % in 2003. This placed the Polish IPO market among the most active primary markets in Europe. On the other hand, the IPO market share by offering value experienced significant growth only between 2008 and 2010. The 8 % average share of offering value on the EU-regulated market, despite a 12 percentage points average increase in the number of IPOs, reflects the number of relatively low-value IPOs Warsaw hosted on its Main Market.

Table 5. Distribution of IPOs in the CEE region (EU Regulated), 2003–2012

	PL	CZ	HU	SL	A	Total CEE	Poland, % of CEE	Poland, % of EU regulated
2003	6	0	0	0	6	12	50.00	8.82
2004	36	1	1	0	1	39	92.31	24.16
2005	35	0	0	0	7	42	83.33	15.28
2006	38	2	3	2	6	51	74.51	15.14
2007	81	2	0	1	6	90	90.00	22.50
2008	33	1	1	1	0	36	91.67	28.70
2009	13	0	2	0	0	15	86.67	31.71
2010	34	1	6	0	0	41	82.93	26.15
2011	38	1	6	1	2	48	79.17	32.20
2012	16	0	0	0	0	16	100.00	20.51
Total	330	8	19	5	28	390	84.62	21.44

Source: CEE Stock Exchange Group and its Capital Markets; Warsaw Stock Exchange, Fact Books (2003–2013); PWC – IPO Watch Europe (2003–2013); Federation of European Securities Exchanges, Statistics & Market Research; World Federation of Exchanges, Statistics; Peterle (2013); Roženský (2008); Sieradzki (2013); own calculations.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 6. Value of IPOs in the CEE region in EUR m (EU Regulated), 2003–2012

	PL	CZ	HU	SL	A	Total CEE	Po- land, % of CEE	Po- land, % of EU regulated
2003	287.89	0.00	0.00	0.00	1,002.0 0	1,290.00	22.32	5.32
2004	3,124.05	174.90	-	0.00	7.00	3,306.00	94.50	12.95
2005	1,808.64	0.00	0.00	0.00	1,162.0 0	2,971.00	60.88	4.04
2006	1,085.30	216.88	-	-	1,465.0 0	2,767.00	39.22	1.90
2007	5,096.87	90.16	186.0 0	309.0 0	1,427.0 0	7,109.00	71.70	7.81
2008	2,235.40	1,581.1 4	5.00	154.0 0	0.00	3,976.00	56.23	19.05
2009	1,701.23	0.00	19.80	0.00	0.00	1,721.00	98.85	39.20
2010	4,005.76	73.21	38.00	0.00	0.00	4,117.00	97.30	16.98
2011	1,931.26	7.90	0.00	0.00	366.00	2,305.00	83.78	7.82
2012	818.60	0.00	0.00	0.00	0.00	819.00	100.00	8.59
To- tal	22,095.0 1	2,144.1 8	248.8 0	463.0 0	5,429.0 0	30,380.0 0	72.73	8.16

Source: CEE Stock Exchange Group and its Capital Markets; Warsaw Stock Exchange, Fact Books (2003–2013); PWC – IPO Watch Europe (2003–2013); Federation of European Securities Exchanges, Statistics & Market Research; World Federation of Exchanges, Statistics; Peterle (2013); Roženský (2008); Sieradzki (2013); own calculations.

Table 7 shows the degree to which national governments have used the capital market as a tool of privatisation over the last ten years. Privatisation via IPOs (PIPOs) was executed on four CEE capital markets. WSE continued to dominate the number of privatisation IPOs on the CEE market (20 cases of privatisation) followed by Austria (5 cases of privatisation), Hungary and Slovenia (1 case of privatisation on each market). Private IPO levels in the region were more than 93 % in terms of numbers between 2002 and 2012.

In view of its extraordinary importance among the CEE capital markets, we also focused on IPO types conducted on the Warsaw SE. Table 8 presents their distribution based on the proportion of primary (new) and secondary shares in IPOs. We can therefore conclude that IPOs with only primary stocks in Poland prevailed with a share higher than 50 %, however

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

this share was 20 percentage points lower than indicated for continental Europe (Kim and Weisbach, 2006).

Table 7. Ownership Structure of IPO companies (EU Regulated), 2003–2012

	PL	CZ	HU	SL	A	Total CEE
Privatisation IPOs (PIPOs)	20	0	1	1	5	27
% in Total	6.06	0.00	5.26	20.00	17.86	6.92
Private Go Public	310	8	18	4	23	363
% in Total	93.94	100.00	94.74	80.00	82.14	93.08

Source: CEE Stock Exchange Group and its Capital Markets; Warsaw Stock Exchange, Fact Books (2003–2013); Peterle (2013); Roženský (2008); Sieradzki (2013); own calculations.

Table 8. Poland – Distribution of IPO Shares (EU Regulated), 2003–2012

	Offering Value	Value of New (Primary) Shares in IPO	% of New (Primary) Shares in IPO
2003	287.89	273.05	94.85
2004	3,124.05	285.85	9.15
2005	1,808.64	1,359.95	75.19
2006	1,085.30	638.14	58.80
2007	5,096.87	4,296.59	84.30
2008	2,235.40	878.42	39.30
2009	1,701.23	1,684.76	99.03
2010	4,005.76	323.37	8.07
2011	1,931.26	374.50	19.39
2012	818.60	289.62	35.38
Mean	2,209.50	1,040.43	52.35
Median	1,869.95	506.32	49.05
Std. Dev.	1,406.70	1,182.69	33.08
Min.	287.89	273.05	8.07
Max.	5,096.87	4,296.59	99.03

Source: Warsaw Stock Exchange, Fact Books (2003–2013); own calculations

Conclusions

Our results indicate strong dynamism on all CEE capital markets between 2003 and 2012. The growth of these markets evaluated by market capitalisation was significantly faster in comparison with developed capital markets in Western Europe, especially before 2008. First and foremost, Poland outperformed all other countries and replaced the former local leader, Austria.

When we consider annual stock index returns, the favourable development of these indicators is another sign of the dynamism recorded on CEE stock exchanges. This could be seen as a signal of increasing market attractiveness for both investors and potential issuers (IPO candidates) and thereby accelerate IPO activity. High average values of annual stock index returns on all CEE stock capital markets were outstanding in comparison with the developed capital markets and were, therefore, another factor increasing CEE capital market attractiveness.

However, despite the promising development of fundamental capital market parameters, our evidence supports the conclusions made by Peterle (2013) that all CEE capital markets, including the Warsaw SE, are characterised by their “lower quality” as compared with developed EU markets. Using Spearman correlation analysis we tested our assumption that a growing market has an explanatory power for the accelerating IPO activity, particularly in Poland. This assumption could not be supported by empirical evidence which implies that although IPO activity was increasing, especially before 2008, no relationship could be identified between the increasing number of primary issues and indicators of size on capital markets. This confirms the findings of Peterle (2013), namely that “capital market factors do not have a decisive impact on IPO activities in the CEE region”, although certain capital market parameters reflecting increasing capital market attractiveness could be an important IPO accelerator. Roženský (2008) concluded, on the basis of descriptive statistics for the CEE capital markets between 2003 and 2008, that the contribution of primary emissions to market capitalisation growth cannot be considered essential in view of the small value of new issues and their low performance: “Increasing market capitalisation on the Budapest, Warsaw and Prague SEs is more related to stock index returns”. Roženský (2008) also points out the low liquidity of the stock of new listed companies in Poland between 2003 and 2007: “Only few new listed companies contributed significantly to market turnover.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Moreover, these companies were either privatised or parallel listed by their foreign shareholders.”

To sum up our conclusions, all CEE capital markets recorded strong dynamism over the observed period. All fundamental capital market parameters increase the attractiveness of individual capital markets, although their values lag behind developed European capital countries. The unambiguous leader in the region is Poland with a flourishing IPO market. Our assumption that a growing market has a positive impact on IPO activities could not be supported by empirical evidence.

A further research on the issues addressed in this paper assumes, firstly, a modification of the explored variables (a combination of macroeconomic, institutional and capital market factors), secondly, an analysis of the individual markets based on both quantitative and qualitative models, and finally a continuous extension of the time series.

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**Proceedings of the 8th International Conference on Applied Economics
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18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
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**The Cost of Capital in the Effectiveness
Assessment of Financial Management
in a Company**

JEL Classification: *G32*

Keywords: *capital; cost of capital; value pricing*

Abstract: Financial management in a company is a decision process subject to achievement of the main goal of the company, that is its value maximization. Estimation of the cost of capital is of great significance in this area. The cost of capital affects the key decisions of the board concerning the scale of investment undertakings, determination of the target, demanded amount and pace of capital growth, shaping of optimal capital structure and other areas of financial management in a company such as capital budgeting, processes of takeovers and fusions etc. It is also a parameter in calculating the return on investment and in other analyses. The utilization of information about the cost of capital in the decision-making process in the company is strictly connected with the assessment of financial management in the company using market value added. The objective of the article is to review the theory confirming the thesis that the effectiveness assessment of financial management in the company, in the context of market value added growth, is largely dependent on the cost of capital in the company. The article is of theoretical-cognitive and methodological character. It constitutes a reason for further empirical research confirming the relation proved in the theory between the cost of capital and company value, which is a basis for the effectiveness assessment of financial management in the company.

Introduction

Financial management in a company is a decision process subject to the achievement of the main goal of the company, that is value maximization. Awareness of the company value has great significance in the business activity of each company and constitutes the most important criterion of making decisions by the owners and executives. In theory and practice a view is common about the key significance of the cost of capital in shaping the company value. It is one of the basic and still discussed issues raised in the field of corporate financial management (Caputa, 2010, pp. 88-100). The purpose of the article is a review of theory confirming the thesis that the effectiveness assessment of financial management in the company is largely dependent on the cost of capital in the company. The subject of the research are the considerations of F. Modigliani and M. Miller as they are the first model solutions related to the problem raised. The author also related to other models created on the basis of these considerations, which may be an alternative. The article is of theoretical-cognitive and methodological character and constitutes a reason for further empirical research that confirms the relation proved in theory between the cost of capital and company value, being an effect of the activities undertaken within the frames of corporate financial management. In the research conducted a method of literature studies was used, both a domestic and foreign one.

The outline of the problem of the cost of capital evaluation

In the considerations concerning the company value it is very important to define the cost of capital precisely. The cost of capital is generally defined as the expected return rate by the investors (both owners and creditors) on the invested capital at the particular risk level. It is connected with the alternative cost, that is the expected return rate on investment that the investors resign from when they choose a particular type of activity and resign at the same time from other possibilities available in a given moment (Compare Duliniec, 2001, p. 149; Kerins at al., 2004, pp. 385-405).

Estimation of the cost of capital is connected with a division of capital into debt capital and equity and consists in a separate calculation of the alternative cost for the particular financing sources of debt capital and equity as well as in calculation, on their bases, the weighted average cost of capital in which target capital structure determines the weights of the separate components (Jonek-Kowalska, 2011, pp. 117-136).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Equity is the company owner's or owners' contribution. In the moment of company establishment it constitutes a sum of resources (assets) brought in by the owner (owners). In the course of conducting the business activity it will be increased by the value of profits achieved. Debt capital is a capital left at the company's disposal for a definite period of time and after that it must be returned. A further division of debt capital may be made into a long-term one that includes long-term credits and bonds, long-term bank loans and other long-term liabilities that will be paid off after over 1 year and into short-term debt capital that comprises of credits, bonds, bank loans and other trade payables as well tax and remuneration liabilities due in less than one year.

In order to determine the weighted average cost of capital there should be the cost of capital calculated coming from different sources engaged in business financing, e.g. the cost of shareholder capital, the cost of bank loans, the cost of capital obtained from bonds sales etc. (Che & Sethi, 2014, pp. 1-34). Each element of capital is subject to different pricing depending on the way of determining the benefits for the capital provider, tax solutions etc. Next, the costs of capital are "weighted" by the share of the particular sources in the capital structure. In a general form, weighted average cost of capital (WACC) may be expressed by the following formula (Groth & Anderson, 1997, p. 477; Jajuga & Słoński, 1997, p.149; Brigham, & Gapenski, 2000, p. 238):

where:

$$WACC = \sum_{i=1}^n w_i K_i$$

where:

w_i – i-number of the sources of capital,

K_i – cost of capital coming from the source of i-number,

n – number of capital sources.

This formula is also presented in a more general form that includes the cost of equity that is obtained from common and preferred stock issuance as well as the cost of debt capital:

$$WACC = w_d k_d (1-T) + w_p k_p + w_e k_e,$$

where:

w_d – debt capital,

w_p – capital from preferred stock issuance,

w_e – capital from common stock issuance,

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

k_d – cost of debt capital,
 k_p – cost of capital from preferred stock,
 k_e – cost of equity from common stock.

The return rate on the particular types of capital is the required return rate on the capital invested by the owners and creditors, determined using market criteria. Beside the return rate, the weighted average cost of capital in the company depends on the capital structure shaped in the company (Ickiewicz, 2001, p. 208).

Determination of the capital structure for the purpose of the cost of capital estimation is connected with some problems. They are connected with various ways of defining the capital structure in the company. The notions of capital structure, liabilities structure and financing sources structure are interchangeably used. These are not fully identical notions though. Defining the capital structure is grounded on the basic division of capital into equity and debt capital as well as on a long-term and short-term capital. One of the depictions of capital structure is its perception as the share of debt capital and equity in financing the company's activity (Sierpińska & Jachna, 2003, p. 255; Bień, 1998, p. 174; Turek & Jonek-Kowalska, 2009, pp. 16-20; Janasz, 2010, p. 35; Jerzemowska, 2006, p. 155; Gabrusewicz, 2005, p. 115). However, there is another approach possible that debt/equity relation determines the structure of company's financing, furthermore, the capital structure is a relation of long-term debt and equity (Moyer et al., 1992, p. 518; Weston & Copeland, 1992, p. 493). Consequently, the capital structure is a part of financing structure which, beside long-term debt and equity, also takes short-term debt into account (Petty et al., 1993, p. 354). Such approach is similar to the considerations of F. Modigliani and M. Miller concerning the relation of debt and equity in the company. According to them, the most common feature of debt as an element of capital structure is payment of interest on debt incurred.

**Effectiveness measurement of corporate financial management
in the view of company value – model solutions**

Corporate financial management should be subject to the achievement of the main goal of the enterprise, that is value maximization and in the view of this category, the effectiveness of management should be assessed. At the same time one should pay attention to a special role of the cost of capital in the process of company value pricing and in the process of effectiveness assessment of corporate financial management too. The relation of

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

company value and the cost of capital was visibly emphasized in the theory of two Noble Prize winners - F. Modigliani and M. Miller (1958), who in 1958 published the article „*The Cost of Capital, Corporate Finance and the Theory of Investment*”. They proposed the first model solutions in this area, determined as MM models from their initials. They based their research on the following assumptions:

- each company may be classified to the groups of different risk level (risk class). The companies from the same groups are burdened with the same level of operational risk, measured as standard deviation of return on equity,
- transactional costs of securities issuance or turnover are not included in the analysis, the securities are freely divided and the information about the capital market is commonly accessible and free of charge,
- there are no taxes,
- companies do not go bankrupt, therefore the interest on capital is the same for everyone as the interest rate on the capital market is free of risk.

On the basis of such assumptions made, two theorems were formulated called MM model without taxes. Proposition I states that the company value does not depend on the capital structure and the weighted average cost of capital (WACC) does not depend on the amount of debt and is equal to the cost of equity of the company that does not use debt capital and it is in the same risk class. In this case the company value is determined using the following formula (Pluta, 2000, p. 120):

$$V_U = V_L = \text{EBIT} / \text{WACC} = \text{EBIT} / k_{eU},$$

where:

- V_U – value of unlevered company,
- V_L – value of levered company,
- k_{eU} – cost of equity of unlevered company,
- EBIT- earnings before deducting interest and taxes,
- WACC – weighted average cost of capital.

The second theorem of MM model without taxes relates to the mathematical dependence between changes in the cost of equity and depending on the degree of financing by debt capital in the company. The formula describing Proposition II of MM model is as follows:

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

$$k_{eL} = k_{eU} + (k_{eU} - k_d) (D/E),$$

where:

k_{eL} – cost of equity of levered company,

k_d – cost of debt,

D – market value of debt,

E – market value of equity.

According to the above, the benefits achieved thanks to using a cheaper debt capital (k_d) are levelled by the increase in the cost of equity (k_e). Consequently, obtaining debt capital by the company affects neither the value of weighted average cost of capital nor the company value.

After introducing income tax to MM model the value of the company using debt capital exceeds the value of the company financed by equity only. The difference is the value of so called tax shield, also called deferred tax (DT). It is the value of tax savings connected with deducting the interest on debt from the tax base. This dependence may be showed as (Proposition I):

$$V_L = V_U + DT.$$

The value of unlevered company (V_U) results from the following formula:

$$V_U = E = EBIT(1-T)/k_{eU}.$$

According to the above, the company may increase its value by increasing the share of debt capital which may, in theory, eliminate equity from the capital structure, but then the issue of risk arises.

Proposition II in the MM model with taxes, similarly to the model without taxes, concerns the amount of the cost of equity. This cost (k_{eL}) is equal to the cost of equity of unlevered company and risk premium, which in this case depends on a difference between the cost of equity of unlevered company and the cost of debt capital, tax rate and the amount of debt-to-equity ratio:

$$k_{eL} = k_{eU} + (k_{eU} - k_d) (1-T) (D/E),$$

According to the above, the cost of equity rises along with the amount of debt incurred. However, in this case the growth pace of the cost of capi-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

tal is slower than in the MM model without taxes. The value of decreasing the growth pace in this model is described by the $(1-T)$ expression.

In the year 1977 M.H. Miller proposed the next version of the model that allows examining the relation between the company value and the cost of capital, called Miller model. This version included, apart from the income tax rate, also the personal taxes paid by the investors. According to this approach, the value of company financed by equity only is indicated by the formula:

$$V_U = \text{EBIT} (1-T_c) (1-T_e) / k_{eU},$$

where:

T_c – corporate income tax rate,

T_e – shareholder income tax rate on equity.

Furthermore, in case of financing using debt capital, the company value is a sum of the value of unlevered company and value added achieved on tax savings, as presented in the formula:

$$V_L = V_U + [1 - (1-T_c) (1-T_e) / (1-T_d)] D,$$

where:

T_d – personal tax rate on income from debt.

Within the frames of the model presented, Miller concluded that the value of tax shield is shaped by the corporate, shareholder tax rate and tax rate on income from debt (T_c , T_e , T_d) and by the market value of debt (D). The Miller Model works properly with the assumption that the market is in the state of equilibrium.

On the basis of MM theory or parallel to it new theories were created concerning the relation of the cost of capital with the company market value. They emphasize the relation of the cost of capital with the capital structure. One of theories that assumes a close relation of the optimal capital structure and the cost of capital is static trade-off model, grounded on the assumptions of F. Modigliani and M. Miller (Modigliani & Miller, 1958, pp. 261-297). In the static trade-off model it is presumed that the capital structure is optimal when the marginal value of tax benefits from additional debt is equal to the marginal value of the cost of financial distress resulting from increased debt. Along with debt increase the company market value

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

grows until some moment (the weighted average cost of capital is decreased). After reaching the point in which the benefits from using the financial leverage are equal to the increased risk connected with using debt capital, further debt increase causes decreasing the company market value. This point indicates the optimal capital structure (the weighted average cost of capital obtains there the lowest level and the company market value is the greatest) (Iwin-Garzyńska, 2010, p. 66). After introducing the income tax rate, the point of optimal capital structure is moved in the result of tax shield appearance. The tax shield causes that the cost of debt decreases. On the other hand, equity may be more expensive due to the income tax on dividend.

An extension of the considerations above is substitution theory that deals with the problem of mutual relations of benefits and costs connected with introducing debt capital into the company in the context of capital structure optimization in the company (Myers, 1984, p. 575). This theory assumes that the value of assets and total capital invested in the company is perpetual and consistently with this assumption, an optimal capital structure is sought that provides the highest company value. According to the substitution theory, shaping of the value of levered company is influenced by both tax benefits (resulting from including the interest on debt in the tax costs) as well as the costs of financial distress coming from the risk of insolvency that accompanies the utilization of debt capital (Nawrocki, Jonek-Kowalska, 2013, pp. 539-559). Consequently, the value of levered company may be expressed as follows:

$$V_L = V_U + PV_{\text{tax shield}} - PV_{\text{CFD}}$$

where:

V_L – value of levered company,

V_U - value of unlevered company

$PV_{\text{tax shield}}$ – present value of tax benefits from the tax shield connected with the interest on debt,

PV_{CFD} – present value of the costs of financial distress (Michalak, 2014).

The application of the cost of capital in practice of the company value pricing

Effectiveness assessment of management in the view of company value growth rises a need to adjust some universal, commonly accepted measures in theory and practice. The traditional financial indicators based on accounting data do not include all factors that affect the company value. Historically, the oldest asset methods of company value pricing use past data that may deviate from the current values and do not include the ability of the particular asset components of the enterprise to generate earnings. These methods do not take the change of currency value in time and the cost of capital into account. Their application in practice is rare. Nevertheless, greater popularity is gained by the measures of company value growth, based on the company ability to generate earnings. Such methods include: Discounted Cash Flow (DCF) and Dividend Discount Model. The first of them estimates the company value as a sum of present value of future cash flow generated by the company (Szwajca, 2010, pp. 212-223). The second one is based on a dividend where the company value is indicated by a discounted flow of future dividends. An increasingly popular alternative for DCF method is Economic Value Added (EVA). These methods provide the same results if the same assumptions are used in analysis, however, according to many authors, the EVA conception has some features that the DCF methodology lacks. It is emphasized that EVA is more complex and clearer in the context of monitoring the process of company value creation (Compare Stewart, 1991). Moreover, the EVA conception allows confronting the internal company results directly with the way they are perceived by the market, using Market Value Added (MVA). The cost of capital used for the company financing has great influence on the company value calculated by these methods (Compare Michalak & Sojda, 2014).

Market Value Added (MVA) measures the company value generated on the market in relation with the invested capital and constitutes a sum of discounted future value of EVA of the company (Boulton et al., 2001, p. 16). The method of economic value added is based on the calculation of operating profit, thus it refers to the operating part of company's activity only, abstracting at the same time from less important areas of activity for the company's existence. However, it also includes tax burden. Therefore, it may be stated that it reflects the actual potential of the company in terms of value creation. Furthermore, economic value added pays attention to the interests of investors (Basak & Pavlova, 2013, pp. 1728-58) using the bene-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

fits expected by them in its formula. It includes the cost of capital engaged in the company's activity. At the same time EVA mitigates the disadvantages of the pricing methods presented earlier. It is worth adding that the conception of market value added (MVA), which uses the economic value added, beside the aforementioned factors important for the company activity, enables inclusion of time flow as well. This is possible because MVA constitutes a flow of discounted EVA in time.

In practice, for EVA calculation, Net Operating Profit After Taxes (NOPAT) is used (Compare Dudycz, 2001, pp. 198-201), decreased by the earnings expected by investors, expressed as a relation of Invested Capital (IC) and the expected return rate on the invested capital expressed by Weighted Average Cost of Capital (WACC). It may be presented using the following formula (Caputa, 2009, pp. 8-13):

$$EVA = NOPAT - WACC \times IC$$

where:

NOPAT – Net Operating Profit After Taxes,
WACC – Weighted Average Cost of Capital,
IC – Invested Capital.

In practice, NOPAT is net operating profit after taxes, that means a profit before deducting the costs of financing the company by debt capital but after deducting tax expressed in cash. NOPAT may be therefore calculated decreasing the operating profit by tax burden:

$$NOPAT = EBIT \times (1 - T)$$

where:

NOPAT – Net Operating Profit After Taxes,
EBIT – Earnings Before Income Taxes,
T - Income Tax rate.

On the basis of EVA, MVA is calculated. It is a sum of discounted EVA that will be achieved in the future periods $t=1,2,3,\dots,n$ and it reflects the premium obtained on the market due to the invested capital in the company (Ehrbar, 1999, p. 21):

$$MVA_t = \sum_{t=1}^n \frac{EVA_t}{(1 + WACC)^t}$$

where:

t – period of time,

MVA_t – Market Value Added,

$WACC$ – Weighted Average Cost of Capital,

EVA_t – Economic Value Added.

MVA expresses the present value of EVA obtained in future periods $t=1,2,3,\dots,n$. According to the above, if the company generates a flow of positive EVA values, the additional positive value will be gained, however, if the value of discounted EVA is negative, the process of value “damage” will occur. MVA provides a basic statement that a new value will only be created if the invested capital in the company provides a return higher than break-even point, indicated by the cost of capital.

As it results from the formulas above, the cost of capital is a very significant parameter appearing in MVA as a discounted rate. It also appears in the process of EVA calculation as the expected return rate on the invested capital by the investors in the company. This capital may be of equity or debt character.

Conclusions

The review of theory made above allows concluding that there are many conceptions confirming a close relation between the cost of capital and the company value, which are the measures of effective corporate financial management. The cost of capital appeared as the value pricing parameter in the middle of XX century in the conceptions of F. Modigliani and M. Miller and in the considerations continued by M. Miller himself. On the basis of these conceptions new models appeared in which the influence of the cost of capital on the company value is proved. These include: static trade-off model, signaling theory, agency dilemma, free cash flow theory. Taking into account that there is a number of methods confirming the relations between the cost of capital and the company value that have been created in the recent several dozen years as well as considering the current solutions used for this purpose in the practice of corporate financial management, the thesis stated at the beginning is positively verified.

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18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
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Strengthening the Post-crisis Fiscal Rules – the Case of Spain, Slovakia and Sweden

JEL Classification: *H3; H62; H63*

Keywords: *fiscal rule; fiscal policy; public debt; budget balance; public finance*

Abstract: The purpose of this article is to identify changes in the development of national fiscal rules in response to the crisis, in terms of the new economic governance in the EU. In-depth analysis was carried out on the example of the three countries that have the highest Fiscal Rule Strength Index, i.e. Spain, Slovakia and Sweden. The conclusions of the study were the basis for the formulation of recommendations for Poland. The research focuses on the new rules as well as the rules modified between 2007 and 2012. The key elements of creating fiscal rules and criteria used for their evaluation were recognized. The research shows that the strength of fiscal rules is determined by their legitimacy, the type of institutions monitoring them, the adjustment mechanism and sanctions, as well as the scope of the public sector, which the rule was imposed on. Short duration of most of the rules limits the ability to evaluate their effectiveness. However, the analysis of changes in the finance sector and local government in terms of new institutional arrangements allowed to conclude that the strong fiscal rules index is not a guarantee of maintaining public finance discipline, and the example of this was the varied fiscal position of the countries surveyed.

Introduction

In recent years, there has been a significant increase of interest of the fiscal authorities of EU members in the use of numerical fiscal rules. To a large extent, this is due to the economic governance reform, launched in 2011, which was a reaction to the negative consequences of the recent financial crisis. The essence of the reform boils down to building a system for monitoring economic policy in order to have early detection of macro-economic imbalances and to strengthen the fiscal surveillance over national fiscal policies.

The Commission and the European Parliament have formulated a number of recommendations to the member countries, related to the conduct of the fiscal policy, including those relating to the institutional arrangements, such as fiscal rules. In accordance with the Council Directive (2011), strong numerical fiscal rules with explicit objective are to be the basis for enhanced budgetary surveillance framework, together with mechanisms for effective and timely monitoring.

The aim of this article is to identify changes in the development of national fiscal rules in response to the crisis, in terms of the new economic governance in the EU. The new rules as well as those modified between 2007 and 2012 were the subject of the study. An in-depth analysis was carried out on the example of the three countries that have the highest Fiscal Rule Strength Index (FRSI), i.e. Spain, Slovakia and Sweden. The conclusions of the research were used to prepare recommendations for Poland.

Methodology of the research

The starting point of the research was a review of the world literature on the characteristics of fiscal rules. Key structural elements of the rules and criteria used for their evaluation were identified, which allows international comparisons. On the basis of the latest Fiscal Rule Strength Index (European Commission, 2012), three countries with the highest standardized indexes were selected for the in-depth analysis. Changes in the types of existing rules, as well as their structural components, occurring under the influence of the crisis and the EU guidelines were studied starting from 2007, when the financial crisis had begun. The approach used in the research was that of the European Commission, based on the concept of Deroose, Moulin, Wierts (2006). Another element of the research method was to analyze the fiscal position of Spain, Slovakia and Sweden in the light of the applicable

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

national fiscal rules. The short period of time when the multiple rules were applied (especially those introduced in 2012) makes it impossible to evaluate their effectiveness. Nonetheless, even a preliminary assessment of the rules provided interesting results, also for Poland. The article uses the following abbreviations for the sectors: General Government - GG, Local Government - LG, Regional Government - RG, State Government - SG, social security - SS.

Review of literature on the characteristics of fiscal rules

Development of fiscal rules, observed in the last quarter of a century, has intensified in the recent years. It manifests itself not only in the increase in the number of rules, but also in important qualitative changes. While at the beginning of the 90s, national fiscal rules in the EU countries were used mainly in relation to the local government sector, rules covering the whole GG sector are now becoming common (EC, 2008, p. 76). There is also an increase in the importance and the number of transnational numerical rules, which are omitted in the article; it focuses instead on national institutions. However, it should be noted that many of the recently implemented rules in EU member countries are closely linked to the EU restrictions.

In the literature, there are many definitions of fiscal rules. The broader and narrower approach can be distinguished (e.g. Wójtowicz, 2011, p. 138). In broad terms, the fiscal rules are generally understood as standards governing fiscal policy. In this article, domestic fiscal rules are defined in narrower terms, according to the approach of Kopits and Symanski (1998, p. 3), most widely used both in the world and national literature. They define the fiscal rule as the permanent limitation of fiscal policy, which boils down to the imposition of quantitative restrictions on budgetary outcomes, such as the budget deficit, public debt or their main components. Restrictions can be expressed in absolute terms in relation to the above-mentioned elements, as well as in relation to economic variables. In other words, the policy rules may be permanent, or based on feedback. Constant policy rule is independent of the changes in the economy. The rule based on feedback is based on the relation between an increase/ decrease of some value and changes in a different category (e.g. in GDP).

Fiscal rules are defined as institutional mechanisms supporting the credibility of fiscal policy. Policy rules were primarily advocated by such economic schools as the monetarist orthodoxy, new classics, the real business cycle school, the Austrian School. In the literature, the advantages and dis-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

advantages of using fiscal rules are indicated. Alesina and Perotti (1996) perceive fiscal rules not only as the tools to discipline public finances, but also as measures affecting the prosperity of society. Rules are also a useful institution according to Buchanan (1997, p. 130), who argues that in the absence of restrictions imposed on, for example, local authorities, the practice of the process of democratic choice could result in debt beyond the boundaries of "efficiency", although the rising costs of servicing the loan could also impose certain restrictions on the over-extension of expenditure. It is a mistake, however, to present an uncritical approach to fiscal rules because of the negative consequences for the economy and public finances. The imposition of excessively restrictive rules could result in the restriction of investment opportunities in the public sector and the need for verification of public tasks, by transferring a part of the funding to the commercial sector or separating the relevant public sector units performing public tasks (Marchewka-Bartkowiak, 2012, p. 49).

Restrictive fiscal rules may lead to the use of creative accounting in order to maintain power and political reputation. Such a hypothesis is formulated by Milesi-Ferreti (2003, p. 377 – 394). Empirical evidence of the correctness of this hypothesis was provided by Hagen and Wolf (2004). Their research shows that fiscal rules introduced in the Pact for Stability and Growth and the consequent excessive deficit procedure resulted in the use of creative accounting by the member countries. An uneven approach to exceeding the limit of the deficit and the debt limit (the procedure was activated only in the case of excessive deficit) contributed to this. Meanwhile, the increase in debt in the period preceding the global financial crisis in many countries of the EMU showed a weak association with the size of the accumulated deficits (public debt).

Similarly, Fourçans and Warin (2007, 51-62) tried, using game theory, to prove that institutional solutions in the Pact, reinforced in 2005, would not reduce the phenomenon of moral hazard.

Research conducted by representatives of science, for example. J.M. Poterba [1994] A. Alesina, R., Perotti, (1996), as well as international institutions, i.e. The International Monetary Fund (2009), show the effectiveness of fiscal rules. The intended objective, however, requires a good design of a fiscal rule. The quality of fiscal rules is determined by the type of rules and their elements.

With regard to the type criterion, we can distinguish the following rules: budget balance, debt, expense and income. In this article, the characteristics of the rules were not covered. I would like to refer the readers to publica-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

tions by other authors (e.g. Działo, 2009; Wójtowicz 2011; Próchnicki, 2013, Marchewka-Bartkowiak, 2012; G. Paluszak, 2010). The article placed greater emphasis on the quality of fiscal rules which, in accordance with the assumptions, should improve the effectiveness of fiscal policy. Construction of high quality fiscal rules requires recognition of possible channels of influence on the economy and public finances. Buiter (2003, p. 84 - 99) formulated the Ten Commandments for a Fiscal Rule in the E(M)U, which can be used to design rules on a national level. According to Buiter the rule should be: 1) simple; compliance should be easily verifiable, 2) maintain the government's solvency, 3) apply to the financial deficit of the sovereign, that is, to the consolidated general government, 4) make sense also in the long run, 5) allow for relevant differences in economic structure and initial conditions, 6) make sense at the level of the individual nation state and for the EMU area as a whole, 7) credible, 8) enforced impartially and consistently. The rule should not: 9) prejudge the issue of the appropriate/optimal size of the public sector; 10) encourage pro-cyclical behavior of the policy instruments.

Research (Schaechter et.al., 2012) conducted in the period from 1985 to March 2012, using the sample of 81 countries, shows that the "new generation" rules are becoming more complex, combining the objectives of sustainable development with the need for flexibility in response to shocks. Thus, e.g. Agénor, Yilmaz (2011, 69-99) conducted research on the efficiency of alternative fiscal rules in a model of endogenous growth, demonstrating the advantage of the primary surplus rule over the balanced budget rule and the golden rule, from the perspective of long-term growth and response to shocks. From this point of view, it is interesting to combine the relationships between the fiscal rules and the key objectives of the country developed by IMF (2009, p. 6). They are presented in Table 1. They show that the expenditure rules and the rules of the limits of windfall gains interact with three main objectives, i.e. debt sustainability, economic stabilization and government size. You can see a very strong positive effect of the debt rule (expressed in relation to GDP) on the debt sustainability and the balanced budget rule over the cycle rule on the economic stabilization.

The information contained in Table 1 shows that, from the perspective of limiting pro-cyclicality, the concept which involves the construction of such fiscal rules that discipline public finances, leaving room for discretionary measures can be regarded as attractive.

These conditions are fulfilled by the balanced budget rule within the cycle. It gives a greater degree of freedom in the conduct of fiscal policy on a

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

discretionary basis, in connection with moving away from the absolute requirement to balance the budget by the end of each financial year to the requirement to balance the budget within one cycle.

Table 1. Properties of Different Types of Fiscal Rules against Key Objectives

Type of fiscal rule	Objectives		
	Debt sustainability	Economic stabilization	Government size
Overall balance	++	-	0
Primary balance	+	-	0
Cyclically adjusted balance	++	++	0
Balanced budget over the cycle	++	+++	0
Public debt-to-GDP ratio	+++	-	-
Expenditure	+	++	++
Revenue	-	-	++
Revenue ceilings	+	+	-
Revenue floors	+	+	-
Limits on revenue windfalls	+	++	++

Note: Positive signs (+) indicate stronger property, negative signs (-) indicate weaker property, zeros (0) indicate neutral property with regard to objective.

Source: IMF (2009, p. 6).

This rule is difficult to apply because the duration of the cycle must be precisely determined. Therefore, in practice, the EU has given high priority to the rule of a cyclically adjusted balance, which is to maintain a balanced structural balance in each year's budget.

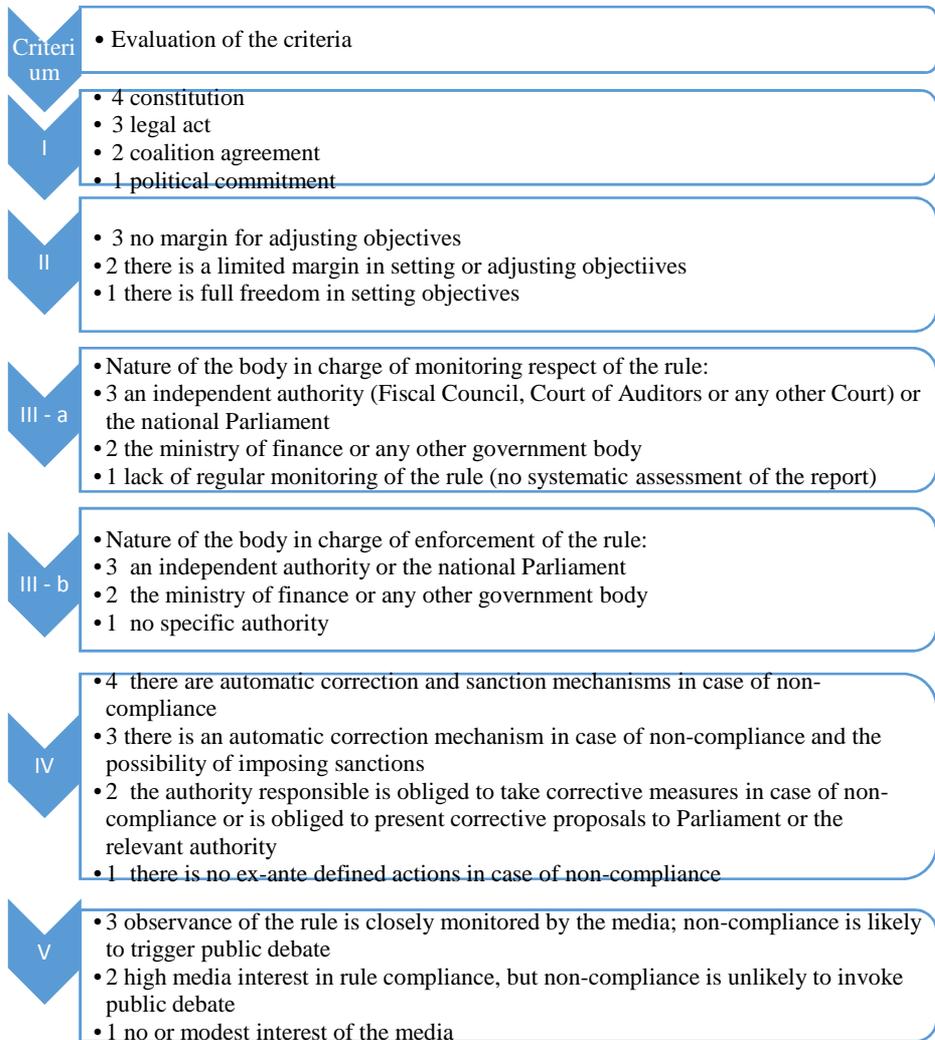
It is also worth noting that the quality of fiscal rules is determined by economic and institutional conditions in which it operates, so the IMF (2009, p. 32) issued a recommendation that the rule should not be introduced in a precarious economic situation.

Key elements of fiscal rules

Quality assessment of such institutional arrangements as fiscal rules, which allows comparability between countries, is carried out by international organizations (European Commission, IMF) on the basis of a synthetic indicator called the Fiscal Rule Strength Index.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Figure 1. The criteria for ranking the characteristics of fiscal rules



Source: Author's own study on the basis of (European Commission, 2012).

For its construction, the characteristics of the fiscal rules are used, judged on five criteria: 1) the statutory base of rule, 2) the room for revising objectives, 3) the mechanism of monitoring compliance and enforcement of

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

the rule, 4) the existence of pre-defined enforcement mechanisms, 5) media visibility of the rule (EU 2006, p. 163 – 164).

Indexes are calculated for each fiscal rule based on the criteria, the assessment of which is described in Figure 1 as well as the ratio of the public finance sector covered by the policy. The cumulative index of fiscal rules in force in the country is obtained by summing the individual indexes. If several rules apply to the same range of public finances, a weight system is used (the methodology was described in the EU in 2006, pp. 149 - 167).

On the basis of the scores of the criteria, it can be established that the highest index will be applied to the fiscal rule: a) incorporated into a legal act with constitutional status, b) with no margin for adjustment of objectives, c) monitored by an independent fiscal institution or parliament - with automatic mechanism of correction and sanctions in case of non-compliance, d) closely monitored by the media, e) covering the entire scope of the GG sector.

Table 2 shows the standardized index of fiscal rules in the EU in 2007 and 2012. The countries are ranked in descending order according to the index size in 2012. The difference in size between the study years, allows us to see the scale of strengthening of the fiscal rules, after negative experiences from the financial crisis.

Index of -1 means that the country did not use national fiscal rules. In 2007, this applied to Cyprus, Malta and Greece. Even in the context of new economic governance, Cyprus and Malta have not introduced national rules, whereas Greece has in 2012 implemented the primary balance limit in respect of the GG sector. The index at the level of 1.984 is an expression of the strength of this rule. The highest index has been granted to the rules in Spain (3.264). The index value greater than 2 characterizes the rules in Slovakia, Sweden and Bulgaria. Slovakia has strengthened the rules the most of all EU countries - the index rose from 0.305 in 2007 to 2.661 in 2012. It should be noted that in nine countries the index decreased between the study years, especially in countries where already in 2009 it remained at a low level (Ireland, Slovenia, Italy, and Czech Republic). In the ranking of the strength of fiscal rules, Poland has a very high 5th place with an index of 1.935. It is significant that in Poland the index was higher in 2007 than in 2012. It is the result of a lower assessment of the institutional arrangements applicable to the local government sector (debt limit, deficit limit) according to the criterion of "media visibility of the rule" (2 in 2007, and 1 in 2012 - figure 1).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 2. Standardized fiscal rules index in the UE countries in 2007 and 2012.

Country	2007	2012	Difference 2012 - 2007	Country	2007	2012	Difference 2012 - 2007
Spain	1.555	3.264	1.709	Austria	0.243	0.819	0.576
Slovakia	0.305	2.661	2.356	Estonia	1.059	0.671	-0.388
Sweden	2.298	2.464	0.166	Finland	1.008	0.408	-0.600
Bulgaria	1.483	2.233	0.750	Belgium	0.114	0.151	0.037
Poland	2.102	1.935	-0.167	Portugal	-0.041	0.129	0.170
Denmark	1.642	1.644	0.002	Latvia	0.074	0.074	0.000
United Kingdom	2.017	1.641	-0.376	Czech Republic	0.221	-0.139	-0.360
France	0.526	1.550	1.024	Italy	-0.144	-0.166	-0.022
Germany	0.501	1.422	0.921	Romania	-0.623	-0.623	0.000
Lithuania	0.371	1.338	0.967	Slovenia	0.438	-0.794	-1.232
Luxembourg	1.758	1.212	-0.546	Ireland	-0.800	-0.810	-0.010
Netherlands	1.115	1.191	0.076	Cyprus	-1.007	-1.007	0.000
Hungary	0.498	1.056	0.558	Malta	-1.007	-1.007	0.000
Greece	-1.007	0.977	1.984				

Source: European Commission, 2012.

Comparison of rules functioning in Spain, Slovakia and Sweden

The rest of this article provides an in-depth analysis of the countries with the highest index of the EU fiscal rules. Table 3 summarizes the rules functioning in Spain, Slovakia and Sweden in the period under observation, indicating its scope (coverage of GG finances).

In all three countries, there were rules that imposed restrictions for the budget balance and public expenditure. In Spain and Slovakia the debt rules are additionally applied to both the local government sector as well as the GG. In Sweden no national debt limits have been introduced. In order to present the diversity in the field of applied solutions in different countries their characteristics are presented below.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Spain

In Spain in 2007, four fiscal rules were functioning, three of which referred to debt limits, and one to budget balance. The index in 2012 has been calculated on the basis of five fiscal rules, three referring to the debt, one which is the limit for the budget balance and one which is the limit for the public expenditure. In the period under observation, the rule relating to the budget balance has changed. The rule (ES-1), introduced in 2006, according to which budgetary objectives should take into account the cyclical nature of the economy, allowing budget deficits in periods of economic downturn (no more than 1% of GDP), with the requirement of the surplus in periods of high growth, remained in force until 2011. From 2012 onwards, more restrictive rule (ES-2) applies, according to which the government deficit (CG) and the deficit of the Autonomous Communities cannot exceed the limit set by the European Union and the budget of municipalities must be balanced. The rule covers 97.5% of the GG sector and has the strongest index of the rules in force in the country (8.77). The advantage of the current rule over the pre-existing one lies in the fact that it is incorporated into the Constitution and is subject to the automatic mechanism of correction and sanctions. The previous rule was introduced by a legal act of lower rank and did not define what actions were to be taken in case of exceeding the limit.

Table 3. The scope and strength of fiscal rules in selected EU countries in the period of 2007 - 2012

Rule no.	Type	Sector	Coverage of GG finances (%)	Fiscal rule strength index (FRSI)	Time when the rule was in force
Spain					
ES-1	BBR	GG	97.5	6.66	2006 - 2011
ES-2	BBR	GG	97.5	8.77	2012 +
ES-3	DR	LG	11.1	5.74	1990 – 2012 +
ES-4	DR	RG	32.2	6.81	1990 – 2012 +
ES-5	DR	RG	32.2	5.62	2003 - 2011
ES-6	ER	GG	70.0	5.72	2011
ES-7	ER	GG	70.0	6.92	2012+
ES-8	DR	GG	100.0	8.11	2012 +
Slovakia					
SK-1	ER	CG	47.2	8.04	2002-2011
SK-2	ER	CG	48.6	7.38	2012+
SK-3	DR	LG	14.6	6.01	2002-2012+

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

SK-4	BBR	LG	18.0	5.44	2005-2008
SK5	BBR	LG	11.6	6.64	2009-2012+
SK-6	DR	GG	100.0	9.71	2012+

Sweden

SE-1	BBR	LG	46.3	5.84	2000-2012+
SE-2	ER	CG, SS	56.4	6.84	2007-2009
SE-3	ER	CG, SS	56.4	8.02	2010-2012+
SE-4	BBR	GG	100.0	6.66	2007 – 2012+

Note: BBR – budget balance rule; DR – Debt rule; ER – Expenditure rule.

Source: the same as Table 1.

The main rule relating to public debt (ES-8) also has a firm legal basis. Like the budget balance rule, it is incorporated into the Constitution and it is an expression of the implementation of the obligations of membership in the EMU. According to it, the debt of the GG sector must not exceed 60% of GDP. A characteristic feature of the rule is that its scope includes the GG sector, but the limits are different for the sub-sectors, i.e. 44% - Central Administration, 13% - Autonomous Communities, 3% - Local entities. Indicators refer to the entire sub-sector, hence the law (Ley Orgánica 2/2012, art. 14, par. 1) clarifies that the debt limit in each of the autonomous regions must not exceed 13% of the gross regional product. An automatic mechanism of correction and sanctions is built into the rule.

In Spain, since 1990, two rules on financial supervision apply - regarding the debt of the local sub-sector (ES-3) and the debt of the regional sub-sector (ES-4). The first one shows that the central government, or the Autonomous Communities, are authorized to approve all long-term credit operations carried out by the local authorities, if they have negative net savings or debt exceeding 75% of the current income. According to the second rule, borrowing by regional authorities requires the authorization of the government. In the period of 2003 – 2011, the debt of the RG sector was tightened by one more rule (ES-5), which obliged each unit of the local government to maintain the debt in nominal terms at the same level at the beginning and at the end of the financial year.

Reduction of expenses in the form of a numerical fiscal rule was introduced in Spain only in 2011. (ES-6). The limit was imposed on eligible expenditure growth, which, on an annual basis, must not exceed the medium-term growth rate of GDP, calculated on the basis of the average size of the GDP in nominal terms for a period of 9 years. In 2012, restrictiveness of expenditure rule (ES-7) was increased, through the extension of the scope of its applicability and by connecting it to automatic mechanism of correction and sanctions for non-compliance with the limit.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Sweden

In Sweden, there are two rules relating to the budget balance. In 2002 they introduced the principle of maintaining balance of the GG sector at 2% of GDP over the cycle. In 2007, this rule was mitigated by adopting the criterion of 1% of GDP (SE-4). Since 2007, the rule operates on the basis of the Constitution before that it was regulated by the coalition agreement.

The second rule (SE-1) includes only the LG sector, forcing its subjects to maintain a balanced budget.

The implementation of the budget surplus is favored by the expenditure rule. It was introduced in 1996, but it was modified in 2007 (SE-2) and 2010 (SE-3). The essence of this rule is to establish a maximum spending limit of the central level and the expenses for pensions, which are settled in a non-budgetary system. Since 2010, a three-year planning period has been introduced. Apart from the rule, expenditure on public debt is allowed.

Slovakia

In Slovakia, the national rule of the GG sector balance has not been introduced. However, the rule disciplining the local government budget (SK-3, SK-4) has been functioning since 2002. It is based on highlighting the operating and the capital budget. The operating budget (current), must be sustainable or closed with a surplus. There is a deficit option in the capital budget, provided that unused funds from previous years, loans or a budget surplus in the current fiscal year are the source of its funding. In 2009, the possibility of imposing sanctions on the municipalities in the case of non-compliance with the principles was introduced.

At the same time, the debt limit (SK-3) was imposed on the local government sector (regional and local). The limit was set at 60% of the nominal current income in the previous year. The limit was also imposed on the annual installments of debt repayment, which must not exceed 25% of the nominal income in the previous financial year.

The implementation of the obligations arising from the signing of the Fiscal Pact in 2012 resulted in the introduction of a new debt rule which, within its scope, included the entire GG sector (SK-6). The rule was introduced by the Fiscal Responsibility Constitutional Act. The solution resembles prudential and remedial procedures operating in Poland since 1998. In Slovakia, four debt thresholds were introduced: 1) 50-53%; 2) 53-55%; 3) 55-57%; 4) 57-60%. The thresholds are to be applied until 2017, when they

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

will be reduced so that the highest rate in 2027 will be 50%. It should be noted that it is this fiscal rule that has received the highest index ratio of 9.71. Polish remedial and prudential procedures were granted the index of 9.05, mainly due to the smaller range of coverage of the public finance sector rule (97.5%).

Expenditure rule has applied in Slovakia since 2002. It also allows an increase in expenditure not included in the budget act during prosperity. Initially, the spending limit was set at 15% of total expenditure approved in the budget, and now it is 1%.

The spending can be increased only if the deficit remains unchanged. In 2012, the coverage of the rule was extended so that it included 48.6% of its public finance sector (previously 47.2%). Despite the tightening of the rules and expanding its range, the index of the rule decreased. This was caused by a decrease in media interest in the rule, which resulted in lower assessment of the rule, according to the "media visibility" criterion.

Characteristics of fiscal rules in Spain, Slovakia and Sweden will be extended to include the assessment of the institutional solutions adopted, on the basis of the assessment of the characteristics of the fiscal rules according to the criteria listed in Figure 1. In this analysis, attention was focused solely on the rules relating to the GG sector. The exception is to include expenditure rule in Slovakia, which is superimposed on the CG sector rather than on the GG sector. Due to the lack of the debt rule in Sweden, and the rule of the GG sector balance, comparisons in case of balance and debt rules will be carried out between the two countries, in which the rule can be found. Assessment of the rules is provided in Table 4.

The best score in the Fiscal Rule Strength Index (FRSI) was granted to the expenditure rule in Sweden. Its biggest advantage over the rules in other countries is that it is closely monitored by the media, so in case of a failure to comply with it, there is a high probability of a call for a public debate. In Slovakia and Spain the media interest in the rule is negligible. The expenditure rule in Spain, where the index is lower by 1.1 percentage points than the same index in Sweden, shows an advantage in connection with the built-in mechanism of action in the event of occurrence of non-compliance. The high assessments of expenditure rules in the countries surveyed consisted of such elements as their incorporation into a legal act and a lack of margin for adjustment of objectives.

In Spain, the budget balance rule, implemented in 2012, received better grades from the rule functioning since 2007 in Sweden. In the period of

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

2006 – 2011, the balance rule in Spain has already functioned, and its index was at the same level as for Sweden (6.66).

Table 4. Evaluation of the rules referring to the GG sector

	Statutory base	Adjustment margin	Monitoring body	Alert mechanism	Enforcement body	Non-compliance actions	Escape clauses	Media visibility	Fiscal Rule Strength Index
Debt rules									
Spain	4	3	2	1	2	4	1	1	8.11
Slovakia	4	3	3	0	3	4	1	3	9.71
Balance rules									
Spain	4	3	2	1	2	4	1	2	8.77
Sweden	3	2	3	1	1	1	0	3	6.66
Expenditure rules									
Spain	3	3	2	0	2	4	0	1	6.92
Slovakia (CG)	3	3	3	1	3	3	0	1	7.38
Sweden	3	3	3	1	2	2	0	3	8.02

Source: the same as Table 1.

The improvement is due to the strengthening of the rule in the aftermath of the crisis. In Spain, the rule was introduced into the Constitution and did not leave any margin for adjusting the objectives. An automatic mechanism of action in case of non-compliance was introduced. In Sweden, the rule is provided in a legal act of a lower rank than the constitution, and some margin in setting or adjusting the objectives is allowed. In the construction of the expenditure rule, greater emphasis was placed on the monitoring system, and the system of correction and sanctions was not accepted. As in the case of the expenditure rule, the media in Sweden show more interest in the rule than they do in Spain, which promotes the discipline of public finances. In Sweden, the rule covers the whole GG sector, while in Spain it covers 97.5%.

In case of the debt rule of the GG sector, the structure adopted in Slovakia was highly rated (9.71). Both in Slovakia and Spain the implementation of rules in 2012 was a part of disciplining measures aimed at public

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

finances in EMU, in accordance with the guidelines of the new economic governance.

In both countries the rules received equally high marks for their legal basis in the constitution, disregarding the margin for adjustment of objectives, automatic mechanism of correction and sanctions, and the rule covering the entire GG sector. A higher value of the debt rule in Slovakia is the result of a stronger monitoring system of respecting and enforcement of the rule, as well as greater interest in the media.

With regards to the rules in force in Spain, it can be noticed that their weakness is the fact that the institution that monitors their compliance with the rules is the Ministry of Finance. The supportive function is fulfilled by the institutions of the regional sector, which control the fulfillment of the debt rule. In terms of monitoring the compliance with the rules, Sweden is the role model, as such powers have been given there not only to the Ministry of Finance and other institutions of the government sector, but also to the independent institutions, i.e. The Court of auditors.

The strengthening of the fiscal rules in the aftermath of the crisis is manifested by a change of their legitimacy. Table 5 presents rules, classified according to the criterion of the legal basis in 2007 and 2012.

Table 5. Legitimacy of the fiscal rules

	Constitution	Legal act	Coalition agreement
2007 r.			
Spain	X	ES-1; ES-3; ES-4	ES-5
Slovakia	X	SK-1; SK3; SK- 4	X
Sweden	SE-4	SE-1	SE-2
2012 r.			
Spain	ES-2; ES-8	ES-3; ES-4; ES-7	X
Slovakia	SK-6	SK-2; SK-3; SK-5	X
Sweden	SE-4	SE-1; SE-3	X

Source: the same as Table 1.

It draws attention to the increase in 2012 of the number of rules incorporated into the constitution, which is to be a guarantee of their sustainability and compliance. While in 2007, only Sweden has given constitutional status to the fiscal rule (budget balance), in 2012 each of the countries surveyed had such a rule. Constitutional authority with regards to fiscal rules

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

in the countries within the euro area is a consequence of adopting the Fiscal Pact.

Slovakia incorporated the debt rule into the constitution, and Spain did the same with both the debt rule and the budget balance rule. Other rules are provided in legal acts of lower rank. In 2012, there were no rules, introduced on the basis of the coalition agreement. In Spain, the debt rule for the RG sector, based on the coalition agreement, was in force in the period of 2003 – 2011. Coalition agreement was the basis for the imposition in 2007 of the expenditure rule on the CG and SS sectors. Since 2010, the expenditure rule is based on a legal act.

Due to restrictions on the volume of the article, detailed solutions for the construction of fiscal rules, such as the exemption from the rule or the mechanism of correction and sanctions were not characterized.

However, as the mechanism of correction and sanctions was a rare element of the rules before the crisis, it was decided that an example of such a solution should be built into the debt rule in Slovakia. This mechanism means that when debt-to-GDP ratio reaches 50 percent, the Minister of Finance is obliged to explain the increase to parliament and suggest measures to reverse it. At 53 percent of GDP, the cabinet shall pass a package of measures to trim the debt and freeze wages. At 55 percent, expenditures would be cut automatically by 3 percent and next year's budgetary expenditures would be frozen, except for cofinancing of EU funds. At 57 percent of GDP, the cabinet shall submit a balanced budget (IMF, 2009, s. 22).

Changing the fiscal position of the surveyed countries

According to J. Działo (2009, p. 2) "rules seem to be an effective instrument because of their simplicity and transparency." These characteristics of the fiscal rules do not prejudice the effectiveness of the rules, the assessment of which must be based on the degree of realization of the objectives. The results of empirical studies confirm the positive impact of fiscal rules on budgetary outcomes (EU, 2008, p. 77; Poterba, 1996). However, caution should be exercised when interpreting the results because the changes which have occurred in the budget expenditure, balance and debt can be attributed to the influence of other factors.

Most fiscal rules, which have received high marks, have functioned only from 2012 onwards. It is difficult to assess the effectiveness of the rules, but it allows for the formulation of some initial conclusions. The research

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

period was extended by two years, i.e. 2006, which preceded the assessment of rules in 2007 and 2013 – the last year with available data.

The data in Table 6 shows that the lowest public debt occurs in Sweden, and it was achieved despite the absence of a national debt limit. In addition, the debt in relation to GDP between 2006 and 2013 decreased in this country by 4.6% of GDP and remains well below the EU rule (60% of GDP).

In Spain, - the country with the highest number and strength of fiscal rules, the debt level increased by 53.2 percentage points. The increase of debt by 23.9 percentage points also occurred in Slovakia, but its size is below the convergence criterion.

Table 6. Debt of the GG sector (% GDP)

	2006	2007	2008	2009	2010	2011	2012	2013	Difference 2013 : 2006
Spain	38.9	35.5	39.4	52.7	60.1	69.2	84.4	92.1	53.2
Slovakia	30.7	29.8	28.2	36.0	41.1	43.5	52.1	54.6	23.9
Sweden	43.2	38.2	36.8	40.3	36.7	36.1	36.4	38.6	-4.6

Source: Eurostat.

In Spain, after the budget surplus in 2006 and 2007, there were high, even double-digit, budget deficits every year in subsequent years. This occurred despite the budget balance rule, imposed on the GG sector, functioning since 2006. Strengthening of this rule in 2012 by means of the above arrangements is to contribute to the increase of fiscal discipline.

Table 7. Budget balance of the GG sector

	2006	2007	2008	2009	2010	2011	2012	2013
Spain	2.2	2.0	-4.4	-11.0	-9.4	-9.4	-10.3	-6.8
Slovakia	-3.6	-1.9	-2.4	-7.9	-7.5	-4.1	-4.2	-2.6
Sweden	2.2	3.3	2.0	-0.7	0.0	-0.1	-0.9	-1.3

Source: Eurostat.

In Slovakia, where the national budget balance rule has not been introduced, after a marked increase of deficits in the years of crisis, in 2013, the excessive deficit was eliminated. Finally, in Sweden, in which there is both the balance rule for LG sector, as well as balance rule for the GG sector, incorporated into the Constitution since 2007, the fiscal situation is the best. In the period of 2006 – 2008, Sweden showed a budget surplus, and in sub-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

sequent years, the budget was balanced or there was a small deficit (from -0.1% to -1.3% of GDP). This is all the more noteworthy considering that in 2009, the most acute year for the EU, it was Sweden that had the highest decline in GDP in comparison with the countries surveyed, as well as the highest output gap (Table 8).

Table 8. Cyclical adjustment of budget balances based on production function approach against the GDP and the output gap (prices from 2005)

	2006	2007	2008	2009	2010	2011	2012	2013
Spain								
CAB	1.0	0.6	-5.0	-9.2	-7.1	-6.8	-7.1	-3.3
GDP	4.1	3.5	0.9	-3.8	-0.2	0.1	-1.6	-1.2
GAP	2.8	2.8	0.9	-4.0	-5.3	-5.9	-7.3	-8.1
Slovakia								
CAB	-4.2	-4.3	-4.7	-7.6	-7.4	-4.4	-3.8	-1.6
GDP	8.3	10.5	5.8	-4.9	4.4	3.0	1.8	0.9
GAP	3.1	7.6	7.9	-1.1	-0.4	-1.1	-2.1	-3.4
Sweden								
CAB	1.1	1.8	1.9	2.7	1.2	0.4	0.3	0.1
GDP	4.3	3.3	-0.6	-5.0	6.6	2.9	0.9	1.5
GAP	2.1	3.0	0.4	-5.8	-1.5	-0.4	-1.4	-2.0

Source: European Commission, 2014, pp. 19, 30, 41.

Respecting the rule to maintain the budget balance at the level of 1% of GDP over the cycle has resulted in structural surpluses in the 2006 to 2013 period in the range of 0.1 - 2.7% of GDP.

In Spain, the structural deficits have occurred since 2008, and in Slovakia during the whole period under consideration. The solutions, adopted in the fiscal Pact, with regards to the size of MTO, which forced the EMU countries in particular to strengthen the national fiscal rules, have a positive impact on its implementation.

In all the countries surveyed, institutional solutions for the local government sector were successful, which is reflected in the budget balance for the LG sector (table 9), which is close to balance. Accordingly, there is a debt stability in the local sector. For example, in Spain, the local debt was 2.7% of GDP in 2006 and 4% of GDP in 2013. In Slovakia, the changes in the amount of debt between 2010 and 2013 reached 0.5 percentage points

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

(from 2.7 to 2.2% of GDP) and in Sweden it was 2.1 percentage points (from 5.4% to 7.5% of GDP). In Spain, the deficit of the SG sector peaked in 2011, i.e. it reached 5.1%, but in 2012 and 2013 it fell below 2% of GDP. This sector is responsible for 20% of GDP of public debt in Spain.

Table 9. Balance of the LG sector (% GDP)

	2006	2007	2008	2009	2010	2011	2012	2013
Spain	0.1	-0.3	-0.5	-0.5	-0.7	-0.8	0.3	0.5
Slovakia	-0.2	-0.1	-0.1	-0.7	-0.9	-0.1	0.1	0.2
Sweden	0.1	0.1	-0.1	-0.2	0.2	-0.3	-0.1	0.0

Source: Eurostat.

Countries covered by the research show significant differences in the size of public spending. In Spain and Slovakia public spending is below the average for EU28 (49.1% in 2013) and in Sweden, were in all years it exceeded 50% of GDP, it is above the average for EU28. Between extreme years, the biggest increase in expenditure was recorded in Spain by 6.4 percentage points. The increase in Slovakia was 2.2 pp., and in Sweden in 2013 it remained at a comparable level as in 2006 (a difference of 0.1 percentage points). Data on changes in expenditures in Sweden are a confirmation of the implementation of the country's sound fiscal policy (economic). The increase in public spending was temporary in the most difficult economic times, after which it decreased.

Table 10. Expenditures of the GG sector as a percent of GDP

	2006	2007	2008	2009	2010	2011	2012	2013	Difference 2013 - 2006
EU28	46.2	45.5	47.0	51.0	50.6	49.0	49.4	49.1	2.9
Spain	38.4	39.2	41.4	46.2	46.3	45.7	47.8	44.8	6.4
Slovakia	36.5	34.2	34.9	41.6	39.8	38.9	38.2	38.7	2.2
Sweden	52.7	51.0	51.7	54.9	52.3	51.5	52.0	52.8	0.1

Source: Eurostat

Looking at the changes in the size of public spending in Spain, it can be assumed that its reduction in 2013 shows the relationship with the expenditure rule, reinforced in 2012. Both in the case of the expenditure rule as well as the other rules, verification of their effectiveness will be possible in a few years.

Conclusions

The growth of the fiscal rules in the EU countries, observed in recent years, is due to the modification of the EU fiscal framework, in accordance with the concept of the new economic governance, which is a response to the recent financial crisis. In the period covered by the research, the EU countries introduced new fiscal rules as well as strengthened the existing solutions. From the countries selected for analysis, the least fiscal rules characterized by the least variability occurred in Sweden. Spain applied the most rules in its fiscal policy. The introduction of the debt rule for the GG sector and strengthening of the fiscal rules in Spain in 2012, in accordance with the regulations for the member countries of the euro area, resulted in Spain obtaining the highest rank in the EU Fiscal Rule Strength Index. Sweden was third in the ranking and this country had a high index already in 2007, and within the time covered by the observations, it made only one change in the legitimacy of the expenditure rule.

In the ranking of fiscal rules, Poland was ranked fifth, with the index of 1.935, which means a reduction of 0.167 percentage points, when compared to 2007. The debt limit, stated in the constitution in 1997, received the highest grade. The limit was strengthened by prudential and remedial procedures included in the Public Finance Act (index (9.05)). The expenditure rule received a rating of 7.47. The indexes of fiscal rules in 2012, relating to the LG sector, received the value of 6.58 for both the deficit rule and the debt rule.

On the basis of the conducted analyzes, the following conclusions can be drawn for Poland in this article:

Firstly, the introduction of fiscal rules should be preceded by research of their potential impact on economic stability.

Secondly, in order to achieve a high index of fiscal rules it is necessary to create solutions using highly ranked institutional key elements of fiscal rules.

Thirdly, we must remember that a strong index of fiscal rules does not guarantee the maintenance of public finance discipline, as demonstrated by a varied fiscal situation of the countries surveyed.

Fourthly, the case of Sweden stimulates a reflection that public finance discipline can be maintained without imposing an increasing number of fiscal rules, with built-in mechanism of correction and sanctions, etc. but by conducting prudent fiscal policy over the business cycle.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Fifthly, sound fiscal policy requires simultaneous approach to the expenditure and revenues (Owsiak, 2014); Uncritical approach to cuts in public spending in the conditions of adopted restrictions, requires verification of tax policy of the state.

Sixthly, when exacerbating the restrictiveness of national fiscal rules, the experience of the EU countries should be taken into account, avoiding the transnational rules.

Seventhly, to increase the effectiveness of fiscal policy in Poland, the establishment of an independent fiscal institution should be considered rather than introducing further quantitative restrictions. The institution, independent of the fiscal authorities, would increase the credibility and transparency of the policy, provide support for the government in respecting national and transnational fiscal rules, and, at the same time, constitute an obstacle to the hiding of discretionary decisions made by politicians from the public, resulting in deterioration of public finances (Moździerz, 2012, pp. 85-86).

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18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
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**Regional Innovation Programs' Sustainability
Under Risk and Uncertainty**

JEL Classification: *G29*

Keywords: *innovation program; region; sustainability; risk factor; system optimization*

Abstract: Globalization in economy has been taking on an ever greater significance recently. Particularly important it is becoming now to such leading-edge technologies in economics as regional innovation processes. The current stage of the development of regional economies differs from the past ones in that the role of innovation programs acquires ever more importance and that forming and designing of such programs becomes now a much more independent process; all this has led to a situation where we have to revise our system of economic methods and ways of managing the risks of a regional innovation program. The existing methods and ways of risk assessment and risk management for innovations are to be complemented by new approaches reflecting the market changes and the advent of new financial instruments and stratagems. In this paper I investigate the issue of applying the system optimization method to the task of building the uncertainty/risk evaluation model for the management of a regional innovation program, proceeding from the method of limiting factor values which reduces the design value of an investment efficiency parameter to its critical limit for direct problems. As a result of my study, I propose the model of a regional innovation program's sustainability zone under risk and uncertainty, using the MATHCAT software.

Introduction

Currently the world community is going through globalization processes, whose first stage dates back to the dawn of civilization. It was as early as IV century B.C. that the first ever state in the Globe was formed and established. By early XX century the territory of the Earth had been finally divided between existing states. And about practically the same time (1990) did begin the second stage of globalization going on till the present day. By this we want to say that when globalization comes to its end, there will ensue effective dissolution of the world community only to give rise to a new cycle of the process. Based on the above, one can come to a conclusion that the process of globalization has a cyclic nature subject to well-known development laws, namely centralization and decentralization. The properties of economic cycles and their functioning are interestingly investigated and summarized in: Schumpeter J., 1939, pp.123-130. It seems to be quite clear that the globalization processes will not come to their respective end in the foreseeable future.

The holistic and cyclical nature of the development of international community allows us to view globalization, on the one hand, as a process, or, on the other, as a system at a certain development stage. The following works investigate how innovation processes unfold themselves in the context of globalization: Vambery R.G., Mayer P., 2012; Dreher A., 2006; Sirgy M.J., Lee D., Miller C., Littlefield J.E., 2004; Tsai C., 2007; Dosi G., 1988; Nikolova L.V., Rodionov D.G., Mokeeva T.V., 2014. If we presume that the global community is a system, then it may be said that it must perforce possess all attributes and properties of a system. This, in its turn, gives us grounds for singling out a subsystem in it - a geographical region having its own innovation program. The 'region' subsystem is also a system (Asheim B., Getleer M., 2004, pp. 121-125) comprising among other things a set of innovation programs (Bataev A.V. (2014); Nikolova L.V., Sergeev D.A., Omelaynenko A.R. (2014); Rodionov D.G., Fersman N. G., Kushneva O. A. (2014); Rodionov D.G., Guzikova L. A., Rudskay I.A (2014), Rodionov D.G., Rudskay I.A., Kushneva O.A. (2014). This thesis provides the author with enough grounds for handling not individual objects but systems with their appropriate emergent and synergetic dimensions.

Goal of the study: to substantiate the sustainability of a region's innovation programs under uncertainty and risk. In order to achieve the above goal

we use the mathematical methods of system optimization: single-criterion methods and multi-criteria methods.

Methodology of the research

Risk management methods and procedures

Conventionally, there are two types of economic and mathematical methods of investment risk assessment for primal and reverse problems in risk management: quantitative and qualitative ones. To quantitative methods belong: design of experiment, spiral risk model, analog approach or conservative forecasts, risk-adjusted interest rate method, scenario analysis, decision tree method, sensitivity analysis, simulation approach. To qualitative methods belong: Delphi approach, SWOT analysis.

A review of research literature on the issue of applying mathematical models (Buyanov V.P., Kirsanov K.A., Mikhailov L.A., 2002; Stubbs W., Cocklin C., 2008; Short S.W., Rana P., Bocken N.M.P., Evans, 2012; Visnjic I.A., Bart V.L., 2012; Arkadiusz Borowiec, 2013.) demonstrates that not all the models have been substantiated mathematically and methodologically. As we know, a mathematical model is an approximated description of a certain class of phenomena denoted by mathematical symbols. By analysing a mathematical model we are able of getting an insight into the nature of objects under investigation. A mathematical model is undoubtedly a powerful tool for obtaining knowledge of the world around us as well as forecasting and controlling things. The models proposed by S.C. Myers and G.A. Pogue the "Longer" model of financial planning and the model of the best cash asset placement (capital planning problem) - are widely adopted by colleagues and used in the methods of sensitivity assessment and scenario analysis. Recently, other models have been getting popularity – those proposed by M.V.Gracheva (project efficiency assessment model with regard for risk-aversion measures; optimization of integrated risk cost model; optimization of integrated internal and external risk costs model); these are also used for sensitivity analysis and scenario analysis tasks. The complexity of calculating the probability-simulation models of assessment, management and optimization proposed by A.G.Novokreshchenov – based on the method of simulation modelling – has led to a situation where such models are very rarely applied to the practical problems of investment. Such models can be successfully applied to the tasks of risk assessment and innovation project management, along with

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

risk assessment and management of regional innovation programs. Uncertainty and risk belong to the objective side or aspect of the innovation process; they are its integral parts bearing on all phases and milestones of its implementation.

Suppose there is a hypothetical model of an innovation process which is a system made up of two interplaying sub-systems: the sub-system of risks composed of risk factors, and the sub-system of conditionally defined implementation stages. The combination of the sub-systems is essentially a model of implementation of real innovations. regional innovation process is also defined as a combination of these sub-systems and can be described as a closed-loop process (cycle), i.e. an innovation system that is subject to the laws of the theory of optimal control of systems. The innovation system is a range of programs – of all scales and sizes - whose implementation implies risks both while solving current and long-term investment tasks. The total variety of approaches to the study of systems can be broken down into analysis and synthesis, which, in their turn could be grouped as follows: analysis – functional or structural, synthesis – emergent (that defines coherence of a system) or synergetic (co-acting, multiplicative effect). The *emergent* properties of investment are linked to the fact that the system acquires new characteristics or qualities belonging to neither of the sub-systems (elements). The rise of *emergent properties* and *emergent risks* in the system can be used as a basis for the method or procedure of defining the systemic qualities of this investment object (see: Buyanov V.P., Kirsanov K.A., Mikhailov L.A., 2002). To reveal *emergent risks* (risk-factors) is one of important tasks in a study; however, it leads solely to the ascertaining of the fact that the interplaying objects begin to acquire new properties. In part this question can be answered with the help of *synergetics* – a science studying the processes and laws of self-organization. The science that does not take systemic risks into account assumes that by an external action upon an object you can always get the desired effect, i.e. transform the object in the way a researcher wants it to. Yet, experience demonstrates that in most cases this is more than problematic. Difficulties related to the process of innovation risk management can be accounted for by the fact that we do not have unambiguous data on the mechanisms regulating certain inner processes, which makes the author of this study limit it to the description of risks as final functional relations.

Given more factors to take into account, logic algebra methods are used in order to make a preliminary conclusion concerning the factors' significance. First we have to quantize the working variation ranges into individu-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

al levels and then, by the method of Boolean functions' minimization, build a Boolean model of the system. At the next step we solve the task of the informal interpretation of the Boolean models.

While proceeding from the qualitative to quantitative analysis of the system's structure, we have to check if the previous results – both quantitative and qualitative – can be used for the evaluation of the system under investigation. There are various methods of such verification to be used here; they differ: by the degree of isomorphism, by the method of choosing the verification rule, by the tools used to find this verification rule. In its simplest form, structural analysis investigates a definite structural component of the system (in our case it means risk-factor). What we actually investigate using this approach are the properties of structural components at different levels when building the model of risk management. The approach I propose here allows us to substantiate the systemic nature of the assessment and management of regional innovation process risks and to create a framework for further studies. To build a model of regional innovation program risk management we have to identify the methodological, procedural and operational principles that can coherently bind together various interests at the macro- and micro-level existing in the region under investigation.

1. The methodological principles, i.e. the ones which determine conceptual fundamentals for regional investment, are the most general and – which is even more important – independent from the specific nature of the type of risk being investigated (they can be even invariant in relation to the concrete semantics of the goal and of value paradigms). For the purpose of shaping the methodology of investment in the region we apply the optimal system control theory and the methods of system analysis.

The methodological fundamentals also imply taking into account the modern specificities of investing that help us substantiate new approaches to the task of building a model of innovation risk management in a given region. The following rules underlie this principle:

- similarity of risks – this means that each participant's perception of risk is the same as that of all others';
- positiveness of risks – this means that the integral risk index lies within the acceptable threshold. In innovation programs this principle is generally associated with the principle of efficiency/performance;
- objectivity of risks – this means that for risk assessment we have to correctly formulate the structure and properties of the changing object;

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

- correctness of risks – this means that the risk assessment procedure is subject to certain formal requirements, such as:
 - a) accumulative monotonicity: meaning that - within a certain exponent range - if activity intensifies the risk also grows; at the same time in boundary zones uncertainty is measured qualitatively;
 - b) non-direct proportionality – this means that the growth of risk is not directly proportionate to the intensification of activity (in the given exponent range);
 - c) transitivity – this means that if situation "a" is less risky than situation "b", and situation "b" is less risky than situation "c", then situation "a" is less risky than situation "c";
 - d) additivity – this means that risk is equal to the sum of particular risks:
 - risk integration – this means that taken as a whole risks have to form a closed system;
 - interdependency of risks – this means that when some risks arise other risks also arise due to interaction effects.
- 2. Procedural principles – i.e. the ones directly associated with the content of the innovation program, its specific characteristics, implementation, and real situations. The following rules underlie this principle:
 - dissonance of risks – this means that each new project impacts the innovation program in its own specific way; the stronger is the dissonance of the new project, the higher is the risk;
 - different perception of risks – this means that different projects making up the program have their risks, which determines the incongruity of interests of project participants and differing attitudes towards possible damage or loss;
 - dynamism of the risks constituting an innovation program means that procedural support takes into account the changing nature of risks;
 - risk coherence in the innovation program means that prevention processes have to be coordinated with other processes, when risks arise.
- 3. Operational principles, i.e. those linked to the availability, reliability and unambiguity of information, and tools at hand to process it.
 - modulability of innovation *program*' risks determines a situation when the arising risks can be described with the help of a model;
 - simplifiability of innovation *program*'s risks tells us that while assessing risks we choose the method which is most simple from the calculation or computing point of view.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

As a result, I have framed a methodology for investigating the problem of sustainability of regional innovation programs under uncertainty and risk. I also identify and define methodological, procedural and operational principles relying on the rules which were used for building the model of risk management.

**System optimization of risk for a regional innovation program
Risk management optimization theory - fundamentals**

The investment sensitivity method is a single-criterion optimization problem, which means that for its implementation only one efficiency function is used, namely the factor impacting innovation efficiency. I propose to consider the further development of sensitivity analysis i.e. to move from single-criterion analysis to multi-criteria one on the basis of S.Pontryagin's analytical procedure, i.e. to solve limited variational problems occurring when we have to optimize control and management in dynamic systems. The analytical procedure proven by S. Pontryagin is used for substantiation of the method of sustainability of a regional innovation program under uncertainty and risk. The method of defining investment sustainability ensures the calculation of the limiting factor values that impact investment efficiency when solving direct problems.

The theory of forming a regional innovation program and its properties help us optimize innovation risks and manage them. One of the particularly troublesome tasks pertaining to making an innovation program of a region is the necessity of using synthesis for the assessment of innovation efficiency. A regional innovation program is a multifaceted dynamic system for the management of whose risks many risk criteria have to be used (risk-factors). In some cases these risk-factors can be reduced to one risk, thus returning the solution procedure to the well-known method of single-criterion optimization. The simplest method of such reduction is the so called *weighting of criteria*. If $f_1(x), \dots, f_n(x)$ are objectives expressing the values of the criteria being used, then for each of them – subject to its impact upon investment efficiency – we choose a positive weighting factor λ_i . The procedure of weighting criteria (objectives) $f_1(x), \dots, f_n(x)$ consists in replacing them by one and only one criterion (objective) $f(x) = \lambda_1 \cdot f_1(x) + \dots + \lambda_n \cdot f_n(x)$ (Tchernorutsky I.G., 2001, p. 34-40).

However, for the purpose of managing the risks of an innovation program such reduction turns out to be practically impossible, therefore in the process of optimization we have to deal with a *vector* efficiency function

(*multi-criteria*). At the same time the permissible region M can change during optimization. More than that: its purposeful change is the substance of the process of optimization for this class of problems.

Since the laws of possible changes in the permissible region M are normally defined by a system of models, the approach to optimization problems I am describing here is called *system approach*. Within the framework of the system approach, the change of limits defining the permissible region in the space of individual parameters takes place as a result of a sequence of solutions we choose from a discrete set of possible solutions, where this set of solutions at the beginning of the optimization process can be defined incompletely and is being enlarged during the development and implementation of the innovation program.

One of very characteristic formalized statements of the problem of system optimization is the 2-criteria analysis. Let us suppose that by choosing the values of these criteria we can uniquely define the appropriate solution. In other words, the desired solution is being sought directly in the space K of optimization criteria that we will denote x_1 and x_2 .

The solution process begins when in the defined space K we choose a point A_o with coordinates a_o, b_o — the desired solution of the problem. Then we build initial constraints $F_1^{(o)}(x_1, x_2) \geq 0, \dots, F_n^{(o)}(x_1, x_2) \geq 0$ which define the initial permissible region P_o . By a direct check we define whether point A_o belongs to region P_o . In the former case, theoretically, we can use the conventional (classical) procedure of optimization by either one of the x_1, x_2 , criteria or by their combinations.

With the system approach, however, a much different method is used, namely: in accordance with model M at a higher level regulating the choice of criteria, point A_o is taken out of permissible region P_o after that we single out the constraints which do not hold for point A_o (in this case those will be $F_3^{(o)}$ and $F_4^{(o)}$). Turning to models M_3 and M_4 , which lay down these constraints, we consider — in the dialog mode — the solutions that can change the appropriate constraints in the desired direction (if possible). The "desired" direction in this case is considered to be the one which decreases the absolute value of negative residuals $F_i^{(o)}(a_o, b_o)$ (in the case under consideration it is $F_3^{(o)}(a_o, b_o)$ and $F_4^{(o)}(a_o, b_o)$).

Here we should bear in mind that in many cases the F_i constraints turn out to be interrelated, so the change of one of them leads to a change in a certain number of other constraints. The control of the solution choice needed to change the constraints is defined here by the minimization of a penalty function $g_o(a_o, b_o)$. For this penalty function the maximum absolute

value of negative residuals $\lambda_i F_i^{(0)}(a_0, b_0)$ is usually chosen (where λ_i – certain positive weight coefficients). If there are no such residuals, then, by definition, $g_0(a_0, b_0) = 0$. As a result of such control, there emerges a range of solutions $R_1 \dots, R_m$, each leading to the decrease of the penalty function value that we shall denote $g_m(a_0, b_0)$ after m solution.

Each of the accepted solutions - by changing the constraints - brings about the appropriate change in the permissible region. Let us consider two of such changes: the first one changes limits $F_3^{(0)}, F_2^{(0)}$, replacing them, respectively, by limits $F_3^{(1)}, F_2^{(1)}$; the second one affects only one constraint $F_4^{(0)}$ replacing it by constraint $F_4^{(1)}$. The resulting permissible region P_2 is limited by lines $F_1^{(0)}, F_2^{(1)}, F_3^{(1)}, F_4^{(1)}$, while the corresponding penalty function value is equal to $g_2(a_0, b_0)$. Advance choice of the final permissible region is impossible due to the fact that the sequence of regions $P_0, P_1 \dots$ cannot be ordered by embedding. In addition to this, the outstanding complexity of making new limits does not allow us to do it beforehand, because too much unnecessary work would be required to be done to change insignificant constraints. If $g_2(a_0, b_0) \neq 0$ and there are no solutions leading to further decrease in the value of the penalty function, then we are returned to the higher model M that controls the choice of the desired solution $A(a, b)$. By successive solutions D_1, D_2, \dots, D_k to change the initial solution of the problem $A_0(a_0, b_0)$ it is replaced by $A_1(a_1, b_1), \dots, A_k(a_k, b_k)$ till one of the next points $A_k(a_k, b_k)$ finds itself within the permissible region ($k = 1$). Solutions for change are chosen from the allowable set of solutions with the aim of minimizing the penalty function. This procedure seems to be very close to the classical optimization apart from the fact that steps are chosen not arbitrarily but in compliance with the permitted (by model M) solutions. After point A_k gets into the final permissible region P_m we can use an additional optimization procedure by various combinations of criteria x_1 and x_2 within this permissible region. This procedure differs from the classical one by the only fact that the choice of optimization steps is not arbitrary but is controlled by the higher level model M . If further improvement of the chosen criterion is hindered by certain limitations which we can change in the desired direction, then the optimization process can be continued through the inclusion of successive limitation-change solutions into it. The most important characteristic of system optimization retained in all approaches to the problem is - apart from multi-criteriality and a possibility to change the permissible region - the interaction of models on different levels. In this case, as part of structural analysis, this is system interaction: of the risk system composed of risk-factors, and of the

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

system of implementation of the regional innovation program – by a model on the M level. A single-valued solution of the problem - through the choice of the values of all optimization criteria - cannot be used here for the purposes of substantiation of the regional innovation program risk management model, because there is no uniqueness to the solution of this problem. The space where the solution is being sought, may have other coordinates in addition to the ones matching optimization criteria. The optimization procedure described above becomes complicated due to the fact that points $A_i (a_i, b_i)$ are replaced by hyperplanes – i.e. stable investment zones. Definition of the penalty function becomes more complicated too: we can take as this function, for instance, the distance between a chosen hyperplane and the next permissible region in the space with defined contractions (stretchings) along the axes corresponding to optimization criteria – change factors for the limiting values of the sustainability model.

The assessment of risks' (risk-factors') impact upon the efficiency of the innovation program has been done on the basis of a number of integral indexes, such as: net present value (NPV_T), profitability index (PI_T^d), internal rate of return (IRR), payback period (PP_T^d). Efficiency indicator's sensitivity to the change of risk-factors has been assessed by defining the indicator's elasticity for this specific factor. Let us denote the risk-factors by q_1, \dots, q_n ; their values we can obtain from the $NPV(q_1, q_2, q_3, \dots, q_n)$ formula ≥ 0 .

Regional innovation program sustainability model.

The model of sustainability of a region's innovation program can be defined as an assembly of risk-factor value sets $q_1, q_2, q_3, \dots, q_n$, satisfying the system of inequalities:

$$NPV(q_1) \geq 0; NPV(q_2) \geq 0; NPV(q_3) \geq 0; \dots; NPV(q_n) \geq 0.$$

If conditions applied to the value of the NPV indicator are met, then the values of indicators PI_T^d , IRR, PP_T^d will change accordingly.

Consider building a sustainability zone for an innovation program in a three-dimensional space with, for instance, four risk-factors affecting the situation.

- I. Define the maximum value by which the impacting risk-factors can increase.
- II. Then define how the sustainability zone of an innovation project changes if during the implementation of the innovations the desired rate of return on capital for an investor (r) changes.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

I. Now assume that the results of the innovation program changed because:

- the return on capital changed by several % ($-q_1$);
- the investment capital (IC_{1t}) increased by several % (q_2);
- the investment capital (IC_{2t}) increased by several % (q_3);

Calculate the factor limiting values with which the innovation program will have a cumulative break-even point.

Defining the limiting value of the return on capital change (q_1)

In a situation when the innovation program will have the cumulative break-even point, i.e. when the NPV will be equal to 0,

$$NPV = -\sum_{t=0}^T \frac{IC_t}{(1+r)^t} + \sum_{t=1}^T \frac{CFi_t - CFo_t}{(1+r)^t} \quad (1)$$

Let us equate expression (1) to 0.

To find the limiting value of the change of return we transform formula (1) by substituting the changes of return (q_1) into it (2):

$$\sum_{t=1}^T \frac{CF_t \left(1 + \frac{q_1}{100}\right)}{(1+r)^t} - \sum_{t=0}^T \frac{IC_t}{(1+r)^t} = 0 \quad (2)$$

By making the transformations we obtain the q_1 (3):

$$q_1 = \left[1 - \left(\frac{\sum_{t=0}^T \frac{IC_t}{(1+r)^t}}{\sum_{t=1}^T \frac{CF_t}{(1+r)^t}} \right) \right] * 100 \quad (3)$$

The resulting formula can be further simplified and the q_1 (4) calculated:

$$q_1 = \left(1 - \frac{DIC_t}{PV}\right) * 100 \tag{4}$$

Defining the limiting value of the change of equipment cost (q₂)

For this we transform formula (1) by substituting the capital investment change (q₂) into it, and then calculate the limiting value of the change of investment cost (IC_{1t}) of the innovation program (5):

$$q_2 = \frac{PV - IC_t}{IC_t} * 100 = \frac{NPV}{IC_t} * 100 \tag{5}$$

Defining the limiting value of the change of the equipment installation cost (q₃)

For this we transform formula (5) by substituting the capital investment change (q₃) into it, and then calculate the limiting value of the change of investment cost (IC_{2t}) of the innovation program (6):

$$q_3 = \frac{PV - IC_t}{IC_{2t}} * 100 = \frac{NPV}{IC_{2t}} * 100 \tag{6}$$

The results of the calculation are presented in Table 1.

Table 1. Impact of the limiting values of factor changes upon the efficiency indicators of an innovation project

Factor in % \ Parameter change,	NPV (thousand roubles)	r	PI	DPP y. m., d.
q ₁ , %	0	r _{0H}	1	T
	0	r _{0H}	1	T
q ₂ , %	0	r _{0H}	1	T
	0	r _{0H}	1	T
q ₃ , %	0	r _{0H}	1	T
	0	r _{0H}	1	T

Source: own work.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Formation of the sustainability zone for a region's innovation program

The practical implementation of the theory of system optimization of risk management is done by the example of the assessment of risks of a particular regional innovation program.

Defining sustainability of the innovation program using specific data, such as:

IC = 90 thousand currency units; CF_{t1}.....CF_{t6}: 10, 20, 30, 30, 40, 51 thousand currency units; project implementation period T = 6 years, calculation time-step t = 1 year.

1. We define the formula of discount rate change (r) by extrapolation (see the text of the program).

2. We shape the sustainability zone for the innovation program using four risk-factors: cash flow - CF_t; capital investment - IC_{1t}, capital investment - IC_{2t}, discount rate - r.

(Carried out in the mathematical modelling software package MATHCAD).

Implementation program:

$$t := 0..6$$

$$CI := 900000$$

$$D := \begin{bmatrix} 0 \\ 10000 \\ 20000 \\ 30000 \\ 30000 \\ 40000 \\ 51000 \end{bmatrix},$$

$$T := 6$$

$$e(t) := 0.1 + 0.01t^2 + 0.05 \ln(t + 1)$$

$$NPV(t) := \sum_{k=0}^T D_k \cdot \frac{1}{(1 + e(t))^k} - CI$$

$$x := 0,$$

$$t := 0..6,$$

$$CI := 90000$$

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

$$D := \begin{bmatrix} 0 \\ 10000 \\ 20000 \\ 30000 \\ 30000 \\ 40000 \\ 51000 \end{bmatrix}$$

$$NPV(E, d, q) := \sum_{t=0}^T D_t \cdot \frac{1+d}{(1+E)^t} - CI \cdot \frac{(1+q)}{(1+E)}$$

$$a := 0 \quad a0_t := \text{root}(NPV(t,0,a,0), a)$$

$$a := 0$$

$$q := 0 \quad q0_t := \text{root}(NPV(t,0,0,q), q)$$

$$s0 =$$

	0
0	-0.252
1	-0.228
2	-0.202
3	-0.168
4	-0.125
5	-0.075
6	-0.017
7	0.046
8	0.112
9	0.179
10	0.245

$$a0 =$$

	0
0	0.494
1	0.434
2	0.371
3	0.296
4	0.21
5	0.119
6	0.026
7	-0.064
8	-0.147
9	-0.222
10	-0.289

$$q0 =$$

	0
0	1.415
1	1.244
2	1.062
3	0.847
4	0.602
5	0.34
6	0.074
7	-0.183
8	-0.422
9	-0.637
10	-0.827

$$A^{(0)} := s0$$

$$A^{(1)} := q0$$

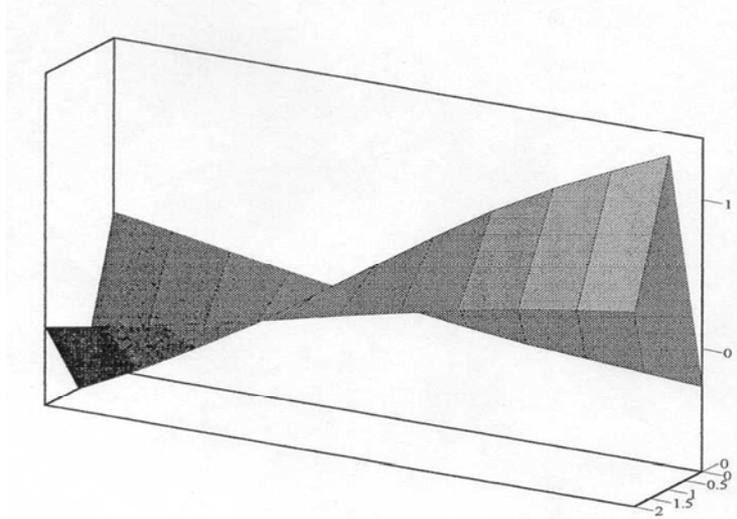
$$A^{(2)} := a0$$

As a result, we have a model of innovation program of a region, in the process of whose implementation the discount rate (r) changes every year.

On Picture 1 you can see 12 models of regional innovation program sustainability consolidated into one image: lower part – 7 models – is the domain of efficiency (inside) the innovation program of the region; upper part of the image – the domain where this innovation program is inefficient (it is added here to make our study more comprehensive).

The analysis carried out by the author has allowed her to define the innovation program of a region as a complex dynamic system whose risk management is possible if the method of sustainability assessment is used; the method is based on the risk management model mathematically substantiated by S.Pontryagin.

Figure A. Sustainability zone of an innovation project



$$x = 0.25$$

$$Tirr (s, a, q) = \text{root} (NPV (x, s, a, q), x)$$

$$Tirr (0,0,0) = 6.281$$

$$IRR (s, a, q) := e(Tirr (s, a, q))$$

$$IRR (0,0,0) = 0.594$$

Source: own work.

Conclusions

The study offers the results of application of the system optimization method to the task of shaping an uncertainty/risk assessment model for the management of a region's innovation program; the method is based on the procedure that assumes defining the limiting values of the factors that bring the design value of a corresponding investment efficiency criterion to its critical limit while solving direct problems. As a result of my study, I propose the model of a regional innovation program's sustainability zone under risk and uncertainty, using the MATHCAT software.

The assessment of risks' (risk-factors') impact upon the efficiency of the innovation program has been done on the basis of a number of integral indexes, such as: net present value (NPVT), profitability index (PITd), internal rate of return (IRR), payback period (PPTd). Efficiency indicator's sensitivity to the change of risk-factors has been assessed by defining the indicator's elasticity for this specific factor. The model of sustainability of a regional innovation program is defined as an assembly of value sets of risk factors $q_1, q_2, q_3, \dots, q_n$, satisfying the system of inequalities:

$$NPV(q_1) \geq 0; NPV(q_2) \geq 0; NPV(q_3) \geq 0; \dots; NPV(q_n) \geq 0.$$

Most generally, point sets of arbitrary form may be involved instead of hyperplanes. Problem formulations are possible where criteria values in these sets are defined ambiguously, while for the definition of more or less desirable solutions we have to define appropriate weight functions in these sets (by a model of the higher level M).

The most important characteristic of system optimization retained in all approaches to the problem is - apart from multi-criteriality and a possibility to change the permissible region - the interaction of models on different levels. In this case, as part of structural analysis, this is system interaction: the risk system composed of risk-factors, and the system of implementation of the regional innovation program - by a model on the M level.

When considering a large number of risks (risk-factors) impacting the efficiency of a region's innovation program and subject to analysis and control, a hyperplane taken in the three-dimensional space tends to a one-sheet hyperboloid.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

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18-19 June 2015, Economics and Finance**

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**The Impact of Capital Ratio on Lending of EU
Banks – the Role of Bank Specialization
and Capitalization***

JEL Classification: *E32; G21; G28; G32*

Keywords: *loan supply; capital ratio; procyclicality*

Abstract: In this paper we aim to find out whether bank specialization and bank capitalization affect the relationship between bank loan growth and bank capital ratio, both in expansions and in contractions. We hypothesize that the impact of bank capital on lending is relatively strong in cooperative banks and savings banks. We also expect that this effect is nonlinear, and is stronger in “low” capital banks than in “high” capital banks. To test our hypotheses we apply two-step GMM robust estimator (Blundell & Bond, 1998) for data spanning the years 1996 – 2011

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

on individual banks available in the Bankscope database. Our analysis shows that lending of poorly capitalized banks is more affected by capital ratio than lending of well capitalized banks. Loan growth of cooperative and savings banks is more capital constrained than lending of commercial banks. Capital matters for the lending activity in contractions only in the case of savings and “low” capital banks.

Introduction

The size of the effect of changes in bank capital on the extension of bank credit has been one of the most important questions of the crisis, due to role that banks play in the economy. In the aftermath of the 2007/8 financial turmoil, Basel Committee proposed significant changes to previously accepted capital standards. The set of new rules has been named Basel III. It covers substantial increases in regulatory capital ratios and in the quality of bank capital (BIS, FSB & IMF, 2011; BIS, 2010, 2011). These new standards are now being implemented in EU, due to formal acceptance of its rules in directive¹ and in regulation² in 2013. As the EU market is a definitely more banking sector oriented economy, it is important to extend our knowledge on the importance of bank capital for bank lending.

Although the magnitude of the effect of bank capital on bank lending in the 2007 financial crisis seemed to be a very salient question for practitioners and researchers, few recent estimates of this effect exist. These estimates are usually focused on the US banks (Beatty and Liao, 2011; Berrospide and Edge, 2010; Carlson, Shan & Warusawitharana Carlson). Some papers investigate a sample of both EU and US banks (Gambacorta and Marquez-Ibanez, 2011). Several papers focus on selected single countries in the EU (e.g UK: Mora & Logan, 2011 and Bridges Gregory, Nielsen, Pezzini, Radia & Spaltro, 2014; France: Labonne & Lame, 2014). The main message from these studies is that bank capital does indeed affect bank lending, though this impact is diversified. In a recent study Olszak, Pipień, Roszkowska & Kowalska (2014 b) focus on large EU banks, and test whether this diversity may be attributed to income smoothing, procyclicality of loan loss provisions, regulations and supervision. They find that

¹ See DIRECTIVE 2013/36/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 26 June 2013 on access to the activity of credit institutions and the prudential supervision of credit institutions and investment firms, amending Directive 2002/87/EC and repealing Directives 2006/48/EC and 2006/49/EC ((L 176).

² REGULATION (EU) No 575/2013 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 26 June 2013 on prudential requirements for credit institutions and investment firms and amending Regulation (EU) No 648/2012 (L 176).

loan growth of banks that have more procyclical loan loss provisions and that do not engage in income smoothing is more sensitive to capital ratios. They also find that more restrictive regulations and more stringent official supervision reduce the magnitude of the effect of capital ratio on bank lending.

Our study makes one significant contribution relative to the literature. We extend analysis of Olszak et al. (2014b) on the effects of capital ratios on loan growth of the EU single market, by analysis of two important research areas. The first consists in looking at potential diversity of association between loan growth and capital ratio in banks differing in their specialization. The other area is related to nonlinear effects of capital ratios on lending, which was tested in the US banks (see Carlson et al., 2013), but not in the EU banks. In this area we ask whether the level of capital ratio is important for the effects of bank capital on lending activity, and how important is it?

To test our hypotheses we apply the two-step GMM robust estimator (Blundell & Bond, 1998) for data spanning the years 1996 – 2011 on individual banks available in the Bankscope database

The rest of the paper is organized as follows. Section 2 develops our hypotheses. In Section 3 we describe our sample and research design. We discuss results and supplemental analyses in Section 4. Section 5 concludes our work.

Hypotheses development

The role of bank specialization for procyclicality of bank capital has not been formally tested thus far.³ Some evidence in this respect, however, can be found in a study of Gambacorta & Mistrulli (2004), who analyzed the impact of bank capital on lending of cooperative banks and commercial banks. They suggest that bank capital channel may be stronger for cooperative banks because of two features of those banks' activity. The first is the fact that cooperative banks' balance sheets contain a larger percentage of long-term loans (which means that balance sheet maturity transformation gap is larger, exposing them to greater interest rate risk), while their bonds issues are lower. The second explanation for the greater effect of the bank capital channel for these banks could be the local activity of these banks and thus little use of derivatives to shield the maturity transformation gap.

³ Specialisation is an important determinant of procyclicality of loan loss provisions (see Olszak et al, 2014a).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

With these characteristics cooperative banks bear a higher cost when interest rates are raised and obtain a higher gain in the opposite case. However, it is also possible that the close relationship of cooperative banks with their members, makes them more resilient to business cycle fluctuations, and therefore it is possible they will lend to their borrowers irrespective of the macroeconomic conditions. In contrast, commercial banks may be more responsive to external financing conditions, and therefore may be responsive to business cycle fluctuations in lending activity. In particular, in the case of commercial banks, the association between loan growth and capital ratio in contractions may be positive, implying that they are capital constrained.

Following the above we hypothesize that:

H1. Commercial banks lending is less affected by capital ratios than cooperative banks lending.

The only sample of banks for which the effect of bank capital on lending has not been empirically tested thus far is the savings banks category. The specific feature of their activity is deposit collection and loan extension to customers –which resembles the business model of cooperative banks, especially due to the potentially large maturity transformation gap in these banks. Consequently, in the same line as cooperative banks, savings banks may be prone to interest rate risk, and thus their lending could be strongly related to capital ratios. But unlike cooperative banks, the customers of savings banks do not have so close ties with the bank. Moreover, savings banks are not operating on local markets. Therefore, they may respond to contractions by reducing their lending. And it is possible, that the association between capital and lending in contractions will be positive.

As for the role of the level of capital ratio for the effects of the capital ratio on loan growth there are at least two possible explanations. On the one hand, Peydró (2010) suggests that due to the correlation between banks and poor quality borrowers on the cross-section, banks with lower capital may lend more on average to firms with higher risk. In contractions or during crisis times financially weaker borrowers, (e.g. companies with low level of internal finance) may need more bank financing, and thus increase the demand for credit. If these borrowers are matched with poorly capitalized banks, then at the bank level the association between capital and lending would be weak or counterintuitive, as these weaker banks are facing higher credit demand. However, as Peydró suggests, this does not mean that bank

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

capital is not crucial, it only shows that an analysis at the bank and borrower level may yield biased estimates.

On the other hand, in the theoretical setting, Valencia (2008) shows that banks seek to keep some precautionary level of capital that serves them as a smoothing mechanism to avert disruptions in the supply of credit when the small shocks occur. Therefore the question is whether the association between capital ratios and loan growth is larger when the capital buffer⁴ – i.e. the difference between the actual bank capital and the minimum capital (e.g. capital adequacy ratio or internal capital requirement) is small, and whether the relationship is weak when the buffer is high.

Some previous empirical evidence suggests that when the capital ratio of a bank is closer to its minimum requirement then banks tend to reduce their lending (Gambacorta and Mistrulli, 2004; Kishan and Opiela, 2006; Carlson et al., 2013). Gambacorta and Mistrulli (2004) show that Italian banks with more capital relative to minimum requirements tend to be less responsive in their lending extension to negative monetary policy shock or cyclical downturn. Kishan and Opiela (2006) investigate the effects of expansionary and contractionary monetary policy on lending of low-capital and high-capital banks. They find that monetary policy has asymmetric impact on lending, depending on whether the bank belongs to either low-capital or high-capital sample and on the type of monetary policy applied. Their results show the low-capital banks are adversely affected by contractionary policy, but expansionary policy is not effective in stimulating the loan growth of low-capital banks.

In a recent paper Carlson et al. (2013) test the hypothesis that the association between capital ratios and loan growth is nonlinear. To test this explanation, they interact capital ratio with three indicator variables: “low” capital, “medium” capital and “high” capital banks. Their study provides strong empirical evidence of a nonlinear effect. While they find that capital ratio has a positive relationship with loan growth, the effect is large and statistically significant when capital ratio is closer to the regulatory minimum requirement and becomes smaller and less significant as capital ratio increases.

Considering the results of previous studies we put forward our second hypothesis below.

⁴ More on the role of a bank’s capital buffer on the risk-taking and therefore on the lending activity of the bank can be found in Borio and Zhu (2012).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

H2: The relationship between capital ratio and loan growth of EU banks is nonlinear.

More specifically, we expect that:

H2.1. The association between capital ratio and loan growth of EU banks is larger when the capital ratio is closer to its minimum requirement.

Beatty and Liao (2011) find that effect of the capital ratio on loan growth is strengthened during recessionary periods in the sample of publicly traded US banks. This result is further supported by Carlson et al. (2013), who found that the effect of three types of capital ratios on loan growth rate was stronger in lending contraction relative to lending expansion. This leads us to our third hypothesis that:

H.3. The association between loan growth and the capital ratio is stronger in contraction in the case of “low” capital banks.

Data and research methodology

Data

We use pooled cross-section and time series data of individual banks' balance sheet items and profit and loss accounts from 27 EU countries and country-specific macroeconomic indicators for these countries, over a period from 1996 to 2011. The balance sheet and profit and loss account data are taken from unconsolidated financials available in the Bankscope database, whereas the macroeconomic data were accessed from the EURO-STAT and the IMF web pages. We exclude from our sample outlier banks by eliminating the extreme bank-specific observations when a given variable adopts extreme values. Since most of these institutions are located in Ireland, the number of countries included in the final sample drops to 26. Based on this selection strategy, the number of banks included in our sample is 2523 (27359 observations and 26 countries).

Methodology of research

The most problematic issue in the measurement of the impact of bank capital on loan extension is the identification of supply and demand factors,

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

which affect lending activity. In particular, during recessionary periods, not only credit supply (due to bank capital and liquidity problems) may decrease, but also credit demand of households and firms may decline. This makes difficult any identification of bank capital effects on lending in downturns.

Several approaches have been used in the literature to take account of both supply side and demand side determinants of bank lending. The *traditional approach* is to take into account economic conditions linked to loan demand such as inflation, gross domestic product growth or unemployment rate (see e.g. Gambacorta & Mistrulli, 2004; Berrospide & Edge, 2010; Beatty & Liao, 2011). Other papers use regional variations of bank health and economic conditions to differentiate between supply and demand effects (Hancock & Wilcox, 1998).

The second approach consists in the application of data extracted from the national central *bank lending surveys* (Blaes, 2011; Del Giovane, Eramo & Nobili; 2011, Bassett et al., 2014 and Labonne & Lame, 2014). In this literature, researches combine bank-level data with individual responses to the lending survey and study the dynamics of credit in Germany (Blaes, 2011), Italy (Del Giovane et al., 2011), US (Bassett, Chosak, Driscoll & Zakrajasek, 2014) and French (Labonne & Lame, 2014). These studies reveal significant contribution of bank lending surveys in disentangling credit supply shocks from demand shocks, especially during the financial crisis.

The third solution is to use a *quasi experiment* – which requires having data on banks affected by shock which had not been generated by a market where the bank is operating. Such an approach has been applied by Peek & Rosengren (1997) who analyzed the effects of capital shocks on the lending of the branches and subsidiaries of Japanese banks located in the United States. By focusing on the transmission of the effects of Japanese stock market losses via the actions of Japanese bank branches and subsidiaries in the United States, Peek & Rosengren were able to isolate the credit supply effects of a fall in bank capital. In a more contemporary study Mora & Logan (2011) use losses on UK banks' loan to non-UK residents (an external shock) and see how this affected lending to UK residents.

The empirical models that addressed the question of whether a bank-capital induced credit crunch was hindering the recovery were developed in the early- and mid-1990s in the US (see e.g. Bernanke & Lown, 1991; Hancock & Wilcox, 1994a,b; 1997; 1998; Peek & Rosengren, 1995). In our study we apply contemporary adoptions of those models available in sever-

al studies (Berrospide & Edge, 2010; Beatty & Liao, 2011; Carlson et al., 2013; Labonne & Lame, 2014; Bridges et al., 2014 and Olszak et al., 2014b). Our basic model is given by equation (1):

$$\Delta Loan_{i,t} = \beta_1 + \beta_2 Contraction + \beta_2 CAP_{i,t} + \beta_3 Contraction * CAP_{i,t} + \beta_4 DEP/TA_{i,t} + \beta_5 INTERBANK_{i,t} + \beta_6 \Delta CAP_{i,t} + \beta_7 QLP_{i,t} + \beta_8 size + \beta_9 \Delta UNEMPL_{j,t} + \beta_{10} \sum_{j=1}^{27} Country_j + \beta_{11} \sum_{t=1996}^{2011} T_t \vartheta_{i,t} + \varepsilon_t \quad (1)$$

where:

i- the number of the bank;

j-the number of country;

t- the number of observation for the i-th bank;

$\Delta Loan$ – real annual loan growth rate;

CAP – capital ratio, i.e. equity capital divided by total assets;

DEP/TA – deposits from nonfinancial customers divided by total assets;

$INTERBANK$ – a measure of interbank market activity; it equals bank loans extended to other banks divided by deposits from banks;

$DEPBANKS$ – deposits from banks divided by total assets;

ΔCAP – annual change in capital ratio;

QLP – is quality of lending portfolio; it equals loan loss provisions divided by average loans;

$size$ – logarithm of assets;

$\Delta UNEMPL$ - annual change in unemployment rate.

In our research we focus on only one capital ratio measured as the equity capital divided by total assets. We do not include other types of capital ratios, such as capital adequacy ratio or Tier 1 capital ratio due to the large number of missing data on these ratios in the Bankscope database.

Annual change in unemployment rate is our measure of demand for loans (Bikker and Metzmakers, 2005; Dell' Ariccia, Igan & Laeven, 2012).

Elements $\sum_{j=1}^{27} Country_j$ and $\beta_{11} \sum_{t=1996}^{2011} T_t$ are a set of country and time dummy variables ϑ are unobservable bank-specific effects that are not constant over time but vary across banks. Finally, ε is a white-noise error term.

In Table 1 we present all variables applied in our econometric model with expected impact they have on loan growth. We predict a negative coefficient on $Contraction$ if loan supply declines during contractions for reasons other than capital and liquidity constraints (as do Beatty & Liao,

2011, p. 7).

To test our first hypothesis we conduct separate regressions for commercial banks, cooperative banks and savings banks.

To test our second hypothesis we divide our banks into three subsamples: low capital, medium capital and high capital. The low capital (henceforth low cap₃₀) bank is a bank that has the capital ratio below 30th percentile of the distribution. The medium capital bank (henceforth medium cap₄₀) is a bank that has the capital ratio between the 30th and 70th percentile, and the high capital bank (henceforth high cap₃₀) has the capital ratio above the 70th percentile. In order to check if the results are robust to different thresholds, we additionally run separate regressions for 20th percentile (high capital), between 20th and 60th (medium capital) and for above 60th percentile (high capital).

To take account of the impact of the capital ratio on loan growth in contractionary periods we include interaction term between CAP and Contraction. We expect positive association between loan growth and this interaction term only when banks feel capital constrained in contractions, and therefore do not increase their lending.

Contraction is one of our key variables. Due to the fact that there is no one dataset including information on business cycle expansions and contractions in all EU countries, we have to resort to our own identification procedure. In this procedure we follow Lenart & Pipień (2013) approach, and apply dataset available in a study by Olszak et al. (2014b, p. 41).

Table 1. Variables description and expected signs in the regressions

Variable name	Expected sign	Basic argument
Δloan		
Contraction	-	A negative coefficient on Contraction is predicted if loan supply declines during contractions for reasons other than capital and liquidity constraints
ContractionxCAP	+/- +	A positive sign is expected if banks' loan growth is constrained by capital in contractions, a negative sign is expected otherwise. A positive sign is expected if loan growth is constrained by capital ratio. That is banks with higher capital ratio will extend more loans.
CAP		

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

DEP/TA	+	Banks which have more stable funding (deposits) relative to loans should be able to extend loans.
INTERBANK	+/-	A positive sign is expected if interbank deposits boost liquidity of a bank, and make lending easier
Δ CAP	-	To increase capital ratio a bank must either increase its capital (without changes in risk weighted assets) or decrease risky loans (without change in capital).
QLP	-	The higher the share of loan loss provisions in bank loans the lower the loan growth
Size	+/-	Large banks may benefit from too-big-to-fail position and thus might isolate better adverse shocks (a positive coefficient).
Δ UNEMPL	-	The higher the unemployment rate the lower is the demand for loans, and thus the loan growth is reduced

Source: own work.

Our econometric model involves explanatory variables that may be endogenous. This means that these variables are correlated with the error terms, both current and lagged. Also one may observe heteroskedasticity effects and autocorrelation within individuals. Therefore, we apply an approach that involves instrumental variables. In order to limit the possible estimation bias we consider the system of generalized method of moments (GMM) developed by Arellano & Bond (1991), and further developed by Blundell & Bond (1998). We control for the potential endogeneity of bank specific variables, i.e. CAP, DEP/TA, INTERBANK, Δ CAP and QLP in the two step system GMM estimation procedure, by the inclusion of up to eight lags of explanatory variables as instruments. The UNEMPL, as well as the country and the time dummy variables are the only variables considered exogenous. The GMM estimator is efficient and consistent if the models are not subject to serial correlation of order two and the instruments are not proliferated. Therefore we apply the test verifying the hypothesis of absence of second-order serial correlation in the first difference residuals (ar2). We also use the Hansen's J statistic for overidentifying restrictions, which tests the overall validity of the instruments tests (see Roodman, 2009, for more details).

Results

Results using full sample of banks are given in table 2. We find evidence in favour of capital ratios impacting loan growth, as the association between loan growth and capital ratio is positive and statistically significant in the full sample of banks. Our estimates suggest that a 1 percentage point increase in capital ratio results in bank loan growth of 1.01%. If we take account of bank specialization, we find that cooperative and savings banks' lending is a little bit more capital constrained by the capital ratio than lending of commercial banks. This gives some empirical support to our first hypothesis (H1).

Our results, which appear in table 2 provide strong evidence of a non-linear effect and thus give support to hypothesis H2. When capital ratio of a bank is below the 30th percentile, our estimates suggest that a 1 percentage point increase in capital ratio raises bank loan growth by 2.34 percentage points. When the capital ratio is above the 70th percentile of its distribution, however, the estimates suggest that capital ratio has a much more modest impact on bank lending. In this sample of banks the association between loan growth and bank capital ratio is 0.62, which means that a 1 percentage point increase in capital ratio results in 0.62% increase in loan growth.

As for the impact of bank capital on lending in contractions two types of banks seem to be capital constrained. The first group consists of savings banks. In this sample the impact of the capital ratio is positive and statistically significant, but relatively weak. The other sample includes "low capital banks, as our results suggest that the effect of capital ratio on lending in contractions is positive and strongest only in the case of "low" capital banks.

With respect to the other variables, we find that liquidity stemming from access to stable financing (measured with DEP/TA) has economically and statistically significant impact on the lending activity of all types of banks. Having said this we must stress the fact that the impact of liquidity constraints is definitely weaker than the impact of capital ratios, as the regression coefficients on DEP/TA are definitely lower than coefficients on CAP.

Relatively poor performance of loans, as measured by loan loss provisions over average loans (QLP), but for savings banks, tends to be associated with slower loan growth rates.

Size also matters for the lending capacity of banks. On average, banks with larger assets extend more new loans, as the regression coefficient on size is positive and statistically significant. The estimated effect is strongest

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

in the case of “low” capital banks. In this subsample a 1 percentage increase in the size variable raises the lending by 5%. Generally, our findings support the view that big banks should be less prone to adjusting their credit portfolio in the event of external shocks (such as monetary policy changes or crises).

We also find that loan growth is higher when unemployment rate is higher all types of banks. This seems to lend support to view that in the case of most banks, supply factors are more important for loan growth, than demand effects.

Table 16. Estimation results

Dep. Var.	<i>full sample</i>		<i>Commercial</i>		<i>Cooperative</i>		<i>Savings</i>		<i>High cap_30</i>		<i>Medium cap_40</i>		<i>Low cap_30</i>	
	<i>1</i>	<i>p.</i>	<i>2</i>	<i>p.</i>	<i>3</i>	<i>p.</i>	<i>4</i>	<i>p.</i>	<i>5</i>	<i>p.</i>	<i>6</i>	<i>p.</i>	<i>7</i>	<i>p.</i>
Loans growth														
$\Delta L(-1)$	-0.209	0.0	-0.183	0.0	-0.36	0.0	-0.176	0.0	-0.148	0.0	-0.241	0.00	-0.135	0.0
	(-6.77)		(-1.84)		(-15.57)		(-6.86)		(-4.69)		(-3.71)		(-2.68)	
$\Delta L(-2)$	-0.161	0.0	-0.023	0.4	-0.294	0.0	-0.186	0.0	-0.070	0.0	-0.126	0.00	-0.096	0.0
	(-6.63)		(-0.70)		(-16.35)		(-3.86)		(-1.77)		(-2.87)		(-1.70)	
Contraction	-1.339	2	-0.818	4	-0.085	6	-2.144	0	-0.894	5	-0.424	0.75	-3.726	4
	(-2.29)		(-0.47)		(-0.17)		(-3.39)		(-1.45)		(-0.31)		(-2.10)	
CAP	1.012	0	0.707	0	1.052	0	0.959	0	0.623	0	1.035	0.00	2.369	0
	(8.85)		(4.19)		(4.11)		(12.04)		(7.59)		(8.51)		(3.59)	
Contraction x CAP	-0.020	8	0.005	8	-0.101	1	0.132	4	-0.066	9	-0.122	0.45	0.367	8
	(-0.28)		(0.03)		(-1.61)		(2.04)		(-1.06)		(-0.75)		(1.33)	
DEP/TA	0.131	0.0	0.239	0.0	0.100	0.0	0.249	0.0	0.135	0.0	0.108	0.00	0.328	0.0
	(5.72)		(4.00)		(2.38)		(4.53)		(5.06)		(3.66)		(2.66)	
INTER-BANK	0.000	0.6	0.000	0.4	0.000	0.1	0.000	0.3	0.000	0.7	0.000	0.34	0.000	0.1
	(-0.45)		(-0.75)		(1.57)		(1.02)		(-0.33)		(0.95)		(1.40)	
Δ CAP	-1.442	0.0	-1.136	0.0	-1.445	0.0	-0.464	0.0	-0.976	0.0	-1.800	0.00	-1.569	0.0
	(-8.29)		(-4.18)		(-3.63)		(-1.95)		(-5.11)		(-3.56)		(-4.62)	
QLP	-0.748	0.0	-0.755	0.0	0.157	0.3	0.893	0.1	-0.758	0.0	0.043	0.95	-0.299	0.3
	(-3.80)		(-3.27)		(0.89)		(1.59)		(-3.83)		(0.07)		(-0.86)	
size	1.045	0.0	1.588	0.0	0.531	0.0	1.839	0.0	0.486	0.1	1.199	0.00	5.220	0.0
	(4.31)		(2.68)		(2.14)		(6.00)		(1.65)		(2.90)		(2.61)	
Δ UNEMPL	2.668	0.0	0.308	0.5	3.162	0.0	3.058	0.0	2.249	0.0	1.978	0.00	3.052	0.0
	(13.60)		(0.54)		(15.09)		(13.11)		(9.30)		(6.59)		(4.44)	
cons	26.262	0.0	40.116	0.0	-17.034	0.0	50.354	0.0	18.009	0.0	-27.178	0.00	109.642	0.0

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

	(-6.07)	(-3.19)	(-3.59)	(-6.64)	(-4.88)	(-3.53)	(-2.60)							
ar1	-3.98	0	-2.19	3	-7.89	0	-4.78	0	-7.05	0	-3.66	0.00	-2.03	4
ar2	-1.48	0.1	-1.43	0.1	-2.78	0.0	-0.84	0.4	-2.31	0.0	-1.15	0.25	-1.3	0.1
Hansen test:														
p.	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
# Observ.	23686	5067	11579	6999	6045	9652	7089							
# Banks	2454	566	1238	643	668	962	691							
# Instrum.	477	477	451	441	469	471	466							

The model is given by equation (1). The symbols have the following meaning: Δ loan – annual loan growth rate (real); Contraction - Dummy equal to one in contractions and 0 otherwise; CAP - capital ratio, i.e. equity capital to total assets; ContractionxCAP - Interaction between contraction and capital ratio (CAP); Δ CAP – annual change in capital ratio; DEPBANKS - Deposits from banks to total assets; LIQGAP - Loans less Total customer deposits less Deposits from banks divided by Loans; size - logarithm of total assets; QLP - Loan loss provisions divided by average loans ; Δ UNEMPL – change in annual unemployment rate. Coefficients for the country and time dummies are not reported. The models have been estimated using the GMM estimator with robust standard errors. The p-val denotes significance levels. Values in bold denote statistically significant results. T-statistics are given in brackets. Data range 1996-2011.

Source: own work.

Conclusions

This paper investigates the existence of cross-sectional differences in the response of bank lending to bank capital in the EU, both in expansions and in contractions. Our analysis is conducted separately for banks differing in specialization and levels of capital ratio. We find that cooperative and savings banks' lending is a little bit more capital constrained by the capital ratio than lending of commercial banks. We also find that "high" capital banks can better shield their lending from contractions as well as are less capital constrained in their credit extension in expansions than "low" capital banks. The lending of poorly capitalized banks is more affected by the capital ratio than lending of well capitalized banks. Capital matters for the lending activity in contractions only in the case of savings and "low" capital banks.

All in all, these findings indicate that bank capital is a relevant determinant of lending activity. As we find that lending of well capitalized banks is less affected to changes in capital ratio, we give empirical support to contemporary changes in capital regulations exemplified in the Basel III standards.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

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18-19 June 2015, Economics and Finance**

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18-19 June 2015, Economics and Finance**

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18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
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**Economic Consequences of the Adoption of the
International Financial Reporting
Standards: Evidences in the Research
Literature***

JEL Classification: *G14; M41*

Keywords: *Economic consequences; International Financial Reporting Standards; listed entities; quality of financial information; stakeholders*

Abstract: Along with the economic globalization, the international accounting regulation bodies faced the need to issue internationally accepted global accounting standards. The effect was the issuance and the widespread of the International Financial Reporting Standards (IFRS). At European level, the IFRS gained legitimacy in 2002, when the European Parliament and Council have decided that all European publicly traded entities must prepare their consolidated financial statements in accordance with IFRS starting with January 1st, 2005. The regulation from

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

2002 on the application of the international standards in EU summarizes the benefits emerging from the adoption and use of IFRS, related to: a high degree of transparency and comparability of financial statements and, as consequence, an efficient functioning capital market. However, the achievement of these expected benefits is based on the assumption that the application of these standards contributes to the increase in the quality of accounting data reported in the financial statements. In this context, our main objective is to summarize, based on the research literature, the economic consequences that emerge from the publication of higher quality accounting data in accordance with IFRS.

Introduction

The contemporary features of the business environment influence the theory and the method of accountancy. Thereby, the need for worldwide financial reporting comparability arise in the context of the expansion of world trade, the spread of multinational corporations, the increasing role of global capital markets and the enhanced foreign direct investment.

In the past decades, the accounting regulating bodies have made efforts in order to address these new challenges and to provide accounting solutions for presenting the accounting information in a common language, understandable for cross-border investors and other stakeholders.

The application of the IFRS registered a continuous progress, from being very little used to becoming nowadays widespread at world level. The number of countries that adopt the international financial reporting standards is increasing, the national accounting regulators allowing or mandating the use of these standards for certain types of entities. According to the information published on the website of IFRS Foundation, today there are over 130 jurisdictions that use the IFRS.

At European level, IFRS widespread was favoured by the issuance of Regulation no. 1606/2002 of the European Parliament and of the Council of 19 July 2002 on the application of international accounting standards (EC, 2002). According to this Regulation, for each financial year starting on or after 1 January 2005, companies governed by the law of a Member State prepare their consolidated financial statements in conformity with the international financial reporting standards if, at their balance sheet date, their securities are admitted to trading on a regulated market of any Member State. Also, Member States have the possibility to allow or to require the use of IFRS for other types of entities (for the individual financial statements of listed entities, for the consolidated and/or individual financial statements of unlisted entities).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The Regulation no. 1606 from 2002 summarizes the benefits of adopting and using the international standards in the EU, regarding the fact that they ensure “a high degree of transparency and comparability of financial statements and hence an efficient functioning of the Community capital market and of the Internal Market” (EC, 2002, article 1).

The research literature conducted in the field of IFRS adoption is generous. Researchers measured the effects of the application of IFRS on accounting numbers (Neag, 2014, pp. 1787–1790; Hung & Subramanyam, 2007, pp. 623–657; Jaruga et al, 2007, pp. 67–78; Jermakowicz, 2004, pp. 51–70), tested the benefits emerging from the transition to IFRS (Armstrong et al., 2010, pp. 31–61; Schleicher et al., 2010, pp. 143–168), pointed out the limits of IFRS implementation (Street & Larson, 2004, pp. 1–29) or analyzed the impact of IFRS adoption on taxation (Păunescu, 2015, pp. 81–91). Another valuable stream of research is represented by the analysis of controlling tasks in the context of IFRS implementation (Roman et al., 2014, pp. 13–26; Mocanu, 2014, pp. 62–66). Researchers have also investigated the perception regarding the manifestation of accounting judgment and ethics in accounting in the process of IFRS application (Cernuşca & Balaciu, 2014, pp. 110–122).

Moreover, we ascertain an emphasis on the research designed to capture the effects on IFRS adoption on the quality of financial reporting, measured by means of value relevance (Filip & Raffournier, 2010, pp. 77–103), earnings management practices (Barth et al., 2008, pp. 467–498; Brad et al., 2014, pp. 871–876; Nichita, 2014, pp. 674–690) or accounting conservatism (Andre et al., 2013, pp. 1–43; Maşca, 2014, pp. 349–355).

The study of the quality of financial reporting subsequent to the adoption of IFRS is important. The expected benefits of the convergence process and of the adoption of the international standards are based on the premises that the application of IFRS contributes to the improvement of the quality of accounting data reported in the financial statements.

However, testing the effects of IFRS adoption on the quality of accounting data is necessary, but not enough; knowing whether IFRS contributed to enhanced accounting quality is not the end of the road. Further research needs to be done in order to investigate the consequences of the increased quality of the information presented in the financial statements (Păşcan, 2014).

In this context, the main objective of our paper is to analyze and summarize, based on the research literature, the economic consequences that

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

emerge from presenting and publishing qualitative accounting data in accordance with the international financial reporting standards.

The paper is structured as follows: next paragraph presents the research methodology; then, we present the pillars of improved accounting quality after the adoption of IFRS and discuss the main economic consequences of using the information in the financial reporting prepared in accordance with IFRS. Concluding remarks are presented at the end of the paper.

Methodology of the research

In order to answer to our stated objective, the research methodology employed in this study is mainly qualitative, based on bibliographic documentation. In order to identify and analyze the economic consequences that emerge from the improved quality of accounting data in the context of IFRS adoption, we have examined the databases containing research literature in the field of accountancy (such as Science Direct, JSTOR, Web of Science), using terms such as „economic consequences”, „IFRS adoption”, „accounting quality”; we have selected the papers that we consider to be relevant for the purpose of our study and formed a database containing theoretical and empirical papers that analyze the economic consequences of IFRS adoption. Aiming not to leave out valuable papers published in this area, we have analyzed the references of certain papers and searched for the papers that we considered fundamental for our field of interest (we have also considered the number of citations associated to the selected papers). Next, we have reviewed the selected papers and summarized the economic consequences of IFRS adoption. We outline a typology of this economic consequences, according to the context of the adoption of IFRS (mandatory of voluntary) and to the category of stakeholders that benefit from analyzing qualitative accounting information prepared in accordance with the international financial reporting standards.

The economic consequences of the adoption of the International Financial Reporting Standards – a literature review

Some features associated to the international financial reporting standards could determine the enhancement of the accounting quality after the application of these standards and regardless of the incidence of country-specific institutional factors. We present the pillars of improved accounting quality after the adoption of IFRS, in order to explain why we could expect

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

higher-quality accounting information in the context of the application of these standards.

The IFRSs are principle-based standards

It is the objective of IFRS Foundation to develop a single set of high quality, understandable, enforceable and globally accepted financial reporting standards based upon *clearly articulated principles*.

With fewer pages and less detail compared to the rules-based standards (for example, the United States Generally Accepted Accounting Principles), the IFRSs still address all major accounting issues, from financial statement presentation to business combinations.

The IFRSs are referred as being principle-based standards because they provide general guidance for recognizing, measuring and presenting the elements in the financial statements. The accountants rely on the general principles stated in the IFRSs in order to guide their professional judgment.

The well-known scandals (Enron, WorldCom) could represent an example on how rigid rules can be manipulated in order to produce concealed accounting information. Being principle-based standards, the IFRSs could improve the quality of accounting information because they are more difficult to circumvent.

Also, relying on principles instead of rules, the IFRSs offer the opportunity to appeal to the professional judgment in order to properly reflect the economic reality, instead of struggling for achieving the compliance with the imposed rules.

The IFRSs allow evaluation methods that better reflect the financial position and performance

For example, the use of fair value could contribute to a more appropriate representation of the economic reality, compared to national accounting regulations. Accounting amounts reported using fair value measurement could improve the quality of accounting data since they are more useful to investors in making their investing decisions.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The limitation of allowable accounting options

In order to faithfully reflect the financial position and performance of an entity, since 2001 the International Accounting Standards Board (IASB) aims to eliminate allowable accounting alternatives. Such an endeavour, directed toward reducing the number of allowed accounting options, represents a premise for improving the quality of accounting data following IFRS adoption, because it limits the earnings management practices, for example by restricting the possibilities to manipulate the earnings.

Ewert & Wagenhofer (2005) cited in Barth et al. (2008, pp. 467-498) find that accounting standards that limit the management opportunistic behaviour allow the determination of accounting income which better reflect the economic reality and, accordingly, are more qualitative.

Moreover, the quality of accounting data could be improved if, simultaneously with IFRS adoption, there would be changes in the financial reporting system, for example, a more rigorous enforcement (Barth et al., 2008, p. 468).

However, the research literature provides mixed evidence on the effects of IFRS on the quality of accounting data. The results of the research conducted in this field do not fully sustain the assumption that IFRS adoption determines the publication of more transparent, more comparable and, therefore, more qualitative financial reporting.

And, even if financial reporting practices of entities would become more transparent or more comparable following IFRS application, the economic consequences of such an improvement of accounting quality cannot be forehand known, nor is there any guarantee that favourable economic consequences will be recorded.

We argue that only knowing the economic consequences arising from the adoption of IFRS, analyzed according to different categories of users of financial reporting, could provide a fully understanding of the effects of international accounting convergence process.

The economic consequences are defined in the research literature as “effects of financial reporting on firm values and on the wealth of those who make or are affected by decisions based on accounting information” or „the impact of accounting reports on the decision-making behaviour of firms and their stakeholders” (Zeff, 1978 cited in Brüggemann et al., 2013, pp. 1-37).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Next, based on the study of the accounting literature, we analyze the economic consequences of increased quality of accounting data following IFRS adoption.

Brüggemann et al. (2013) have classified the economic consequences that emerge from the mandatory adoption of IFRS in relation with the stated objectives from EU Regulation from 2002 on the application of international accounting standards, as follows:

- a) financial reporting effects, regarding:
 - compliance with IFRS requirements and accounting choices under IFRS.
 - In our opinion, it is important to test these consequences, because they offer insight into the extent to which the adoption of IFRS facilitates the comparability of financial statements between countries.
 - accounting properties, such as earnings quality (expressed by means of earnings smoothing, conditional conservatism, discretionary accruals). Studying accounting properties has, among others, the role of indicating whether the objective regarding financial statement transparency is fulfilled after mandatory IFRS adoption.
 - value relevance, referring to the ability of information presented in the financial statements prepared in accordance to IFRS to capture the value of an entity;
- b) capital market effects, which could consist in:
 - increasing the liquidity of stock market;
 - decreasing the bid-ask spread;
 - decreasing the cost of equity capital;
 - increasing the equity investments by institutional investors;
 - decreasing the cost of public debt;
 - increasing the firm-level capital investment efficiency;
 - increasing the content of earnings announcements;
 - enhancing the quality of analysts' information environment;
- c) macroeconomic effects, such as the increase of foreign direct investment.

Ahmed *et al.* (2013, p. 1346) present the favourable economic consequences associated with mandatory IFRS adoption documented in the research literature, related to the improvements in analyst forecast accuracy, reduction in the cost of equity capital and positive price reactions to events suggesting an increase in the likelihood of mandatory IFRS adoption. But, contrasting with these findings, in the context of an empirical research conducted on 20 countries that adopted IFRS in 2005 relative to a benchmark group of firms from countries that did not adopt IFRS, Ahmed *et al.* (2013)

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

state that “improved accounting quality is unlikely to be an explanation for these favourable economic consequences”.

Aiming to test whether higher corporate performance is a consequence of better quality of financial information, (Martinez-Ferrero, 2014, pp. 49-88) also find that the increased quality of accounting information facilitates transparency, which in turn reduces the informational asymmetry and satisfies the information needs of investors and other stakeholders.

Amiram (2012, pp. 57–81) find that foreign equity portfolio investments increase in countries that adopt the IFRSs, and Moscardiello *et al.* (2014, pp. 63-82) observe positive consequences of mandatory adoption of IFRS on the cost of debt.

A valuable research direction was followed by Daske *et al.* (2013, pp. 495-547), which studied the economic consequences of the adoption of IFRS, by analyzing the heterogeneity among entities regarding the way of implementation of new standards. The surveyed entities were classified as “label adopters” (those which adopted the international standards merely in name, without making material changes to their reporting policies) and “serious adopters” (entities that adopted the international standards as part of a broader strategy to increase their commitment to transparency). Favourable economic consequences, related to increased liquidity and decreased cost of capital, were observed only in case on “serious adopters”.

Another research that propose to test the economic consequences of IFRS adoption in relation to the heterogeneity of analyzed entities was published by Christensen *et al.* (2007, pp. 341–379). The authors have studied the economic consequences of mandatory IFRS adoption in case of the entities from UK, starting from the premise that these consequences depend on whether entities perceive (or not) benefits from the process of IFRS adoption. Thus, mandatory IFRS adoption does not uniformly produce benefits for all entities, but generates winners and losers; the obligation to apply IFRS determines net benefits for entities that would have voluntarily decided to switch to IFRS if they would have the chance, while other entities are forced to comply with the provisions of these standards against their will. The research analyzed two types of economic consequences. First, market reaction (measured by share price) to news regarding the EU decision to mandatory adopt the IFRS was analyzed. Second, the authors considered the relative change of the cost of equity between the time when the EU started to consider IFRS adoption and the time when the decision to adopt IFRS was effectively final and binding on all member states. The results show that the stock-price reaction of UK firms to news favorable

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

(unfavorable) to mandatory IFRS adoption is positively (negatively) related to UK entities' willingness to adopt IFRS; moreover, the change in the cost of equity is negatively associated to the variables that express UK entities' willingness to adopt IFRS.

The general conclusion of this study is that mandatory IFRS adoption generates significant differences among entities, a very important issue when analyzing the cost and benefits of this process in a certain community. The authors conclude that „implementing mandatory IFRS has the potential to redistribute wealth among agents in society through changes to the cost of capital”.

The study of the research literature give us the opportunity to identify the main economic consequences of improved accounting quality following IFRS adoption and to differentiate a typology of these consequences; the economic consequences can be analyzed in the context of voluntary or mandatory IFRS adoption, according to the measure of achieving the objectives of the European and international accounting convergence, and according to the benefits perceived by each category of stakeholders that uses the information published in the financial reporting prepared in the spirit of IFRS standards.

Conclusions

Global accounting standards could represent one of the most important changes of accounting regulation. The decision of the European Commission to mandate IFRS adoption for all the entities listed on EU's regulated markets, the efforts made by different jurisdictions in order to achieve the convergence of national accounting regulations with IFRS, and the recent debates regarding the use of IFRS for US listed entities suggest that the international financial reporting standards represent a set of high-quality accounting standards. However, the economic consequences of this change are still debatable.

The research literature offers mixed evidence on the effects of IFRS adoption on the quality of accounting data. We consider that the effects of IFRS adoption on accounting quality must be interpreted in the context of country-specific factors, as well as entity-specific factors.

Testing the effects of IFRS adoption on accounting quality is an important endeavour, but not sufficient; such research should also investigate the economic consequences emerging from the publication of increased quality accounting data prepared and presented in accordance with IFRS.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The study of the economic consequences of IFRS adoption must consider, on the one hand, the direct benefits for the entities that report this information and, on the other hand, the perceived benefits for different users of accounting data.

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
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18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
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**Catering Approach to the Dividend
Payment Policy on the Warsaw Stock
Exchange***

JEL Classification: *G02; G10; G35*

Keywords: *catering theory of dividends; dividend policy; propensity to pay dividend; behavioural finance*

Abstract: Dividend payment policy is a significant issue of neoclassical theories of finance. One of the concepts which poses a challenge to the neoclassical approach to dividend payment policy is behavioural finance, including a catering theory of dividends. The aim of the article is to examine whether and to what extent the catering theory of dividends is reflected in the behaviour of shareholders and managers on the WSE. The opportunity to accomplish the aim of this paper was conditioned by the empirical verification of research hypothesis stipulating that the number of dividend payers increases if the dividend payers are priced by the capital market higher than the nonpayers. The empirical verification of hypothesis was conducted basing on the equal- and value-weighted dividend premium as well as dividend payment ratios. Moreover, descriptive statistics, Spearman's rank correlation coefficient, linear regression and coefficient of determination were used. The study was carried out on the basis of companies operating in the electromechanical industry sector that were listed on the WSE in the period between 1999-2013. The figures were taken from the Stock Exchange Yearbooks, Notoria

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Serwis database and GPWInfostrefa platform. The preliminary results of empirical research in the range of the catering theory of dividends allow to draw a conclusion that this theory may be useful in explaining the dividend policy conducted by electromechanical industry companies listed on the WSE.

Introduction

The issues of net profit distribution are among the most significant strategic decisions made at the general meeting of shareholders. The division of net profit determines the conditions for the existence and development of the company and the growth of its competitiveness. Moreover, it is associated with the changes in the market value of the company. The dividend policy remains an issue that is not fully examined and explained by the theory, despite its significant impact on the capital market reaction and the future of company. The concept of dividend puzzle is being discussed not only by the neoclassical theory of finance, but more and more often it is explained by behavioural finance. Behavioural theories – including the catering theory of dividends – denying the assumption of capital market efficiency search for the new ways of explanation of capital market phenomena and complement the neoclassical theories by a new approach based on the irrational behaviour of managers or investors.

Assuming that the managers of stock companies behave in a rational way and investors categorize the companies in terms of dividend payment, we set the aim of the paper. This aim is to examine whether and to what extent the catering theory of dividends is reflected in the behaviour of the shareholders and managers on the Polish capital market. The opportunity to accomplish the objective of the paper was conditioned by the empirical verification of the research hypothesis stipulating that the number of dividend payers increases if the dividend payers are priced by the capital market higher than the nonpayers. Such a formulation of the research hypothesis results from the behavioural aspects of the stakeholders activities, in particular the managers and investors behaviour. When investors behave irrationally (i.e. they categorize companies taking into consideration only the criterion of dividend payment, not including company's investment opportunities), rational managers should recommend to the general meeting of shareholders a continuation of the dividend payments or an initiation of dividend in order to increase the market value of the company.

**The essence and place of catering theory among the dividend
payment theories – a literature review**

As part of the neoclassical theory of finance we should distinguish three main approaches to dividend policy. They are: neutral approach, pro-dividend approach and anti-dividend approach (Damodaran, 2007, p. 1013; Duraj, 2002, p. 124-137; Sierpińska, 1999, p. 131-151).

The representatives of neutral approach are Miller & Modigliani (1961, pp. 411-433) who proposed the dividend irrelevance theory. These authors, assuming a strong market efficiency as well as the lack of taxes and transaction costs, concluded that the dividend policy does not affect the market value of the company. Moreover, the investors are indifferent whether they receives income in the form of dividend or capital gains. According to the dividend irrelevance theory, the only factors that affects the market value of the company are the investment opportunity and company's ability to growth.

According to the pro-dividend approach an increase in the level of dividend is usually comprehended by investors as a positive signal sent by the company, indicating its good financial condition. An announcement of dividend payment leads to the increase in demand for shares and, consequently, to the growth in the market value of the company. According to Gordon (1959, pp. 99-105) dividend payment is also supported by the fact that along with the increase in the level of retained earnings cost of equity increases because investors require an additional premium for investment risk associated with the uncertainty of their future income. The uncertain future investment situation makes that the shareholders prefer dividend payment in regard to the possibility of achieving the potential capital gains in the indefinite future (Lintner, 1962, pp. 243-269).

The representatives of anti-dividend approach believe that the dividend payment has a negative impact on the market value of the company. The reasons for this are perceived in a different taxation of dividends and capital gains. If the dividend is taxed at the higher income tax rate than capital gains, the shareholders are not interested in dividend and prefer to retain the net profit (Litzenberger & Ramaswamy, 1979, pp. 163-195).

Among the neoclassical theories of dividend are also these considering the signalling theory and information asymmetry theory (see Asquith & Mullins, 1983, pp. 77-96; Pieloch-Babiarz, in print), agency theory (see Easterbrook, 1984, pp. 650-659; Jensen, 1986, pp. 323-329),

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

the organizational life cycle (see Mueller, 1972, pp. 199-219; Grullon et al., 2002, pp. 387-424) and clientele effect (Dhaliwal et al., 1999, pp. 179-194).

By contrast, Baker & Wurgler (2004a, pp. 1125-1165; 2004b, pp. 271-288) proposed a catering theory of dividends. This theory assumes that the behaviour of stock market investors is irrational. They categorize the companies taking into consideration only one factor – a dividend payment. When deciding, investors are focused solely on the fact of dividend payment. They do not pay attention to the amount of dividend payment as well as to the business development opportunities, the financial condition of the company, the size of its assets, the development stage of enterprise or the sector in which it operates. Therefore, investors divide the companies into two groups: dividend payers and nonpayers. In turn, the managers behave in a rational way. They analyse the market reactions adjusting the dividend payment policy to the changes in investor sentiment to dividend payers. The managers respond to the stock market investors' needs paying the dividend if the market value of dividend payers is high and omitting the dividend payments if the market value of nonpayers is high (see Konieczka & Szyszka, 2013, pp. 175-188). It should be added that the catering theory of dividends may be treated as an amplification of propensity to pay dividend concept formulated by Fama & French (see 2001, pp. 3-43).

The catering theory of dividends has been confirmed mainly in the US market. Baker & Wurgler (2004a, pp. 1125-1165) – introducing the concept of dividend premium, defined as a difference in the average market-to-book value ratios of dividend payers and nonpayers – proved that the number of dividend payers is strongly correlated with the level of dividend premium. The similar findings were derived from the studies conducted among stock companies in the UK (see Ferris et al., 2006, pp. 1149-1173). However, the catering theory of dividends has not been proven on the Japanese market (Tsuju 2010, pp. 1-14) as well as on the most developed capital markets of the European Union (Eije & Megginson, 2008, pp. 347-374). On the Polish capital market, preliminary research was conducted by Gajdka (2013, p. 141-156). The results of his study did not confirm the occurrence of catering on the Warsaw Stock Exchange.

The catering theory of dividends is still being improved and expanded with additional factors that may determine the behaviour of stock market investors and shape the market value of the company. Li & Lie (2006, pp. 293-308) extended the catering model of Baker & Wurgler with the amount of dividend payment. They found that the companies increase the level of payment if the dividend premium increases. If the dividend premium de-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

creases, companies reduce dividend payments and replace them with the share repurchasing. The issue of dividend substitution was also discussed by Jiang et al. (2013, pp. 36-50) who introduced the concept of repurchase premium. Their research showed that if this premium is positive (i.e. the companies that conduct share repurchasing are valued by investors higher than the dividend payers) managers replace dividend payments by share repurchasing. Similar results of empirical research were also obtained by Kulchania (2013, pp. 180-195).

Li & Zhao (2008, pp. 673-694) extended the catering model with a variable describing the risk. They proved that when the capital market values the dividend payers, it considers the changes in stock market sentiment and investment risk. Their findings were confirmed by Hoberg & Prabhala (2009, pp. 79-116) who observed that after the model's extension by adding individual and systematic risk the dividend premium ceased to be relevant. On this basis, they formulated the conclusion that the dividend premium is a measure of risk.

Denis & Osobov (2008, pp. 62-82), in turn, proved that the propensity to pay dividend depends mainly on such factors as: the company's size, its development opportunities and its profitability. To less extent it depends on the level of dividend premium. Also, Julio & Ikenberry (2004, pp. 89-100) drew attention to the size and age of the company. They showed that the effect of catering theory of dividend disappears if the model is extended with these two additional variables.

Another variable that may complement the model is legislation. Ferris et al. (2009, pp. 1730-1738) proved that the catering theory of dividends applies mainly to those legal systems that take good care of minority shareholders. This situation occurs, for example, in the Nordic countries. De Rooij & Renneboog (2009, pp. 215-238) also focused on the legislation. These authors conducted research on the Dutch market. They proved that stock companies initiate dividend payments to compensate the minority investors for having few rights and decision possibilities.

Methodology of the research

The empirical research was conducted basing on 41 companies operating in the electromechanical industry sector that were listed on the Warsaw Stock Exchange in the period between 2000-2013. Due to the methodology of research, the calculations were also carried out for 1999. The figures were taken from the Stock Exchange Yearbooks, Notoria

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 1. Basic dividend payment ratios

Ratio	Symbol	Formula
Dividend payment initiation ratio	$Init_t$	$\frac{New\ Payers_t}{Total\ Nonpayers_{t-1} - Delist\ Nonpayers_t}$
Dividend payment continuation ratio	$Cont_t$	$\frac{Old\ Payers_t}{Total\ Payers_{t-1} - Delist\ Payers_t}$
Dividend payment ratio of newly listed companies	$List_t$	$\frac{List\ Payers_t}{List\ Payers_t + List\ Nonpayers_t}$
Dividend payment omission ratio	$Omit_t$	$\frac{New\ Nonpayers_t}{Total\ Payers_{t-1} - Delist\ Payers_t}$
Share of new dividend payers in the number of total payers	$Init\ Share_t$	$\frac{New\ Payers_t + List\ Payers_t}{Old\ Payers_t + New\ Payers_t + List\ Payers_t}$
Share of dividend payers in a total number of companies in sector	$Pay\ Total_t$	$\frac{Total\ Payers_t}{Total\ Payers_t + Total\ Nonpayers_t}$
Share of new payers in a total number of companies in sector	$Init\ Total_t$	$\frac{New\ Payers_t + List\ Payers_t}{Total\ Payers_t + Total\ Nonpayers_t}$
Share of companies continuing dividend payments in a total number of companies in sector	$Cont\ Total_t$	$\frac{Old\ Payers_t}{Total\ Payers_t + Total\ Nonpayers_t}$
Share of companies omitting dividend payments in a total number of companies in sector	$Omit\ Total_t$	$\frac{New\ Nonpayers_t + Delist\ Payers_t}{Total\ Payers_t + Total\ Nonpayers_t}$
Symbols: $Total\ Payers_t$ – the companies paying dividend in year t , $Total\ Nonpayers_t$ – the companies not paying dividend in year t , $New\ Payers_t$ – the companies paying dividend in year t and not paying it in year $t-1$, $New\ Nonpayers_t$ – the companies not paying dividend in year t and paying it in year $t-1$, $Old\ Payers_t$ – the companies paying dividend in year t and in year $t-1$, $Old\ Nonpayers_t$ – the companies not paying dividend in year t and in year $t-1$, $List\ Payers_t$ – the companies paying dividend in year t and not in the sample in year $t-1$, $List\ Nonpayers_t$ – the companies not paying dividend in year t and not in the sample in year $t-1$, $Delist\ Payers_t$ – the companies paying dividend and delisted in year t , $Delist\ Nonpayers_t$ – the companies not paying dividend and delisted in year t .		

Source: own study on the basis of Baker & Wurgler (2004, p. 1133).

Serwis SA database and GPWInfostrefa platform.

Empirical verification of the research hypothesis was conducted mainly on the basis of the methodology proposed by Baker & Wurgler (2004a, p. 1133). In the first stage of the study, we determined separately for each year the number of companies paying dividend (i.e. the companies initiating and continuing payments) as well as the number of companies not paying dividends (i.e. the companies omitting dividend payments and not paying dividend at all). Moreover, the structure of these companies was examined.

Then, the basic dividend payment ratios were calculated. We used three

ratios proposed by Baker & Wurgler (2004, p. 1133) and six author's ratios, including four total structure ratios (see Table 1). These additional ratios were added in the hope of a fuller study of the issue of shareholders' and managers' behaviour on the Warsaw trading floor.

In the next stage of the study, the dividend premium was calculated. It was defined as a difference in the average price-to-book value ratios (p/BV) of dividend payers and nonpayers. The dividend premium was calculated using two formulas, i.e. formula for equal- and value-weighted dividend premium (compare Kowerski, 2011, p. 91).

The formula for equal-weighted dividend premium in year t is as follows:

$$EWp_t^{D-ND} = \frac{1}{NP_t} \sum_{i=1}^{NP_t} (EW \frac{p}{BV})_{i,t} - \frac{1}{NN_t} \sum_{n=1}^{NN_t} (EW \frac{p}{BV})_{n,t}$$

where:

EWp_t^{D-ND} – equal-weighted dividend premium at the end of year t ,

$(EW \frac{p}{BV})_{i,t}$ – the value of price-to-book ratio at the end of year t for i payer,

$(EW \frac{p}{BV})_{n,t}$ – the value of price-to-book ratio at the end of year t for n non-payer,

NP_t – the number of payers in year t ,

NN_t – the number of nonpayers in year t .

The formula for the value-weighted dividend premium is as follows:

$$VWp_t^{D-ND} = \frac{1}{VP_t} \sum_{i=1}^{NP_t} [vp_{i,t} (VW \frac{p}{BV})_{i,t}] - \frac{1}{VN_t} \sum_{n=1}^{NN_t} [vn_{n,t} (VW \frac{p}{BV})_{n,t}]$$

where:

VWp_t^{D-ND} – value-weighted dividend premium at the end of year t ,

$(VW \frac{p}{BV})_{i,t}$ – the value of price-to-book ratio at the end of year t for i payer,

$(VW \frac{p}{BV})_{n,t}$ – the value of price-to-book ratio at the end of year t for n non-payer,

$vp_{i,t}$ – capitalization at the end of year t of i payer's shares,

$vn_{n,t}$ – capitalization at the end of year t of n nonpayer's shares,

VP_t – capitalization at the end of year t of all payers,

VN_t – capitalization at the end of year t of all nonpayers,

NP_t – the number of payers in year t ,

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

NN_t – the number of nonpayers in year t .

Next, we determined the median for the dividend premium (calculated according to both formulas) and divided the research period into the years of relatively high and relatively low dividend premium. The years of relatively high dividend premium are these years for which the dividend premium was higher than the median. Otherwise, it was the year of relatively low dividend premium. Assuming that the dividend payment decisions are based on the historical data it was supposed that the level of dividend premium in one year affects the dividend payment decision in the following year.

In the next stage, the average values of dividend payment ratios for years of relatively high and relatively low dividend premium were compared. Moreover, medians and standard deviations were calculated. Then, we determined Spearman's rank correlation coefficient between the equal- and value-weighted dividend premium and dividend payment ratios. These actions were undertaken in order to examine the occurrence of dependence between the relative market value of dividend payers and propensity to pay dividend.

In the last part of the study, four models of linear regression were used. These models describe the relationship between the dividend premium in year $t-1$ (calculated in two ways) and the value of *Init*, *Cont*, *List* and *Omit* ratios in year t (see Table 2).

Table 2. Linear regression models for the catering theory of dividends

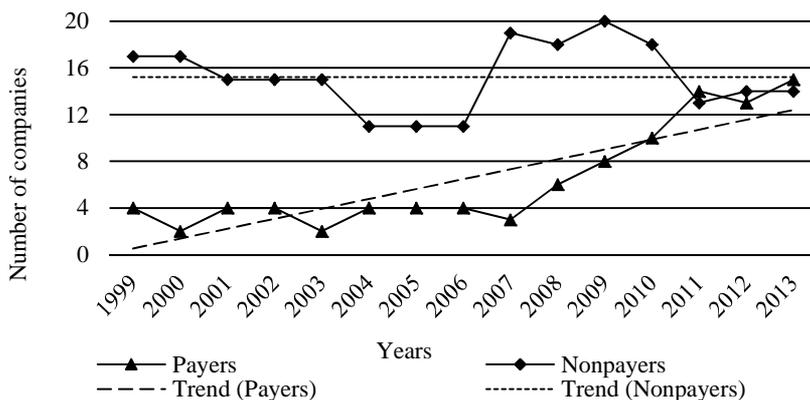
Dependent variable	Dividend premium	
	Equal-weighted	Value-weighted
Dividend payment initiation ratio	$Init_t = \alpha + \beta EWp_{t-1}^{D-ND} + \varepsilon_t$	$Init_t = \alpha + \beta VWp_{t-1}^{D-ND} + \varepsilon_t$
Dividend payment continuation ratio	$Cont_t = \alpha + \beta EWp_{t-1}^{D-ND} + \varepsilon_t$	$Cont_t = \alpha + \beta VWp_{t-1}^{D-ND} + \varepsilon_t$
Dividend payment ratio of newly listed companies	$List_t = \alpha + \beta EWp_{t-1}^{D-ND} + \varepsilon_t$	$List_t = \alpha + \beta VWp_{t-1}^{D-ND} + \varepsilon_t$
Dividend payment omission ratio	$Omit_t = \alpha + \beta EWp_{t-1}^{D-ND} + \varepsilon_t$	$Omit_t = \alpha + \beta VWp_{t-1}^{D-ND} + \varepsilon_t$

Source: own study.

Characteristics of the companies operating in the electromechanical industry sector in the period between 1999-2013

In the majority of years of research period, among companies operating in the electromechanical industry sector dominated dividend nonpayers. Most of companies did not decide to conduct a dividends payment during the economic downturn, i.e. between 2007-2010. The successive increase in the number of dividend payers have been observed since 2007. In the last three years of the research period, the number of dividend payers and nonpayers was at a similar level. The only years in which relatively more companies conducted the dividend payment were 2011 and 2013 (14 and 15 companies, respectively). In the period between 1999-2013, a horizontal trend line was observed for nonpayers, while for the dividend payers linear trend was increasing (see Figure 1).

Figure 1. The number of dividend payers and nonpayers in electromechanical industry sector in the period between 1999-2013



Source: own study on the basis of Roczniki Gieldowe (2001-2014), Notoria Serwis SA and GPWInfostrefa.

Among the dividend payers dominated those companies that were continuing dividend payments. This may denote the stability of dividend policy in the analysed sector. In 2003 and 2007, all companies that paid the dividend did the same in the previous year. It should be added that these were only 2 and 3 companies, respectively. The largest number of companies continued dividend payments in the last four years of research period. In

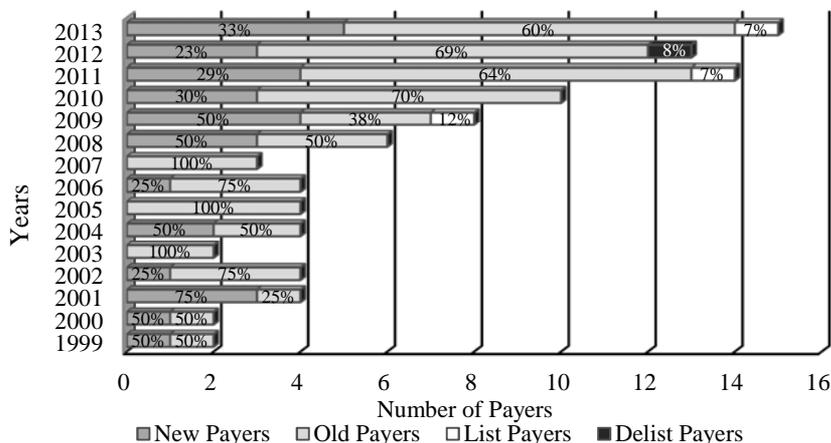
**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

2010, the share of companies continuing the dividend payments in a total number of dividend payers amounted to 70% (7 companies), in 2011 stood at 64% (9 units), in 2012 was equal to 69% (9 enterprises) and in 2013 reached the level of 60% (9 companies). In 2001 and 2009, the share of companies continuing the dividend payment in a total number of analysed companies was the lowest. In 2001 it amounted to 25% and in 2009 it stood at 38% (1 and 3 companies, respectively).

The second largest group of dividend payers comprised of the companies that did not pay dividend in the previous year. Their largest share in total payers was observed in 2001 and amounted to 75%. In 2004, 2008 and 2009, this share stood at 50%. The majority of companies, that in the previous year did not pay dividend, decided to pay it in the last year of analysis, i.e. in 2013. It was 5 companies (33% of the study group).

In the entire research period, only three companies that in a given year were newly listed on the main market of the Warsaw Stock Exchange (including those companies passing from NewConnect market), paid a dividend in the same year. In 2009 it was Centrum Klimat SA, in 2011 it was Zamet Industry SA and in 2013 it was Newag SA. Only one company paid dividend and then, in the same year, was excluded from stock exchange trading. This occurred in 2012 (see Figure 2) and the company was Centrum Klimat SA.

Figure 2. The number and structure of dividend payers in electromechanical industry sector in the period between 1999-2013

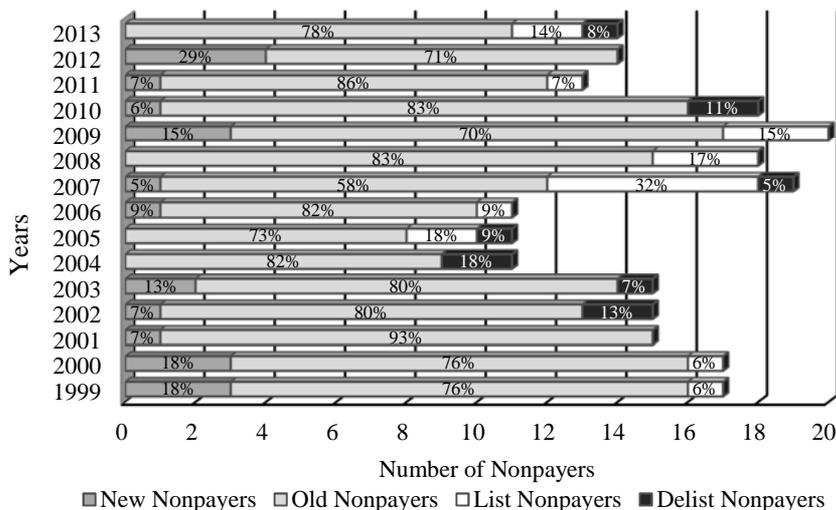


Source: own study on the basis of Roczniki Gieldowe (2001-2014) and Notoria Serwis SA.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Among dividend nonpayers dominated those companies that did not distribute cash to shareholders in the previous year. Most of such companies were observed in 2001 (93% of the study population), in 2011 (86%), in 2008 (83%) and in 2010 (83%). In 2008 and 2010, the majority of companies continued strategy of so called zero dividend payment policy (15 companies per year). Most companies omitted dividend payment in 2012 (4 cases) as well as in 1999, 2000 and 2009 (3 companies per year). However, in the 2004, 2005 and 2013 none of the companies paying dividend in the previous year decide to discontinue the payment. The largest number of newly listed companies that did not pay dividend was observed in 2007 (7 cases, accounting for 32% of nonpayers in this year). In 2008 and 2009, there were 3 such cases per year. In 2005 and 2013, we observed 2 such cases per year. Moreover, there were just a few companies that did not pay dividend and were delisted in the same year. In 2002, 2004 and 2010, there were two such cases per year, and in 2003, 2005, 2007 and 2013, we observed only one such case per year (see Figure 3).

Figure 3. The number and structure of dividend nonpayers in electromechanical industry sector in the period between 1999-2013



Source: own study on the basis of Roczniki Gieldowe (2001-2014) and Notoria Serwis SA.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The highest percentage of companies initiating the dividend payment was observed in the last years of research period. Dividend payment initiation ratio reached the highest value in 2013, when 38,46% of the previous nonpayers initiated dividend payments. In 2012, the value of $Init_t$ stood at 23,08%, while in 2009 and 2011 this ratio amounted to 22,22% per year. The lowest value of this ratio was equal to 0%. None of the previous nonpayers decided to initiate dividend in three last years of research period, i.e. in 2003, 2005 and 2007. The average annual dividend payment initiation ratio reached the level of 13,87%, its standard deviation stood at 10,55% and median amounted to 15,59% (see Table 3).

All companies paying the dividend in year $t-1$ decided to continue the payments in 2004-2005 and in 2008. The high value of dividend payment continuation ratio was observed in 2011 (this ratio amounted to 90%) and in 2010 (this ratio reached the level of 87,5%). In the last two years of the study the value of $Cont_t$ amounted to 69,23% per year. In the period between 2000-2013 the average annual dividend payment continuation ratio stood at 72,57%, median reached the level of 75% and standard deviation amounted to 21,74% (see Table 3).

Table 3. Measures of dividend payment in the period between 2000-2013 (in %)

Years	Dividend payment ratios								
	$Init_t$	$Cont_t$	$List_t$	$Omit_t$	$Init Share_t$	$Pay Total_t$	$Init Total_t$	$Cont Total_t$	$Omit Total_t$
2000	5,88	25,00	0,00	75,00	50,00	10,53	5,26	5,26	15,79
2001	17,65	50,00	x	50,00	75,00	21,05	15,79	5,26	5,26
2002	7,69	75,00	x	25,00	25,00	21,05	5,26	15,79	5,26
2003	0,00	50,00	x	50,00	0,00	11,76	0,00	11,76	11,76
2004	15,38	100,00	x	0,00	50,00	26,67	13,33	13,33	0,00
2005	0,00	100,00	0,00	0,00	0,00	26,67	0,00	26,67	0,00
2006	9,09	75,00	0,00	25,00	25,00	26,67	6,67	20,00	6,67
2007	0,00	75,00	0,00	25,00	0,00	13,64	0,00	13,64	4,55
2008	15,79	100,00	0,00	0,00	50,00	25,00	12,50	12,50	0,00
2009	22,22	50,00	25,00	50,00	62,50	28,57	17,86	10,71	10,71
2010	16,67	87,50	x	12,50	30,00	35,71	10,71	25,00	3,57
2011	22,22	90,00	50,00	10,00	35,71	51,85	18,52	33,33	3,70
2012	23,08	69,23	x	30,77	23,08	48,15	11,11	33,33	18,52
2013	38,46	69,23	33,33	30,77	40,00	51,72	20,69	31,03	3,45
Mean	13,87	72,57	13,54	27,43	33,31	28,50	9,84	18,40	6,37
Median	15,59	75,00	13,54	25,00	32,86	26,67	10,91	14,71	4,90
SD	10,55	21,74	18,60	21,74	22,45	13,31	6,85	9,48	5,58

Source: own study on the basis of Roczniki Gieldowe (2001-2014) and Notoria Serwis SA.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

In the case of companies that were listed on the Warsaw trading floor for the first time, most of them paid dividend in 2011 (50% of newly listed companies). The high value of $List_t$ was also observed in the last year of research period. In 2013, this ratio stood at 33,33%. Moreover, in most years of the analysed period the value of $List_t$ was equal to 0% or – due to the lack of newly listed companies in electromechanical industry sector – impossible to calculate.

The highest value of dividend payment omission ratio was observed in 2000 when 75% of dividend payers refrained from dividend payments. In 2001, 2003 and 2009, the value of $Omit_t$ stood at 50% and in 2012-2013 it was equal to 33,77% per year. The average annual value of dividend payment omission ratio amounted to 27,43%, median stood at 25%, and standard deviation reached the level of 21,74%.

The analysis of share of the companies initiating dividend payments in the total number of payers showed that the value of $Init Share_t$ was the highest in 2001. It was equal to 75%. The high value of this ratio was also observed in 2009, when 62,5% of dividend payers accounted for the companies initiating the dividend payments. In 2000, 2004 and 2008, the value of $Init Share_t$ stood at 50% per year. The average value of this ratio was equal to 33,31%, median reached the level of 32,86% and standard deviation was 22,45%.

Analysing the share of dividend payers (including the companies initiating and continuing payments) in the total number of companies operating in electromechanical industry sector, it should be noted that relatively many companies paid dividend in the period between 2009-2013. The highest value of $Pay Total_t$ was observed in 2011 and 2013 (51,85% and 51,72%, respectively). In the research period, the dividend payers accounted for 28,5% of the companies operating in the examined sector. Moreover, in half of the years at least 26,67% of companies paid dividend.

The companies that initiated dividend payments accounted for 9,84% of the study population, and the companies that continued dividend payments accounted for 18,4% of the total number of companies. Median was at the level of 10,91% and 14,41%, respectively, and standard deviation stood at 6,85% and 9,48%, respectively.

The highest value of $Omit Total_t$ was observed in 2012. It was equal to 18,52%. In contrast, the lowest value of this ratio occurred in 2004, 2005 and 2008. It stood at 0%, which means that in those years no company resigned from dividend payment. The average annual value of this ratio stood

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

at 6,37%, median reached the level of 4,9% and standard deviation was equal to 5,58%.

**The results of empirical studies on the occurrence of catering approach
to dividend payments on the Warsaw Stock Exchange**

The highest average price-to-book value ratio, calculated for dividend payers in the period between 2000-2013, was observed in 2007. In this year, the average value of EWp/BV was equal to 3,76 and the average value of VWp/BV stood at 4,43. The lowest average values of this ratio, in turn, were observed in 2001 (0,51 and 0,58, respectively). The average annual value of EWp/BV for dividend payers stood at 1,69 and VWp/BV was equal to 2,38. The median amounted to 1,67 and 2,33, respectively, and standard deviation was equal to 0,94 and 1,15, respectively.

In the case of nonpayers, the highest average value of price-to-book value ratio was observed in 2013. In this year, EWp/BV amounted to 3,69. In turn, VWp/BV was the highest in 2006. It was equal to 3,79. The average annual values were equal to 1,38 and 1,40, respectively. Median stood at 1,12 and 1,18, respectively (see table 4).

The dividend premium was positive in the majority of analysed years. That means that the capital market was usually pricing dividend payers higher than nonpayers. The highest dividend premium was observed in 2007 (EWp^{D-ND} stood at 1,68, and VWp^{D-ND} was equal to 2,19). The lowest equal-weighted dividend premium occurred in 2013. It was equal to -1,69. The lowest value-weighted dividend premium, in turn, was observed in 2001. It stood at 0,14. The average annual value of EWp^{D-ND} amounted to 0,31, and VWp^{D-ND} was equal to 0,99. Median of equal-weighted dividend premium stood at 0,40, and median of value-weighted dividend premium reached the level of 0,67.

Table 4. Average equal- and value-weighted price-to-book value ratios and dividend premiums in the period between 1999-2013

Years	Payers		Nonpayers		Dividend Premium	
	$(EWp/BV)_t$	$(VWp/BV)_t$	$(EWp/BV)_t$	$(VWp/BV)_t$	EWp_t^{D-ND}	VWp_t^{D-ND}
1999	0,70	1,57	0,82	1,14	-0,12	0,43
2000	0,62	0,89	0,80	0,19	-0,18	0,70
2001	0,51	0,58	0,73	0,44	-0,22	0,14
2002	0,75	1,16	0,50	0,90	0,25	0,27
2003	1,76	2,82	0,90	1,03	0,86	1,79
2004	2,24	3,47	1,20	1,20	1,03	2,28
2005	2,13	3,82	1,47	1,72	0,66	2,11

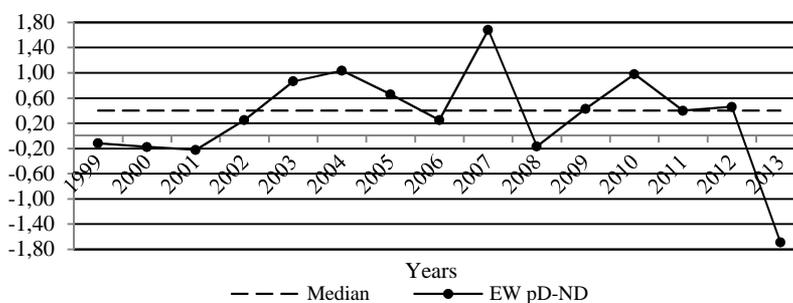
**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

2006	3,41	4,26	3,16	3,79	0,25	0,47
2007	3,76	4,43	2,08	2,24	1,68	2,19
2008	0,96	1,51	1,12	0,98	-0,17	0,53
2009	1,67	2,22	1,24	1,67	0,43	0,55
2010	2,11	2,41	1,13	1,18	0,98	1,23
2011	1,22	1,74	0,83	0,73	0,40	1,01
2012	1,50	2,33	1,04	1,66	0,46	0,67
2013	2,00	2,54	3,69	2,09	-1,69	0,45
Mean	1,69	2,38	1,38	1,40	0,31	0,99
Median	1,67	2,33	1,12	1,18	0,40	0,67
SD	0,94	1,15	0,88	0,84	0,74	0,72

Source: own study on the basis of Roczniki Gieldowe (2000-2014) and GPWInfostrefa.

By adopting the value of median as a reference level of the dividend premium, which is used by the companies in the process of deciding to pay (i.e. to initiate or to continue dividend payments) or not to pay dividend (including dividend omissions), the research period was divided into years of relatively high and relatively low valuation of dividend payers. For the year of relatively high valuation of dividend payers was considered that year, when the dividend premium was at least equal to the median. Otherwise, that year was considered to be the year of relatively low valuations of dividend payers. The values of equal-weighted dividend premium as well as its median are shown in Figure 4.

Figure 4. The values of equal-weighted dividend premium and its median in the period between 1999-2013

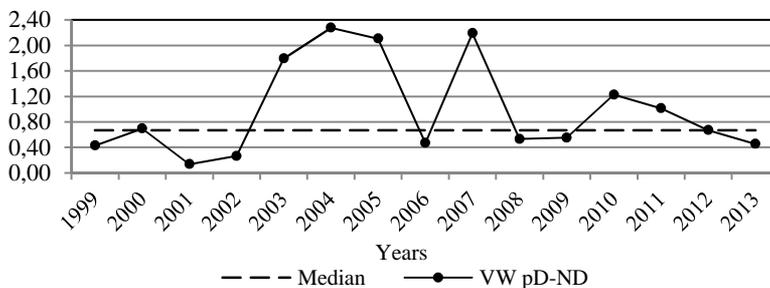


Source: own study on the basis of Roczniki Gieldowe (2000-2014) and GPWInfostrefa.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Consistent with the catering approach, the decision to pay dividend is made by the company on the basis of the level of dividend premium for a previous year. For the years of relatively high equal-weighted dividend premium were considered the following years: 2003, 2004, 2005, 2007, 2009, 2010, 2011 and 2012. This means that the companies should be more likely to pay dividend in years: 2004-2006, 2008 and 2010-2013 (see Figure 4). The years of a relatively high value-weighted dividend premium are as follows: 2000, 2003, 2004, 2005, 2007, 2010, 2011 and 2012. This means that the companies should be more likely to pay dividend in the following years: 2001, 2004-2006, 2008 and 2011-2013 (see Figure 5).

Figure 5. The values of value-weighted dividend premium and its median in the period between 1999-2013



Source: own study on the basis of Roczniki Gieldowe (2000-2014) and GPWInfostrefa.

The values of descriptive statistics of dividend payment ratios seem to confirm the catering activities of managers of stock companies operating in electromechanical industry sector. In the years of relatively high dividend premium (calculated in two ways) the average values of $Init_t$, $Cont_t$ and $List_t$ are higher than in the years of relatively low dividend premium. In the years of relatively high valuation of dividend payers, measured with the equal-weighted dividend premium, the average dividend payment initiation ratio was equal to 17,95%. In the years of relatively low dividend premium, in turn, $Init_t$ stood at 8,91% (see Table 5).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 5. Descriptive statistics of dividend payment ratios in the years of relatively high and low valuations of dividend payers (in %)

Dividend premium	Descriptive statistics	Dividend payment ratios								
		<i>Init_t</i>	<i>Cont_t</i>	<i>List_t</i>	<i>Omit_t</i>	<i>Init Share_t</i>	<i>Pay Total_t</i>	<i>Init Total_t</i>	<i>Cont Total_t</i>	<i>Omit Total_t</i>
<i>EWp_{t-1}</i> ^{D-ND}		Years of relatively high dividend premium								
	Mean	17,59	86,37	16,67	9,78	31,72	36,55	11,69	24,40	7,42
	Median	16,23	88,75	0,00	5,00	32,86	31,19	11,81	25,83	6,67
	SD	10,47	12,69	21,08	11,52	15,34	11,33	6,06	7,85	4,83
		Years of relatively low dividend premium								
	Mean	8,91	54,17	8,33	45,83	35,42	17,77	7,36	10,41	12,38
	Median	6,79	50,00	0,00	50,00	37,50	17,34	5,26	11,24	13,25
SD	8,40	17,18	11,79	17,18	29,24	6,37	7,05	3,96	4,38	
<i>VWP_{t-1}</i> ^{D-ND}		Years of relatively high dividend premium								
	Mean	17,71	81,68	16,67	14,47	37,35	34,72	12,33	21,93	6,74
	Median	16,72	82,50	0,00	5,00	37,86	26,67	12,92	23,33	5,96
	SD	10,47	17,44	21,08	17,67	20,91	12,44	6,19	10,06	4,70
		Years of relatively low dividend premium								
	Mean	8,74	60,42	8,33	39,58	27,92	20,21	6,52	13,69	13,29
	Median	6,79	62,50	0,00	37,50	27,50	17,34	5,26	12,70	13,25
SD	8,23	20,94	11,79	20,94	23,29	9,30	6,25	6,00	3,22	

Source: own study on the basis of Roczniki Gieldowe (2000-2014) and GPWInfostrefa.

In the years of the relatively high dividend premium, 86,37% of dividend payers decided to continue dividend payments, while in the other years *Cont_t* was lower and amounted to 54,17%. A similar relationship can be observed among the companies that were listed on the Warsaw Stock Exchange for the first time. On average, 16,67% of these companies initiated dividend payments in the years of relatively high dividend premium. If the dividend premium was low or it was negative dividend was paid only by 8,33% of newly listed companies.

The similar conclusions on the dividend catering may be drawn by analysing the values of *Pay Total_t*, *Init Total_t*, *Cont Total_t*, and *Omit Total_t*. The catering behaviour of companies was also confirmed by examination of the median values of these ratios in the years of relatively high and relatively low dividend premium. Moreover, the compatible findings may be formulated when using the value-weighted dividend premium (see Table 5).

The preliminary conclusions on the catering behaviour of companies should be verified by studying the dependence between dividend payment ratios and dividend premium. The values of Spearman's rank correlation coefficient indicate the existence of relationship between the market valua-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

tion of companies and the number of dividend payers. The strongest unidirectional dependence was observed between the dividend premium and the number of companies continuing dividend payments. The value of Spearman's rank correlation coefficient was equal to 0,78 if calculation was based on EWp_{t-1}^{D-ND} and it stood at 0,63 if VWp_{t-1}^{D-ND} was used. A strong unidirectional dependence was also observed between the dividend premium and value of $List_t$. It was equal to 0,6 and 0,86, respectively. The weakest unidirectional dependence took place in the case of $Init_t$ (0,04 and 0,20, respectively). In contrast, the strongest bidirectional dependence was observed between the dividend premium and dividend payment omission ratio ($Omit_t$). It was equal to -0,86 and -0,68, respectively (see Table 6).

Table 6. The values of Spearman's rank correlation coefficients for the dependence between dividend premium and dividend payment ratios

Dividend premium	$Init_t$	$Cont_t$	$List_t$	$Omit_t$	$Init$ $Share_t$	Pay $Total_t$	$Init$ $Total_t$	$Cont$ $Total_t$	$Omit$ $Total_t$
EWp_{t-1}^{D-ND}	0,04	0,78	0,60	-0,86	-0,12	0,46	0,13	0,46	-0,52
VWp_{t-1}^{D-ND}	0,20	0,63	0,86	-0,68	0,09	0,45	0,27	0,36	-0,64

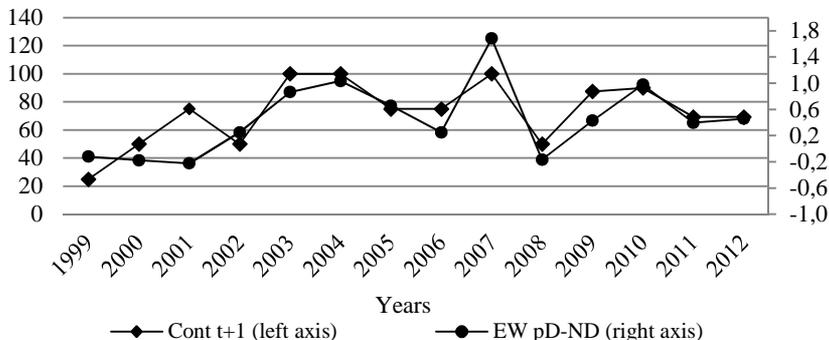
Source: own study on the basis of Roczniki Gieldowe (2000-2014) and GPWInfostrefa.

The unidirectional dependence between the dividend premium and the number of dividend payers is particularly seen in the case of companies continuing dividend payments. If the dividend payers were priced higher than nonpayers in year t , relatively more companies continued dividend payments in year $t+1$. If the dividend premium was low or negative in year t , some of the companies omitted the dividend payment in the following year (see Figure 6).

On the existence of a relationship between the relative market value of dividend payers and the number of companies conducting the dividend payments indicates some of estimated values of the parameter β in the linear regression models (positive when the dependent variable is $Init_t$, $Cont_t$ and $List_t$, and negative in the case of variable $Omit_t$). If the dependent variable is the share of companies continuing dividend payment in the year t in the number of dividend payers in year $t-1$, the value of the parameter β is positive and statistically significant at the significance level of 0,01. Thus, the increase in the value of the dividend premium (calculated in two ways) is accompanied by a relative increase in the number of companies continuing dividend payments. Moreover, a variability of $Cont_t$ is explained in the model by variability of equal-weighted dividend premium in 59% and by variability of value-weighted dividend premium in 57%.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Figure 6. The dividend premium EWp_{t-1}^{D-ND} and the value of $Cont_t$ (one-year-ahead)



Source: own study on the basis of Roczniki Gieldowe (2000-2014) and GPWInfostrefa.

The occurrence of the catering behaviour of company is also visible in the case of $Omit_t$, for which the value of parameter β is negative and statistically significant at the significance level of 0,01. In this case, the coefficient of determination amounted to 51% and 45%.

Table 7. Estimation of linear regression models for the dependence between the dividend payment ratios and dividend premium

Dependent variable	Parameter β (<i>t</i> -Student)		Intercept α (<i>t</i> -Student)		Coefficient of determination R^2	
	<i>EW</i>	<i>VW</i>	<i>EW</i>	<i>VW</i>	<i>EW</i>	<i>VW</i>
$Init_t$	0,28 (1,07)	0,21** (0,78)	0,95 (2,63)	0,89*** (1,96)	0,09	0,05
$Cont_t$	1,12* (4,17)	1,09* (3,97)	2,23* (6,02)	1,68* (3,57)	0,59	0,57
$List_t$	0,27 (1,22)	0,14 (0,61)	0,10 (0,34)	0,12 (0,31)	0,11	0,03
$Omit_t$	-0,48* (-3,55)	-0,45* (-3,10)	1,30* (6,92)	1,51* (6,09)	0,51	0,45

Symbols: * statistically significant at the significance level of 0,01,
** statistically significant at the significance level of 0,05,
*** statistically significant at the significance level of 0,10.

Source: own study on the basis of Roczniki Gieldowe (2000-2014) and GPWInfostrefa.

If the dependent variable was $Init_t$ or $List_t$, the positive values of the parameter β were observed. This may indicate the use of catering by managers of companies operating in electromechanical industry sector.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

It should be noted that statistically significant the value of the parameter β was obtained at a significance level of 0,05 in the case of linear regression model in which the explanatory variable was VWp_{t-1}^{D-ND} and the dependent variable was $Init_t$. However, the value of the R^2 was very low and amounted to 5% (see Table 7).

Conclusions

The dividend payers operating in electromechanical industry sector in the period between 1999-2013 were valued by the investors of the Warsaw trading floor higher than nonpayers. The decisions on dividend payment (both continuing and initiating dividend payments) were made more frequently in the years of relatively high dividend premium. If the dividend premium was relatively low or negative, some of the companies decided not to pay dividend. Such behaviour of stock companies may confirm that the managers take action in accordance with the catering theory of dividends. They cater to investors by paying dividends if the capital market put a stock price premium on payers. They do not pay dividends if investors prefer nonpayers.

The results of the study presented in this paper are of the preliminary nature, so conclusions should not be generalized. The conducted empirical research are *in statu nascendi*, so it is necessary to consider the need for its intensification and extension as well as application of the other dividend payments ratios and different methods of dividend premium calculation. There is no doubt that research must be extended with the macroeconomic factors (e.g. the economic situation), the development and technological opportunities of sector as well as the investment strategies of companies.

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18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
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**What Determines the Reforms
of Employment Protection Legislation?
A Global Perspective**

JEL Classification: *D02; D78; J08; J32*

Keywords: *political economics; employment protection legislation; labor law; labor market institutions; labor market policy*

Abstract: The aim of this research was to identify determinants of the employment protection legislation reforms in the global perspective. The study was based on the Labor Freedom index published by the Heritage Foundation, which allowed to include 179 countries in the research that were observed in the period 2003-2013. The conducted research has indicated that changes in GDP and the level of employment in industry may induce the introduction of labor reforms. The changes in the labor law also occurred to be correlated with the number of the nearly excluded from the labor market (the long-term unemployed and youth not in education, employment or training) and also with changes in the government expenditure. However, all these factors may lead to substantially various reform programs in particular countries due to the heterogeneous political pressure of the labor market interest groups and different governmental determination in introduction of the reforms.

Introduction

The labor economics literature has generated a lively and continuously growing discussion concerning the role of labor market regulations for the labor market performance for the last three decades (Blanchard, 2006, pp. 13-35). Nowadays, there are no doubts that the situation on the labor market is dependent on its institutional framework (Lehmann & Muravyev, 2012). In this context it is quite surprising that only a relatively small number of studies was aimed at answering the question of what determines the labor institutional framework in the particular countries.

The existing analyses in this area have been focused mainly on the OECD economies and were aimed primarily at explaining the differences among levels of various institutional indicators in the particular countries. In consequence, there is a need to develop this strand of research by conducting more analyses on determinants of the changes of the labor market institutions and by expanding the geographical scope of these studies. Therefore, the aim of this research is to identify determinants of the employment protection legislation reforms around the world. The analysis is focused only on the employment protection due to data availability. The group of the analyzed countries comprises of 179 entities, while the time scope is 2003-2013.

In the next section the methodology of the research is briefly described. Thereafter, an analysis of the determinants of labor market reforms based on the literature is presented. In the next section the general tendencies of the employment protection legislation changes in the research period are identified and analyzed. Thereafter, the results of the econometric investigation are presented. The last section concludes the article.

Methodology of the research

Identification of the determinants of employment protection legislation reforms presented in this article was divided into two main steps. In the first step the critical analysis of the literature was conducted in order to select potential determinants of these reforms. In the next step the econometric investigation was executed in order to find which potential determinants are statistically significant. During this investigation the panel data models were used.

It was decided to use the index of Labor Freedom that is published by the Heritage Foundation (2014) as a quantitative measure of the employ-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

ment protection legislation. It is an index that reflects various aspects of the legal and regulatory framework of a country's labor market, including regulations concerning minimum wages, laws inhibiting layoffs, severance requirements, and measurable regulatory restraints on hiring and hours worked. It takes values from 0 to 100 – the higher the value is, the lesser is the guaranteed employment protection. Although the index tries to capture various labor market institutions, description of its methodology suggests that it predominantly measures the strictness of the employment protection legislation (Heritage Foundation, 2014). It can also be noticed that it is similar to the EPL index published by the OECD (2014). Although the EPL is widely used in the literature, its values are regularly collected only for the OECD countries, whereas the Labor Freedom index has been assembled for 184 countries in 2014. It has been published from 2005 and refers to the period from 2004 to 2014. Therefore, the Labor Freedom index allows not only to analyze the short-term changes in the labor legislation, but also to identify the medium-term tendencies, because all the published values were estimated with the use of the same methodology.

All indicators that were analyzed as potential determinants of the employment legislation were derived from the World Development Indicators database (World Bank, 2014). It was decided to use this data set, because the measures for almost all countries investigated by the Heritage Foundation are published there (Taiwan is the only exception).

Not surprisingly, for such a broad set of countries the missing values occurred to be a significant obstacle during the study. Therefore, countries or years with almost no observations had to be removed. The obtained unbalanced panel data set comprised of 179 countries that were observed in the period 2003-2013.

Insights from the literature

The institutions of the labor market may be defined as rules influencing the scope of choices available to the participants of this market with respect to the amount of work offered or demanded, and the level of wages (Boeri & Van Ours, 2008, p. 3). Although these rules can be both formal and informal, most analyses focus only on the formal rules due to data availability (and so it was done in the presented study).

The number of studies concerning the labor market institutions began to rise rapidly in the 80's of the 20th century (Blanchard, 2006, pp. 13-35). It was a time when many labor economists tried to explain the mechanism of

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

the unemployment hysteresis occurrence. Labor market institutions were found not only to influence the hysteresis in a significant degree, but also allowed to explain why the strength of this effect is different in the particular countries. Layard, Nickell and Jackman (2005, p. xxvii) state that labor market institutions indicators can explain around 55% of the unemployment volatility in highly developed states in years 1960-1990.

However, while there are no doubts now that the labor market institutions matter, it is quite surprising that relatively few researchers have given significant consideration to the question stated by Arpaia and Mourre (2005, p. 17-18): ‘why labor market institutions are as they are, and to what extent the current configuration of labor market institutions might be desirable despite sometimes their unfavorable impact on labor market performance’.

One possible answer to this question is that labor market institutions have their origins in the history of the country law or its culture (Arpaia and Mourre 2005, p. 18; Algan & Cahuc, 2009). The second proposed explanation (Boeri & Van Ours, 2008, p. 19) indicates that a competitive market for labor does not exist in practice. Informational asymmetries, externalities, search frictions and structural mismatches are the reasons why the labor market performance is usually far from the fully competitive market equilibrium. Thus, imposing institutions on the labor market may allow to attain at least the second-best outcome. The third view indicates that labor market institutions are introduced, because they remain beneficial for the society, even if they hamper the labor market performance. For instance, Bertola and Koeniger (2004) show that strict employment protection and high unemployment benefits may be introduced in order to reduce labor income fluctuations in countries with under-developed financial systems, where consumer credit is relatively scarce. This argument can be especially significant for developing countries. Boeri and Van Ours (2008, p. 19) argue also that labor market institutions can increase the income equality effectively, which can also be perceived as socially beneficial. Finally, many labor market institutions exist, because they are beneficial for some interest groups, especially for the employees who are the largest group of voters on the labor market (Saint-Paul, 1996, 2002; Boeri, Conde-Ruiz & Galasso, 2003). Employees tend to exert pressure on the government to provide them protection against labor market risks at the cost of other labor market groups and labor productivity. This mechanism is present in every

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

country, however its strength can be very different¹. It should be stressed that all these factors do not exclude one another, but operate complementarily, which leads to the substantial variety of institutional frameworks in the particular countries.

Therefore, it can be concluded that labor market institutions are reformed if one of the previously mentioned factors has changed. The work of Blanchard and Wolfers (2000) suggests that these changes can especially be a consequence of adverse macroeconomic shocks. Such a shock strongly affects the situation on the labor market, which induces the government to show its competence and react in some way (Saint-Paul, 1996, p. 276). Thus, the scope of reforms will be dependent on preferences and determination of the government. For instance, it can offer more protection to employees. On the other hand, however, an adverse shock can decrease the political opposition of the insiders against labor reforms (Saint-Paul, 1996, p. 280), because they become more exposed to the risk of being dismissed, and in consequence, grow more interest in instruments that help the unemployed to find a job. In such a situation the government can increase the ALMP expenditure without changing the labor law (or even decide to introduce some liberalization of the law, for instance for temporary contracts). Therefore, it is not clear what will be the direction of labor reforms in reaction to such a shock, because it will depend on the political strength of particular groups on the labor market, on their preferences, on the scale and nature of the shock, and on the government decisions.

These shocks do not need to be demand shocks only. Changes in the level of competition on the goods market (caused for example by the technological progress or by opening to new international markets) may also lead to changes in the labor market institutions (Boeri, 2005). When the level of competition rises, existing labor regulations cause higher forgone efficiency, and in consequence, the difference between achieved social welfare and potential social welfare is higher. In such a situation it would be economically desirable to liberalize the labor regulations, which – however – could be politically unattainable due to the opposition of some

¹ For instance, in order to ensure higher labor market flexibility many governments decided to liberalize regulations concerning the temporary employment. In the case of Germany (Eichhorst & Marx, 2011), although the insiders had objected to such flexibilization in principle – once the reforms were in place – they reacted with decreasing their pressure on ensuring greater employment protection in order to strengthen their competitiveness relative to flexible workers. On the other hand, relaxing regulations of the temporary contracts in Spain (Dolado, García-Serrano, & Jimeno, 2002) increased the pressure from permanent employees to secure their posts, which resulted in formulation of the dual market.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

groups of employees (Boeri & Van Ours, 2008, p. 21). Thus, the government may only decide to propose a two-tier reform (Boeri & Garibaldi, 2006) which will relax the labor regulations only for some groups (for instance temporary employees).

Paradoxically, this opposition may be so strong that it will induce the government to deliberately introduce some labor protective institutions at the cost of social welfare. The government can for example offer some form of compensation to the insiders in order to gain their support for the reform (Drazen, 2002, pp. 624-625). For instance, it may create a special ALMP program or increase the level of unemployment benefits. The government may also decide to implement reforms gradually if various interest groups are against some parts of the reform only (Drazen, 2002, pp. 626-632). This 'divide and conquer' strategy will extend the time span between a macroeconomic shock and labor market changes, and in fact disturb a relationship between these two phenomena.

Although the conducted review of the literature was succinct, it allows to conclude that labor market institutions reforms can be triggered by a broad set of factors among which presumably the most important are adverse demand shocks that significantly affect the situation on the labor market and positive supply shocks that allow to increase the labor productivity. However, due to the political opposition of the insiders, these changes can have various scope, time of implementation and even different direction².

Therefore, it can be concluded that although the literature suggests many potential determinants of labor reforms, it does not give clear-cut conclusions concerning their significance and strength of their influence. Thus, there is a need to identify these determinants empirically and to assess their average impact, which will be the goal of the following sections.

Global tendencies in the employment protection reforms

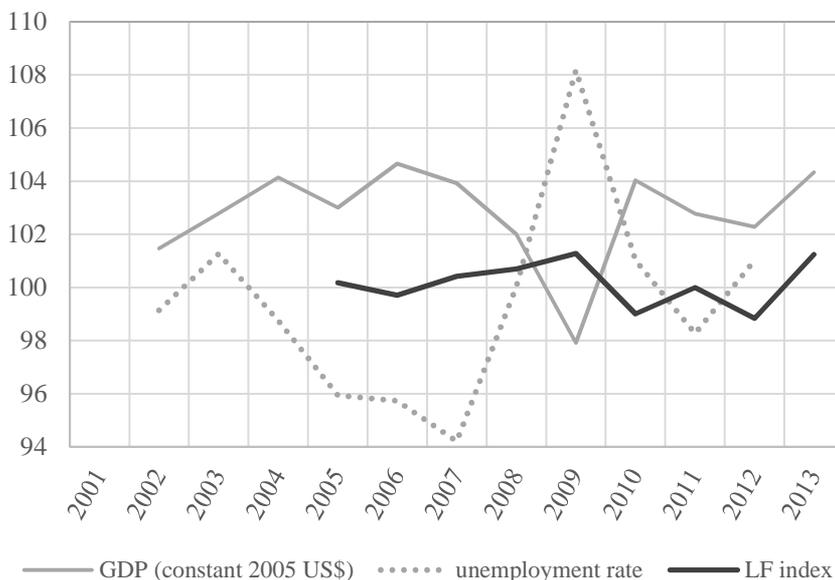
The year to year changes in global GDP, unemployment rate and Labor Freedom index are presented on Figure 1. The data indicates that employment protection legislation in the world was (on average) being liberalized slightly in years 2006-2009, so in the time when many economies were

² Thus, it is not surprising that labor regulations are changed relatively often. Boeri and Van Ours (2008, p. 23) state that in the EU countries in years 1986-2005, on average, more than 1.2 labor reforms were conducted per year and country, however more than 90% of the reforms can be perceived as marginal.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

experiencing growth. That process was stopped in 2009 when the global unemployment rate reached its peak and the world economy fell into recession. The collected data indicates that between 2010 and 2012 the mean world value of the Labor Freedom index was decreasing. Therefore, it can be concluded that the governments decided rather to support the insiders and strengthen the employment protection in reaction to the adverse shock. It probably resulted in more difficulties in decreasing the unemployment rate during the following recovery.

Figure 1. Year to year changes in GDP, unemployment rate and Labor Freedom index (global averages, last year = 100).



Note: the values of the Labor Freedom index are given for the concerned year, not for the year of their publication.

Source: own elaboration based on the Heritage Foundation (2014) and World Bank (2014).

The year to year changes in the Labor Freedom index can be treated as an indicator of the short-term employment protection reforms. Additionally, we calculate also an index of the long-term reforms which is aimed at representing the main tendency of labor reforms in each of the analyzed states with the use of a single variable. It is calculated as a relative differ-

ence between the largest and the smallest values of the Labor Freedom index for each particular country.

More precisely, for each country we first identified years when the minimum and the maximum value of the Labor Freedom index were observed (they were denoted as t_{min} and t_{max} respectively). Secondly, the long-term reform (LTR) index was calculated as³:

$$LTR = \begin{cases} \max(LF_t) / \min(LF_t) \cdot 100\%, & \text{if } t_{max} > t_{min} \\ \min(LF_t) / \max(LF_t) \cdot 100\%, & \text{if } t_{max} \leq t_{min} \end{cases}, \quad (1)$$

where t means time and LF represents Labor Freedom index. The absolute difference of t_{min} and t_{max} indicates the duration of the long-term reform. Therefore, whenever the long-term reform index takes a value below 100%, it means that the analyzed country has strengthened the labor protection (and in consequence the Labor Freedom index has fallen), whereas a value above 100% means that the labor law regulations have been liberalized. If the index had a value equal to 100%, it would mean that the analyzed country did not change labor regulations at all in the analyzed period (then the maximum value would be equal to minimum).

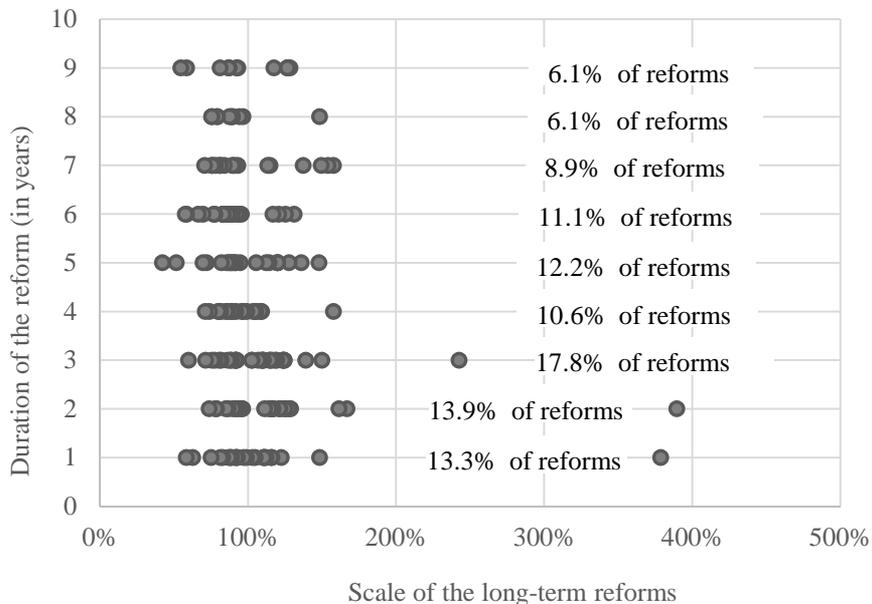
The values of the long-term reform index are presented on Figure 2. As it can be noticed, the durability of labor law reforms is significantly diversified, however, generally shorter duration is more probable than longer one. The modal duration is 3 years, which may indicate that more governments prefer to apply the gradual rather than the immediate approach to employment protection reforms. Although the average value of the long-term index was equal to 102,8%, the results reveal that in 58.3% of countries the labor freedom was limited (in the case of 18.3% states by more than 20%), while only in 41.7% the employment regulations were liberalized (in the case of 18.9% states by more than 20%). One may conjecture that the estimation of

³ It should be added that the lowest value of the Labor Freedom index in the data set was equal to 20, therefore there was no risk of dividing by zero. Of course, one can imagine many other indicators than can represent the long-term reforms. It was decided to use this one, because it assigns single value for each country and ensures that every country is equally represented in the data set. Moreover, this index allows to capture the most radical reform for each country, both gradual and immediate.

the average value was biased by 3 outliers (for Bahrain, Burma and Libya respectively) that are clearly visible on Figure 2. However, even after their exclusion the average values of the long-term reform indices higher than 100% was proportionally greater than analogous average for the values of the index lower than 100% (122% to 83% respectively). This indicates that the average long-term labor law liberalization was greater than the average long-term labor freedom limitation by 5 percentage points⁴.

These result can be seen in the perspective of political opposition from employees against labor law liberalization. The calculated indicators suggest that governments often decide to postpone the reforms that relax the employment protection. However, when the reforms are conducted, they are deeper than the typical changes that increase the level of that protection.

Figure 2. The scale and durability of the long-term reforms in the analyzed countries.



Source: own calculations based on the Heritage Foundation (2014).

⁴ It was calculated as: $(122 - 100) - (100 - 83) = 5$

Econometric analysis

The empirical analysis was focused on identifying determinants of the short-term labor law reforms that were measured by the year to year changes in the Labor Freedom index. Although a separate analysis was also conducted for the long-term reforms, it was decided not to present it, because it did not allow to identify any significant determinants of the labor market reforms, which was probably a consequence of a relatively small number of observations (one value for each country).

The empirical analysis for the short-term reforms was conducted in two steps. Firstly, a set of unbalanced panel models was estimated for all gathered indicators from the World Bank (2014) that were analyzed as potential determinants of the labor law reforms. During that step for all independent variables the indices of a year to year change were calculated and were added to the data set⁵. Secondly, for the selected variables that occurred to be significant in the first step two balanced data set were constructed⁶, which allowed to perform the final analysis. One of the balanced data set comprised all significant variables, but at the cost of relatively small number of observations, while in the second one a few variables were dropped, which substantially increased the number of observations. Such an approach allowed also to verify the results with different data sets.

The models were estimated as the *pooled, fixed effects* (the within estimator) and *random effects* (Swamy & Arora, 1972)⁷. The decision which model type should be used was based on the Breusch-Pagan and Hausman tests. It was decided to use the estimator of the covariance matrix proposed by Arellano (1987), which is designed to handle both heteroskedasticity and autocorrelation in the data sets consisting of many units observed in relatively few periods. The variables were not logarithmically transformed, which is not a rare approach in empirical analysis concerning the labor market institutions (Nickell, 1997; Cazes & Nesporova, 2003; Lehmann and Muravyev 2012). It should be added that the models reestimated with

⁵ Thus all analyzed indicators were expressed both in levels and in indices.

⁶ Singular missing values for particular variables were filled with linear interpolation. However, if the multiple missing values were noticed, it was decided to drop the particular country or year from the data set.

⁷ The models were also estimated with the use of the system GMM estimator (Arellano & Bover, 1995; Blundell & Bond, 1998). However, it occurred that in all estimated models the lagged values of the dependent variable were insignificant, therefore it was decided not to use the GMM estimator. Moreover, obtaining such results limits the potential problems with endogeneity.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

the logarithmically transformed variables led to the same conclusions, albeit their fit to the data occurred to be generally worse.

For the theoretical models do not specify accurately which indicators should have decisive impact on the labor market reforms, in the preliminary analysis a broad set of various variables, characterizing mainly the situation on the labor market and different economic shocks, was employed into the analysis. Many of them occurred to be insignificant. The group of irrelevant variables comprised of: labor force participation rate, unemployment rate, youth unemployment rate, age dependency ratio (separately for younger and older dependents), employment to population ratio, GDP *per capita*, consumption expenditure, exports of goods and services, current account balance, foreign direct investments, market capitalization, and central government debt.

Table 1. Description of variables presented in the econometric analysis.

Variable	Short description	Obs.
Dependent variable		
<i>yy_LFI</i>	A year to year change in the Labor Freedom Index	1487
Independent variables		
<i>LFI</i>	The Labor Freedom Index (scale 0-100)	1667
<i>yy_world_LFI</i>	A year to year change in the global average of the Labor Freedom Index	9
<i>u</i>	Unemployment rate (ILO estimate, alternatively national estimate)	1524
<i>emp_ind</i>	Employment in industry (% of total employment)	835
<i>u_long</i>	Long-term unemployment (% of tot. unemp.)	544
<i>neet</i>	Share of youth not in education, employment or training (% of youth population)	371
<i>yy_gdp</i>	A year to year change in GDP (constant 2005 US\$)	1760
<i>market_cap</i>	Market capitalization of listed companies (% of GDP)	959
<i>gov_exp</i>	General government final consumption expenditure (% of GDP)	1535

Note: a prefix 'yy_' before the variable name means that it is an index of the year to year change of that variable, where previous year = 100.

Source: own elaboration based on the Heritage Foundation (2014) and World Bank (2014).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Surprisingly, only a few analyzed variables occurred to be significantly correlated with the year to year changes in the Labor Freedom index. The selected results for these variables are presented in Table 2, 3 and 4, where as their short description is shown in Table 1.

The results of the unbalanced panel estimation (Table 2) confirm that in the analyzed period more countries decided to strengthen their labor protection legislation. It is indicated by the negative and significant parameter for the *LFI* variable. It informs also that the higher the level of labor freedom was, the greater was the pressure to limit it. A surprising result was obtained for the unemployment rate which occurred to be insignificant determinant of labor law reforms. As far as the GDP growth is concerned, it was found that the better the economic situation is, the stronger the tendency to liberalize labor regulations (Model 2). Although such a result is in line with previously derived conclusion (see Figure 1), it has to be stated that this relationship loses its significance if the *LFI* and *yy_world_LFI* are added to the model (Model 3).

Table 2. Selected results obtained for the unbalanced panel.

	Mod. 1	Mod. 2	Mod. 3	Mod. 4	Mod. 5	Mod. 6
Intercept		91.002 ^{***} (5.148)			98.373 ^{***} (0.689)	91.000 ^{***} (7.281)
LFI (-1)	-0.598 ^{***} (0.053)		-0.614 ^{***} (0.052)	-0.614 ^{***} (0.065)		
yy_world_LFI	1.166 ^{***} (0.401)		0.799 ^{***} (0.262)	0.529 [*] (0.296)		
u (-1)	0.150 (0.119)					
yy_gdp (-1)		0.087 [*] (0.050)	-0.009 (0.064)			
market_cap (-1)				0.025 (0.019)		
neet (-1)					0.099 ^{**} (0.042)	0.069 [*] (0.035)
u_long (-1)						0.032 ^{**} (0.016)
yy_gov_exp (-1)						0.069 (0.068)

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

R ²	0.097	0.027	0.171	0.177	0.196	0.411
Adjusted R ²	0.086	0.026	0.150	0.156	0.195	0.407
Model type	FE	RE	FE	FE	RE	RE
Number of observations	1433	1463	1463	946	370	338
Number of countries	173	179	179	110	67	47
Time effects	no	yes	no	no	yes	yes

Note: the '(-1)' symbol attached to almost all independent variables means that they were lagged by one year. Standard errors are reported in parentheses. Asterisks denote significance levels: *** - 1%, ** - 5% and * - 10%.

Source: own estimates.

Moreover, adding the measure of the market capitalization, which can also be seen as an indicator of the current economic situation, did not help to explain the scale of labor law reforms. Interesting results were obtained for the *neet* and *u_long* variables. They indicate that the higher the group of excluded (or nearly excluded) from the labor market is, the greater the pressure to liberalize the labor law. However, this conclusion is in fact limited mainly to the highly developed countries due to the large amount of missing values for developing countries for the *neet* and *u_long* variables.

The results for the first balanced panel data set that consists of 96 countries and 768 yearly observations are presented in Table 3. It can be noticed that Model 7 has the same set of variables as Model 8 (the same applies to Model 10 and 11), which is a consequence of the fact that the Breusch-Pagan and F tests gave unequivocal results concerning the need to introduce dummy variables for the countries. The results obtained for this panel also did not indicate that changes in GDP are significant determinants of the changes in the Labor Freedom index. Model 12 indicated that the market capitalization of listed companies could be an important factor, however this relation was not confirmed by other models. Different conclusions can be derived for the government expenditure. The estimates indicate that the higher these expenditures are, the stronger is the pressure to strengthen the labor protection. Probably, changes in both variables can be seen as two elements of the same decision. In reaction to an adverse shock the government might both increase the public spending and strengthen the labor protection.

The results for the second balanced panel that consists of 37 countries and 296 observations are presented in Table 4. Here also some equations

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

are presented for two different estimators due to the unequivocal results for the Breusch-Pagan and F tests. Quite surprisingly, the previously derived conclusions concerning the government expenditure and excluded groups from the labor market did not find confirmation in this reduced data set. It may indicate that previously identified relationships have heterogeneous relevance for different groups of countries. Such a result is less surprising if it is remembered that (and as the literature suggests) the impact of the analyzed determinants may be dependent on the political strength of particular groups on the labor market and also on the government's preferences and determination. All these political factors are not directly observed (especially globally), therefore it was not possible to analyze their potential interactions with the identified determinants. However, it may be concluded that these factors play different role in particular countries, which in consequence led to obtaining unequivocal results.

Table 3. Results obtained for the first balanced panel.

	Mod. 7	Mod. 8	Mod. 9	Mod. 10	Mod. 11	Mod. 12
Intercept	49.540 (45.116)			47.207 (44.483)		
IEF(-1)	-0.034* (0.020)	-0.534*** (0.061)	-0.542*** (0.057)	-0.034* (0.018)	-0.522*** (0.068)	-0.615*** (0.083)
IEF(-2)						-0.065 (0.075)
yy_world_LFI	0.520 (0.446)	0.359 (0.410)	0.359 (0.385)	0.524 (0.443)	0.597 (0.459)	
yy_gdp (-1)	0.060 (0.068)	-0.091 (0.128)	-0.100 (0.138)	0.073 (0.071)	-0.033 (0.099)	
market_cap (-1)	-0.000 (0.004)	0.023 (0.020)	0.030 (0.020)			0.032* (0.018)
market_cap (-2)						-0.010 (0.009)
yy_market_cap (-1)	0.006 (0.014)	0.004 (0.012)		0.006 (0.013)	0.007 (0.013)	
gov_exp (-1)	-0.037 (0.041)	-0.407** (0.171)	-0.463** (0.205)			-0.657* (0.343)
yy_gov_exp (-1)	-0.055 (0.074)	-0.029 (0.042)		-0.055 (0.069)	-0.041*** (0.014)	

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

R ²	0.030	0.160	0.156	0.030	0.147	0.200
Adjusted R ²	0.030	0.139	0.135	0.030	0.128	0.170
Model type	pooled	FE	FE	pooled	FE	FE
Number of observations	768	768	768	768	768	672
Number of countries	96	96	96	96	96	96
Time effects	no	no	no	no	no	no

Note: the '(-1)' symbol attached to almost all independent variables means that they were lagged by one year. Standard errors are reported in parentheses. Asterisks denote significance levels: *** - 1%, ** - 5% and * - 10%.

Source: own estimates.

Table 4. Results obtained for the second balanced panel.

	Mod. 13	Mod. 14	Mod. 15	Mod. 16	Mod. 17	Mod. 18
Intercept	190.614 (47.833)			169.116 (43.919)	165.212 (62.187)	112.107 (8.255)
IEF(-1)	0.000 (0.017)	-0.441 (0.108)	-0.437 (0.100)	-0.007 (0.015)	-0.006 (0.015)	
yy_world_LFI	-0.999 (0.550)	-0.831 (0.627)	-0.737 (0.405)	-0.796 (0.524)	-0.763 (0.689)	
yy_gdp (-1)	0.210 (0.166)	0.221 (0.189)	0.090 (0.107)	0.208 (0.172)	0.204 (0.176)	
market_cap (-1)	0.004 (0.007)	0.011 (0.017)	0.017 (0.009)			0.007 (0.005)
yy_market_cap (-1)	0.007 (0.011)	0.003 (0.015)		0.011 (0.009)	0.011 (0.012)	
gov_exp (-1)	-0.042 (0.055)	-0.006 (0.507)	0.171 (0.366)			
yy_gov_exp (-1)	0.054 (0.093)	0.054 (0.167)		0.043 (0.083)	0.048 (0.083)	
emp_ind (-1)	0.211 (0.088)	0.392 (0.330)	0.210 (0.291)			0.199 (0.071)
yy_emp_ind (-1)	-0.238 (0.085)	-0.268 (0.098)		-0.164 (0.093)	-0.164 (0.093)	-0.182 (0.086)
u_long (-1)	-0.019	-0.026	-0.043			

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

	(0.018)	(0.065)	(0.059)			
yy_u_long (-1)	0.005 (0.009)	0.002 (0.013)		-0.003 (0.009)	-0.005 (0.010)	
neet (-1)	0.017 (0.033)	0.234 (0.311)	0.211 (0.217)			
yy_neet (-1)	-0.001 (0.028)	-0.012 (0.029)		0.006 (0.029)	0.011 (0.030)	
R ²	0.072	0.154	0.132	0.041	0.030	0.036
Adjusted R ²	0.069	0.128	0.112	0.039	0.029	0.035
Model type	pooled	FE	FE	pooled	RE	RE
Number of observations	296	296	296	296	296	296
Number of countries	37	37	37	37	37	37
Time effects	no	no	no	no	yes	yes

Note: the '(-1)' symbol attached to almost all independent variables means that they were lagged by one year. Standard errors are reported in parentheses. Asterisks denote significance levels: *** - 1%, ** - 5% and * - 10%.

Source: own estimates.

The results presented in Table 4 indicate however, that the level of employment in industry (as a percentage of total employment) and changes of that level can be important determinants of labor law reforms. Probably, the theoretical analysis conducted by Boeri (2005) can help to explain this relationship. A stronger industry sector should result in greater exposure to supply shocks. Thus, positive supply shocks lead to higher forgone efficiency (when the labor regulations are not changed), which causes pressure to liberalize the labor law. This liberalization is, however, opposed by the industry workers. Therefore, it is not surprising that increase in the number of these workers provides them with greater political strength and may result in reinforcement of their protection.

Conclusions

The aim of this research was to identify determinants of the employment protection legislation reforms around the world. Critical analysis of the literature indicated that macroeconomic shocks could be incentives to these

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

reforms, especially the adverse shocks (that worsen the situation on the labor market). However, also the positive supply shocks can trigger the reforms, because the increase in labor productivity causes that current employment protection regulations result in higher forgone efficiency. However, these incentives may lead to different governmental decisions, since the government also has to include the political pressure from various interest groups on the labor market, especially the employees. In consequence, the initiated reforms can have various scope, time of implementation and even different direction.

The empirical analysis was conducted for 179 countries with the use of the Labor Freedom index published by the Heritage Foundation. The initial analysis of the collected data revealed that governments less often decide to conduct reforms that relax the employment protection. However, when the reforms are initiated, they are usually deeper than the typical changes that increase the level of that protection. It was also found that in years 2006-2009, when the world economic situation was promising, most governments decided to liberalize the labor law. However, this tendency was reversed in reaction to the global recession in 2009 when governments generally decided to strengthen the protection of employees.

The econometric investigation allowed to identify a few indicators that can initiate the labor law reforms. It was found that changes in GDP and the level of employment in industry may be such factors. Labor law reforms may also depend on the number of the nearly excluded from the labor market (long-term unemployed and the youth not in education, employment or training). The changes in employment protection also occurred to be correlated with changes in the government expenditure.

However, these results were not confirmed in all models, which may be a consequence of omitting potentially important factors, i.e. the political strength of particular groups on the labor market and the determination of government to implement the reforms, because they are not directly observable. The low level of the coefficient of determination in almost all estimated equations indicates that these omitted factors may play a substantial role in explaining the changes in the labor law. Therefore, there is a need to continue the research in this field, especially in order to assess the strength of political factors that may affect the labor market reforms. It is also advised to continue these analyses with the use of other indicators of labor market institutions in order to verify conclusions obtained in the presented research.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

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18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
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**The Question of State Aid for Rescuing
and Restructuring Undertakings in Difficulty in
the Context of the General Government Sector
Debt of EU Member States***

JEL Classification: *E62; K20; K33.*

Keywords: *the European Union; legal regulation; rescue and restructuring aid; the general government sector debt; financial and economic crisis*

Abstract: The subject of the article is an analysis of the rules of state aid admissibility on the basis of the implementing regulations, adopted by the European Commission in 2004 and 2014 on rescue and restructuring aid. This should lead to verify the thesis that due to the taken up at EU level – in response to the effects of the financial and economic crisis – economic recovery plan, the support of the public authorities directed at rescuing and restructuring undertakings in difficulty has become the most broadly used form of State aid due to the value among all the forms of aid granted by Member States of the European Union. The adoption of such a thesis raises the question of the influence of State aid on the size of the *general government* sector debt in the EU Member States, which have provided State aid for undertakings in difficulty. This analysis was carried out based on the linear regression model. The response variable (dependent variable Y) is the size of the *general government* sector debt, and explanatory variable (independent variable

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

X) is the expenditure on State aid. The research shows that between expenditures of the EU Member States on aid for rescuing and restructuring undertakings in difficulty and the condition of the public finances of these countries there is no substantial statistical relationship. Taking this into consideration the most important question arises. Does the State aid "to prevent the bankruptcy of undertakings" follow the condition of art. 107 par. 2 point c of Treaty on the functioning of the European Union?

Introduction

The crisis in the financial markets, which began in 2007, in a short time began to significantly affect the real economy. This effect could be observed by a strong downward turn in the overall economy, which affected directly both households and undertakings. The result of the financial crisis in the banking sector in the Member States of the European Union was the process carried out by banks of reducing own debt relation to equity capital. Banks have therefore become less willing to take risk comparing to the previous years, which in turn led to reduced availability of credits as a source of financing for undertakings and reduce the number of credits in general. This trend had negative consequences not only for enterprises that did not have adequate financial security in case of insolvency, but even for enterprises with good and stable financial condition, which were suddenly reduced the credit line or denied the credit. Taking into account that affordable and sufficient access to finance is a prerequisite for undertakings in making investments and creating new jobs, it should be noted that a restrictive credit policy affected mainly small and medium-sized enterprises, which access to financing is more difficult compared with large enterprises. Hence, in this economic situation State aid granted by the Member States started to be an important complement of efforts to unblock credits for enterprises.

The financial crisis ended a period in the European Union of economic growth, low intensity of granted State aid and decreasing budget deficits as well as declining unemployment rate (compare Hallerberg, 2011). On 26 November 2008 the European Commission adopted a statement titled "The European economic recovery plan" (EC, 2008) talking about how to get Europe out of the financial crisis. This plan, which was based on two interdependent components, assumed a more intense and faster implementation of reforms already underway under the Lisbon Strategy. The first is the short-term measures to increase demand, job protection and restore confidence to financial institutions, and the second is "smart investments",

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

which in the long run were to ensure a higher growth rate and sustainable economic growth. Economic recovery plan also contained proposals on the application of State aid rules in a way that achieves maximum flexibility for tackling the crisis while maintaining equal conditions for all enterprises and avoiding excessive restriction of competition.

Taking into consideration that the consequence of the financial crisis affecting the restriction of access to finance and the crisis in the real economy which leads mainly to a decline in production is a crisis of excessive public debt and budget deficit resulting from the slowdown in the various fields of economy, the purpose of this article is to analyze the conditions of admissibility of State aid for rescuing and restructuring undertakings in difficulty. This should lead to verify the thesis that due to the economic recovery plan taken by the European Union, the implementation of which would result in a reduction in the social costs of the economic downturn, stimulating demand and strengthening consumer confidence, as well as supporting innovation, building a knowledge-based economy and quicker transition to a low-carbon and efficient in terms of resource use economy, the support of the public authorities directed at rescuing and restructuring undertakings in difficulty has become a form of State aid the most widely used due to the value from all forms of aid provided by Member States of the European Union. The adoption of such a thesis raises the question of the influence of State aid on the size of the *general government* sector debt in the Member States, which have provided aid to enterprises in difficulty. It is possible – with a certain simplification - to accept that since the premise of granting such aid is prosperity and increase of the competitiveness of the European Union, such aid should have a positive impact on public finances, as the expenditure on this aid will be offset by a strong reduction of operational aid granted to cover current cost of the enterprise activities as well as budget revenues from taxes and other public levies paid by effectively functioning, restructured enterprises. Thereby, it will be possible to say that the amount of expenditure on State aid to undertakings in difficulty for the whole European Union and particular Member States should be negatively correlated with the size of the *general government* sector debt. The negative correlation of the size of the *general government* sector debt with the amount of expenditure on State aid for rescuing and restructuring undertakings would mean that with increasing amount of State aid to enterprises in economic difficulty the *general government* sector debt of Member States providing such aid should decrease.

Methodology of the research

A feature of applied research method is the analysis of the intervention instruments used by the State from the point of view of concepts of State aid within the meaning of art. 107 par. 1 of the Treaty on the functioning of the European Union (TFEU - OJ 2010 C 83/1). The adoption of such a method provided an opportunity to: firstly, determining the semantic scope of admissibility and the rules of providing aid as interpreted by the Court and the Court of Justice of the European Union, and secondly - capturing the specific characteristics of State aid for enterprises in difficulty. Another feature of the method used in the paper is the analysis of the relation between the Member States expenditure on State aid designed for rescuing and restructuring undertakings in difficulty and the size of the *general government* sector debt of these countries. This analysis was carried out in accordance with the linear regression model. The response variable (dependent variable Y) is the size of the debt of the *general government* sector and the explanatory variable (independent variable X) is the expenditure on State aid.

Statistical analysis was carried out based on three source tables. The first and second table show the calculations for the linear regression model concerning respectively the intersection parameter (free term α) and slope parameter (directional factor β). The factors a and b of the regression function II are the estimators of the parameters α and β of regression function I (Bielecka, 2011, pp. 279-281). The standard error S_a is the standard error of the estimator a of the parameter α , whereas the standard error S_b is the standard error of the estimator b of the parameter β . The designations "Lower 95%" and "Upper 95%" concern lower and upper limits of so-called confidence interval of numerical values for parameters α and β , where these parameters are with a probability of 95%.

t Stat is a test of linear relationship occurrence between expenditure on State aid to enterprises in difficulty and the size of the *general government* sector debt. This statistical test allows to verify the authenticity of the so-called null hypothesis that the parameters of the regression function I type α and β are equal to zero, with the alternative hypothesis that they are not equal to zero ($H_0: \alpha = 0$; $H_A: \alpha \neq 0$ and $H_0: \beta = 0$; $H_A: \beta \neq 0$). The acceptance of the null hypothesis that the parameter $\alpha = 0$ would mean that if the expenditure on State aid are zero (State aid does not exist), then the value of the *general government* sector debt will also decrease to zero. In turn the acceptance of the null hypothesis that the parameter $\beta = 0$ would

mean that the increase in the value of expenditure on State aid by € 1 million will not cause any changes in the size of the *general government* sector debt which means the lack of any relationship between expenditure on State aid and the size of the *general government* sector debt. In other words, the acceptance of the null hypothesis means the lack of the influence of the State aid for rescuing and restructuring undertakings provided by the Member States of the European Union on the size of their *general government* sector debt. From the perspective taken in this paper it will be essential to reject the null hypothesis in favor of the alternative hypothesis which states that between the studied phenomena - expenditure on State aid and the size of the *general government* sector debt - there is a significant statistical relationship. From the tables of critical values of t-Student it is seen that $\pm t_{\alpha/2} = \pm 2.5706$ for $\alpha = 0.05$ and $n - 2 = 5$ degrees of freedom. The null hypothesis can be rejected in favor of the alternative hypothesis only when $t_b < t_{\alpha/2}$ or $t_b > t_{\alpha/2}$, that is when $-t_b < -2.5706$ or $+t_b > +2.5706$.

The p -value is the probability of making so-called type I error, involving the rejection, based on the results of the test, of the hypothesis that assumes the values of the parameters α and β are equal to zero, when in fact they are equal to zero in the whole population. In other words, type I error is a rejection of a real null hypothesis. The higher the value of the t-test means the lower the probability of type I error. In general, it is assumed that if the p -value is less than 0.05, the null hypothesis can be rejected in favor of the alternative hypothesis, and thus claim that there is a statistically significant relationship between the expenditure of EU Member States on State aid directed at enterprises in difficulty and the size of the *general government* sector debt of these countries.

The third table contains regression statistics. Among the regression statistics are: the correlation coefficient, determination coefficient, standard error and the parameters of F test, that is the value of F-test and the probability of making type I error, when the hypothesis is verified concerning the lack of impact of expenditure on State aid on the size of the *general government* sector debt (irrelevance of State aid expenditure in the regression model). F-test, similarly as described above t-test, is used for testing the significance of linear regression coefficient β evaluation. The checking of this test is a statistic F having F-Snedecor distribution of k_1 and k_2 freedom degrees. When rejecting the null hypothesis $F > F_{\alpha}$ of no relation between expenditure on State aid and the size of the debt of the *general government* sector and accepting the alternative hypothesis of the existence of a statisti-

cally significant relationship between the variables. From the table of critical values of the F-Snedecor for $k_1 = 1$ (1 independent variable) and $k_2 = n - 2 = 5$ degrees of freedom and $\alpha = 0.05$ we read $F_{0,05} = 6.608$. Thus, the alternative hypothesis can be adopted only when $F > 6.608$.

Economic justification for intervention in the Internal Market mechanisms

From the economic point of view relating to state interventionism it ought to be noted that State aid can be a justified action mainly because of the social prosperity if free competition market mechanism does not bring satisfactory results. In this case, a well-planned state intervention may improve the allocation of production factors, reduce the irregularity in the market functioning and enable the achievement of common interest. The major criterion for providing State aid should be rationality, which is the highest determinant of the admissibility of using the aid measures. It results from the fact that in a market economy the competition is essential for the proper functioning of the market and protecting the interests of its participants. State aid should not violate it unless its violation will be compensated by positive market phenomena that were caused by providing the aid. With the use of the aid instrument the State realizes the objectives that are considered a priority for socioeconomic development.

In the market of the European Union, which is based on the mechanism of free competition, many changes occur as a result of the impact of micro-, meso- and macroeconomic factors. On the one hand, these changes go together with positive effects in the form of the development of the enterprises, both those already operating in the Internal market as well as those whose strategic goal is to enter the market and do business activity in the long term. Compliance with the principles of free competition, reduction of the entry barriers, elimination of customs barriers, consistent combating monopolistic practices, the inflow of direct foreign investments and the related production increase, creating the conditions for public procurement and the suppliers endeavour for uniform purchase prices and purchasing the products at prices adopted in the country where they are the lowest, they are the desired effects of competition in the Single European Market, enabling economic and social development of the European Union (Adamkiewicz-Drwiłło, 2010, p. 58). On the other hand, not all market processes can be considered as the desired effect of competition. Then it is indicated, that the market economy, in which the primary regulator of the occurring pro-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

cesses is the competition, is burdened with certain deficiencies. The deficiencies of the market system are in such a situation justification for a replacement or supplement based on free competition of the market mechanism by other decision making processes, such as the State intervention.

The existence of market inefficiencies makes the assumptions, on which the model of the perfect competition is made, not always fulfilled, and thus it becomes difficult to achieve overall balance as well as maximize total prosperity. In other words, the lack of optimal market efficiency in the Pareto sense may justify the state interventionism with the object of ensuring the optimal allocation of resources. Therefore, the market inefficiencies justify the State intervention and legitimize public authorities to adopt specific legal, administrative and economic regulations within the scope of aid for enterprises, however it is important to remember of such balancing of the size of provided aid so as the negative consequences do not bring more harm to entities functioning in the market. The actions taken by the State aimed at correcting the market failures within the scope of the intervention in economic processes can also be ineffective due to the probability of government failures. At this point the failure of the state is shown, associated with its role as a remedy to the problem of information asymmetry and coordination of supply and demand, which means that the state actions to encourage improvements in efficiency and allocation of market mechanism are subject to failures and as a result can lead just as the market mechanism to inefficient allocation of resources (Demsetz, 1969). This means that the State intervention in the economy is basically justified only in the occurrence of market imperfections, even then there is no guarantee that the measures used by the state will lead to greater prosperity, which is due to the lack of possession by the public authorities of the necessary information or high cost of the use of appropriate measure of aid. However, even if the State has the necessary information and relevant financial resources and intervenes in order to promote the market mechanisms and economic growth, the control of these interventions can not be avoided at the supranational level. This is because even the legitimate actions taken by the given state within the interference in economic processes can cause harmful side effects in other countries (Nicolaidis, 2004, pp. 365-396). Hence, due to the impact that the provided aid has on the economic interests of enterprises that are beneficiaries, and also their competitors, and the economy of individual countries, the issues relating to the admissibility of the aid are precisely regulated within the European Union. The rules adopted at EU level affect the national regulations that relate to the provision of aid itself (see

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Hille & Knill, 2006; Toshkov, 2008; König & Mäder, 2013; Böhmelt, 2013). They answer the question of whether the aid designed by a Member State, legal in the light of its national law, may be considered as compatible with the objectives of the European Union and whether it can be given? These principles are addressed to the Member States and are designed to eliminate the aid which has negative impact on competition and trade within the Internal market, and in cases where such aid must be exceptionally provided – discipline of these countries and standardizing the conditions within the EU that must be fulfilled in order for aid to be provided, which in turn should minimize its negative effects.

**Admissibility of State aid for rescuing and restructuring
undertakings in difficulty**

State aid for rescuing and restructuring enterprises is without a doubt one of the most controversial cases of financial support provided by the State, which considerably affects the distortion of competition and trade within the European single market (Nicolaidis & Kekelekis, 2005, pp. 17-26). The only legal basis on which the aid for undertakings in difficulty can now be regarded as admissible is art. 107. par. 3 point c) of the Treaty on the functioning of the European Union (TFEU). According to this provision the European Commission has the power to authorize "aid to facilitate the development of certain economic activities or of certain economic areas, if [the aid] does not affect trading conditions to an extent contrary to the common interest". This case may take place in particular when the aid is necessary to correct disparities caused by market failures or to ensure economic and social cohesion. Therefore providing the aid to the economic entities in this field can be regarded as legitimate only under certain conditions. This aid may be justified, for example, due to the applied social or regional policy, because of the need to take into account the advantageous role fulfilled by small and medium-sized enterprises in the economy or, exceptionally, due to the need to maintain the competitiveness on the market at a time when the liquidation of enterprises in difficulty could lead to create a monopoly or clear oligopoly on that market. On the other hand, in any case, it is not justified to artificially support of the activity of the enterprise in a sector characterized by long-term and structural overproduction or the enterprise whose survival depends only on repeated state interventions.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The existing rules for granting aid to undertakings in difficult economic situation were largely based on the practice of supporting the steel sector in Europe in recent decades. In article 4 point c of the Treaty establishing the European Coal and Steel Community it was specified that any State aid is incompatible with the common market of coal and steel (ECSC - Treaty of Rome, 1957). In practice such a provision would mean that State aid is prohibited within the Community. This provision however proved to be too far-reaching and, consequently, granting of certain types of aid was allowed, recognizing them as the community aid – it mainly concerned State aid for the mining sector in order to secure energy supplies in the Community. The first report on Competition Policy of 1971 stated that the European Commission will not, as a rule, oppose granting aid by the Member States to enterprises in difficulty, if such aid will be used in exceptional circumstances and on the basis of clearly specific program of reorganization, so that it becomes a real contribution to the reorganization of their respective enterprises or regions (Anestis & Mavroghenis & Drakakakis, 2004, p. 27). Basing on the experience gained the European Commission announced in subsequent reports on competition policy more detailed rules for granting aid to undertakings in difficulty (compare Borghetto, 2014). As a result the conditions of admissibility of State aid directed at rescuing and restructuring of enterprises in difficulty were determined in the appropriate community guidelines adopted in the form of communications from the European Commission.

The Commission adopted its original Guidelines on State aid for rescuing and restructuring undertakings in difficulty in 1994 (OJ C 368, 23.12.1994, p. 12). In 1997, the Commission added specific rules for agriculture (OJ C 283, 19.9.1997, p. 2). A modified version of the guidelines was adopted in 1999 (OJ C 288, 9.10.1999, p. 2). In 2004 the Commission adopted new guidelines (OJ C 244, 1.10.2004, p. 2), the validity of which was first extended until 9 October 2012 (OJ C 156, 9.7.2009, p. 3) and subsequently until their replacement by new rules (OJ C 296, 2.10.2012, p. 3) in line with the reform programme set out in the Commission Communication of 8 May 2012 on EU State aid modernisation (EC, 2012). From 1 August 2014 the provisions entered into force of the new guidelines on State aid for rescuing and restructuring non-financial undertakings in a difficult situation (OJ C 249, 31.7.2014, p. 1), which introduces some changes, most favorable to the beneficiaries - e.g. temporary restructuring support.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

European Commission guidelines clearly indicate that aid for rescuing and restructuring undertakings in difficulty can be granted only to enterprises in difficulty. An enterprise in difficulty is the business entity which using its own funds is not able to reduce the growing negative financial result and without outside intervention of public authorities is not able to function in the short or medium term. According to the guidelines of the European Commission in 2004 - on the basis of which Member States granted State aid both before the financial crisis and already in the period of its duration - the undertaking was considered to be at risk in the following circumstances:

- where more than half of the registered capital has been lost including more than one quarter of that capital over the preceding 12 months (a limited liability company, joint stock company), or when more than half of the company's capital according to the financial statement has been lost, including more than one quarter of the preceding 12 months (personal trading company and a civil partnership);
- if the criteria of the national law were met concerning collective insolvency proceedings (regardless of the type of company).

The enterprise was also regarded as a threat, if there are premises indicating loss of financial liquidity, such as increasing losses in the current activity, diminishing turnover, growing stock inventories, excess capacity, declining cash flow, mounting debt, rising interest charges and falling or nil net asset value. In each of these cases an enterprise in difficulty was eligible for aid only if it clearly could not regain financial liquidity through its own resources and, in some justified cases, through resources obtained from the shareholders or from market sources.

The previous definition of "undertaking in difficulty" contained both so-called "hard" (objective) criteria and "soft" criteria which required a broader and more subjective assessment of the undertaking's situation. To improve clarity and legal certainty, the new guidelines aim to shift the emphasis from soft to hard criteria, making it easier for granting authorities and potential aid beneficiaries to determine whether a given undertaking is in difficulty. The soft criteria are therefore reduced to a residual category that will apply only in exceptional circumstances. To keep the coverage of the definition approximately the same overall, the new guidelines balance the reduction in the scope of the soft criteria by introducing new hard criteria. Therefore, an undertaking is considered to be in difficulty if at least one of the following circumstances occurs:

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

- a) in the case of a limited liability company (Annex I, OJ L 182, 29.6.2013), where more than half of its subscribed share capital has disappeared as a result of accumulated losses. This is the case when deduction of accumulated losses from reserves (and all other elements generally considered as part of the own funds of the company) leads to a negative cumulative amount that exceeds half of the subscribed share capital.
- b) in the case of a company where at least some members have unlimited liability for the debt of the company (Annex II, OJ L 182, 29.6.2013), where more than half of its capital as shown in the company accounts has disappeared as a result of accumulated losses.
- c) where the undertaking is subject to collective insolvency proceedings or fulfils the criteria under its domestic law for being placed in collective insolvency proceedings at the request of its creditors.
- d) in the case of an undertaking that is not an SME, where, for the past two years:
 - 1. the undertaking's book debt to equity ratio has been greater than 7,5 and
 - 2. the undertaking's EBITDA interest coverage ratio has been below 1,0.

New guidelines from 2014 do not contain an indication that the quarter of enterprise capital loss must have occurred within the preceding 12 months.

Community guidelines of 2004 distinguish between two types of aid to enterprises in difficulty, i.e. aid for rescuing and aid for restructuring. EU guidelines of 2014 distinguish additionally third type of aid - temporary restructuring support.

Rescue aid

Rescue aid for undertakings in difficulty is a support which is by nature temporary and reversible, which is focused on maintaining financial liquidity of unprofitable enterprise for the time to develop a plan for its restructuring or liquidation. The general principle is that rescue aid makes it possible to provide temporary support to an undertaking facing a serious deterioration of its financial situation, involving an acute liquidity crisis or technical insolvency. Such temporary support should allow time to analyse the circumstances which gave rise to the difficulties and to develop an appropriate plan to remedy those difficulties.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Rescue aid cannot be longer than six months, is repayable and is admissible in the form of credit guarantees or loans with an interest rate comparable to loans for enterprises in good financial condition, including, in particular, with an interest rate comparable to the reference rates published by the European Commission (OJ C 14, 19.1.2008, p. 6). Within six months from the moment of granting the aid the Member State has three possibilities of action: 1) it shall notify the enterprise restructuring plan to the European Commission; 2) it shall submit a plan of liquidation of the enterprise; 3) it shall provide proof of full repayment of the loan or proof of termination of the guarantee validity. New guidelines of 2014 show that the amount of admissible rescue aid must be limited to the minimum. Rescue aid must be restricted to the amount needed to keep the beneficiary in business for six months.

It should be noted that the rescue aid is a one-off operation designed to keep functioning of the undertaking in a certain period of time, in which its chances will be assessed concerning continuing existence in a given market - i.e. the principle of *one time last time* (Mehta, 2009, pp. 216-217). In the situation when the rescue aid is granted to an enterprise that has already received restructuring aid, it can be considered that the beneficiary's difficulties are of lasting and stable nature and frequent state interventions cause distortions of competition, which is contrary to the principles set out in the TFEU of State aid admissibility. Repeated granting of rescue aid essentially misses the principle when it only comes to the shift in time of inevitable liquidation of the enterprise. Therefore, in order to avoid unfair provision of aid to the undertakings that can survive on the market only by repeatedly granted State aid, rescue aid should be granted only once. In turn, the responsibility of the Member State intending to provide emergency aid should be submitting to the European Commission the necessary documentation which shows if the potential beneficiary used in the past ten years of this type of aid. In addition, the application of the principle of "first and last" is in no way affected by the ownership changes of the enterprise following the granting of aid and any administrative or judicial procedures, aimed at "healing" the balance sheet, reducing liabilities or cancelling previous owner debts.

Restructuring aid

From the moment in which the restructuring or liquidation plan of enterprise in difficulty has been established and is being implemented, every

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

additional aid will be considered as aid granted for the purpose of restructuring. The purpose of restructuring aid is to restore the long-term profitability of the undertaking. Restructuring may involve one or more of the following elements: the reorganisation and rationalisation of the beneficiary's activities on to a more efficient basis, typically involving withdrawal from loss-making activities, restructuring of those existing activities that can be made competitive again and, possibly, diversification towards new and viable activities. It typically also involves financial restructuring in the form of capital injections by new or existing shareholders and debt reduction by existing creditors. It should be however noted that restructuring processes cannot be limited only to financial aid which will compensate the losses without identifying and removing the causes of their occurrence. The restructuring plan which duration must be as short as possible, must accurately describe the circumstances that led to the company's difficulties, thereby providing a basis for assessing whether the proposed measures are appropriate. In addition the restructuring plan should include the analysis of the current status and forecasts concerning changes in demand and supply in the market, taking into account situations based on the best, and the least favorable and intermediate assumptions and the specific weaknesses and strengths and of the enterprise. This plan must also provide such a change in the situation of enterprise, which after the completion of the restructuring processes will allow it to cover all costs including amortization and other charges.

The amount and intensity of restructuring aid must be limited to the strict minimum necessary to enable restructuring to be undertaken, in the light of the existing financial resources of the beneficiary, its shareholders or the business group to which it belongs. In particular, a sufficient level of own contribution to the costs of the restructuring and burden sharing must be ensured. Such assessment will take account of any rescue aid granted beforehand. The European Commission expects the beneficiaries of the aid that a substantial contribution to the restructuring plan will come from their own resources, including the sale of assets that are not essential to the continued existence of the undertaking. Contributions must be real, that is to say actual, excluding future expected profits such as cash flow, and must be as high as possible. The minimum contribution is at least 25% for small enterprises, 40% for medium-sized enterprises and 50% for large enterprises. In order to limit the distortive effect, the amount of aid or the form in which the aid is granted cannot provide the company with the surplus cash, which can be used for speculative activities distorting competition in the

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

internal market. Therefore the Commission shall make a thorough analysis of the enterprise liabilities after the restructuring, taking into account primarily financial situation after each postponement or reduction of its debts. In the case of restructuring aid to small and medium-sized enterprises it is sufficient to forward each year a copy of the balance sheets and profit and loss account of the aided enterprises. In the case of aid granted to large enterprises, the Commission shall require providing confirmation of the proper way of implementation of the restructuring plan through regular detailed reports transmitted by the Member State concerned, which contain all the necessary information on the stages of the implementation of restructuring program, the schedule of payments of subsequent tranches for the enterprise and its current financial situation and to comply with all conditions and obligations laid down in the decision approving the aid.

The previous guidelines has required undertakings that are being restructured to make a contribution to the restructuring costs from their own resources. This "own contribution" rule has helped to limit the amount of aid to the minimum necessary. However, it has lacked the precision needed to ensure that the costs of restructuring are distributed fairly among investors and taxpayers. In dealing with State support to banks during the crisis, the Commission developed a more targeted approach in this respect, using the concept of "burden sharing". This concept looks not only at the amount of own contribution, but also at who is providing that contribution. In particular, since the high returns that shareholders obtain when a enterprise is performing well are balanced by the risk of losses that they bear, there is no justification for expecting taxpayers to bear losses in place of shareholders.

Another issue, which therefore required more detailed regulation was the sharing of the burden between current investors. The draft guidelines of 2014 contained two possible approaches to this question. Option 1 took a more broad-brush approach by requiring that the contributions made by incumbent shareholders and creditors should be reasonable in view of the likely losses that they would have suffered in the event of insolvency. Option 2 was more precise, requiring first that all past losses be borne by shareholders and then, if that is not sufficient, that subordinated creditors also contribute. Finally the principle of adequate burden sharing was accepted, according to which incumbent shareholders and, where necessary, subordinated creditors must absorb losses in full. Subordinated creditors should contribute to the absorption of losses either via conversion into equity or write-down of the principal of the relevant instruments. Therefore, State intervention should only take place after losses have been fully ac-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

counted for and attributed to the existing shareholders and subordinated debt holders.

Admissibility of restructuring aid depends on taking appropriate compensatory measures to avoid excessive distortions of competition. Aid for undertakings in difficulty cannot be treated in terms of "automatic mechanism", where its operation will be based on the principle: "if necessary - the State will intervene and grant appropriate support". The possibility of receiving unconditional State aid in the event of a threat of bankruptcy on the one hand can lead to excessive risk-taking, on the other hand, however, such aid may mean rewarding those enterprises that have the latest adapt to changing market conditions. Compensatory measures are intended to provide a kind of renunciation for the enterprise benefiting from State aid, the price for the opportunity to remain on the market. It is most often the appropriate reduction of capacity. The reasoning behind this requirement is, however, more difficult in a situation where on a given market there is no excessive production capacity. In this case, production capacity limitation of the undertaking which is a recipient of the State aid will in the short term cause the shortage of production capacity on a given market and, consequently, decrease the supply of the goods and increase of prices. In the long term, assuming that the market is a competitive market and is not characterized by a very low price elasticity of supply, the balance will be restored, because the most effective competitors, adapting to changing market conditions by lowering costs and increasing productivity, will fill the gap on the market.

Condition for implementation of compensatory measures would not be normally applied to small enterprises, since it can be assumed that *ad hoc* aid to small enterprises generally do not distort competition to an extent contrary to the common interest. Generally speaking aid for small and medium-sized enterprises have a lesser effect on trading conditions than aid granted to large enterprises. Hence the plan of restructuring small or medium-sized enterprise is not subject to individual notification and notification by the European Commission, but only to approval by the Member State concerned (Quigley, 2009, p. 311). Whereas any rescue aid to granted for more than six months, or stopped after a period of six months must be individually notified to the Commission. Aid schemes for rescuing and restructuring aimed at small and medium-sized enterprises must specify the maximum amount of aid that can be granted to each enterprise, taking into account possible changes in the restructuring plan. The maximum amount of aid granted in total for rescuing and restructuring undertakings may not be

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

more than € 10 million, and if it is exceeded it shall be individually notified to the European Commission. In addition Member States are required to individually inform the Commission of the aid granted to the enterprise, which took over the assets of another, already supported for rescuing and restructuring, enterprise.

The tangible result of the restructuring processes carried out should be a significant reduction or complete cessation of activity by the undertaking. It results from the fact that the decrease in market share is necessary to achieve the intended efficiency and rationality of management, regardless of the reduction of production capacity. However these savings lead to a reduction in employment in the restructured enterprise. Therefore the aid is additionally distinguished to cover the social costs of restructuring. Beside covering the costs of redundancy payments and early retirement, this aid includes special restructuring schemes through training, counseling and practical help with finding alternative employment, aid in moving, as well as professional training and assistance for employees who want to run their own business. Given that such measures, which increase the employability of redundant workers, further the objective of reducing social hardship, the European Commission consistently takes a favourable view of such aid when it is granted to undertakings in difficulty.

Temporary restructuring support

The previous guidelines have treated all forms of restructuring aid alike: loans, guarantees, capital injections, debt waivers and even outright cash grants. However, liquidity assistance (loans and guarantees) that is limited in both amount and duration is less distortive than other forms of aid, since it does not go beyond what is needed to address the liquidity problems that are commonly the main obstacle to restructuring and since it must be repaid with interest. To simplify the provision of aid for restructuring, while also reducing distortions of competition, the guidelines of 2014 include a new concept of temporary restructuring support.

Temporary restructuring support is liquidity assistance designed to support the restructuring of an undertaking by providing the conditions needed for the beneficiary to design and implement appropriate action to restore its long-term viability. Temporary restructuring support may only be granted to SMEs and smaller State-owned undertakings. This kind of State aid may also be granted to undertakings that are not in difficulty but that are facing acute liquidity needs due to exceptional and unforeseen circumstances.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Temporary restructuring support may be granted for a period not exceeding 18 months. Before the end of that period the Member State must approve a restructuring plan, or liquidation plan, or the loan must be reimbursed or the guarantee terminated. Recipients of temporary restructuring support do not have to submit a full restructuring plan, but they are required to provide a simplified plan that identifies the actions that they intend to take to restore their long-term viability.

Does the provision of State aid by the EU Member States for rescuing and restructuring enterprises in difficulty affect their *general government* sector debt?

Taking into account the rules of admissibility of aid for rescuing and restructuring undertakings in difficulty, the enterprise interested in receiving aid must comply with a number of conditions. While the rescue aid is a one-off operation, the aim of which is a temporary improving finances of the enterprise for the time needed to prepare a restructuring or liquidation plan, the restructuring aid is based on the specified plan to restore long-term profitability of the enterprise. Hence in the latter case, to get the support of the public authorities, the undertaking must provide a detailed recovery plan that describes how to return to financial liquidity and reduce the production, which is a form of compensation for other enterprises in the sector of the economy that did not receive State aid.

Table 1 shows the intensity of State aid provided for the purpose of rescuing and restructuring undertakings in the Member States of the European Union in 2007-2013.

Table 1. Rescue and restructuring aid in the EU Member States in 2007-2013 (in millions of euros)

Member States	2007	2008	2009	2010	2011	2012	2013	Total
Austria	0,5	3,0	540,7	6,0	6,0	5,9	3,9	0,5
Belgium	15,9	0,0	0,0	0,0	0,0	0,0	0,0	15,9
Bulgaria	1,2	0,3	1,2	0,3	0,0	0,0	0,0	1,2
Croatia	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Cyprus	17,0	0,0	0,0	0,0	0,0	0,0	0,0	17,0
Czech Republic	0,1	2,0	12,3	76,0	5,3	16,7	0,0	0,1
Denmark	0,0	4,6	4,8	4,7	0,0	0,0	0,0	0,0
Estonia	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Finland	0,5	0,8	0,0	0,2	0,3	1,6	0,0	0,5
France	11,3	1,3	35,5	2,8	0,5	1,0	0,5	11,3
Germany	19,1	22,5	20,4	13,3	56,4	173,1	11,9	19,1
Greece	19,1	0,0	16,9	18,7	2,0	0,0	21,3	19,1
Hungary	45,4	0,0	25,5	149,6	0,0	0,0	0,0	45,4
Ireland	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Italy	36,8	67,4	37,3	60,9	41,2	44,7	33,0	36,8
Latvia	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Lithuania	2,5	0,0	0,0	0,0	0,0	0,0	0,1	2,5
Luxembourg	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Malta	16,2	7,9	0,0	1,6	3,9	25,3	60,0	16,2
Netherlands	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Poland	60,9	184,5	39,9	56,6	12,2	103,1	5,2	60,9
Portugal	0,2	0,1	29,9	10,2	0,6	0,6	0,0	0,2
Romania	150,5	38,0	20,5	3,6	4,2	9,2	10,4	150,5
Slovakia	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Slovenia	1,8	1,7	3,6	2,7	2,6	0,5	37,5	1,8
Spain	5,7	6,1	10,2	12,7	25,2	8,2	0,0	5,7
Sweden	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
United Kingdom	274,8	277,3	280,3	283,0	399,5	304,1	320,2	274,8
EU 28	679,3	617,3	1079,0	703,1	559,8	694,1	503,9	679,3

Source: EUROSTAT.

In the analyzed period the total amount of aid for rescuing and restructuring, which in table 1 is presented jointly in a horizontal and sectoral manner, settled for the area of the EU-28 at € 679 million in 2007, € 617 million in 2008, € 1079 million in 2009, € 703 million in 2010, € 560 million in 2011, € 694 million in 2012 and € 504 million in 2013. On the basis of the data presented in table 2 it can be concluded that it corresponded to a share in the total amount of the State aid in these years respectively at the level: 1.20%, 0.96%, 1.58%, 1.11%, 0.98%, 1.20% and 0.92 %. Therefore, on the basis of available statistical data covering the period 2007-2013 it is difficult to positively verify the thesis adopted at the beginning of the article of a significant increase of the aid in the European Union for rescuing and restructuring enterprises in difficulty during the crisis.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 2. Share of rescue and restructuring aid in total State aid in 2007-2013 (in%)

Member States	2007	2008	2009	2010	2011	2012	2013
Austria	0,04	0,20	23,95	0,32	0,38	0,35	0,24
Belgium	1,06	0,00	0,00	:	0,00	:	:
Bulgaria	3,57	1,63	3,71	1,68	0,00	0,00	0,00
Cyprus	18,82	:	:	:	:	:	:
Czech Republic	0,01	0,18	1,60	7,81	0,46	1,30	0,00
Denmark	:	0,24	0,21	0,23	0,00	0,00	:
Finland	0,06	0,09	0,00	0,02	0,02	0,13	:
France	0,13	0,01	0,26	0,02	0,00	0,01	0,00
Germany	0,13	0,14	0,12	0,10	0,50	1,56	0,11
Greece	2,28	0,00	0,88	1,10	0,09	0,00	0,80
Hungary	4,23	0,00	1,83	8,00	0,00	0,00	:
Italy	0,73	1,25	0,73	1,81	1,36	1,20	1,18
Lithuania	4,11	0,00	0,00	0,00	0,00	0,00	0,06
Malta	12,38	6,83	0,00	2,02	4,04	24,31	46,83
Poland	4,38	7,29	1,47	2,07	0,55	4,57	0,27
Portugal	0,01	0,01	1,80	0,62	0,04	0,06	0,00
Romania	36,43	12,13	9,92	1,73	1,05	1,44	1,23
Slovenia	1,37	0,93	1,23	0,92	0,77	0,14	7,26
Spain	0,14	0,13	0,21	0,29	0,67	0,26	0,00
United Kingdom	6,42	6,53	6,17	5,96	9,65	6,43	7,50
EU 28	1,20	0,96	1,58	1,11	0,98	1,20	0,92

Source: EUROSTAT.

Among nine Member States there can be noted a significant growth in the rescue and restructuring aid in 2008-2010, when the most intense anti-crisis measures were taken. These were: the Czech Republic, Greece, Spain, France, Italy, Hungary, Austria, Poland and Portugal. However, as in the case of the EU level, the increase in the absolute value of this kind of aid did not translate into a significant increase in relation to the total State aid, which resulted from an increase of the expenditures at the same time by the Member States on regional and horizontal aid.

In the so-called group of countries of "old fifteen", which have provided this kind of support to domestic entrepreneurs in the greatest amount there should be indication on Austria, Germany, the UK and Italy. These countries provided aid for rescuing and restructuring primarily to large enterprises of iron and steel sector (ThyssenKrupp - Germany, Arcelor - France)

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

and air transport (Alitalia - Italy, Olympic Airlines - Greece) and the automotive sector (Opel - Germany, Peugeot Citroen - France). However in the group of 13 countries that joined the European Union since 2004, the support provided in this direction is characteristic mainly for Poland, Romania and Hungary, and in most cases it is also sectoral aid. It should be noted that in the group of the EU-15 the upward trend of provided aid for rescuing and restructuring undertakings can now be pointed for Greece and the UK, and in case of the EU-13 countries the State aid to enterprises in difficulty in 2013 was increased by 3 countries: Malta, Romania and Slovenia.

Table 3 shows the size of the *general government* sector debt of EU Member States in the years 2007-2013. Bearing in mind that in the analyzed period the *general government* sector debt showed continuously a rising trend, it is difficult to mention the positive impact of State aid for rescuing and restructuring undertakings in difficulty on the condition of public finances of the Member States, as the size of the debt is fairly not reduced. Thus already at this point, we can reject the hypothesis set at the beginning of this article of a negative correlation of expenditures on State aid for rescuing and restructuring enterprises with the size of the *general government* sector debt. Does therefore the aid provided by Member States to enterprises in difficulty have an adverse effect on the condition of their public finances, leading to an increase in the *general government* sector debt? Or does such aid not have any impact on the *general government* sector debt? Answers to these questions will be provided by the regression analysis. Table 4 shows the test result for the sought relationship between the State aid for rescuing and restructuring undertakings in difficulty and the size of the *general government* sector debt, whether the intersection of the regression line with the axis of ordinates (free term) is equal to zero.

Table 3. The size of the *general government* sector debt of EU Member States in the years 2007-2013 (in billions of euros)

Member States	2007	2008	2009	2010	2011	2012	2013
Austria	183,0	200,0	228,2	242,4	253,3	259,3	262,0
Belgium	299,9	327,5	347,2	364,1	388,1	403,7	413,2
Bulgaria	5,3	4,8	5,1	5,9	6,3	7,4	7,5
Croatia	15,1	17,0	20,2	23,4	26,4	28,2	32,8
Cyprus	9,3	8,4	9,9	10,8	12,9	15,4	18,5
Czech Republic	40,0	42,8	50,5	60,2	63,9	73,2	68,2
Denmark	63,8	80,5	93,0	103,5	114,5	114,0	114,1

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Estonia	0,0	0,0	0,0	1,0	1,0	1,7	1,9
Finland	63,4	63,3	75,5	88,2	95,5	105,5	112,7
France	1248,9	1354,2	1527,1	1627,8	1749,4	1865,8	1949,5
Germany	1592,9	1660,2	1778,5	2067,4	2095,6	2173,6	2159,5
Greece	240,0	264,6	301,0	330,3	356,0	304,7	319,1
Hungary	66,0	72,6	75,7	78,4	72,2	76,7	77,7
Ireland	47,1	79,6	104,5	144,2	190,1	210,2	215,6
Italy	1605,9	1671,2	1769,8	1851,3	1907,6	1989,9	2069,8
Latvia	1,9	4,5	6,8	8,4	8,7	9,1	8,9
Lithuania	4,8	5,0	7,8	10,2	11,7	13,3	13,6
Luxembourg	2,6	5,4	5,6	7,7	7,9	9,4	10,7
Malta	3,6	3,8	4,2	4,5	4,8	4,9	5,2
Netherlands	259,9	348,1	348,9	372,6	393,9	426,1	441,0
Poland	145,9	143,3	165,3	193,8	191,0	215,6	222,9
Portugal	120,1	128,2	146,7	173,1	195,7	211,8	219,2
Romania	14,8	17,2	28,0	37,5	44,7	50,1	54,2
Slovakia	16,8	19,2	23,0	27,6	30,5	37,6	40,2
Slovenia	8,0	8,2	12,5	13,7	17,0	19,2	25,4
Spain	383,8	439,8	568,7	649,3	743,5	891,0	966,2
Sweden	133,5	114,6	129,3	144,2	148,0	156,2	164,4
United Kingdom	879,6	822,1	1099,4	1384,1	1585,3	1741,3	1792,8
EU 28	7456,0	7906,4	8932,0	10025,5	10715,4	11415,0	11786,8

Source: EUROSTAT.

Table 4. Size of State aid for rescuing and restructuring undertakings in difficulty and the size of the *general government* sector debt - analysis of variance: the line "intersection"

EU Member States	Free term <i>a</i>	Standard error <i>S_a</i>	<i>t</i> Stat <i>t_a</i>	<i>p</i>-value	Lower 95%	Upper 95%
Austria	233267,9	13802,19	16,90078	1,33E-05	197788,2	268747,6
Belgium	373993	13661,13	27,37643	1,22E-06	338875,9	409110
Bulgaria	6628,469	423,4498	15,65349	1,93E-05	5539,957	7716,981
Croatia	-	-	-	-	-	-
Cyprus	12640,23	1545,76	8,177358	0,000445	8666,731	16613,74
Czech Republic	55361,52	6125,906	9,037279	0,000277	39614,37	71108,66
Denmark	101495,9	10431,19	9,730034	0,000195	74681,63	128310,1
Estonia	-	-	-	-	-	-
Finland	84961,15	11030,38	7,70247	0,000589	56606,66	113315,6
France	1671963	118535,3	14,1052	3,22E-05	1367259	1976668

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Germany	1844646	118855,5	15,52007	2,02E-05	1539118	2150174
Greece	306348	25484,15	12,02112	7,03E-05	240838,9	371857,1
Hungary	73684,63	2051,833	35,91161	3,15E-07	68410,22	78959,04
Ireland	-	-	-	-	-	-
Italy	2024086	256920,9	7,878244	0,00053	1363650	2684522
Latvia	-	-	-	-	-	-
Lithuania	10276,33	1383,649	7,426979	0,000697	6719,548	13833,11
Luxembourg	-	-	-	-	-	-
Malta	4160,836	261,1844	15,93064	1,77E-05	3489,44	4832,231
Netherlands	-	-	-	-	-	-
Poland	199338	17583,21	11,33684	9,34E-05	154139	244537,1
Portugal	175917,9	18513,45	9,502169	0,000218	128327,6	223508,3
Romania	42293,25	5556,953	7,61087	0,000622	28008,65	56577,85
Slovakia	-	-	-	-	-	-
Slovenia	12399,54	2029,298	6,110261	0,001701	7183,065	17616,02
Spain	668096	150409	4,441862	0,006753	281457,4	1054735
Sweden	-	-	-	-	-	-
United Kingdom	-283945	1004120	-0,28278	0,788678	-2865117	2297226
EU 28	11915358	2720436	4,379945	0,007155	4922256	18908460

Source: Own calculations.

The formulated hypothesis concerning the size of the *general government* sector debt in the Member States of the European Union, according to which lack of State aid to enterprises in difficulty will reduce the *general government* sector debt to zero, must be rejected. Outside the United Kingdom, the test for individual Member States exceeds a critical value $t_{\alpha/2} = \pm 2.5706$ for $\alpha = 0.05$ and $n - 2 = 5$ degrees of freedom. The probability of making type I error is smaller than the accepted significance level of 0.05, and thus it is very unlikely that the wrong conclusion will be drawn that not granting State aid by a Member State for rescuing and restructuring undertakings cannot lead to a total decrease of the *general government* debt in the European Union. With a probability of 0.95 it can be concluded that in the absence of State aid for rescuing and restructuring in the EU the *general government* sector debt of all 28 Member States should adopt a value between (€ 4922.26 billion, € 18908.46 billion). In the case of Poland this range would form: (€ 154.14 billion, € 244.54 billion). The interpretation in relation to the UK is noteworthy at first glance, where the cessation of granting aid to enterprises in difficulty could lead not so much to total reduction of public debt, but also to developing substantial budget surpluses. However, this is due to a large type I error value (p-value), which is much

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

higher than the reference threshold of 0.05, which prevents the rejection of the null hypothesis in favor of the alternative hypothesis.

The most essential statistical test in a simple regression analysis is a test of whether the regression coefficient equals zero. If in a particular case a conclusion can be drawn that the slope coefficient of the true regression line in the population equals zero, it will mean that between expenditures on State aid to enterprises in difficulty and the size of the *general government* sector debt there is no linear relationship, or expenditures on aid and the size of the *general government* sector debt are not linearly dependent. Therefore, it is needed to test the occurrence of linear relationship between expenditures on State aid for rescuing and restructuring undertakings in difficulty in the Member States and the size of the *general government* sector debt. The statistics on this test are shown in table 5. Based on the calculations, it should be stated that the statistical basis for the recognition of the occurrence of a linear relationship between expenditures on State aid and the size of the *general government* sector debt do not exist both in the case of the individual Member States, as well as at the level of the European Union (EU- 28). In other words, on the basis of the t-test value and the value of the probability of making II kind error the hypothesis can be tested which concerns the lack of stochastic relation between State aid to enterprises in difficulty and the amount of the *general government* sector debt providing such aid EU Member States, in such a way that it is not possible to reject the hypothesis zero for the alternative hypothesis, which means lack of stochastic dependence between the studied variables.

Table 5. Size of State aid for rescuing and restructuring undertakings in difficulty and the size of the *general government* sector debt - analysis of variance: the line "variable X"

EU Member States	Regression coefficient b	Standard error S_b	t Stat t_b	p -value	Lower 95%	Upper 95%
Austria	-8,35138	67,52197	-0,12368	0,906384	-181,92	165,2194
Belgium	-4651,33	2268,211	-2,05066	0,095562	-10482	1179,292
Bulgaria	-1340,26	628,6765	-2,13188	0,086199	-2956,3	275,8033
Croatia	-	-	-	-	-	-
Cyprus	-195,652	240,0761	-0,81496	0,452152	-812,79	421,4832
Czech Republic	100,0302	205,3134	0,487207	0,646719	-427,75	627,8052
Denmark	-1938,49	3411,499	-0,56822	0,594451	-10708	6831,044
Estonia	-	-	-	-	-	-
Finland	2700,77	15187,07	0,177833	0,865834	-36339	41740,39

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

France	-7205,17	8392,559	-0,85852	0,429831	-28779	14368,59
Germany	1942,345	1686,546	1,15167	0,301532	-2393,1	6277,749
Greece	-368,621	1766,235	-0,2087	0,842915	-4908,9	4171,632
Hungary	16,5059	34,2725	0,481608	0,650424	-71,594	104,6062
Ireland	-	-	-	-	-	-
Italy	-4055,92	5411,656	-0,74948	0,487312	-17967	9855,185
Latvia	-	-	-	-	-	-
Lithuania	-2121,3	1452,166	-1,46078	0,203911	-5854,2	1611,616
Luxembourg	-	-	-	-	-	-
Malta	16,18228	10,20955	1,585014	0,173818	-10,062	42,42677
Netherlands	-	-	-	-	-	-
Poland	-254,088	201,3916	-1,26166	0,262727	-771,78	263,6058
Portugal	-881,834	1548,272	-0,56956	0,59361	-4861,8	3098,126
Romania	-210,369	93,49147	-2,25014	0,074264	-450,69	29,95876
Slovakia	-	-	-	-	-	-
Slovenia	342,1536	141,3809	2,420084	0,060111	-21,278	705,5848
Spain	-506,427	12360,13	-0,04097	0,968903	-32279	31266,29
Sweden	-	-	-	-	-	-
United Kingdom	5278,71	3256,136	1,621158	0,16591	-3091,5	13648,87
EU 28	-3136,63	3819,989	-0,82111	0,448947	-12956	6682,961

Source: Own calculations.

The lack of the linear relationship between expenditures on State aid for rescuing and restructuring undertakings in difficulty in the EU Member States and the size of the *general government* sector debt is also confirmed by the F test parameters, that is the value of F-test and the probability of type I error, when hypothesis is verified which regards the lack of impact of expenditures on State aid aimed at rescuing and restructuring on the size of the *general government* sector debt (irrelevance of expenditures on State aid in the regression model). For all the countries indicated F-test values are lower than the critical value of 6.608, and the probability of making type I error is higher than 0.05. The calculations in this regard are presented in table 6.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 6. Size of State aid for rescuing and restructuring undertakings in difficulty and the size of the *general government* sector debt - regression statistics and F-test

EU Member States	Regression statistics			Test F	
	Corelation indicator	Determination coefficient	Standard error	F	Significance F
Austria	0,055229	0,00305	33539,25	0,015298	0,906384
Belgium	0,675891	0,456829	33462,79	4,205208	0,095562
Bulgaria	0,690044	0,47616	849,8974	4,5449	0,086199
Croatia	-	-	-	-	-
Cyprus	0,342427	0,117256	3786,323	0,664158	0,452152
Czech Republic	0,212891	0,045323	13665,87	0,237371	0,646719
Denmark	0,24629	0,060659	20864,56	0,322878	0,594451
Estonia	-	-	-	-	-
Finland	0,079279	0,006285	21494,16	0,031625	0,865834
France	0,358431	0,128473	264953,8	0,737054	0,429831
Germany	0,45788	0,209654	241073,7	1,326344	0,301532
Greece	0,092932	0,008636	42836,93	0,043557	0,842915
Hungary	0,210553	0,044333	4616,581	0,231946	0,650424
Ireland	-	-	-	-	-
Italy	0,317801	0,100997	173900,1	0,561718	0,487312
Latvia	-	-	-	-	-
Lithuania	0,546918	0,299119	3373,968	2,133881	0,203911
Luxembourg	-	-	-	-	-
Malta	0,578293	0,334422	530,4093	2,51227	0,173818
Netherlands	-	-	-	-	-
Poland	0,491406	0,24148	30418,88	1,591787	0,262727
Portugal	0,246834	0,060927	42500,83	0,324399	0,59361
Romania	0,709321	0,503136	12099,61	5,063121	0,074264
Slovakia	-	-	-	-	-
Slovenia	0,734479	0,539459	4642,929	5,856805	0,060111
Spain	0,01832	0,000336	239647,4	0,001679	0,968903
Sweden	-	-	-	-	-
United Kingdom	0,58697	0,344533	355756,5	2,628152	0,16591
EU 28	0,344706	0,118822	1744057	0,674223	0,448947

Source: Own calculations.

Analyzing the correlation coefficient, it should be noted that they are contained within the range of (0.01832; 0.734479). However, even in the case of countries which are characterized by the highest correlation between the amount of aid to enterprises in difficulty and the level of their

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

debt in relation to the *general government* sector (Slovenia, Romania, Bulgaria, Belgium), there can be no satisfactory adjustment of the regression line to the empirical data. The determination coefficients for these countries equal 0.539459; 0.503136; 0.47616; 0.456829. This means that the variation in the size of the *general government* sector debt of Slovenia, Romania, Bulgaria and Belgium was explained in approx. 50% by the variability in the expenditures of these countries on State aid for rescuing and restructuring undertakings in difficulty. The remaining approx. 50% is the effect of random and non-random factors (other non-aid variables, inaccuracy of adjusting straight line to the empirical data etc.). If the determination coefficient takes less than 0.5, the regression explains only less than 50% of the variation of the size of the *general government* sector debt and predictions based on such a regression model may be unsuccessful because the regression model explains then very little.

Conclusions

Conducted regression analysis showed that between expenditures of the EU Member States on aid for rescuing and restructuring undertakings and the condition of the public finances of these countries there is no substantial statistical relationship. Granting aid by Member States to enterprises in difficulty does not affect the size of the *general government* sector debt of these countries. The question that now arises is whether: is the (potential) lack of impact of State aid for rescuing and restructuring undertakings on the size of the *general government* sector debt the sufficient justification for its granting? It should be noticed that the principle of compatibility of State aid to the mechanisms of the Single European Market is to provide State aid for the "positive" purposes that is in order to encourage beneficiaries of this aid to the activities that are considered desirable from the point of view of common European interest. Taking into account that the purpose of the "common interest" may be of a social or economic nature, State aid granted by Member States is to be directed at targets, such as environmental protection, job creation, investment in research and innovation, or the development of small and medium-sized enterprises. State aid in accordance with the provisions of the Treaty is to encourage activities to a greater extent than the market would be willing to provide. Therefore what is the purpose of the State aid for rescuing and restructuring enterprises in difficulty? The aim of this seems not to support a particular activity, but to support the activities "as such". State aid for rescuing and restructuring undertakings in

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

difficulty, that is, enterprises often already standing on the brink of bankruptcy, is concerned to protect existing business activities from the disappearance, which seems to be inevitable without State intervention. The conclusion can be drawn that such aid is not so to encourage specific actions as to prevent the liquidation of its business activities, which would be a natural consequence of the action of the market mechanism. This is especially seen in the case when the State aid is not for the actual restructuring of the enterprise, but it is spent to pay debts or maintain overcapacity. Such activities are often the result of the resistance of the public authorities from the introduction of the necessary, but difficult from the social perspective, changes. But this phenomenon can lead to favoring specific social groups, which can be seen in the case of big enterprises threatened with bankruptcy which operate in sensitive sectors, e.g. the mining industry, shipbuilding, rail, automotive. And does this kind of aid only delay necessary from economical point of view, but unacceptable for political reasons, certain restructuring actions, in particular the reduction of employment? The answer to this question is essential primarily from the perspective of the notification procedure under which the European Commission assesses the compatibility with the internal market of the plans of aid notified by the Member States. As far as in the case of any other State aid the notification procedures which are to determine the admissibility of aid occur between the authorities of the Member State and the European Commission whereas the beneficiary is not formally a party to these proceedings, in the case of aid for rescuing and restructuring, the role of the beneficiary is principally important. In this case the beneficiary, which is often enterprise standing at the brink of bankruptcy, must develop a restructuring plan, and then implement it and consistently realize. Member State should have in this regard extra responsibility that comes from the fact that when reporting to the European Commission a restructuring plan, the Member State confirms the legitimacy and rationality of the destination of public funds for the project, thereby confirming its credibility.

Taking this into consideration the most important question arises. Does the State aid "to prevent the bankruptcy of undertakings" follow the condition of art. 107 par. 2 point c of TFEU? It is after all based on this provision of the Treaty, which constitutes the sectoral and regional aid, such aid is considered acceptable and compatible with the internal market (CFI, T-17/03, para 43). Is regulated by this provision conditional exclusion for providing by Member States public aid in fact the basis for the promotion of the least efficient enterprises that cope the worst with competition on the

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

free market and that in the absence of State aid would have to fall and thus give its share in the market to competitors generating lower costs or offering more attractive products? Action of Member States in connection with the effects of the recent financial crisis has shown that State aid for rescuing and restructuring enterprises in difficulty follows more the premise of art. 107 par. 2 point b of TFEU, according to which the anti-crisis aid may be granted. Anti-crisis aid is aid to remedy a serious disturbance in the economy of a Member State. Such aid must be the action taken in response to a crisis situation concerning the whole economy of the country (CFI, T-132/96 and T-143/96, para 167; ECJ, C-57/00 P and C-61/00 P, para 97). Therefore, these serious disturbances in the economy must be of a general nature and may not apply to only one region or one sector (ECJ, C-301/96, para 106). The financial crisis showed, however, that anti-crisis aid will also be admissible in the situation when it will be one sector of the economy, but considered through the prism of several Member States. In this context, State aid may be reasoned by significant decrease in employment, production or investment or threat to the existence of strategic companies. When we go back in time and look at the actions taken by the Member States in connection with the oil crisis in the 70s of the twentieth century, which have provided State aid in the steel industry practically without specifying its purpose – first to support the expansion of the sector, and then to prevent the collapse of enterprises - a proposal to declare State aid for rescuing and restructuring undertakings in difficulty as anti-crisis aid seems to be the most reasonable. The financial crisis of the first decade of the twenty-first century, such as the oil crisis of the 70s of the twentieth century, showed that State aid for rescuing and restructuring enterprises in difficulty will always be regarded as acceptable, when a group of entities (individuals, enterprises) interested in obtaining support is determined and focused while the cost of such support are paid by all taxpayers (the whole society), so the dispersed and less interested in the cost of such support group.

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18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
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Innovation in Contemporary Economies

JEL Classification: *H53; O12; O32; O38*

Keywords: *innovation; knowledge; market economies; the state*

Abstract: The hereby article discusses the issues related to the existing or required support given by the State to enterprises in order to provide them conditions to innovate. Neoclassical economy puts an emphasis to the price mechanism as a decision making effective tool, but enterprises meet many barriers in creating and introducing innovation, like high cost, high risk or lack of demand for innovation. These phenomena tend to inhibit innovation of enterprises. This means that market is not an efficient mechanism for innovation activity of enterprises, and its imperfections provoke State's intervention. The goal of the article is to shape the objectives of State's impact on decisions of innovative enterprises. Research method is the critical literature review and public data on State's support on business R&D analysis. The research results show State's support for both – incremental and radical innovation, which proves that innovative activity of enterprises is far from being a spontaneous, market-based process.

Introduction

Contemporary economies development is strongly related to innovation. Innovations which are understood as „something new proven to be useful” cause the productivity-, value added- and – economic growth. The ultimate performers of innovation are enterprises. And according to Schumpeter – innovation is an autonomous feature of entrepreneur, who looks for new

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

solutions and introduces them to the market. And his most important goal is to maximize the profit. However innovation activity (especially in the field of disruptive innovations) is an activity that involves high cost, risk and uncertainty. Profits constituting the reward and the basic motivation for entrepreneur in innovative activity are highly uncertain and deferred. So the entrepreneur does not necessarily find innovative activity attractive. The question arises whether decisions on introducing innovative activity in enterprises are independent business decisions. If entrepreneur avoids high risk and uncertainty, what makes him to be innovative? The huge role plays the State. Its actions are of twofold: first – it reduces the “market imperfections” which makes innovative activity in enterprises possible. Second – the State creates markets and enables innovation diffusion. The goal of the article is to identify the tools thanks to which the State influences the innovative decision of enterprises in case of both: sustained and disruptive innovations.

Methodology of the research

The hereby article is an attempt to specify tools the State uses in purpose of stimulating the innovative behavior of firms. First the importance of innovation for economy has been described. There have been shown growth theories for which innovations (as a technological change) are the important pro-growth factor. The possible State’s actions in promoting technology-driven growth have been underlined. Then the innovations have been classified. Four innovation types have been listed with respect to two criteria: level of financial involvement and risk (profit). In the next paragraph the twofold attitude of entrepreneur to innovative activity has been taken into account (as a result of his opportunism) – autonomous (spontaneous) innovator, and “conditional” innovator. The first entrepreneur type is “Schumpeterian-like”, the other – “State-dependent”. Innovative activity of enterprises is a high-cost, high-risk activity, therefore the State – as a stimulus, plays a huge role here. There have been specified tools by which the State influences firms’ decisions, the tools have been matched with each innovation types. Therefore the two kinds of tools have been listed – classic and institutional. The R&D expenditures as the main category of classic tools has been considered.

In purpose of achieving the objectives of the hereby article the critical analysis of literature has been made, in territorial, theoretical and methodological contexts.

Innovation landscape

There have been said many words about innovation so far. As Oslo Manual (OSLO, 2005) says, innovation, as an outcome of creative application of knowledge, is seen to play a central role in the knowledge-based economies. It gives the knowledge a crucial role in economic processes and for this reason the nations that develop and manage effectively their knowledge assets perform better. And innovation – as a new product, process or method, freshly introduced to the market – is an outcome of relevant knowledge application. Its role is to bring wealth and social welfare (Vaitheeswaran, 2007), it is an inherent feature of entrepreneurship.

Entrepreneurship and entrepreneurial innovations constitute the basis for the first theory explaining the activities that lead to economic growth in capitalist economies. The author of that theory is Schumpeter (Schumpeter, 1960). His theory centers around entrepreneurial innovations and their role as the key driver of economic growth. Schumpeter argues that competition among market participants leads to a desire to seek out new ways to improve technology, new ways to do business and other types of advantages that would increase profit margins and directly impact the entrepreneur's standard of living. Schumpeter identified innovation as the critical dimension of economic change. He argued that economic change revolves around innovation, entrepreneurial activities, and market power. Schumpeter gives the entrepreneurial power of enterprises the leading role in creating innovation

Subsequent economic theories trying to explain the interplay between innovation and economic growth were Abramowitz (1956) and Sollow (1956) who showed that the economic growth is rather a result of “unexpected residual” reflecting the productivity growth rather than the quantity of production factors. But it was Robert Sollow who modeled the growth through production function, where output is a function of quantity of physical capital and human labor- *ceteris paribus*. The technological change responsible for innovation, was performed as exogenous to the production factors (Mazzucato, 2014, Woźniak, 2008, s. 189). As the technology became a more vital part of innovation and – growth landscape, the economists had to reconsider its place in the growth models. This gave rise to the “endogenous” or the “new growth” theory. This theory states that it is the technology that gives the endogenous outcome of an R&D investment function as well as investment in human capital formation (Grossman,

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Helpman 1991). It is noteworthy that in the new growth theory new ideas were treated as endogenous to the enterprise, not to the institutional organization that transforms ideas into products. The relation between technological change and growth indirectly led policymakers to focus on the importance of investment in technology and human capital to foster growth (Mason, Bishop, Robinson 2009). The consequence of that is the emergence of innovation-led growth policies, that support the knowledge economy. Policy indicators like R&D spending and patent success became the evidence of the market value of firms and their innovation performance. But the State with its policies became a vital part of the innovation landscape.

The 'Evolutionary Theory of Economic Change' (Nelson, Winter 1982) was built in opposition to the endogenous or exogenous growth theories. The theory was built on the basis of Schumpeterian approach to innovation. In perspective of this attitude innovation is firm specific and highly uncertain.

The mix of Schumpeterian and 'evolutionary' approach to studying firm's pro-innovation behavior has led to the 'systems of innovation' policy, where the most important thing is to understand the way in which firms are set in a system of sectoral, regional or national levels. In this view not the quantity of R&D is important but the way it is distributed throughout the economy. And here's the place for State's dominance – it is the State that influences the distribution. The definition of systems of innovation describes relations of economic actors: "...networks of institutions in public and private sectors whose activities and interactions initiate, import, modify and diffuse new technologies" (Freeman, 1995) , or "...the elements and relationships which interact in the production, diffusion and use of economically useful knowledge" (Lundvall, 1992).

The importance of innovation for the economy's performance is unquestioned. Schumpeter asserted that innovation is a result of autonomous entrepreneurial decisions of entrepreneurs. Further growth theories found innovative activity of the firms susceptible to State's action in form of innovation support policies. The question is – who is the innovator? Is it still an autonomous enterprise or not? Are profit prospects that significant that enterprises innovate (or auto-innovate)? Or is it State's policy that introduces innovation to enterprises (by lowering risk and costs)?

Types of innovation

The crucial issue at this moment is to understand the idea of innovation. The dominant part of each innovation definition is the word “new”. So innovation is defined as a new solution, new product, new process. Its novelty is the most important part of the definition. Innovation is a solution introduced to the market. Innovation without the market success is only an invention.

But how new the innovations are? The definitions of innovation show a wide range of possible examples of innovative solutions. From small-step improvements to great, disruptive projects. But are the enterprises equally willing to create incremental and radical innovations? Where is the difference between these definitions.

Incremental innovation can be understood as series of small improvements to an existing product or product line that usually helps maintain or improve its competitive position over time. Radical innovation is concerned with exploration of new technology, it is fundamentally different from incremental innovation that is concerned with exploitation of existing technology. "Radical innovation is a product, process, or service with either unprecedented performance features or familiar features that offer potential for significant improvements in performance and cost"(Leifer et al., 2000). It creates such a dramatic change in processes, products, or services that they transform existing markets or industries, or create new ones. The differences between incremental and radical innovation are shown in **Table 1**.

Table 1. Radical vs. Incremental innovation

Radical innovation	Incremental innovation
Explores new technology	Exploits existing technology
High uncertainty	Low uncertainty
Focuses on products, processes or services with unprecedented performance features	Focuses on cost or feature improvements in existing processes, products or services
Creates a dramatic change that transform existing markets or industries, or creates new ones	Improves competitiveness within current markets or industries

Source: Retrieved from: http://www.1000ventures.com/business_guide/innovation_radical_vs_incr.html

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

In 1997 Clayton M. Christensen in his seminal work suggested different view on the innovation. He's also identified two kinds of innovation: disruptive and sustaining one (Christensen, 2010).

The first characteristic of a disruptive innovation is that it initially provides inferior performance (as measured by the prevailing industry metrics) to existing products available. As a result, it is usually not of much interest to existing users or customers. The second characteristic of a disruptive innovation is that it is adopted by a market that is currently underserved or not served at all. In other words, it serves a market segment that did not exist before. Since disruptive innovations are usually not of interest to a company's existing customers, market leaders are rarely the source of disruptive innovations.

As opposed to disruptive innovation is a sustaining one. Sustaining innovation is one that perpetuates the current dimensions of performance – for example Intel developing faster and faster chip speed. In contrast to disruptive innovation, a sustaining innovation does not create new markets or value networks but rather only evolves existing ones with better value, allowing the firms within to compete against each other's sustaining improvements. Sustaining innovations may be either "discontinuous" (Christensen describes as "revolutionary" innovations as "discontinuous" "sustaining innovation" i.e. "transformational" or "revolutionary") or "continuous" (i.e. "evolutionary") (Christensen, 2010, p. 21-22).

Radical and disruptive innovation differ. Radical innovation almost always seems to mean an order of magnitude improvement in performance or a significant shift from existing performance or solving a complex problem that existing products don't solve. This means more sophisticated technology, based on pushing the boundaries of knowledge (like biopharmaceutical drugs – completely different technology addressed to medical problems that could not be solved satisfactorily by existing drugs).

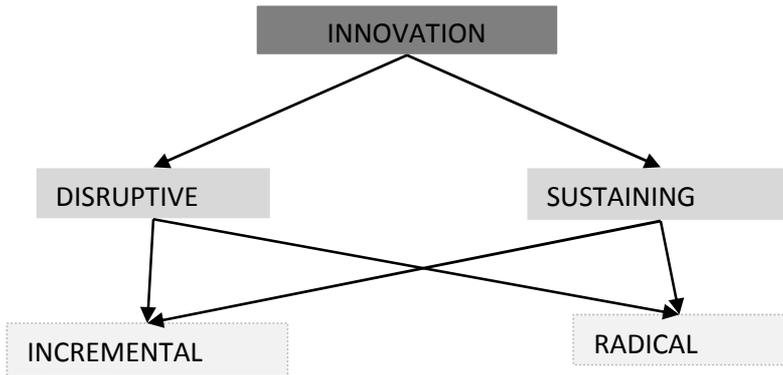
Disruptive innovations don't need to be based on radical technological innovations of this nature (microfinance, for example, did not involve radically new technology). But some disruptive innovations can be radical as well.

Radical innovations would rarely be classified as disruptive because, as we have seen, they are often aimed at driving the performance frontier rather than serving under-served or unserved markets.

Undoubtedly these two classifications of innovation refer to different distinctive features. Incremental and radical innovation are innovation types distinguished due to the creation method. Disruptive and sustaining

innovation are more about consequences that entrepreneurs have to bear due to market introduction of a new product or process. This means that from entrepreneur's point of view there are two kinds of innovation: disruptive and sustained. And these innovation types have two features each: radical or incremental.

Figure 1. Innovation types and features

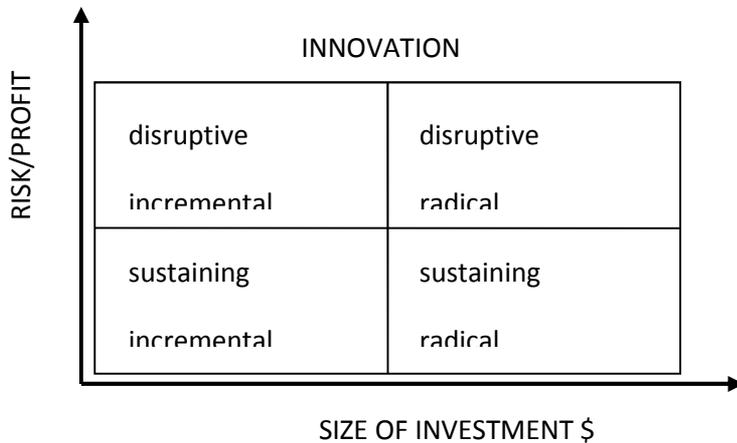


Source: own work.

The crucial determinant of entrepreneur's engagement in innovative activity is the level of risk. And the risk (uncertainty) level is correlated to the height of investment done (the higher uncertainty level the more money is being invested). The motivation for high-risk, high-cost investment is a possibility of obtaining a profit that is higher than in any alternative activity.

The level of risk is the determinant of autonomous innovative activity of enterprises. With increased risk the propensity to innovate autonomously decreases. Unlike Schumpeter claimed, enterprises do not fancy risk much enough to invest in areas where returns are highly uncertain. This puts disruptive radical innovations in the position of the matrix (see **Figure 2**) where the level of the risk and money necessary to invest discourage firms from their entrepreneurial activity. If the level of autonomous firm's involvement in innovative activity can be understood as the money that enterprise is willing to invest – the term "incremental" will determine the autonomous innovation activity of enterprises. High profits from disruptive incremental innovations can be understood as a bonus here.

Figure 2. The innovation matrix



Source: own work

High level of investment is the barrier that stops many firms from innovative activity. Radical sustaining innovations are high cost/low risk ones, and they result with smaller profits than disruptive radical ones, which are top risk and top cost ones. Undoubtedly they have a potential of high profits, but at high cost that excludes enterprises from this kind of activity. This means that enterprises behave in a Schumpeterian way in a limited extend.

Inclination to innovation

According to the types of innovation selected in the previous paragraph one can find that the criterion of firm's involvement in innovative activity is first – the cost, and second – the risk. This means that the autonomous innovative activity of firm refers mainly to the incremental innovations. The sustaining incremental and the disruptive incremental innovations are both the low cost ones. And more often the result is sustaining than disruptive. The relation between incremental innovation and growth is inadequate. As Tucker in his seminal work says: “Because much of the innovation taking place today is incremental, so is its impact on growth. Little ventured, little gained” (Tucker, 2008) . It means that entrepreneurial behavior of firms seeking innovation does not bring the growth. And the improvements – important to firm's production process because of the

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

productivity increase and firm's economic performance, do not cause the upswing of economy's competitiveness.

On the opposite corner of the innovation matrix there is disruptive-radical innovation. If succeed – guarantees high profits and new market emergence. It is a high-risk and high-cost activity that majority of enterprises will not choose. It is concentrated on new knowledge creation (more like basic, than applied or experimental research). Moreover – disruptive radical innovation do not only mean “high cost”. They also mean “new product” with no existing market. So the profits from this kind of activity are possible to achieve in a more distant future than an enterprise is willing to wait for. But disruptive radical innovations have a positive impact on economy's performance. They are more likely to create growth and increase competitiveness than incremental ones. So are radical-sustaining innovations. They can create new markets, they do not break the business cycle but they create new products. They are developing new technologies.

Enterprises do not accept the high-risk innovation activity, but such an activity can cause many benefits to economy. The catalyst of high-risk innovation activity is the State. The State's activity is twofold. The classical attitude to the role of the State in the economy concerns “market failure” approach. State's role is to fix the “market failures”, which are unexpected (and therefore not included in the costs) external effects of economic activity of market players like, for example: pollution (a negative externality, not included in firm's costs), etc. Standard economic theory justifies State's intervention when social return on investment is higher than private return, which makes it unlikely that private business will invest (Mazzucato, 2014). The modern attitude to State's role on this field is more complex. The State's role is not only to “de-risk” private sector decisions. It's role is to solve main socioeconomic questions like ageing, hunger, diseases, climate change, etc. Rather than active correction of ‘market failures’ its role is to shape and create the markets. The most adequate here are the findings of Karl Polanyi (1944), who emphasized how the capitalist ‘market’ has from the start been heavily shaped by State's actions. In innovation, the State not only ‘crowds-in’ business investment but also ‘dynamizes it in’ – creating the vision, the mission and the plan.

Tools to promote innovation

In general, State's impact on innovation in enterprises is at least two-fold. First – State can provide a direct or indirect support. This is a well-known kind of support used as a part of country's industrial policy. The support given to enterprises may take the form of direct (e.g. subsidies, grants, loans etc.) or indirect (fiscal policy instruments) financing. It can also have a form of institutional support (like DARPA or SBIR for innovation in USA). Second – knowledge-based economies are strongly dependent on new knowledge. Therefore State's role is also to create society's creativity in order to reap benefits from it.

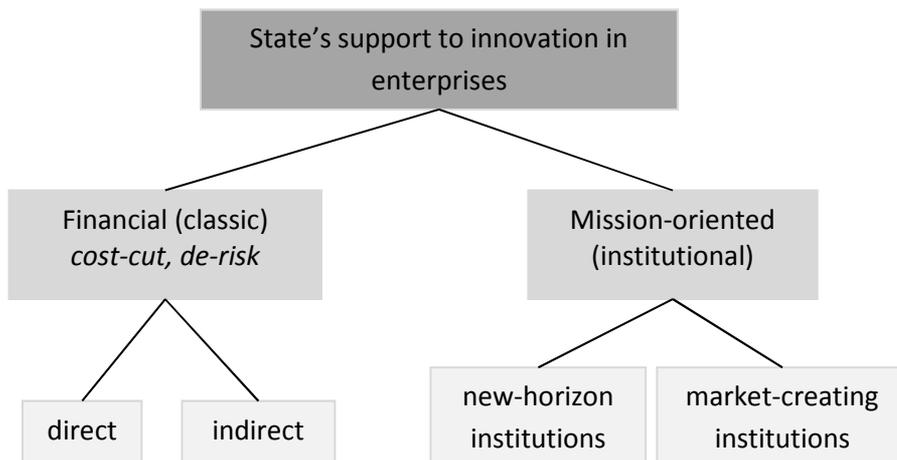
It is noteworthy that State's support to enterprises in form of financing R&D expenditures is dedicated more to incremental innovation than to radical ones. The high risk and uncertainty of the innovation process are the main reasons for which profit-maximizing companies would invest less in basic and more in applied research (D from R&D). The greater and more immediate returns from the latter are a good explanation to these. Investment in basic research is a typical example of fixing 'market failure' where the market alone would not produce enough basic research, so the government must step in. Therefore enterprises mainly get involved in the development, which is a more predictable activity than research (especially basic research). Innovations that arise in this way are mainly improvements and developments of existing products or processes. Radical innovations strongly rely on new knowledge, that is created mainly in form of basic research. As the data show (OECD 2013, p.102, OECD 2014, p. 194) most basic research is performed in universities and in public research organizations. The mission-oriented, highly risky and unsecure, but potentially extremely profitable projects are based upon basic research. For the US economy, for example, government spending on R&D makes up only 26 per cent of total R&D, with the private sector making up 67 per cent, the proportion is much higher when basic research is considered in isolation. Indeed public spending accounts for 57 per cent of basic research in the USA, with the private sector taking on only 18 per cent (Mazucatto, 2014). So the State's support to this kind of research institutions influences new knowledge creation and therefore impacts both forms of radical innovation creation.

The State's support to innovation does not only mean reduction of risk and cost, especially in case of disruptive innovations. Disruptive innovations constitute the supply of innovations that are addressed to an unknown

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

market or – such a market does not exist yet. Therefore States’ support must reach far beyond financing. The interplay between demand and supply is needed here to provide a market for innovation. The problem has been widely discussed in literature (Etzkowitz, 2008).

Figure 3. State’s support to innovation in enterprises



Source: own work

As presented in Figure 3 State’s support to innovation in enterprises is twofold. Financial support to innovation creation considers mainly financing of enterprises R&D activity – directly or indirectly (see Table 2).

Table 2. Major public instruments for financing business R&D and innovation

Financing instruments		Key features	Some country examples
Direct public funding	<i>Grants, subsidies</i>	Most common funding instruments. Used as seed funding for start-ups and innovative SMEs. Granted on a competitive basis and in some cases, on the basis of private co-funding. No repayment is usually required. Supply-side, discretionary instruments.	ANR subsidies (Argentina), Central Innovation Programme for SMEs(Germany), R&D Fund (Israel), SmallBusiness Innovation Research (SBIR)Program (USA)
	<i>Debt financing</i> <i>Credit loans</i>	Government subsidised loans. Require sorts of collateral or guarantee. Obligation of repayment as debt. The investor/lender does not receive an equity stake.	Novallia (Belgium), High-Tech Gründerfonds (Germany), Public Investment Bank (France), Microfinance Ireland, Slovene Enterprise Fund, British Business Bank (Great Britain)

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

		<i>Repayable grants/ advances</i>	Repayment required, partial or total, sometimes in the form of royalties. Could be granted on the basis of private co-funding.	Repayable Grants for Start-Ups (New Zealand)	
		<i>Loans guarantees and risk-sharing mechanism</i>	Used widely as important tools to ease financial constraints for SMEs and start-ups. In the case of individual assessment of loans, can signal ex ante the creditworthiness of the firm to the bank. Often combined with the provision of complementary services (e.g. information, assistance, training)..	Small Business Financing Program (Canada), Mutual guarantee schemes (Confidi) (Italy), 7 Loan Program (USA), R&I Loans Services (European Commission)	
	<i>Debt/equity financing</i>	<i>Non-bank debt/equity funding</i>	New funding channels. Innovative lending platforms and non-bank debt or equity funds.	Business Finance Partnership (Great Britain)	
		<i>Mezzanine funding</i>	Combination of several financing instruments of varying degrees of risk and return that incorporate elements of debt and equity in a single investment vehicle. Used at later stage of firms' development. More suitable for SMEs with a strong cash position and a moderate growth profile.	Guarantees for Mezzanine Investments (Austria), PROGRESS Programme (Czech Rep.), Industrifonden and Fouriertransform (Sweden), Small Business Investment Company (USA)	
	<i>Equity financing</i>	<i>VC funds and funds of funds</i>	Funds provided by institutional investors (banks, pensions funds, etc.) to be invested in firms at early to expansion stages. Tends to increasingly invest at later -less risky- stage. Referred as patient capital, due to lengthy time span for exiting (10-12 years). The investor receives an equity stake.	Seed Fund Vera (Finland), France Investment 2020, Yozma Fund (Israel), Scottish Co-investment Fund (Great Britain)	
		<i>Business angels</i>	Provide financing, expertise, mentoring and network facilities. Tends to invest in the form of groups and networks. Financing at start-up and early stage.	Seraphim Fund (Great Britain), Tech Coast Angels and Common ANGELS (USA)	
		<i>Innovation vouchers</i>	Small lines of credit provided to SMEs to purchase services from public knowledge providers with a view to introducing innovations in their business operations.	Innovation vouchers (Austria, Chile, China, Denmark, etc.)	
	Indirect public funding	<i>Tax incentives</i>	<i>Tax incentives on CIT</i>	Used in most countries. Broad range of tax arrangements on corporate income tax, including tax incentives on R&D expenditure and, less frequently, tax incentives on IP-related gains. Indirect, non-discriminatory.	SR&ED tax credit (Canada), R&D Tax Credit (France), exemption on payroll withholding tax (Netherlands), patent box (Great Britain)
			<i>Tax incentives on PIT</i>	Available in many countries. Broad range of tax incentives on R&D and entrepreneurial investments and revenues that apply to personal income tax, value added tax or other taxes (consumption, land, property, etc.). Indirect, non-discriminatory.	Personal wage tax reduction for foreign researchers and key staff (Denmark), wealth tax exemption for business angels (France), Business Expansion and Seed Capital Schemes (Ireland)

Source: OECD, 2014, p. 157.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The State's mission-oriented support for business innovation can be characterized as institutional support, because the State – through establishing the institutions affects both – firms' propensity to involve in risky and costly activity and creates the conditions for innovation to diffuse. They are both important to disruptive innovations. There are numerous examples of State's activity in this field. For example public procurement for R&D and innovation. It is an instrument that creates a demand for technologies or services that do not exist, or, targets the purchase of R&D services (pre-commercial procurement of R&D). It also provides early-stage financial support to high-risk innovative technology-based small firms with commercial promise. The country example is Small Business Innovation Research (SBIR) Program (USA) and SBIR-type of programs (UK). Another example can be technology consulting services and extension programs that expand the diffusion and adoption of already existing technology, and contribute to increase the absorptive capacity of targeted firms (especially SMEs). Provide information, technical assistance, consulting and training, etc.

A great example of institution that gave rise to new disruptive innovations is DARPA. It was set up to give the USA technological superiority in different sectors, mainly those related to technology. Its budget is more than 3 billion USD per year, 240 staff. Going beyond simply funding research DARPA funded the formation of computer science departments, provided start-up firms with early research support, contributed to semiconductor research and support to human-computer interface research, oversaw the early stages of Internet. DARPA provided both – supply and demand for innovation (Mazucatto, 2014). The next example is SBIR – a consortium between Small Business Administration and different government agencies like Department of Defense, Department of Energy and Environmental Protection Agency. The Small Business Innovation Research programme required government agencies with large research budgets to designate a fraction (ca. 1,25%) of their research funding to support small, independent firms. As a result many highly innovative start-ups were supported. Literature shows other examples of successful institutional support, like Orphan Drug Act (ODA) supporting biotechnology or, National Nanotech Initiative (Mazucatto, 2014).

One can notice that support given to disruptive radical or disruptive incremental innovations is not only about financing. Even more important issue here is creating a markets for innovation or “picking winners” –

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

which means targeting a new growth areas (as a result of industry-university-enterprise interplay).

Conclusions

Innovation in market economy comes from enterprises. Anyway enterprises are innovation producers. But innovative activity comes not only from enterprises opportunism. Schumpeter claimed that entrepreneurship means innovation. In modern market economies innovation is strongly addicted to new knowledge creation which often means – it's risky and costly. And entrepreneurs avoid high risk and cost. But the innovation gives growth and wealth, increases competitiveness of economies. There are numerous tools supporting innovation in business, but the most growth-giving innovations are disruptive innovations but their characteristics exclude enterprises as innovative agents. The State, as a main beneficiary of innovation (growth) takes the control on promoting and supporting innovation with help of numerous supporting tools.

The history of breakthrough innovations shows, that State's role in promoting innovation in business, goes far beyond financial tools. The State finances the most risky research – basic and applied, but also can be – and usually is – the source of the most radical disruptive innovations. The State's role is not only to “fix markets” but also to create them.

Moreover, State – thanks to its institutions (laboratories, agencies, Acts) has a potential to accelerate the knowledge diffusion. This means, that the State is a main player of the innovation system, so its role is not limited to the country level, neither to long-term subsidies for specific sorts of activity. The State, in order to create markets and introduce technological progress, use regulatory tools, orders, public procurement. It means that the State is the catalyst for technology change.

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
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**On the Use of Panel Stationarity Tests
in Convergence Analysis: Empirical Evidence
for the EU Countries***

JEL Classification: *C22; C23; O47; O52*

Keywords: *economic growth; convergence; catching up; stationarity; ADF test*

Abstract: The study examines the concept of stochastic convergence in the EU28 countries over the 1994-2013 period. The convergence of individual countries' GDP per capita toward the EU28 average per capita income level and the pair-wise convergence between the GDP of individual countries both are analyzed. Additionally, we introduce our own concept of conditional stochastic convergence which is based on adjusted GDP per capita series in order to account for the impact of other growth factors on GDP. The analysis is based on time series techniques. To assess stationarity, ADF tests are used. The study shows that the process of stochastic convergence in the EU countries is not so widespread as the cross-sectional studies on β or σ convergence indicate. Even if we extend the analysis to examine conditional stochastic convergence, the number of converging economies or pairs of countries rises but not as much as it could be expected from the cross-sectional studies.

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Introduction

Ever since the Sala-i-Martin's and Barro's and Mankiw et al.'s well recognized studies (see e.g. Barro & Sala-i-Martin, 1990, 2003; Mankiw et al., 1992), the issue of income-level convergence has gained huge popularity in the literature. The two most common concepts of convergence were proposed: β convergence (when less developed countries grow faster than more developed ones) and σ convergence (when income differences between economies decrease over time). A number of methods have been developed which enable for empirical verification whether the process of convergence actually is taking place, starting with the cross-section based Barro regression as the most popular technique that enables for the verification of the β convergence hypothesis.

However, parallel to the classical definitions and methods of analysis, the concept of stochastic convergence has been theoretically and empirically developed in the literature. With the gradual development of panel data based stationarity tests, the range of tools available for empirical analysis has rapidly increased and there currently exist numerous tools that allow to verify empirically the existence of so called stochastic convergence. Its idea, dating from the early nineties and described fully in such papers as Bernard & Durlauf (1995), is to define convergence on the basis of time series rather than – as in the case of the most popular β convergence – cross section, though recently both concepts have been seriously developed due to popularity of panel data studies. Contrary to the β -convergence-type thinking in which it is the current situation and the recent influence of the lagged GDP on current growth, in the case of stochastic convergence it is the expected value of future differences between the GDP levels in different countries that are taken into account. In the case when there is stochastic convergence, the basic concept is to expect the difference between the level of development to be zero in the infinite time horizon.

All the concepts of convergence are interrelated. However, they should be tested separately and treated as complementary rather than substitutive. Since they require different estimation methods, the results need not be the same. For example, as Bernard & Durlauf (1996) indicate, time series tests are based on a stricter notion of convergence than the cross-section tests; hence, under certain assumptions, the cross-section tests can spuriously reject a no-convergence hypothesis while time-series tests do not.

Our analysis covers the 28 European Union countries (EU28) and the 1994-2013 period. We examine the stochastic convergence of the individu-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

al countries toward the EU28 average per capita GDP level as well as between the pairs of the individual countries (by examining 378 pairs).

A new element of our analysis is the extension of the classical concept of stochastic convergence. The stochastic convergence, implying that GDP differences against the group average or between the individual countries diminish over time, is called the absolute stochastic convergence. However, as in the case of the β convergence, we extend this approach for conditional convergence because there are many factors of economic growth and it is difficult to assume that all the countries tend to the same steady state. Namely, we adjust the GDP time series by eliminating the impact of selected economic growth determinants to account for the fact that the countries are not homogenous in terms of economic growth factors. The analysis of stochastic convergence on the adjusted-GDP time series is the core of the concept of stochastic conditional convergence. ADF tests are used to test for stationarity of the series of differences between the GDP of a considered country and mean GDP of the considered group of countries (as in Bernard & Durlauf, 1995), however, ADF tests are also used in the Pesaran's (2007) procedure of testing stationarity of the series of GDP gaps in each possible pair of countries from the considered group. The GDP series might though not converge due to serious diverging trends caused by different values of GDP growth factors in different countries. That is why we follow by checking the existence of conditional stochastic convergence by first estimating a panel-data-based β convergence equation. We use the estimates of parameters on the growth factors to eliminate their influence from the GDP growths of different countries and follow by reconstructing the GDP level series, applying the *ceteris paribus* rule with regard to the considered growth factors. We then repeat the above described procedures of Bernard & Durlauf and Pesaran with the series from which the influence of the growth factors has been eliminated.

There is a lot of empirical studies on cross sectional β and σ convergence. Abreu et al. (2005) found an enormous number of 1650 empirical articles on convergence. Matkowski et al. (2013) present a wide review of empirical studies on convergence for the EU countries. The studies in which stochastic convergence is analyzed appear less frequently in the literature, although they are by no means scarce.

For instance, Bernard & Durlauf (1995) reject the existence of stochastic convergence in the whole group of the 15 OECD countries over the 1900-1987 period, but find substantial evidence for common trends (smaller samples of European countries did not converged either). Pesaran (2007)

examines both the output and growth stochastic convergence among the world countries from 1951 to 2000 (the number of countries for some sub-periods exceeds 100) concluding that there is no output convergence and the findings of convergence clubs in the literature might be spurious, but there is significant evidence of growth convergence. Other studies in which stochastic convergence (in different operational form) with the use of time-series techniques was tested for various groups of countries include: Cuñado & Pérez de Gracia (2006) for African countries; Christopoulos & León-Ledesma (2008) for the OECD countries; Cunado (2011) for the OPEC countries; Evans & Kim (2011) for the Asian countries. Stochastic convergence was also examined in the regional context by: Kane (2001) for the U.S. regions; Lau (2010) for Chinese regions; and Le Pen (2011) for European regions. However, we have not seen in the literature the study in which the stochastic convergence for the whole EU28 group was examined in the way adopted here.

The paper is composed of four sections. The next section discusses the research methodology by presenting the concept of absolute and conditional stochastic convergence. The further section describes and discusses the results. The last section concludes.

Methodology of the research

Let $\ln GDP_{i,t}$ represent the logarithm of the GDP of country i in period (year) t . We can then state that countries i and j converge stochastically¹ if

$$\lim_{k \rightarrow \infty} (\ln GDP_{i,t+k} - \ln GDP_{j,t+k} | I_t) = 0, \quad (1)$$

where I_t represents the set of information available at time t , and the $\ln GDP_{i,t}$ throughout the paper is the natural logarithm of the i th country's GDP per capita (at purchasing power parity at constant US\$) in year t . The econometric way to see and test for the above is to notice that for the formula (1) to be fulfilled, a cointegrating vector $[1, -1]$ is required for the series $\ln GDP_{i,t}$ and $\ln GDP_{j,t}$. Suppose we are testing for convergence in

¹ This definition is quite strict – Bernard & Durlauf (1995), among others, also define a more liberal concept of common trend in bivariate or multivariate output, whose special case is the exact stochastic convergence. That requires replacing formula (1) with $\lim_{k \rightarrow \infty} (\ln GDP_{i,t+k} - \gamma \ln GDP_{j,t+k} | I_t) = 0$.

the bivariate case of countries i and j . That requires computing the gap series

$$dGDP_{ij,t} = \ln GDP_{i,t} - \ln GDP_{j,t} \quad (2)$$

and testing for the stationarity of the $dGDP_{ij,t}$ series.² Usually a variation of the ADF test would be used here, though Pesaran (2007) among others discusses also the KPSS-type tests as the power of ADF tests is questionable especially in the case of short series.

Should a group of – potentially – converging countries include more than two of them, two main options are available. Again following Bernard & Durlauf (1995) and most other research, one can test for convergence replacing the series of gaps between two countries output (2) with the series of gap between the $\ln GDP_{i,t}$ and its mean in a group of considered countries:

$$dGDP_{i,t} = \ln GDP_{i,t} - \overline{\ln GDP}_t, \quad (3)$$

while the definition of stochastic convergence (1) would now be replaced with

$$\lim_{k \rightarrow \infty} (\ln GDP_{i,t+k} - \overline{\ln GDP}_{t+k} | I_t) = 0. \quad (4)$$

Pesaran (2007), however, points out the weakness of such a procedure and suggests a modified approach for the multivariate case. Its core in a group of N countries is to check for stationarity of gap series defined as (2) for every possible pair of countries, that is for all the $N(N-1)/2$ non-redundant cases. With the support of simulation studies, Pesaran argues for the efficiency of such a procedure and points out that if we apply the ADF-type tests of stationarity and assume certain level of significance α , then if there is no convergence in the considered group, the rejection rate of the null hypothesis shall asymptotically tend to α .

In this paper we analyze the convergence of the group of the 28 EU countries. The annual series of data start in 1994 and finish in 2013. Both the convergence to mean (as in (4), $i=1, \dots, 28$) and pairwise convergence

² In the case of common trends instead of the strict stochastic convergence, the test of trend-stationarity would be used instead and the cointegrating vector would need to be $[1, -\gamma]$.

(as in (1), $i,j=1,\dots,28$) are analyzed. An ADF test is used with a single lag in each of the equations (we check that it is sufficient to eliminate the – in most cases slight – autocorrelation of $dGDP_{ij,t}$ and $dGDP_{i,t}$ respectively).

In the analyses of the β convergence it is common to consider two types of it: the absolute and the conditional convergence. We suggest a similar approach in the field of stochastic convergence. There is a possibility that the series of $\ln GDP$ of certain country would not be converging due to other than autonomous reasons. Namely: flow of physical as well as human capital and technical thought would make it converge if it were not for the values of certain growth factors. As an example, suppose that the government of the country does everything it could in order to convert it in an autarchy, which naturally limits also the flow of technical thought. Further suppose that the government consumption is excessively high. It might be that unless these two factors slowed down the convergence process, the country would be heading towards the rest of the considered group, but as the two above mentioned growth factors play a highly negative role, the convergence of the pure series of $\ln GDP$ would not be observed. In order to overcome this issue we propose analyzing the convergence of the series of adjusted $\ln GDP$. The proper correction that should be applied consists in eliminating the influence of the (non-homogeneous across countries) growth factors that distort the series. The procedure that we suggest is the following.

As the first step, we estimate a Barro-type model of GDP convergence as in Próchniak & Witkowski (2013). The functional form of the estimated model is

$$\Delta \ln GDP_{it} = \alpha_i + \beta_0 \ln GDP_{i,t-1} + x'_{it} \beta + \varepsilon_{it}, \quad (5)$$

where α_i is the individual effect of i -th country, β_0 is the β -convergence parameter, x_{it} is the vector of the growth factors while β is the vector that covers their influence on the GDP growth and finally ε_{it} represents the error term. The model itself is estimated as such while cross-sectional data are used, while a minor transformation is applied in the case of panel-data-based analysis as it is in this paper (Próchniak & Witkowski, 2014).

In this paper the convergence of the EU28 group is considered in the 1994-2013 period. We thus have a panel with annual observations and the Blundell and Bond's system GMM estimator is used (Blundell & Bond, 1998). Given the economic sense and data availability, the following variables are considered as economic growth determinants

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

- log of lagged GDP per capita (at purchasing power parity at constant US\$);
- investment (% of GDP) – *inv*;
- general government consumption expenditure (% of GDP) – *gov_cons*;
- openness rate ((exports + imports)/GDP) – *open*;
- current account balance (% of GDP) – *cab*;
- inflation (annual %) – *infl*;
- log of fertility rate (births per woman) – *fert*;
- population growth (annual %) – *pop_gr*;
- population ages 15–64 (% of total) – *pop_15_64*;
- log of life expectancy at birth (years) – *life*;
- log of population, total – *pop*.

The last two variables (*life* and *pop*) are further eliminated in the step-wise regression procedure and they are not included in the final model.

The aim of this study is not to explain fully the sources of economic growth. Instead, the aim is to include in the GDP growth regression the factors that from the theoretical and empirical point of view are the most important determinants of both the pace of economic growth and the steady-states to which the individual countries are tending. The choice of control variables is based on our earlier studies on β convergence and economic growth determinants. The set of variables includes typical and significant factors of economic growth, but of course not all the possible time series. The variables that represent population aspects – mainly responsible for human capital – (*fert*, *pop_gr*, *pop_15_64*, *life*, *pop*) are treated as exogenous while all the remaining are allowed to be endogeneous, which is based on the economic knowledge and/or intuition in this manner: the variables assumed to be exogeneous are not likely to be dependent on the economic growth in short time horizon themselves, which is why we do not decrease efficiency of the estimator by allowing their endogeneity.

Once the model (5) is estimated, the estimates $\hat{\beta}$ are known. Now in the second step, the vector of $\Delta \ln GDP_{it}$ for each $i=1, \dots, N$ can be modified so as to constitute

$$\Delta \widehat{\ln GDP}_{it} = \Delta \ln GDP_{it} - (x'_{it} - \bar{x}'_t) \hat{\beta}, \quad (6)$$

where the \bar{x}_t represent average values of all the considered growth factors throughout the sample in period t .

In the third step, the modified $\ln GDP$ series are created for each of the considered countries. In each of the cases, the modified series is defined as

$$\overline{\ln GDP}_{it} = \begin{cases} \ln GDP_{it} & t = 1 \\ \overline{\ln GDP}_{i,t-1} + \Delta \ln GDP_{it} & t = 2, \dots, T. \end{cases} \quad (7)$$

Naturally, should a group of countries be homogeneous in the sense of the values of growth factors across countries x_{it} in each of the periods $t=1, \dots, T$, the properties of the $\overline{\ln GDP}_{it}$ would be the same as of the $\ln GDP_{it}$. However, they are obviously not, thus while the absolute stochastic convergence (1) or (4) might not take place, the relative convergence, defined as

$$\lim_{k \rightarrow \infty} (\overline{\ln GDP}_{i,t+k} - \overline{\ln GDP}_{j,t+k} | I_t) = 0 \quad (8)$$

if Bernard and Durlauf's type of procedure is applied or as

$$\lim_{k \rightarrow \infty} (\overline{\ln GDP}_{i,t+k} - \overline{\ln GDP}_{t+k} | I_t) = 0 \quad (9)$$

if Pesaran's type approach is applied might occur.

As a last step we apply the same ADF test with a single lag in order to test for stationarity of the series of

$$d\overline{\ln GDP}_{i,t} = \overline{\ln GDP}_{i,t} - \overline{\ln GDP}_t \quad (10)$$

in the Bernard and Durlauf's type of approach or

$$d\overline{\ln GDP}_{ij,t} = \overline{\ln GDP}_{i,t} - \overline{\ln GDP}_{j,t} \quad (11)$$

in the Pesaran's type of approach. Rejecting the null hypothesis of non-stationarity of the series (10) or (11) would suggest that the considered economies converge stochastically in the conditional sense, while the stronger case of rejection the non-stationarity hypothesis of (2) or (3) would suggest the existence of absolute stochastic convergence. The empirical results of the above described procedures are given in the next section.

Results

The results of testing the stochastic absolute convergence hypothesis are presented in Tables 1 and 2. Table 1 refers to the convergence toward the EU28 average per capita income level while Table 2 concerns the pair-wise catching-up process.

Table 17. Results of stochastic absolute convergence toward the EU28 income level

Converging countries	<i>p</i> -value
Cyprus	0.1

The table includes only the countries that exhibited convergence, i.e those for which GDP deviations against the EU28 average were stationary. ADF test with a single lag and a constant is used.

Source: Own calculations.

It turns out that the studied countries did not reveal – in general – very strong stochastic convergence tendencies. Table 1 shows that Cyprus is the only country that converged toward the EU28 average income level. For the other 27 countries, the null hypothesis in the stationarity test could not be rejected at the 10% significance level. In the case of Cyprus, the null hypothesis was rejected meaning that the deviations of Cyprus’s GDP from the average EU28 per capita income are stationary meaning the existence of convergence.

The confirmation of stochastic absolute convergence for Cyprus may result from the fact that Cyprus is a small island country. Its economy is influenced by a lot of external factors and it exhibits stochastic convergence toward the average GDP per capita in the EU28 group.

These findings give new light on the catching-up process of the EU countries and should be treated as complementary to the other studies on convergence, based on different concepts and methods. Namely, while most cross-sectional studies on β and σ convergence confirm the existence of the catching-up process inside the enlarged European Union, in the case of stochastic convergence the results are less evident. This difference constitutes the value added of this analysis and can be explained as follows.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 2. Results of pair-wise stochastic absolute convergence

No.	Country	Countries with which a given country is converging
1	Austria	Germany, Ireland, Malta
2	Belgium	Ireland
3	Bulgaria	Estonia, Latvia, Lithuania, Poland, Slovakia
4	Croatia	Germany, Hungary, Slovenia
5	Cyprus	-
6	Czech Republic	-
7	Denmark	Ireland
8	Estonia	Bulgaria
9	Finland	France, Germany, Ireland
10	France	Finland, Ireland, Spain, UK
11	Germany	Austria, Croatia, Finland, Ireland, Malta, Sweden
12	Greece	-
13	Hungary	Croatia, Ireland
14	Ireland	Austria, Belgium, Denmark, Finland, France, Germany, Hungary, Italy, Luxembourg, Malta, Netherlands, Portugal, Spain, Sweden, UK
15	Italy	Ireland
16	Latvia	Bulgaria
17	Lithuania	Bulgaria
18	Luxembourg	Ireland
19	Malta	Austria, Germany, Ireland
20	Netherlands	Ireland
21	Poland	Bulgaria
22	Portugal	Ireland
23	Romania	-
24	Slovakia	Bulgaria
25	Slovenia	Croatia
26	Spain	France, Ireland
27	Sweden	Germany, Ireland
28	UK	France, Ireland

p -value of 0.1 is assumed in stationarity tests. ADF test with a single lag and a constant is used.

Source: Own calculations.

First, the lack of stochastic convergence toward the EU28 average income may result from the fact that the EU group's average GDP is created by a number of countries which are homogenous in the long-run perspective but in the short run they may reveal different economic growth paths.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Hence, due to a differentiated influence of EU members on the current pace of economic growth of the whole group, the average GDP per capita for the whole group does not match well that for the individual countries.

Second, it is also likely that the stronger catching-up tendencies would be observed toward only Western Europe rather than the EU28 as a whole. This hypothesis would require testing the EU15 per capita income level or the weighted average EU28 per capita GDP as the reference point (in the latter case, the impact of the CEE countries on the average would be much smaller and in the case of some small CEE countries – like the Baltics, Cyprus or Malta – even negligible).

Third, the lack of stochastic convergence may result from the fact that the individual countries tend toward the best performers (like Luxembourg) or the biggest economies (like Germany, France, or UK) and not toward the EU28 average. To verify this hypothesis, the pair-wise convergence should be tested that will be done in the next step of the analysis.

Fourth, it is likely that the lack of stochastic convergence results from the fact that the convergence is analyzed in absolute terms (on the basis of non-adjusted GDP per capita time series). In contrast, it may be expected that the catching-up process occurs conditionally with regard to different steady-states to which the individual countries are tending. This view will be assessed in the next steps when the conditional stochastic convergence is examined.

The results of pair-wise stochastic absolute convergence are reported in Table 2. Table 2 lists the pairs of countries for which the stochastic convergence has been confirmed. The results are symmetric meaning that if country A is converging toward country B, country B is also converging toward country A. The results of pair-wise convergence need not be similar to those toward the EU28 as already described; hence, it is worth to analyze both of them.

In the studied group of countries, the pair-wise convergence, like the convergence toward the EU28, is not very strong either. Only 8.2% of the total number of pairs of countries turned out to be statistically significant at the 10% significance level (see: Table 6). Based on the results, it is possible to identify pairs of countries for which we can find arguments that the results are not spurious. Nevertheless one should notice, that the share of rejected null hypotheses in the ADF tests is lower than the assumed significance level, which might also mean that the attained results lay within the frame of test error and despite their economic sensible interpretation, they actually are econometrically spurious. The most important findings from

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

the analysis of Table 2 – which should still be taken with some caution – are the following.

The best performer in terms of the stochastic absolute convergence is Ireland. This country exhibited stochastic convergence with 13 Western European countries (Austria, Belgium, Denmark, Finland, France, Germany, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, and UK) and two new EU members (Hungary and Malta). The fact that the Irish economy catches up with Western Europe is logical. Ireland has strong trade and capital links with Western Europe and this is one of the sources stimulating convergence tendencies of the Irish economy toward the other Western European countries.

Some neighboring countries with close economic links also confirm the existence of stochastic convergence. This refers to both Western Europe and the new EU member states. As regards the Western European countries, convergence has been evidenced in the case of Austria and Germany (two neighboring countries with the same language and close links), France and Spain as well as France and UK (Spain and UK are the two neighbors of France³) and UK and Ireland (countries closely linked with strong historical, political, and economic ties). As regards the CEE countries for which the convergence can be economically justified, we can enumerate Croatia and Slovenia (two former Yugoslav-republics) and – to a lesser extent – Croatia and Hungary (due to a common border).

Looking at the results of the absolute stochastic convergence some questions arise. Firstly, why Cyprus is the only country that exhibited stochastic convergence toward the EU28 average per capita income level? Secondly, why the pair-wise convergence was not evidenced in the case of some countries which should catch up due to evident historical, cultural, political, institutional, and economic relationships (like the Czech Republic and Slovakia, the Baltic states, Spain and Portugal, or the Scandinavian countries)?

To address these questions, it is worth to extend the analysis for conditional convergence. The lack of convergence in some evident cases may be caused by the fact that Tables 1 and 2 refer to the absolute catching-up process. Cross-sectional studies on β convergence indicate that absolute convergence does not show the full picture of economic growth paths of the examined countries. The main argument is that the countries tend to different steady-states because the process of economic growth is multidimen-

³ The UK is treated as the northern neighbor due to a common maritime border with France.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

sional and there are numerous factors affecting the rate of economic growth that need not be equally distributed among the considered countries. It is thus worth to verify the idea of conditional stochastic convergence, which is our new concept of the analysis.

In the case of stochastic conditional convergence, we adjust the GDP time series for each country from the impact of the given country's economic growth determinants. The adjustment is made based on the empirical model of economic growth. Initially, as described in the previous section, 10 variables were considered as economic growth determinants (and the initial GDP per capita level being the 11th variable). On the basis of the stepwise regression, two variables (life expectancy and the number of population) were eliminated due to statistical insignificance. As the result, the final model of economic growth encompasses 9 explanatory variables (including initial GDP).

Table 3 shows the estimation results of the final model of economic growth, which is used to adjust GDP per capita time series for the analysis of conditional stochastic convergence. The model given in Table 3 is estimated with the use of the Blundell and Bond (1998) GMM system estimator with the volume of GDP per capita in the current period being the explained variable.

Table 3. The model of economic growth used to adjust GDP growth rates for the stochastic conditional convergence

Explanatory variable	Coefficient	<i>t</i>-statistics	<i>p</i>-value
Initial GDP per capita	0.9732	288.94	0.000
Inv	0.0060	21.83	0.000
gov_cons	-0.0012	-2.90	0.004
Open	0.0001	5.18	0.000
cab	0.0017	6.41	0.000
infl	-0.0001	-5.19	0.000
fert	-0.0308	-2.89	0.004
pop_gr	-0.0065	-5.25	0.000
pop_15_64	-0.0037	-4.44	0.000
Constant	0.4315	7.18	0.000

Dependent variable: GDP per capita in the current period. Estimator: Blundell and Bond GMM system estimator.

Source: Own calculations.

This model is generally correct from the economic and statistical point of view. All the variables are statistically significant (*p*-values less than 0.01). The coefficient standing on initial income is less than 1 meaning that

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

in the standard untransformed economic growth model with the change in output as the dependent variable, the coefficient on initial income would be less than zero. Hence, the model confirms the existence of cross-sectional conditional β convergence (i.e. a negative relationship between the initial income level and the subsequent growth rate). Investments, trade openness and current account balance are the variables that have a positive impact on GDP growth while inflation, government consumption, population growth and fertility rate have a negative impact on the dynamics of output. These results are in line with the theoretical structural model. In the case of the share of population aging 15-64, the estimated coefficient is negative and this outcome has weaker economic background.

The results of testing the conditional stochastic convergence hypothesis, based on the adjusted GDP figures, are presented in Tables 4 and 5. Their structure is the same as that of Tables 1 and 2.

Table 4 shows the results of conditional stochastic convergence toward the EU28 average per capita income level. Now, the convergence has been evidenced for more countries than in the case of absolute convergence. In conditional terms, four countries were catching up stochastically: Croatia, Cyprus, Germany, and Ireland. As it can be seen, after introducing adjusted GDP time series, the number of converging countries increased. Among the countries that caught up, we can distinguish mainly peripheral small economies, namely Croatia, Cyprus, and Ireland. To some extent, this can be explained by the fact that small countries tend to be more open and more dependent on the other economies and it is for them easier to bridge the gap toward the average income of a given international organization. This is only our presumption because the group of converging countries includes also Germany, i.e. the biggest EU economy. In contrast, the Germany's catching-up process may result from the fact that the biggest economies determine the reference point to which the whole group is tending and that is why they are also converging to this point.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 4. Results of stochastic conditional convergence toward the EU28 income level

Converging countries	<i>p</i>-value
Croatia	0.01
Cyprus	0.1
Germany	0.1
Ireland	0.05

The table includes only the countries that exhibited conditional convergence, i.e those for which adjusted GDP deviations against the EU28 average were stationary. ADF test with a single lag and a constant is used.

Source: Own calculations.

Table 5. Results of pair-wise stochastic conditional convergence

No.	Country	Countries toward which a given country is converging
1	Austria	Croatia, Finland, Ireland, Sweden, UK
2	Belgium	Croatia, Finland, Ireland, Netherlands, Spain, UK
3	Bulgaria	Estonia, Latvia, Lithuania, Poland, Slovakia
4	Croatia	Austria, Belgium, Germany, Hungary, Luxembourg
5	Cyprus	-
6	Czech Republic	Ireland
7	Denmark	Ireland
8	Estonia	Bulgaria
9	Finland	Austria, Belgium, Germany, Ireland, Luxembourg
10	France	Ireland
11	Germany	Croatia, Finland, Ireland, Malta, Sweden
12	Greece	-
13	Hungary	Croatia, Ireland
14	Ireland	Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Hungary, Italy, Luxembourg, Malta, Netherlands, Portugal, Slovenia, Spain, Sweden, UK
15	Italy	Ireland
16	Latvia	Bulgaria
17	Lithuania	Bulgaria
18	Luxembourg	Croatia, Finland, Ireland
19	Malta	Germany, Ireland
20	Netherlands	Belgium, Ireland
21	Poland	Bulgaria
22	Portugal	Ireland
23	Romania	-
24	Slovakia	Bulgaria

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

25	Slovenia	Ireland
26	Spain	Belgium, Ireland
27	Sweden	Austria, Germany, Ireland
28	UK	Austria, Belgium, Ireland

Notes as in Table 2.

Source: Own calculations.

Table 5 indicates that the pair-wise conditional stochastic convergence inside the studied group is stronger than the absolute convergence. At the 10% significance level, 10.1% of all the pairs of countries caught up while in the case of absolute convergence this share stood as 8.2% (see: Table 6).⁴ The country that exhibited the strongest pair-wise convergence is again Ireland. The Ireland's per capita GDP caught up with that of the 17 countries, two more than in the case of absolute convergence: 13 Western European economies (Austria, Belgium, Denmark, Finland, France, Germany, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, and the UK) and 4 new EU member states (the Czech Republic, Hungary, Malta, and Slovenia).

Among the Western European countries, numerous converging partners were recorded also by Germany (Austria, Croatia, Finland, Ireland, Malta, Sweden) and France (Finland, Ireland, Spain, UK). Germany and France are the two largest EU economies (according to the 2014 total GDP at both current exchange rates and purchasing power parities). It is thus likely that these countries reveal a large impact on economic growth paths of the other EU members and that is why they have relatively many converging neighbors. As regards the new EU member states, the biggest number of converging partners had some peripheral economies, namely Bulgaria (5 countries), and Croatia and Malta (both 3 countries).

Just like in the case of absolute convergence, it is also possible to find some pairs of countries exhibited conditional catching up where the convergence has strong historical, political, and economic background. This refers to Austria and Germany, Croatia and Slovenia, France and Spain, France and UK, as well as Ireland and UK. However, some other theoretically evident cases (like the Baltics or the Scandinavian countries) have not been converging in pairs.

⁴ Theoretically, the pairs showing absolute convergence should also reveal conditional convergence. However, when examining empirical data for the real economies such a situation need not hold due to, inter alia, the nature and assumptions of quantitative methods in macroeconomic modelling.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 6. Robustness tests: the share of converging pairs of countries at different significance levels

<i>p</i> -value	Pair-wise absolute stochastic convergence	Pair-wise conditional stochastic convergence
0.01	4.5%	5.0%
0.05	6.3%	7.1%
0.10	8.2%	10.1%

The total number of different pairs is $(28 \times 28 - 28) / 2 = 378$. ADF test with a single lag and a constant is used.

Source: Own calculations.

Finally, a robustness analysis to check how the results are affected by introducing different significance levels can be performed. Table 6 shows the share of converging pairs of countries for the three significance levels: $p = 0.01$, 0.05 , and 0.10 , while the last figure has been adopted in the main analysis in Tables 2 and 5. These p -values refer to the stationarity tests where the null hypothesis assumes that both time series are non-stationary, that is they are not converging. Hence, the confirmation of convergence requires the rejection of the null hypothesis. The lower the p -value, the lower number of rejected null hypotheses, and the lower number of confirmed pairs of converging countries. Indeed, under the basic p -value of 0.10 , 8-10% of total examined pairs of countries exhibited stochastic convergence. At the p -value of 0.05 , the share of converging countries falls to 6-7%, while at $p = 0.01$ it falls to 4-5%. That means that in most cases, except the low 0.01 significance level, the rate of rejection in the tests does not differ much from the assumed level of significance. Following the rationale of Pesaran (2007), such a result in asymptotic conditions would suggest no converging tendencies. The number of time periods in the sample is quite far from the number that would allow us to treat the conditions as asymptotic, nevertheless, all in all we should admit a failure to find any well palpable converging tendencies.

Summing up, our analysis shows that the process of stochastic convergence in the EU countries is not as widespread as the cross-sectional studies on β or σ convergence indicate. Even if we extend the analysis to examine conditional stochastic convergence (the original approach proposed by the authors of this study), the number of converging economies or pairs of countries rises but not as much as it could be expected from the cross-sectional studies. These results also confirm the theoretical Bernard's and Durlauf's (1996) view that time series tests are based on a stricter notion of convergence than cross-section tests.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

This analysis gives new insights into the nature of economic growth paths of the examined countries. The results indicate that our concept of conditional stochastic convergence is a good idea. It shows a broader picture of economic growth tendencies than the absolute convergence hypothesis and it has been worth to examine it. However, the methods of analyzing conditional stochastic convergence require further theoretical developments and empirical applications to check the robustness of the results.

Conclusions

The study examines the concept of stochastic convergence in the EU28 countries over the 1994-2013 period. The stochastic convergence means that the expected value of future differences between the GDP per capita levels in different countries is zero in the infinite time horizon. In the paper, the convergence of individual countries' GDP per capita toward the EU28 average per capita income level and the pair-wise convergence between the GDP of individual countries both are analyzed. Additionally to the standard Bernard's & Durlauf's (1995) and Pesaran's (2007) approach, we introduce our own concept of conditional stochastic convergence which is based on adjusted GDP per capita series to account the impact of the other growth factors on GDP. To test for stationarity of the series of differences between the GDP of a considered country and mean GDP of the whole group as well as differences of the GDP of the two countries, ADF tests are used.

The analysis shows that the process of stochastic convergence in the EU countries is not so widespread as the cross-sectional studies on β or σ convergence indicate. Even if we extend the analysis to examine conditional stochastic convergence, the number of converging economies toward the EU28 group's mean GDP rises from 1 to 4 and the share of converging pairs of countries rises from 8.2% to 10.1%; this is still not as much as it could be expected from the cross-sectional studies.

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**Proceedings of the 8th International Conference on Applied Economics
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Globalisation Effect Measure via Hierarchical Dynamic Factor Modelling

JEL Classification: *C43; E32; C10*

Keywords: *leading indicator; hierarchical dynamic factor model; globalisation; economic growth*

Abstract: In this paper the issue of globalisation and deteriorating precision of domestically oriented frameworks is addressed. A hypothesis that the effect of international trends on the growth of economy is increasing over time is formed. In order to validate this a method of composing foreign series with local indicators in a hierarchical dynamic factor model is presented. The novelty of this approach is that globalisation effect is measured focusing on prediction rather than similarity. This way the measure presents country's sensitivity to global shocks and reveals how much focal country's economy is intertwined with global economy. The application was performed on Lithuanian data and the hypothesis was validated. The results indicate that globalisation effect has an increasing effect over time.

Introduction

The globalisation is increasingly addressed as the underlying cause of diminishing accuracy of traditional domestically oriented macro-econometric models. An example of extended Conference Board methods (Drechsel and Sheufele, 2010) shows that more and more indicators have to be incorporated into leading index construction to keep up with the accuracy of previously constructed models. This result could indicate that

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

processes are becoming of more complicated structure impelled by increasing amount of information available for a single agent of economy and therefore affecting its decision-making. The accuracy of domestically oriented models deteriorates with time and this phenomenon is addressed by Fichtner et al. (2009). They find that it is caused by globalisation, however adding information about external environment improves the forecast performance.

Globalisation measure has been constructed by other authors although with different focus. Deher et al. (2008, pp. 25-74) label globalisation as multi-domain, pluralistic phenomenon which consists of many processes so they take a complex approach to construct index based on many indicators which reveal globalisation presence. Kearney (2004) globalisation index is canonical example of such measure it is aggregate weighted index calculated from indicators of areas: political engagement, technology, personal contact and economic integration. This index is quantitative but heavily relies on weighing and this weakness is often addressed by other authors, e.g. Lockwood (2004, pp. 507-623), Heshmati (2006). This index is also criticised for not being clear of what exactly it measures and that indicators from different countries are calculated using different methodologies therefore not possessing the desired feature of cross-comparability (Castelli, 2008, pp. 383-404).

Another approach to measure globalisation is based on international trade, e.g. Naghshpour and. Sergi (2009, pp. 1-24) created an index by classifying and ranking the countries on their imports and exports or international trade share to GDP. This method is useful for comparing countries but does not contribute to the dynamic aspect and does not address globalisation in the time domain. Another example of using international trade to inspect and measure the globalisation is study by Kim and Shin (2002, pp. 445-468). Their method was network based and revealed interesting patterns in geographical domain. They also compared 2 time periods (1959 and 1996) and made generalisations about globalisation process from them: the international trade is becoming denser due to globalisation.

The similarity in dynamics of economic indicators in different countries could be measured in various ways, but the most popular method is some sort of factor modelling. The findings of Cubadda et al. (2012) show that a common factor explains a lot of co-movements of different European countries therefore including data of other countries could help acquire better accuracy in evaluating models, since the factor model approach is

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

data greedy. Andersen and Herbertsson (2003, 2005, pp. 1089-1098) analysed indicators of economic integration, applied used factor analysis to measure the commonality across different countries and calculated the index of globalisation. Similar results were acquired by Maslov (2001, pp. 397–406) using the similar methods (principal component analysis) on financial time series.

The findings of mentioned authors suggest that the component of foreign information in economic models is gaining more importance. Statistical explanation for this could be that the foreign component of these processes was always present, but was discarded as insignificant, because of its noise-like features. However due to globalisation indicators from different economies are becoming more similar and supranational element is becoming more apparent. This effect should be particularly visible for small open economies.

In the light of these statistical observations it was decided to take a new approach on measuring the globalisation effect with the focus on prediction. Other authors like Andersen and Herbertsson (2003) measure the similarity of economic indicators across different countries. However this way the 'globalisation effect' might be represented by spurious relationships. Therefore prediction based measurement could indicate country's sensitivity to global shocks and reveal how much focal country's economy is intertwined with global economy. This way we could define what we want to measure: the globalisation impact as a proportion of economy growth explained by supra-national factors.

The relationship between globalisation and the growth of economy has been analysed by many authors, e.g. Dreher (2006, pp. 1091-1110) found that globalisation promoted economic growth, Quinn's and Toyoda's (2008, pp. 1403-1449) findings reveal that capital account liberalization had a positive association with growth in both developed and emerging market nations, Villaverde and Maza (2011, pp. 952-971) conclude that globalisation has been one of the main drivers of economic growth. These authors mostly distinguished relationship between the degree of globalisation measured by Kearney or similar indexes and the growth rates of economy. The novelty of this paper is that it tries to reveal what part of the economic growth was generated from drivers of globalised economic environment and measure this effect in the time domain so that the monitoring of the globalisation impact could be performed. Another issue that is addressed in this paper is the dynamics of measured globalisation effect: does it grow in magnitude?

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The main hypothesis in this study is: the effect of international trends on the growth of economy is increasing over time. In order to distinguish and quantify domestic and foreign factors the structural approach is required and a dynamic hierarchical factor model was built following Moench et al. (2009).

The main objectives of this paper are the following:

- Adapt the hierarchical dynamic factor model to distinguish and evaluate the effect of domestic and foreign drivers of the economy and attain a quantitative measure of magnitude of either effect in the time domain
- Apply the new method for Lithuanian data
- Validate the hypothesis that due to globalisation the proportion of economic growth forecast explained by foreign indicators is increasing over time

The introductory paragraph outlines clearly state the objectives and motivation for writing the paper. The introduction should provide a context for the discussion in the body of the paper.

Methodology of the research

Since the main objectives are to determine the load of domestic and foreign drivers on the growth of focal economy the leading indicators approach is used. The GDP growth was used as a measure for economy growth. The leading series are identified on several criteria (correlation, Granger causality, ect.) and used in the following steps of study after necessary transformations (stationarisation and scaling).

The structural methods are necessary in order to distinguish domestic and foreign components of economy drivers. For this reason it was necessary to enforce structural division of domestic and supra-national indicators and hierarchical dynamic factor model served that purpose very well. The time series were organised into 2 blocks: one for domestic and the other for foreign indicators. The evaluation of this model was performed using Monte Carlo Markov Chain (MCMC) simulations with Gibbs sampling technique assuming gaussian innovations.

After the evaluation of domestic and foreign factors a dynamic linear model was built to identify time-varying weights of domestic and foreign factors on the growth of GDP. The initial values were selected upon regressing GDP growth on evaluated factors.

The leading indicators

Since the global economic environment is described by many indicators the Stock and Watson (2002) method for macroeconomic forecasting using diffusion indexes was chosen. This method allows to use many predictors which could be cumbersome for some traditional techniques such as vector auto-regression or structural equation modelling. The factor model also deals with an issue of indicators being not suitable for cross-comparability (due to different methodologies of measurement in different countries) addressed by Castelli (2008, pp. 383-404). Factor model lets us extract signal from large panel of data series therefore discrepancies caused by different measurement methods are discarded as noise.

The selection of leading indicators was performed following Gaudreault et al. (2003). An initial data set consisted of almost all Lithuanian quarterly economic indicators starting at least at 1998 (this date was important since there was a recession in 1998-1999 and it would be interesting to monitor the results in this particular period), and the major economic indicators of Lithuania's top 20 international trade partners. Leading series were selected based of three criteria:

1. Granger causality
2. Correlation between series $\Delta X_{i,(t-l)}$ and GDP growth ΔGDP_t should be greater with lags $l > 0$
3. R^2 criterion should be bigger in regression $\Delta GDP_t = \Delta X_{i,t-l} + e_t$ with lags $l > 0$

Only the series that met all three criteria were selected. A three level model was built and separate factors were estimated for domestic and foreign variables since the domestic series were organised into one block, while another block contained the foreign series. The domestic block consisted of 4 time series and foreign block was formed from 20 series. The domestic leading indicators largely overlapped with selected leading indicators from another study where they were used for constructing Lithuanian leading economic index (Reklaite, 2011, pp. 91-107).

The hierarchical factor model

The equations constituting the three level hierarchical model are the following:

$$X_{bit} = \Lambda_{G,bi}G_{bt} + e_{Xbit} \quad (1)$$

$$G_{bt} = \Lambda_{F,b}F_t + e_{Gbt} \quad (2)$$

$$\psi_F(L)F_t = \varepsilon_{Ft} \quad (3)$$

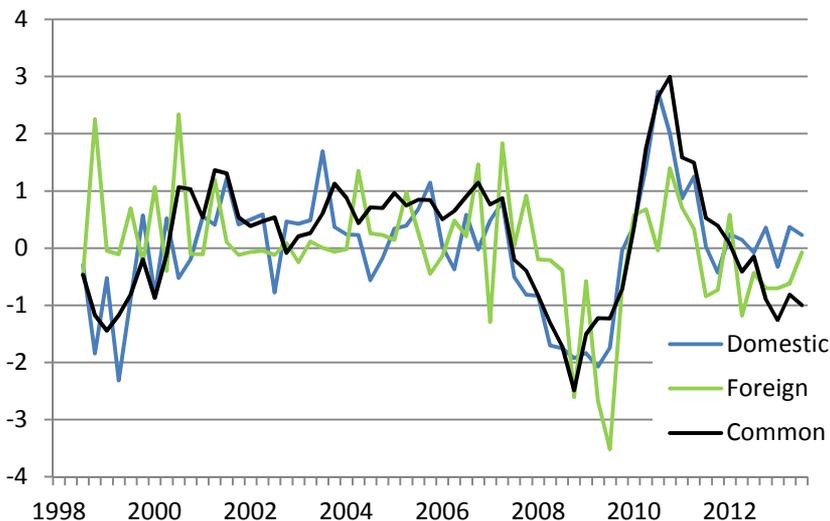
X_{bit} are leading series, which were transformed to be stationary and scaled, index b denotes the block (either domestic or foreign), i - index of time series, t denotes time index. Λ_G and Λ_F are loadings, G_{bt} are block-level factors, F_t is a common factor. The equation (3) describes stationary AR(1) process. e_{Xbit} , e_{Gbt} and ε_{Ft} have zero mean and their variances $\Sigma_X = cov(e_{Xbit})$ and $\Sigma_G = cov(e_{Gbt})$ are assumed to be diagonal. The evaluation of this model was carried out following the procedure by Moench et al. (2009), via Markov Chain Monte Carlo (MCMC) using Gibbs sampling technique (Carter and Kohn, 2004, pp. 541-553), under assumption of Gaussian innovations. Data series are structured into blocks $b = 1, \dots, B$. Each series i in a given block b is decomposed into a serially correlated idiosyncratic component e_{Xbit} and a common component $\Lambda_{G,bi}(L)G_{bt}$ which it shares with other variables in the same block. Each block level factor G_{bjt} has a serially correlated block-specific component e_{Gbjt} and a common component $\Lambda_{F,bj}(L)F_t$ which it shares with all other blocks. Finally, the economy-wide factor F_t is assumed to be serially correlated. In this model, variables within a block can be correlated through F_t and the e_{Gbjt} 's, but variables between blocks can be correlated only through F_t . Estimation procedure by MCMC: Let $\Lambda = (\Lambda_G, \Lambda_F)$, $\Psi = (\Psi_F, \Psi_G, \Psi_X)$, $\Sigma = (\Sigma_F, \Sigma_G, \Sigma_X)$.

1. Organize data into blocks to yield X_{bt} , $b = 1, \dots, B$. Use principal components to initialize $\{G_t\}$ and $\{F_t\}$. Use these to produce initial values for Λ , Ψ and Σ .
2. Conditional on Λ , Ψ , Σ and $\{F_t\}$ draw $\{G_t\}$ taking into account time varying intercepts.

3. Conditional on Λ , Ψ , Σ and $\{G_t\}$ draw $\{F_t\}$.
4. Conditional on $\{G_t\}$ and $\{F_t\}$, draw Λ , Ψ and Σ
5. Return to 2.

One dynamic factor for each block and one common factor were evaluated. 10000 iterations were made, and first 500 were dropped out as a "burn-in". The domestic and foreign leading factors were evaluated calculating the expectation from posterior distributions. The estimations were carried out using *dlm* package (Petris, 2010) of statistical software *R*. The resulting factors are plotted in figure 1.

Figure 1. Evaluated common, domestic and foreign leading factors from the hierarchical factor model



Source: own work.

The results indicate that even though the extracted domestic and foreign factors are a bit noisy, they depicted the economic crisis and recovery in 2007-2011 pretty well. As expected, domestic and foreign factors have similarities with common factor (domestic factor $G_{1,t}$ correlates with common factor by 0.88, foreign factor $G_{2,t}$ correlates with common factor F_t by 0.56). Even though correlation between $G_{1,t}$ and $G_{2,t}$ is positive (0.29) they have periods where they act opposite of each other, which is

imminent since model specification allows them to correlate only through the common factor F_t .

Combining the indexes

To determine the magnitude of the effect of domestic and foreign drivers to the Lithuanian economy, a simple linear model was built following macroeconomic forecasting example by Stock and Watson (2002) by regressing the growth of coincident index on both leading factor estimates. The 1-period ahead forecast was made:

$$\Delta GDP_{t+1} = \alpha_1 G_{1,t} + \alpha_2 G_{2,t} + \varepsilon_{t+1} \quad (4)$$

The estimates of parameters are in the table 1.

Table 1: Estimates of model parameters from equation (4)

	Estimate	Std. Error	t value	p-value
α_1	0.297	0.113	2.639	0.010
α_2	0.399	0.113	3.543	0.001

Source: own work.

Here $G_{1,t}$ was a the domestic leading factor, and $G_{2,t}$ was the foreign leading factor. It can be identified from table 1 that foreign factor has a larger load on the future state of economy which is not surprising since the focal economy is small and open.

Dynamic linear model

Equation (4) was evaluated under the assumption that the coefficients are fixed over time. Relaxing this assumption lets us build a dynamic linear state-space model to identify how the effects of domestic and foreign drivers of economy change over time and validate the hypothesis that the proportion of economic growth forecast explained by foreign indicators is increasing over time:

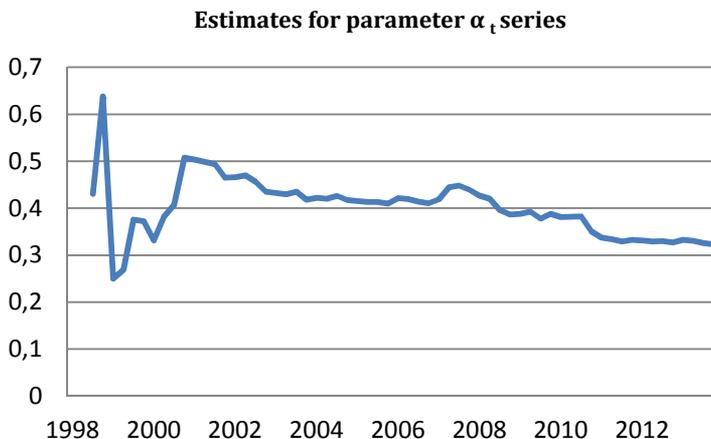
$$\Delta GDP_{t+1} = \alpha_t G_{1,t} + (1 - \alpha_t) G_{2,t} + \varepsilon_{t+1}, \quad (5)$$

$$\alpha_{t+1} = \psi\alpha_t + u_t. \tag{6}$$

The parameters at $G_{1,t}$ and $G_{2,t}$ were constrained to sum to 1 in order to make this model identifiable. Under this specification our hypothetical statement means that the parameter α_t should be declining over time since $G_{1,t}$ is domestic factor. The parameters of this model were evaluated by maximum likelihood (assuming Gaussian innovations) and Kalman filtering. The prior value of α was set to match result from regression (4). The plot of dynamic coefficient α_t is in the figure 2.

It can be identified from graph 2 that the Russian crisis of 1998-1999 had huge impact. Also, it shows that parameter α_t is decreasing, which means that Lithuanian economy is more and more intertwined with other European economies. This result also validates our hypothesis about the increasing amount of explained forecast by foreign indicators. It leads to a conclusion that globalisation makes quantifiable and increasing effect in focal economy.

Figure 2. Evaluated parameter series α_t - the parameter of domestic factor impact in future economy



Source: own work.

Conclusions

In this paper a hypothesis was formed: due to globalisation the proportion of economic growth forecast explained by foreign indicators is increasing over time. In order to validate it a hierarchical dynamic factor model was built. Using this structural approach the domestic and foreign drivers of economy were distinguished and their effects quantified. This measure offers a new view at globalisation since it is measured focusing on prediction rather than similarity and reveals how much focal country's economy is intertwined with global economy in terms of how sensitive it is to global shocks.

This new measure has a clear interpretation and withstands critique aimed at many other measures, such as obscurity of what exactly they measure, or lack of robustness in spite of their strong reliance on weighting and indicator selection. The factor model also deals with issue of data quality in sense of lacking measurement precision and infeasible indicators from different countries on the grounds that it extracts the signal from large data panels and discrepancies are recognized as noise.

Lithuanian example showed that foreign series correspond to an amount which is increasing over time. This confirms not only that incorporating foreign data is useful, but also that in this framework the globalisation effect is visible and it can be monitored using dynamic linear models. These conclusions state that the hypothesis was validated and foreign information corresponds to an amount of forecast explained that is increasing over time.

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18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
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Optimization of the Variables Selection in the Process of Real Estate Markets Rating*

JEL Classification: *B16*

Keywords: *real estate market rating; optimization of the variables selection; Hellwig's method*

Abstract: The growing significance of the real estate market prompts investors to search for factors and variables which support cohesive analyses of real estate markets, market comparisons based on diverse criteria and determination of market potential. The specificity of the real estate market is determined by the unique attributes of property. The Author's assume that developing real estate market ratings identifies the types of information and factors which affect decision-making on real estate markets. The main objective of real estate market ratings is to create a universal and standardized classification system for evaluating the real estate market. One from the most important problem in this area is collection of appropriate features of real estate market and development dataset. The main problem involves the selection and application of appropriate features, which would be relevant to the specificity of information related to the real estate market and create a kind of coherent system aiding the decision-making process. The main aim of this study is to optimization of variables set that were used to develop the real estate market ratings. To this purpose Hellwig's method of integral capacity of infor-

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

mation was applied. In this particular case, this method shows what set of variables provides information most sufficiently. The results lead to obtain the necessary set of features that constitute essential information which describes the situation on the local real estate market.

Introduction

The real estate market is one of the most rapidly developing goods markets that attract massive investments, but as an object of research, it poses numerous problems.

The level of knowledge about the market and its participants is a factor that determines the efficiency of the real estate market, but is often disregarded in market analyses. Knowledge gaps may originate with active market participants who have limited information about the system and its constituent elements. Other market participants may also have limited knowledge in this area. The knowledge manifested by entities conducting transactions on the RE market is (according to theoretical assumptions) limited or negligent. The above implies that market participants conduct transactions without mutual knowledge which leads to asymmetry in the decision-making process. This could lower the efficiency and, consequently, the effectiveness of the entire market. Researchers analyzing the real estate market should also demonstrate a sufficient level of knowledge about the mutual relationships between the subjects and objects of market transactions (Renigier-Biłozor, Wiśniewski, 2012, str. 95-110).

Providing access to the knowledge of the real estate market developed in the form of a simple message is the only way to solve this problem. The authors assumed that it can be achieved by developing a measure of the rating real estate markets providing general and unambiguous/clear information classifying the object of analysis and being an effective decision-making support system.

The specificity of the real estate market is determined by the unique attributes of property. For this reason, rating methodologies applied on capital markets cannot be simply copied to the real estate market.

The main objective of real estate market ratings is to create a universal and standardized classification system for evaluating the real estate market. A rating system contributes to objectivity in the decision-making process and it shortens decision-making time (Renigier-Biłozor et al., 2014).

Real estate market ratings serve a variety of practical purposes. They are used to develop portfolio investment strategies (Anglin and Yanmin, 2011, Collett, Lizieri and Ward, 2003) and formulate long-short portfolio strate-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

gies on housing indices for more risky and less risky assets characterized by low liquidity (Berach and Skiba, 2011). The scarcity of relevant information results from the shortcomings of market effectiveness analyses (Case and Shiller, 1989, Fama, 1990, Grossman and Stiglitz, 1980, Dawidowicz and oth 2014). According to Case and Shiller (1989, 1990), the ineffectiveness of the analyzed market can be attributed to individual investors who do not have access to objective knowledge about the real estate market.

One from the most important reasons behind undertaking research in this area is the problem which occurs in the advanced real estate analysis, as collection of appropriate features of real estate market and development dataset. Market features are usually divided into macroeconomic and microeconomic factors, including socio-demographic development, overall economic development and political, legal condition and property market. The main problem involves the selection and application of appropriate features, which would be relevant to the specificity of information related to the real estate market and create a kind of coherent system aiding the decision-making process.

The main aim of this study is to verify the variables that were used to develop the real estate market ratings in the author's previous work entitled: "Rating methodology for real estate markets - poland case study" (Renigier-Biłozor et al., 2014). At this target Hellwig's method of integral capacity of information was applied. This method, in this particular case it is showing, what store of features are providing information with the almost full source.

The results lead to obtain the necessary set of features that constitute essential information which describes the situation on the local real estate market.

The study was prepared as a result of implementation of research project No. UMO-2014/13/B/HS4/00171 financed from the funds of the National Science Centre.

Methodology of the research

Although recent year have witnessed the growing popularity of various support systems, comprehensive and effective information systems that facilitate real estate management and analyses continue to be in short supply. The above results from the specific character of real estate management operations which involve complex procedures and decisions, as well

as the unique character of real estate data. Those factors prevent smooth flow of information which is required for the implementation of rational decisions and actions in business, investment, financial and promotional projects (Renigier-Biłozor, 2013).

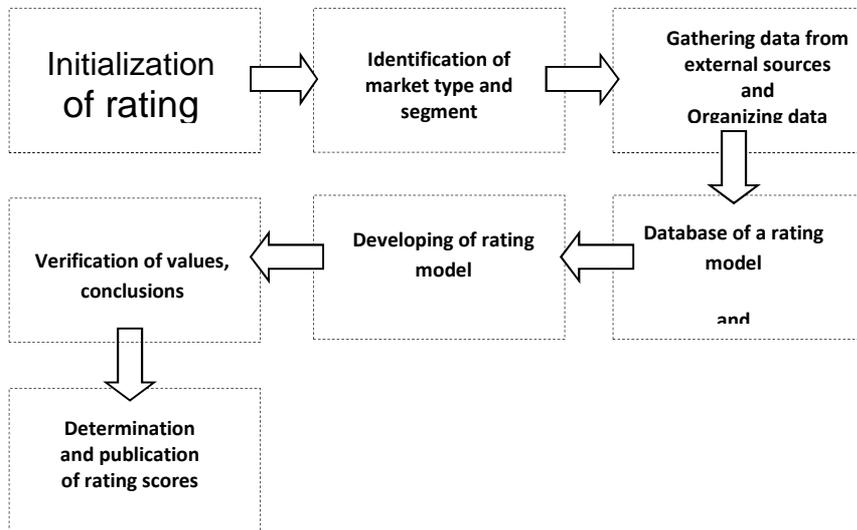
The growing significance of the real estate market prompts investors to search for factors and variables which support cohesive analyses of real estate markets, market comparisons based on diverse criteria and determination of market potential. Investors search for similarities that would enable them to develop risk minimizing strategies. Ratings are a modern tool that can be deployed in analyses and predictions of real estate market potential.

The Author's assume that developing real estate market ratings identifies the types of information and factors which affect decision-making on real estate markets. The detailed objectives of developing scoring systems for real estate markets are: to introduce objective benchmarks for comparing real estate markets, to reduce the number of variables in the decision-making process, to evaluate real estate markets' potential for economic and spatial growth, to evaluate social benefits/losses resulting from the development of a given real estate market, to provide for effective flow of information about the real estate market.

A rating methodology has to be adapted to the specific attributes of a real estate market. A general diagram of a real estate market rating procedure is shown in Fig. 1.

The diagram has been expanded to include detailed information about the type of the analyzed real estate market, its structure and functions. A detailed diagram can be then used to evaluate any real estate market. Rating scores are diversified for different market types and market segments at the level of rating variables, i.e. information and factors describing real estate functions. The proposed system has a modular structure to ensure greater methodological openness. A given market can be rated with the involvement of all or selected modules.

Figure 1. Diagram of a rating procedure.



Source: Own study based on Renigier et al., (2014).

In this study, we assume that the type and the segment of the real estate market are identified, and the utility function of real estate is determined. Market type is indicative of the utility function of real estate: investment market, commercial market, industrial market, agricultural market. etc. Market segment accounts for a specific group of real estate which is identified in a given type of a market in view of its utility function. A real estate market would be very difficult to rate without prior classification. The aim of the proposed division is to introduce a certain degree of uniformity to the rating procedure. The main standardizing factor is the utility function of the market and real estate, which implies that markets will be evaluated based on their utility rather than legal status (Renigier et al., 2014).

In order to collect appropriate data set of variables that diagnosed situation on the residential real estate market the many publication (Kaklauskas et al. (2011) Irwin et al. (1993), Jaffe and Sirmans (1989), Bryx and Matkowski (2001), Case (2000) , Żróbek and Grzesik (2013)) has been analyzed. The authors compiled the existing knowledge to propose an indicator sets for evaluating the real estate markets (table 1) that identify the types of information and factors which affect decision-making on real estate markets.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Mainly residential real estate market is selected for the analysis, due to the lack of such solutions on the market, and the universality of participation from the viewpoint of customers.

Since the main aim of a rating is to provide quick, objective, reliable and updated information, a dataset has to be developed as a platform for quantitative and qualitative analyses. In view of the specific character of the real estate market, the availability of market information and the sudden and unpredictable changes that often occur on that market, the developed system for gathering market data should be flexible enough to enable frequent modifications.

From the analytical point of view, the solution to the problem requires the selection of appropriate methods for analyzing the available information rather than, as it is often observed in practice, the adaptation of the existing information to analytical methods. In the era of globalization, quick and unified solutions (procedures, algorithms) are needed to enhance the objectivity and the reliability of research results. The preferred solutions should address the problem on a global scale while accounting for the local characteristics of the analyzed markets and the relevant information.

In this case, the authors suggest use of Hellwig's method (Hellwig, 1976) as a tool for determining an optimum set of variables to evaluate real property market rating.

The heuristic proposed by Hellwig (1969) takes into account both class feature correlation and correlation between pairs of variables. The best subset of features is selected from among all possible subsets that maximizes the so-called "integral capacity of information.

**Development of an optimal set of variables to assess
the rating of real estate market**

Residential property (apartment) markets in capital cities of Polish regions were rated in this study.

The dataset for the residential property market was developed for supply and demand categories (Table 1 and 2) based on the available information.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 1. Demand of data categories

Cities	x1	x2	x3	x4	x5	x6	x7	x8	x9	...	x23
Gdańsk	0,67	12677,00	1034,00	0,75	-1,68	101,50	14,00	0,86	-1,68	...	38,00
Olsztyn	0,85	11888,00	-222,00	0,47	-5,80	94,22	3,00	0,80	-5,80	...	35,00
Szczecin	0,85	9696,00	96,00	0,52	-3,07	116,44	6,00	0,87	-3,07	...	42,00
Bydgoszcz	0,92	10101,00	-401,00	1,07	-7,50	71,61	4,00	0,82	-7,50	...	31,00
Białystok	0,84	12389,00	-576,00	0,48	-3,60	111,61	9,00	0,71	-3,60	...	34,00
Poznań	0,66	13112,00	472,00	0,65	-0,06	102,50	11,00	0,74	-0,06	...	45,00
Warszawa	0,52	18684,00	1181,00	0,85	-5,25	118,60	11,00	0,69	-5,25	...	46,00
Łódź	0,92	10850,00	-312,00	0,44	-6,30	84,20	3,00	0,84	-6,30	...	34,00
Wrocław	0,67	14915,00	-19,00	1,02	-3,57	105,48	8,00	0,66	-3,57	...	41,00
Lublin	0,75	10886,00	-58,00	0,32	-1,30	126,40	3,00	0,73	-1,30	...	35,00
Kraków	0,57	13056,00	123,00	0,20	-1,16	145,64	4,00	0,59	-1,16	...	42,00
Rzeszów	0,81	11525,00	-16,00	0,46	-1,56	121,96	10,00	0,80	-1,56	...	33,00
Zielona Góra	1,06	11627,00	-670,00	1,13	0,13	90,04	9,00	0,87	0,13	...	39,00
Kielce	0,80	13553,00	-414,00	0,54	-2,10	109,77	4,00	0,71	-2,10	...	33,00
Katowice	0,87	12804,00	1309,00	0,55	-10,50	100,46	11,00	1,18	-10,50	...	34,00
Opole	0,89	12752,00	-172,00	0,22	-4,32	105,56	6,00	0,85	-4,32	...	35,00

x1 - average purchasing power in comparison with the national average, x2 - local government's spending per 1 resident in recent years, x3 - difference between the national average salary and the average salary on the local market, x4 - local government's spending on promotion, x5 - changes in local property prices, x6 - ratio of replacement value of 1 m2 of property and the average transaction price on the local real estate market, x7 - number of property transactions per 1000 residents, x8 - purchasing power on the local housing market, x9 - changes in local property prices, x10 - ratio of replacement value of 1 m2 of property and the average transaction price on the local real estate market, x11 - average time on the market in months, x12 - number of real estate agents on the local market, x13 - availability of mortgages in terms of m2, x14 - value of property transaction per 1 resident on the local market, x15 - population density per m2, x16 - number of marriages, x17 - number of divorces, x18 - net migration rate, x19 - population growth, x20 - age structure of potential clients (25-45 population group vs. total population in a given area), x21 - unemployment rate, x22 - quality of life, x23 - number of new registered businesses per 1000 residents.

Source: own study based on Renigier et al. (2014).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 2. Supply of data categories.

Cities	x1	x2	x3	x4	x5	x6	x7	x8	x9	...	x14
Gdańsk	419	3203	279	50	123,59	22863	52,00	168,74	299,00	...	64,32
Olsztyn	93	911	72	28	102,86	4926	19,00	131,46	375,00	...	44,36
Szczecin	247	2704	226	39	128,04	15918	45,00	151,26	739,00	...	41,44
Bydgoszcz	35	1255	139	64	76,67	22786	25,00	158,00	1017,00	...	30,66
Białystok	393	1184	156	20	123,35	5879	10,00	139,27	273,00	...	33,46
Poznań	340	4438	526	33	115,07	18072	45,00	143,28	1396,00	...	31,39
Warszawa	379	15663	980	90,5	142,06	155703	266,00	116,17	-634,00	...	28,77
Łódź	359	2562	655	20,6	93,50	15186	52,00	141,62	936,00	...	5,33
Wrocław	621	8053	479	75,5	119,98	47823	100,00	107,45	13,00	...	46,09
Lublin	26	2267	207	23	131,93	8043	20,00	152,43	87,00	...	44,17
Kraków	221	8620	494	82,5	153,64	62393	154,00	125,43	148,00	...	35,79
Rzeszów	226	1486	669	13	127,35	2301	110,00	136,75	-187,00	...	11,66
Zielona Góra	613	1144	133	18	95,04	2151	10,00	129,13	686,00	...	57,35
Kielce	262	1378	226	12	116,17	2502	43,00	131,67	445,00	...	11,05
Katowice	694	1351	130	28	113,58	6815	30,00	181,95	1361,00	...	20,55
Opole	174	270	76	21	114,94	2633	11,00	165,14	899,00	...	33,13

x1 - local government's spending on housing policy in zł, x2 - total number of issued construction permits, x3 - number of issued construction permits, x4 - number of property offers per 1000 residents, x5 - ratio of replacement value per 1 m² of property to the average price quoted on the local real estate market, x6 - number of property offers, x7 - number of developers on the local market, x8 - affordability of rental housing in m², x9 - difference between the average prices of new and second-hand property, x10 - number of deaths (older than 50), x11 - existing residential area per 1 resident, x12 - number of residents per 1 existing apartment, x13 - number of new apartments per 1000 residents, x14 - percent of land covered by zoning.
Source: own study based on Renigier et al. (2014).

Rating scores were determined individually for supply and demand with utilization of rough set theory and Ward's cluster analysis and statistical measures. In mentioned study assumed that real estate markets are scored on a 10-point rating scale and are divided into four rating level groups: investment, development, stagnant and crisis. Except for the crisis level group which has a single score – D, there are three scores per each group: AAA/BBB/CCC, AA/BB/CC and A/B/C. Scores AAA/BBB/CCC represent the highest rating, AA/BB/CC – a medium rating, and A/B/C – the lowest rating in a given group. Plus (+) and minus (-) signs may be appended to rating symbols to indicate their relative position within each group. Numerical values were assigned to every rating score to facilitate calculations: AAA – (1), AA – (2), A – (3), BBB – (4), BB – (5), B – (6), CCC – (7), CC – (8), C – (9) and D – (10).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The result of this work was the elaboration of average rating scores that were determined for the analysed markets for demand and supply (Table 3).

Table 3. "Average rating scores" for the analyzed real estate markets

Markets	Rating of supply		Rating of demand	
Gdańsk	4.07	BBB	4.52	BB+
Olsztyn	6.00	B	5.42	BB-
Szczecin	4.86	BB	5.47	BB-
Bydgoszcz	6.07	B	5.61	B+
Białystok	5.50	BB-	5.71	B+
Poznań	4.64	BB+	4.80	BB
Warsaw	3.07	A	3.42	A-
Łódź	5.36	BB-	5.89	B
Wrocław	3.64	BBB+	4.76	BB+
Lublin	5.28	BB-	6.19	B
Kraków	4.00	BBB	4.67	BB+
Rzeszów	5.14	BB	5.42	BB-
Zielona Góra	5.71	B+	5.71	B+
Kielce	5.71	B+	6.27	B-
Katowice	5.43	BB-	5.33	BB-
Opole	6.36	B-	6.28	B-

Source: own study based on Renigier (2014).

Efficiency of presented studies depends, in a significant degree, on availability of data, data reliability and uniformity. The analysed phenomenon is very complex in its nature and requires collection of a lot of varied data. This is related to significant labour outlays, as well as the necessity of incurring significant costs.

The objective of this study is to determine an optimum set of information indispensable for preparing a rating assessment. In the presented scheme No. 1, this is a module related to the database of a rating model and data verification. In the original study (Renigier ... 2014), it was not possible to verify the significance of variables on account of absence of dependent variable. Therefore, assuming the result of a rating in numerical form as a dependent variable, analysis of significance of the accepted information divided into demand and supply nature of the market was adopted.

For the purpose of finding an optimum combination of explanatory variables – combinations with greatest integral information capacity index, Hellwig's method was applied. At the beginning, the Pearson's correlation coefficient was calculated for demand and supply indices (explanatory var-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

variables) with respect to the demand rating (Table No. 4) and supply rating (Table No. 5).

Table 4. Correlation scores for real estate rating of demand

Demand variables	Correlation scores with rating of demand
average purchasing power in comparison with the national average	0,75
local government's spending per 1 resident in recent years	-0,70
difference between the national average salary and the average salary on the local market	-0,69
local government's spending on promotion	-0,34
changes in local property prices	-0,01
ratio of replacement value of 1 m2 of property and the average transaction price on the local real estate market	-0,24
number of property transactions per 1000 residents	-0,57
purchasing power on the local housing market	0,23
changes in local property prices	-0,01
ratio of replacement value of 1 m2 of property and the average transaction price on the local real estate market	-0,24
average time on the market in months	0,34
number of real estate agents on the local market	-0,79
availability of mortgages in terms of m2	-0,22
value of property transaction per 1 resident on the local market	-0,72
population density per m2	-0,45
number of marriages	-0,80
number of divorces	-0,83
net migration rate	-0,69
population growth	-0,37
age structure of potential clients (25-45 population group vs. total population in a given area)	-0,81
unemployment rate	0,70
quality of life	-0,53
number of new registered businesses per 1000 residents	-0,74

Source: own study based on Renigier 2014.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 5. Correlation for supply of real estate rating

Supply variables	Correlation scores with rating of demand
local government's spending on housing policy in zł	-0,34
total number of issued construction permits	-0,89
number of issued construction permits	-0,73
number of property offers per 1000 residents	-0,75
ratio of replacement value per 1 m2 of property to the average price quoted on the local real estate market	-0,65
number of property offers	-0,78
number of developers on the local market	-0,81
affordability of rental housing in m2	0,45
difference between the average prices of new and second-hand property	0,55
number of deaths (older than 50)	-0,76
existing residential area per 1 resident	-0,61
number of residents per 1 existing apartment	0,62
number of new apartments per 1000 residents	-0,49
percent of land covered by zoning	-0,21

Source: own study based on Renigier 2014.

Subsequently, the matrix of correlation coefficients was determined among explanatory demand (Table No. 6) and supply (Table No. 7) variables.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 6. Correlation coefficients for demand

Correlation scores	x1	x2	x3	x4	x5	x6	x7	x8	x9	x10	x11	...	x23
x1	1,00											...	
x2	-0,68	1,00										...	
x3	-0,57	0,50	1,00									...	
x4	0,55	-0,33	0,34	1,00								...	
x5	-0,23	-0,02	-0,27	-0,04	1,00							...	
x6	-0,63	0,28	0,21	-0,56	0,45	1,00						...	
x7	-0,27	0,42	0,63	0,36	0,11	0,02	1,00					...	
x8	0,55	-0,33	0,34	0,06	-0,57	-0,45	0,28	1,00				...	
x9	-0,23	-0,02	-0,27	-0,04	1,00	0,45	0,11	-0,57	1,00			...	
x10	-0,63	0,28	0,21	-0,56	0,45	1,00	0,02	-0,45	0,45	1,00		...	
x11	0,27	-0,14	-0,20	0,01	-0,20	-0,19	-0,20	0,12	-0,20	-0,19	1,00	...	
x12	-0,69	0,74	0,50	0,10	0,00	0,33	0,22	-0,38	0,00	0,33	-0,21	...	
x13	0,01	0,08	0,74	0,07	-0,42	-0,08	0,43	0,77	-0,42	-0,08	-0,01	...	
x14	-0,45	0,59	0,49	0,31	-0,07	0,13	0,52	-0,10	-0,07	0,13	-0,36	...	
x15	-0,40	0,54	0,11	0,16	-0,10	0,11	0,04	-0,43	-0,10	0,11	0,38	...	
x16	-0,72	0,70	0,46	0,20	-0,01	0,26	0,18	-0,45	-0,01	0,26	0,00	...	
x17	-0,71	0,69	0,52	0,18	-0,11	0,26	0,20	-0,37	-0,11	0,26	-0,08	...	
x18	-0,51	0,76	0,38	0,20	-0,04	0,35	0,25	-0,31	-0,04	0,35	-0,22	...	
x19	-0,45	0,44	0,15	0,12	0,40	0,45	0,34	-0,39	0,40	0,45	-0,48	...	
x20	-0,71	0,73	0,52	0,17	-0,09	0,26	0,21	-0,37	-0,09	0,26	-0,01	...	
x21	0,58	-0,59	-0,70	-0,21	0,03	-0,14	-0,49	-0,03	0,03	-0,14	0,46	...	
x22	-0,35	0,18	0,57	0,06	-0,38	-0,06	0,48	0,21	-0,38	-0,06	-0,39	...	
x23	-0,63	0,54	0,44	0,18	0,38	0,38	0,37	-0,35	0,38	0,38	-0,38	...	1,00

x1 - average purchasing power in comparison with the national average, x2 - local government's spending per 1 resident in recent years, x3 - difference between the national average salary and the average salary on the local market, x4 - local government's spending on promotion, x5 - changes in local property prices, x6 - ratio of replacement value of 1 m2 of property and the average transaction price on the local real estate market, x7 - number of property transactions per 1000 residents, x8 - purchasing power on the local housing market, x9 - changes in local property prices, x10 - ratio of replacement value of 1 m2 of property and the average transaction price on the local real estate market, x11 - average time on the market in months, x12 - number of real estate agents on the local market, x13 - availability of mortgages in terms of m2, x14 - value of property transaction per 1 resident on the local market, x15 - population density per m2, x16 - number of marriages, x17 - number of divorces, x18 - net migration rate, x19 - population growth, x20 - age structure of potential clients (25-45 population group vs. total population in a given area), x21 - unemployment rate, x22 - quality of life, x23 - number of new registered businesses per 1000 residents.

Source: own study based on Renigier. 2014.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 7. Correlation coefficients for supply

Correlation scores	x1	x2	x3	x4	x5	x6	x7	x8	x9	...	x14
x1	1,00									...	
x2	0,19	1,00								...	
x3	0,13	0,77	1,00							...	
x4	0,06	0,83	0,46	1,00						...	
x5	0,00	0,57	0,41	0,35	1,00					...	
x6	0,11	0,97	0,72	0,83	0,47	1,00				...	
x7	0,10	0,92	0,85	0,72	0,60	0,92	1,00			...	
x8	-0,08	-0,57	-0,51	-0,36	-0,25	-0,48	-0,54	1,00		...	
x9	0,11	-0,57	-0,49	-0,39	-0,60	-0,57	-0,67	0,61	1,00	...	
x10	0,16	0,90	0,81	0,69	0,37	0,92	0,84	-0,39	-0,41	...	
x11	0,50	0,67	0,59	0,38	0,32	0,60	0,53	-0,23	-0,03	...	
x12	-0,53	-0,71	-0,54	-0,49	-0,25	-0,68	-0,53	0,29	0,08	...	
x13	0,04	0,22	0,26	0,17	0,52	0,15	0,33	-0,27	-0,64	...	
x14	0,11	0,05	-0,37	0,26	0,08	0,02	-0,16	0,00	-0,13	...	1,00

x1 - local government's spending on housing policy in zl, x2 - total number of issued construction permits, x3 - number of issued construction permits, x4 - number of property offers per 1000 residents, x5 - ratio of replacement value per 1 m2 of property to the average price quoted on the local real estate market, x6 - number of property offers, x7 - number of developers on the local market, x8 - affordability of rental housing in m2, x9 - difference between the average prices of new and second-hand property, x10 - number of deaths (older than 50), x11 - existing residential area per 1 resident, x12 - number of residents per 1 existing apartment, x13 - number of new apartments per 1000 residents, x14 - percent of land covered by zoning

Source: own study based on Renigier. 2014.

On this basis, individual indices of information capacity were determined for each combination according to the following formula:

$$h_{kj} = \frac{r_j^2}{1 + \sum_{\substack{i=1 \\ i \neq j}}^m |r_{ij}|} \quad (1)$$

r_j - correlation between Y and X_j

r_{ij} - correlation between X_i and X_j

k - number of combinations, $k = 1, 2, \dots, l$

j - variable number of combinations $j = 1, 2, \dots, m$

Finally, integral information capacity indices should be determined for each combination according to the following formula:

$$H_k = \sum_{j=1}^m h_{kj}, \quad k = 1, 2, \dots, l \quad (2)$$

The optimal set of information indicates from combination of variables with the highest H_k .

Table 8. Indices of integral information capacity for supply

	Sets of variables combinations	Indicate of integral information capacity (H)
(Ht)	C1= x1,x2,x3, x4, x5, x6, x7, x8, x9, x10, x11, x12, x13, x14	0,8365
Hi (x1)	C2 = x2,x3, x4, x5, x6, x7, x8, x9, x10, x11, x12, x13,x14	0,8191
Hi(x2)	C3 =x1,x3, x4, x5, x6, x7, x8, x9, x10, x11, x12, x13, x14	0,8307
Hi(x3)	C4 =x1,x2,x4, x5, x6, x7, x8, x9, x10, x11, x12, x13, x14	0,8381
Hi(x4)	C5 =x1,x2,x3, x5, x6, x7, x8, x9, x10, x11, x12, x13, x14	0,8142
Hi(x5)	C6 =x1,x2,x3, x4, x6, x7, x8, x9, x10, x11, x12, x13, x14	0,8113
Hi(x6)	C7 =x1,x2,x3, x4, x5, x7, x8, x9, x10, x11, x12, x13,x14	0,8404
Hi (x7)	C8 =x1,x2,x3, x4, x5, x6, x8, x9, x10, x11, x12, x13, x14	0,8416
Hi(x8)	C9 =x1,x2,x3, x4, x5, x6, x7, x9, x10, x11, x12, x13, x14	0,8458
Hi(x9)	C10 =X1,X2,x3, x4, x5, x6, x7, x8, x10, x11, x12, x13, x14	0,8452
Hi(x10)	C11 =x1,x2,x3, x4, x5, x6, x7, x8, x9, x11, x12,x13, x14	0,8368
Hi(x11)	C12 =x1,x2,x3, x4, x5, x6, x7, x8, x9, x10, x12, x13, x14	0,8313
Hi(x12)	C13 =x1,x2,x3, x4, x5, x6, x7, x8, x9, x10, x11, x13, x14	0,8415
Hi(x13)	C14 =x1,x2,x3, x4, x5, x6, x7, x8, x9, x10, x11, x12, x14	0,809
Hi(x14)	C15 =x1,x2,x3, x4, x5, x6, x7, x8, x9, x10, x11, x12, x13	0,8411
Ho	C16 =x1,x2, x4, x5, x11, x13	0,8948

Source: own study

The authors modified the classical assumptions of this theory and conducted the sensitivity analysis in order to increase the efficiency of the analysis and to estimate the time saved. In this analysis the influence of

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

every variable on the result of the integral information capacity (Hi) was verified. The total integral information capacity (Ht) (with all variables) was compared with individual integral information capacity (Hi) (after deleting each variable) respectively. These deleted variables with individual indicators bigger than the total indicator were removed (bold font - table No. 8 and 9). The analysis indicated that the remaining variables constituted the combination of optimal set with the highest integral information capacity (Ho) (table No.8 and 9).

Table 9. Indices of integral information capacity for demand

	Sets of variables combinations	integral information capacity (H)
(Ht)	C1= x1,x2,x3, x4, x5, x6, x7, x8, x9, x10, x11, x12, x13, x14, x15,x16,x17,x18,x19,x20,x21,x22,x23	0,8053
Hi (x1)	C2 = x2,x3, x4, x5, x6, x7, x8, x9, x10, x11, x12, x13, x14, x15,x16,x17,x18,x19,x20,x21,x22,x23	0,8028
Hi(x2)	C3 =x1,x3, x4, x5, x6, x7, x8, x9, x10, x11, x12, x13, x14, x15,x16,x17,x18,x19,x20,x21,x22,x23	0,8064
Hi(x3)	C4 =x1,x2,x4, x5, x6, x7, x8, x9, x10, x11, x12, x13, x14, x15,x16,x17,x18,x19,x20,x21,x22,x23	0,7978
Hi(x4)	C5 =x1,x2,x3, x5, x6, x7, x8, x9, x10, x11, x12, x13, x14, x15,x16,x17,x18,x19,x20,x21,x22,x23	0,7981
Hi(x5)	C6 =x1,x2,x3, x4, x6, x7, x8, x9, x10, x11, x12, x13, x14, x15,x16,x17,x18,x19,x20,x21,x22,x23	0,8197
Hi(x6)	C7 =x1,x2,x3, x4, x5, x7, x8, x9, x10, x11, x12, x13, x14, x15,x16,x17,x18,x19,x20,x21,x22,x23	0,8226
Hi(x7)	C8 =x1,x2,x3, x4, x5, x6, x8, x9, x10, x11, x12, x13, x14, x15,x16,x17,x18,x19,x20,x21,x22,x23	0,7893
Hi(x8)	C9 =x1,x2,x3, x4, x5, x6, x7, x9, x10, x11, x12, x13, x14, x15,x16,x17,x18,x19,x20,x21,x22,x23	0,8274
Hi(x9)	C10 =x1,x2,x3, x4, x5, x6, x7, x8, x10, x11, x12, x13, x14, x15,x16,x17,x18,x19,x20,x21,x22,x23	0,8197
Hi(x10)	C11 =x1,x2,x3, x4, x5, x6, x7, x8, x9, x11, x12, x13, x14, x15,x16,x17,x18,x19,x20,x21,x22,x23	0,8226
Hi(x11)	C12 =x1,x2,x3, x4, x5, x6, x7, x8, x9, x10, x12, x13, x14, x15,x16,x17,x18,x19,x20,x21,x22,x23	0,8050
Hi(x12)	C13 =x1,x2,x3, x4, x5, x6, x7, x8, x9, x10, x11, x13, x14, x15,x16,x17,x18,x19,x20,x21,x22,x23	0,7971
Hi(x13)	C14 =x1,x2,x3, x4, x5, x6, x7, x8, x9, x10, x11, x12, x14, x15,x16,x17,x18,x19,x20,x21,x22,x23	0,8145
Hi(x14)	C15 =x1,x2,x3, x4, x5, x6, x7, x8, x9, x10, x11, x12, x13, x15,x16,x17,x18,x19,x20,x21,x22,x23	0,7834
Hi(x15)	C16= x1,x2,x3, x4, x5, x6, x7, x8, x9, x10, x11, x12, x13, x14,x16,x17,x18,x19,x20,x21,x22,x23	0,8097
Hi(x16)	C17= x1,x2,x3, x4, x5, x6, x7, x8, x9, x10, x11, x12, x13, x14, x15,,x17,x18,x19,x20,x21,x22,x23	0,7918
Hi(x17)	C18= x1,x2,x3, x4, x5, x6, x7, x8, x9, x10, x11, x12, x13, x14, x15,x16,x18,x19,x20,x21,x22,x23	0,7916

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Hi(x18)	C19= x1,x2,x3, x4, x5, x6, x7, x8, x9, x10, x11, x12, x13, x14, x15,x16,x17,x19,x20,x21,x22,x23	0,8030
Hi(x19)	C20= x1,x2,x3, x4, x5, x6, x7, x8, x9, x10, x11, x12, x13, x14, x15,x16,x17,x18,x20,x21,x22,x23	0,8123
Hi(x20)	C21= x1,x2,x3, x4, x5, x6, x7, x8, x9, x10, x11, x12, x13, x14, x15,x16,x17,x18,x19,x21,x22,x23	0,7939
Hi(x21)	C22= x1,x2,x3, x4, x5, x6, x7, x8, x9, x10, x11, x12, x13, x14, x15,x16,x17,x18,x19,x20, x22,x23	0,7893
Hi(x22)	C23= x1,x2,x3, x4, x5, x6, x7, x8, x9, x10, x11, x12, x13, x14, x15,x16,x17,x18,x19,x20,x21,x23	0,7841
Hi(x23)	C24= x1,x2,x3, x4, x5, x6, x7, x8, x9, x10, x11, x12, x13, x14, x15,x16,x17,x18,x19,x20,x21,x22	0,7941
Ho	C25 = x1,x3, x4, x7, x11, x12, x14,x16,x17, x18, x20,x21,x22,x23	0,9359

Source: own study.

Conclusions

The authors prepared analyses of verification of variables that were used to develop the real estate market ratings. To this purpose Hellwig's method of integral capacity of information was applied. The mentioned method enables to choose the optimal combination of variables with the highest information capacity integral indicators. The results lead to obtain the necessary set of features that constitute essential information which describes the situation on the local real estate market.

The conducted analyses indicate that the most optimal set of indicators for demand rating comprises: average purchasing power in comparison with the national average, difference between the national average salary and the average salary on the local market, local government's spending on promotion, number of property transactions per 1000 residents, average time on the market in months, number of real estate agents on the local market, value of property transaction per 1 resident on the local market, number of marriages, number of divorces, net migration rate, age structure of potential clients (25-45 population group vs. total population in a given area), quality of life, number of new registered businesses per 1000 residents and for supply rating: local government's spending on housing policy in zł, total number of issued construction permits, number of property offers per 1000 residents, ratio of replacement value per 1 m² of property to the average price quoted on the local real estate market, existing residential area per 1 resident, number of new apartments per 1000 residents.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
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18-19 June 2015, Economics and Finance**

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Demographic Changes in Poland – the Regional Dimension

JEL Classification: *J11; J14; R11*

Keywords: *demographic changes; population ageing; regional diversity of ageing*

Abstract: The progressive ageing process concerns both Poland and the other Member States of the European Union. In recent years, the share of workers of non-mobile and post-productive age in the total population has been rising, and according to forecasts, in 2035 people aged 45 years and over will represent two-thirds of our society. Since the year 2012, announced the Year of Active Ageing and Solidarity between Generations by the European Commission, more and more attention has been paid in the Polish public space to the issues of an ageing society, including its impact on the health of the economy.

The article notes that the ageing process does not occur uniformly across all Polish regions, i.e. at the same pace and with the same intensity. The results of studies indicating the regions being most vulnerable to the ageing of the regional community and the negative consequences of this process in the next two decades are presented.

Introduction

The ageing of society is a global phenomenon (Lee, 1994, pp. 8-49), although its pace is different in different parts of the world, countries and regions (Population Division of the United Nations, 2013; Heran, 2013, pp. 13-20; Żołądowski, 2012, p. 30). The society is ageing (Stańczak, 2014) if

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

the share of seniors in the total population is rising¹. According to Rosset (1959), the population reaches the so-called demographic senility when the population aged 60 years or more comprises at least 12% of the total population. The measures of an ageing population may also be the fertility rate below the generation replacement rate, decreasing mortality among the elderly, increasing median age of the population (Suntoo, 2012), as well as increasing life expectancy and life in good health expectancy (Burzyńska et al., 2010, pp. 530-536).

The ageing of the population is affected by many factors. Among the basic ones, the literature mentions: the decreasing number of births and fertility rates and increasing life expectancy (Gavrilov & Heuveline, 2003; Richert-Kaźmierska 2013, p. 127). In addition, the rate of ageing of communities in various regions is affected by migration (Strzelecki & Witkowski, 1991, pp. 59-72), including economic emigration (Devictor, 2012).

The demographic crisis, linked to the ageing of the society, currently relates primarily to industrialized, well-developed countries (Population Division of the United Nations, 2013). According to Batini, Callen and McKibben (2006), the developing countries will be using the so-called demographic dividend in the next 20–30 years (Bloom et al., 2001, p. 3). Only in the following decades also this group of countries will experience the ageing of population and the demographic changes will affect their macroeconomic situation, including the level of savings, investment, capital flows and changes in the level of productivity. The World Health Organization (WHO) predicts that the ageing process in these countries will progress much faster than before in the industrialized ones. The published estimates show that, while the increase in the proportion of people aged 65 years and older from 7% to 14% of the total population in France took over 100 years, in Brazil it will take place in just 20 years (National Institute of Aging, National Institute of Health, World Health Organization, 2011).

The ageing of society is a complex process, affecting i.a. the condition and the stability of the public finance sphere, pension schemes or the organization of health and social care. Moreover, it shapes a new reality in the labour market, as well as affects the supply and demand in the market for goods, services and capital (Cutler et al., 1990; Kotowska, 2006, pp. 55-89; Prskawetz et al., 2008, pp. 298-323). An ageing society also means social

¹The Polish Central Statistical Office considers the threshold of old age, i.e. the age beyond which a person belongs to seniors, to be 60 or 65 years (uniformly for men and women or the age of 65 years for men and 60 years for women). The UN studies use uniform age for males and females – 65 years.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

change, including the family structure and intrafamily relationships, education system and the organization of cultural and social life of the elderly (Li et al., 2007).

The analyses related to demographic changes and their consequences are frequently carried out in macroeconomic perspective (Arnott & Chaves, 2012; Clement, 2008). However, the intensity and nature of the effects of ageing are varied regionally (Department of Economic and Social Affairs, United Nations, 2008; Styczyńska & Zaman, 2013). It is primarily the local and regional authorities who are facing new challenges due to the growing share of older people in local and regional communities (Gromig & Trapp, 2006; Ferry & Baker, 2006). One of the key priorities in the decisions and actions taken by them is meeting the needs of the elderly. Błądowski (2002, p. 175) writes about the need to create social policy towards the elderly as a system of activities aimed at people of retirement age and their families. Such actions would be aimed at comprehensive compensation of the capabilities to meet one's own needs, which decrease with age, as well as at the integration with the local community. At the same time, the subject-matter literature emphasizes the need for the development of local and regional comprehensive policies towards ageing, understood more widely than policy aimed exclusively at supporting the elderly (Ilmarinen, 2005, p. 41; Cruz-Saco & Zelenev, 2010; Warner et al., 2010; Błądowski 2002 p. 110; DTT Global Office Creative Studio, 2007).

This article attempts at moving away from the analysis of issues related to ageing in a national perspective, and transferring it to the level of regions. It is shown that the demographic changes in Polish regions have an uneven pace, which means that in each of them the consequences of population ageing may be felt differently. The main objective of the study conducted by the author was to identify regions with the lowest and the highest rate of ageing of the regional community, as well as the regions for which the population data forecasts for the year 2035 are most inferior due to the age structure of their population. The identification of the existing and projected demographic disparities between regions would serve as an inspiration for a debate on the need to create a policy on ageing at regional level, according to the principle of differentiation of the instruments used in it.

Methodology of the research

The changes in the size and age structure of the Polish population observed in the past and projected for the next decade show considerable territorial variation. Therefore, the main objective of the study was to answer the following questions:

- whether there are similarities in the age structure of the population in each of the regions (at present and in the future),
- in which regions the pace of population ageing is highest and where the lowest,
- in which regions the demographic situation is unfavourable economically in the perspective of the next two decades, i.e. where the people of retirement age will constitute the greatest burden on regional communities.

The study consisted of conducting basic and multivariate statistical analysis.

The diagnosis of similarities in age structures of individual provinces was conducted using the multi-dimensional analysis of agglomerates. In order to group the selected provinces, the method of agglomeration with full binding and square Euclidean distance was chosen.

The pace of population ageing was established on the basis of the calculation of the average yearly changes in the age groups and the changes of shares of each of the groups in the total population in the year 2035, compared to the year 2014. In addition, the demographic burden factor², including the demographic burden related to senior citizens³, was calculated for all provinces for the years 2014 and 2035.

To carry out the mentioned above analyses, data from the population forecasts for the years 2008–2035 prepared by the Central Statistical Office (GUS) was used. The population projections for the period 2014–2035 were downloaded from the CSO database, broken down by age and province. The data for the individual provinces were grouped into five age groups (0–17 years, 18–44 years, 45–64 years, 65–79 years and 80 years

² In this case, the demographic burden factor was calculated as the ratio of the number of people at an age when they are economically inactive or passive, i.e. of non-productive age (the number of children aged 0–17 years plus the number of people aged 65 years or more) to the number of people of working age (number of persons aged 18–64 years).

³ The demographic burden factor related to the elderly was in this case calculated as the ratio of the number of persons aged 65 years and more to the number of individuals of working age (number of persons aged 18–64 years).

and more). The adopted distribution allowed for an assessment of the demographic changes in the breakdown meaningful in view of the functioning of local and regional economies, i.e. into the group of individuals of pre-productive age (0-17 years), the so-called *prime age*⁴ (18–44 years), the non-mobile productive age (45–64 years) and retirement age (65 years or more), with distinction of the age group of the aged 80 years or more. The results obtained from such study led to the formulation of proposals related to the present and future demographic situation of Polish regions and the potential economic and social consequences which in relation to such circumstances will have to be faced by the local and regional authorities.

The specificity and the pace of demographic changes in the regions of Poland

Poland has exceeded the threshold of the demographic old age⁵ in 1967 (Główny Urząd Statystyczny, 1968). In the period 1994–2002 the share of the population aged 65 years and over in the general population increased from 11% to 12.6%, and aged 60 years and more from 15.7% to 16.8% (Rządowa Rada Ludnościowa, 2003). According to data from the Central Statistical Office (CSO) in Poland, the population aged 65 years and more in 2014 constitutes 15.3% and in the year 2035 it will constitute 24.5% of the total population (Główny Urząd Statystyczny, 2014) (see Table 1).

Table 1. The age structure of the Polish population in the years 2014 and 2035

Age groups	2014	2035
	[% of total population]	
0–17 years	18.2	15.3
18–44 years	39.8	29.4
45–59/64*	23.6	27.4
60+/65+**	18.4	28.0

* 59 years for women / 64 years for men

** 60 years and more for women and 65 years and more for men

Source: (Główny Urząd Statystyczny, 2014).

⁴ The *prime age* term is not explicitly defined in the subject-matter literature, however it is referred to i.a. by Kautonen (2008) and Boushey (2005, pp. 659–670).

⁵ According to the UN standards, it represents a 7-percent share of persons aged 65 years and over in the general structure of the population.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

According to the predictions of CSO, the population of Poland in the period from 2014 until the year 2035 will decrease by more than 2 million and will amount to 35 993 thousand in the year 2035. During the same period, the median age will rise by about seven years and in the year 2035 will be 47.9. The demographic changes will not, however, take place evenly on a national scale. The current and future demographic situation shows considerable variation in individual regions (see Table 2).

Table 2. The age structure of the population in the provinces of Poland in the years 2014 and 2035

Provinces	Age groups									
	0–17		18–44		45–64		65–79		80 years and more	
	2014	2035	2014	2035	2014	2035	2014	2035	2014	2035
	[% of total population]									
dolnośląskie	16.9	14.7	39.6	29.5	28.1	31.9	11.4	16.1	3.9	7.7
kujawsko-pomorskie	18.8	15.9	39.8	30.3	27.0	30.7	11.0	15.9	3.5	7.1
lubelskie	18.6	15.5	39.0	29.5	26.6	30.6	11.5	16.9	4.2	7.5
lubuskie	18.7	15.9	40.0	30.1	27.5	31.0	10.5	16.0	3.3	7.1
łódzkie	16.9	14.7	38.2	28.8	30.0	31.5	12.5	17.1	4.4	8.0
małopolskie	18.9	16.2	40.8	31.1	25.6	30.6	10.9	15.6	3.8	6.5
mazowieckie	18.4	16.2	39.8	30.6	26.2	31.1	11.3	15.0	4.3	7.1
opolskie	16.2	13.7	39.7	29.0	28.5	32.0	11.8	17.9	3.9	7.3
podkarpackie	19.0	16.0	40.7	30.2	26.0	30.9	10.6	16.4	3.8	6.6
podlaskie	18.0	15.4	39.5	29.1	26.8	30.6	11.2	17.5	4.5	7.3
pomorskie	19.8	17.0	40.2	31.4	26.1	30.1	10.6	14.8	3.4	6.8
śląskie	16.8	14.7	39.0	29.2	28.3	31.5	12.3	17.1	4.5	7.6
świętokrzyskie	17.3	14.3	38.3	28.1	27.8	31.4	12.1	17.1	4.5	7.6
warmińsko-mazurskie	19.5	16.3	40.0	30.6	27.2	30.2	10.0	16.1	3.4	6.8
wielkopolskie	19.3	16.4	40.8	31.1	26.0	31.0	10.6	15.1	3.3	6.5
zachodniopomorskie	17.9	15.3	39.7	30.1	28.0	31.3	10.9	16.0	3.5	7.3

Source: own elaboration based on (Główny Urząd Statystyczny, 2009).

According to the population projections for the years 2008–2035 in 2014 the regions with the highest share of persons of pre-productive age (0–17 years) in the total population were the pomorskie (19.8%), warmińsko-mazurskie (19.5%) and wielkopolskie (19.3%) provinces. The highest share of people of working age (18–64 years) in the total population was

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

recorded in the opolskie (68.2%), zachodniopomorskie (67,7%) and dolnośląskie (67,7%) provinces. It has to be noted, however, that the highest share of persons of *prime age* in total population was reported in the wielkopolskie (40.8%), małopolskie (40.8%), podkarpackie (40.7%) and pomorskie (40.2%) provinces, while the share of people of the non-mobile productive age was highest in the opolskie (28.5%), śląskie (28.3%) and dolnośląskie (28.1%) provinces. The provinces with the highest share of persons aged over 65 years in the general population are łódzkie (16.9%) and świętokrzyskie (16.6%). According to the same data, in the year 2035 the provinces with the highest share of persons of pre-productive age in the general population will be pomorskie (17.0%), wielkopolskie (16.4%) and warmińsko-mazurskie (16.3%). On the other hand, the provinces with the highest share of post-productive age are opolskie (25.2%) and łódzkie (25.1%). The share of people of *prime age* in the total population will be largest in pomorskie (31.4%), wielkopolskie (31.1%) and małopolskie (31.1%) provinces.

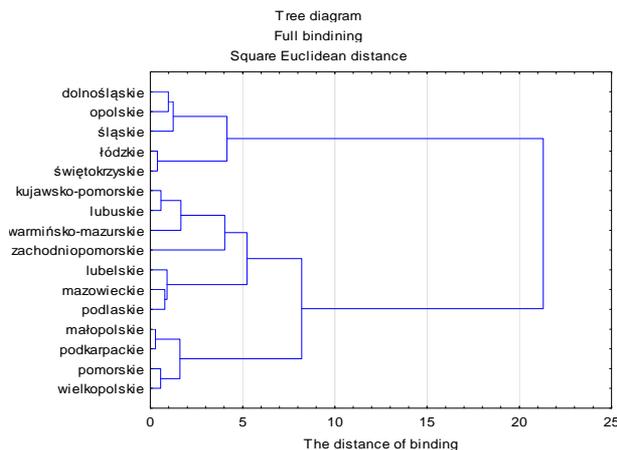
On the basis of the collected data it can be concluded that in 2014 the most favourable demographic situation was present in pomorskie and wielkopolskie provinces. In both these provinces a relatively high proportion of people of pre-productive age and *prime age*, as well as a relatively low share of people of post-productive age (65 years and over) in the total population have been reported at the same time. On the other hand, the opolskie and dolnośląskie provinces, despite having the highest share of people of productive age in the general population, should be considered to be demographically threatened. A significant part of the 18–64 age group are, in fact, people of non-mobile working age, who in subsequent years will be shifting towards the "outbound from the labour market" group and joining the already large group of people of post-productive age. An additional threat in the case of both these provinces is the lowest share of people of pre-productive age in the overall population. The highest share of people of post-productive age in the overall population, including the group of people of old age, has been reported for the łódzkie and świętokrzyskie provinces. It seems that these two provinces were first to begin to feel the effects of an ageing population in Poland.

The verification of the similarity of the structures of the provinces population in 2014 has been conducted based on the multi-dimensional analysis of agglomerates. The tree diagram (see Fig. 1) confirms the above indicated differentiation and allows for dividing the provinces into two main groups: having an adverse demographic structure (dolnośląskie, opolskie, śląskie,

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

świętokrzyskie, łódzkie) and having a moderately favourable demographic structure, with two regions being most favourable as far as demographics is concerned (pomorskie and wielkopolskie).

Figure 1. The similarity of population age structures of the provinces in Poland in the year 2014 – a tree diagram



Source: own work.

According to the forecasts of the Central Statistical Office, the most significant demographic changes in the years 2014–2035 will take place in the opolskie, podkarpackie, podlaskie and warmińsko-mazurskie provinces. And so, in the opolskie province within the next 21 years the share of people aged 18–44 years in the total population will decrease by 10.6 percentage points (p.p.), while the proportion of persons aged 65 years and over will increase by 9.6 p.p. In the warmińsko-mazurskie province the largest decrease of the population of pre-productive age will be observed (by 3.2 p.p.), together with the increase in the number of persons aged 65 and over by more than 9.5 p.p. In the podkarpackie and podlaskie provinces, the share of the persons of *prime age* in the total population will decrease by over 10 p.p., and in addition, a significant decrease in the share of individuals of pre-productive age will occur (by more than 3 percentage points).

The provinces in which the demographic situation will change relatively least, are pomorskie and mazowieckie. In the mazowieckie province, a decrease in the share of individuals of pre-productive age by 2.2 p.p. and the individuals of *prime age* by 9.1 p.p., as well an increase in the proportion of people of old age by 2.8 p.p. will occur. In turn, in the pomorskie

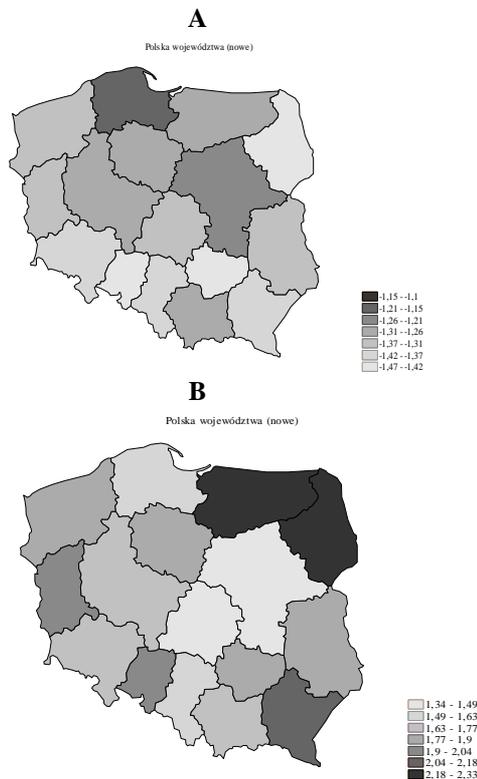
**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

province the lowest decrease in the share of individuals of *prime age* (by 8.8 p.p.) and relatively insignificant decrease of the share of people of pre-productive age (by 2.8 p.p.) are projected.

In the years 2014–2035 the largest average yearly changes are projected:

- in the 0–17 age group: in the świętokrzyskie province (-0.89%),
- in the 18–44 age group: in the opolskie province (-1.5%),
- in the 45–64 age group: in the małopolskie province (+0.9%),
- in the 65–79 age group: in the warmińsko-mazurskie province (+2.3%),
- in the 80+ age group: in the lubuskie province (+3.7%).

Figure 2. Average yearly changes in the proportion of the 18–44 (A) and 65–79 (B) age groups in the total population of the provinces in the years 2014–2035



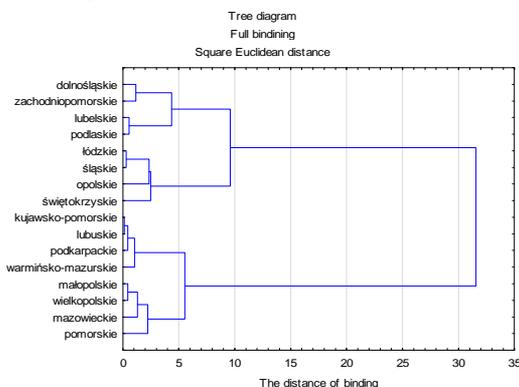
Source: own work.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

As demonstrated in Figure 2, in years 2014–2035 the greatest rate of adverse changes consisting in reducing the share in of the 18–44 age group in the population of the region will be present in the opolskie, świętokrzyskie and podlaskie provinces. On the other hand, the changes consisting of a rapid increase in the share of the 65–79 age group in the general population will be present in the warmińsko-mazurskie, podlaskie, podkarpackie, opolskie and lubuskie provinces.

The verification of the similarity of the structures of the provinces population in 2035 has been conducted based on the multi-dimensional analysis of agglomerates. The tree diagram (see Fig. 3) confirms that the specificity and pace of the demographic changes projected for the years 2014–2035 will affect the new layout of the demographic similarities among provinces. Once can still talk about the two major groups of provinces being similar to each other in terms of the age structure of the population of the region, although in comparison to the figures for the year 2014 it is more possible to extract four subgroups of provinces similar in terms of their age structure. Among the similar provinces, the most beneficial age structure predicted for the year 2035 should be present in pomorskie, mazowieckie, wielkopolskie and małopolskie.

Figure 3. The similarity of population age structures of the provinces in Poland in the year 2035 – a tree diagram



Source: own work.

The ageing of society resulting from an increase in the share of the individuals of old age in the decreasing population means a number of negative consequences for the economy. The demographic burden rate and demo-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

graphic burden rate related to seniors are considered to be measure of the intensity of a given population's ageing.

In year 2014, the average demographic burden factor calculated as the ratio of the number of people of an age when they are economically inactive or passive, i.e. of non-productive age (the number of children aged 0–17 years plus the number of people aged 65 years or more) to the number of people of working age (number of persons aged 18–64 years), amounted to 0.49 for all the regions, however in the year 2035 it will amount to as much as 0.64. In turn, the demographic burden factor related to seniors, calculated as the ratio of the number of persons aged 65 years and more to the number of persons of working age (the number of persons aged 18–64 years), in the year 2014 averaged 0.22 for all regions, while in the year 2035 it will amount to as much as 0.39 (see Table 3).

Table 3. The demographic burden factor and the demographic burden factor related to seniors in the Polish regions in the years 2014 and 2035

	The demographic burden factor		The demographic burden factor related to seniors	
	2014	2035	2014	2035
dolnośląskie	0.48	0.63	0.23	0.39
kujawsko-pomorskie	0.49	0.64	0.22	0.38
lubelskie	0.52	0.67	0.24	0.41
lubuskie	0.48	0.64	0.20	0.38
łódzkie	0.51	0.66	0.25	0.42
małopolskie	0.50	0.62	0.22	0.36
mazowieckie	0.52	0.62	0.24	0.36
opolskie	0.47	0.64	0.23	0.41
podkarpackie	0.50	0.64	0.21	0.38
podlaskie	0.51	0.67	0.24	0.42
pomorskie	0.51	0.63	0.21	0.35
śląskie	0.49	0.63	0.24	0.41
świętokrzyskie	0.51	0.68	0.25	0.44
warmińsko-mazurskie	0.49	0.65	0.20	0.38
wielkopolskie	0.49	0.61	0.21	0.35
zachodniopomorskie	0.48	0.63	0.21	0.38

Source: own work.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

In all regions the demographic burden factors and demographic burden factors related to seniors in the year 2035 will be higher than in the year 2014. In the case of the demographic burden factor related to seniors, expressly indicating the progress of the ageing of the population, the most unfavourable results are projected for the świętokrzyskie, podlaskie, łódzkie, śląskie, opolskie and lubelskie provinces. In turn, the largest increase in the demographic burden factor related to seniors in the period 2014–2035 is projected to take place in the świętokrzyskie, warmińsko-mazurskie, podlaskie, opolskie and lubuskie provinces.

Conclusions

The results of analyses of the population data presented in the article confirmed that the demographic changes, including the ageing of the society over the next two decades, will concern all Polish provinces. The projected pace and scope of these changes will, however, differ among the provinces.

The provinces in which the rate of adverse changes is expected to be the highest include warmińsko-mazurskie, podlaskie, podkarpackie, opolskie and lubuskie. The greatest changes in the share of young people (0–17 years) in the total population in the years 2014–2035 are projected for the provinces: świętokrzyskie (-0.89%) lubelskie (-0.86%) and warmińsko-mazurskie (-0.85%). In the 65–79 age group, the greatest changes are, in turn, projected in the warmińsko-mazurskie (+2.32%), podlaskie (+2.18%) and podkarpackie (+2.11%) provinces. The świętokrzyskie, podlaskie, łódzkie, śląskie, opolskie and lubelskie provinces also have the least favourable demographic forecasts for the year 2035. In these provinces the share of the population of pre-productive age and prime age in the overall population will decrease significantly over the next two decades, whereas the share of older people (65 years and over) and the demographic burden factor related to seniors will increase.

The application of method of multi-dimensional analysis of agglomerates allowed for distinguishing groups of provinces demographically similar to each other in the years 2014 and 2035. In both cases, two main groups of similar provinces were extracted. A subgroup of provinces with relatively best demographic situation in the years 2014 and 2035 was also discerned. In 2014, the group is made up by the pomorskie and wielkopolskie provinces. In the year 2035, it will comprise the pomorskie, mazowieckie, wielkopolskie and małopolskie provinces.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The changing demographic situation in individual provinces forces the regional authorities to take appropriate actions aimed at limiting the negative effects of the ageing of the population and adapting the regional policies to new conditions. However, as the pace and scope of the projected changes are varied, the activities of the regional government must be selected according to the current and future demographic situation in the regions.

The article does not provide any research results allowing for the formulation of clear conclusions on the impact of demographic changes on the economic condition of each of the provinces over the next two decades. However, based on the conclusions of the research referred to in the first part of the article, it can be assumed that the most vulnerable are the economies of the regions with the least favourable demographic forecasts. It seems, therefore, that in view of the ageing of the regional communities, the most urgent and intensive actions related to the adaptation of the regional economy, including the infrastructure, labor market organization, social policy etc., should be taken by the governments of the świętokrzyskie, podlaskie, łódzkie, śląskie, opolskie and lubelskie provinces. In turn, the pomorskie, mazowieckie, małopolskie and wielkopolskie provinces (regions with relatively the most favourable demographic forecasts for the year 2035) should focus on activities aimed at ensuring the maintenance of a favourable demographic structure and exploiting the potential inherent in "young" regional communities.

Each of the provinces should work out its own policy in relation to the ageing of the regional community, corresponding to its current and future demographic situation. Without such a policy or in the case of the implementation of a model that fails to match the characteristics of the region, the condition of the regional economy can be threatened and the quality of life in the region, as well as its competitiveness can decrease.

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18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
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Fiscal Capacity for Euro Area – Towards a Bigger EU Budget?

JEL Classification: *E60; E61; E62; E63*

Keywords: *Fiscal capacity; Fiscal federalism; European Union; Euro area; EU Budget*

Abstract: The European Union has recently implemented one of the biggest reform packages in its history. Developed solutions are designed to (1) strengthen EU's resilience to shocks and (2) improve its shock absorption capabilities. It seems that so far stress was mainly placed on the first objective. Among the reforms, which satisfied the second objective, the European Stability Mechanism (ESM) plays a key role. However, this is not the only solution. The European Union is also developing a fiscal capacity for the euro area.

On the base of a subject literature study, I have developed a model with boundary conditions of fiscal federalism, which then was compared to macroeconomic data for the EU. Results of my findings show that the European Union, and especially the euro area, share a lot of characteristics typical for fiscal federalism. From this point of view, a budget for the euro area seems to be the best form of fiscal capacity. However, it could bring further fragmentation of economic integration process in the EU which probably would not positively contribute towards the stability in the political sphere.

Introduction

Global financial crisis and sovereign debt crisis has launched an unprecedented program of reforms in the European Union. There seem to be no significant disagreements among economists about the causes of crisis, however the proposals for remedies for the EU are not so obvious.

In this work I come forth with the assumption that the European Union is similar in substance to the federation model. As a confirmation of the statement formulated above, I may indicate a number of characteristics which prove that the EU does not differ from countries implementing this model (see: Appendix 1). Presented data show that the European Union is not a unique structure neither by economic development, nor by complexity of administration division. What distinguishes the European Union from other federal countries is national diversity of European society. However, cultural patterns seem to be rather close and one can expect that the tendency will be for them to converge. In my opinion, the biggest problem is a high number of official languages which reduces mobility of labour force within the European Union. This does not bring EU closer to the fulfillment of Optimum Currency Area criteria and the reduces capacity of shock absorption (Tchorek, 2013, pp.187-190). That is why I assume that conducted reforms should lead the European Union to a model of fiscal federalism as a complex solution which could be able to ensure economic stability.

Yet, a lot was done in the monetary sphere of the euro area's economic governance. However, recent economic theory (Rosiak, 2014a, pp.119-121) and practice, put increasing emphasis on the role of fiscal policy. So far, the aim of reforms in the fiscal policy area was mainly to reduce euro area's vulnerability to shocks and strengthen the monetary policy through a fiscal consolidation in member countries. The only permanent solution for shock absorption is European Stability Mechanism (ESM). Functioning of the ESM envisages assistance mainly through loans. Its ability for stabilizing the euro area economy is rather limited (comparing its lending capacity of 500bln euro to whole euro area GDP), therefore one can say, that stabilization functions, like intertemporal stabilization or interregional-insurance, have not been sufficiently provided yet.

The main objective of this paper is to examine whether a new proposal for creating fiscal a capacity for the euro area will fulfill the gap between EU structures and the model of fiscal federalism. Particular emphasis was put on stabilization functions which would help in ensuring sound econom-

ic governance.

Methodology

In my research I have used descriptive approach which, thanks to conducted literature study, allowed me to specify essential features of fiscal federalism. Having collected general features I compared them to the advancement of the EU's pre-crisis integration. Afterwards, I assessed whether recent reforms bring European Union, and especially the euro area, closer to the model of fiscal federalism.

Finally, knowing main drawbacks of conducted reforms in the fiscal federalism context, I gave comments about potential forms of fiscal capacity for the euro area.

Has European Union developed a model of fiscal federalism?

Until recently, literature on fiscal federalism defines only two main boundary conditions of fiscal federalism: presence of a monetary union¹ and a common market (Weingast, 1995). In my paper (Rosiak, 2014b) I introduced main characteristics of this model based on review of literature of fiscal federalism. Those are:

- Multilevel system of governments
- Presence of central and local budgets
- Distinctive features of central budget:
 - a. Size in range from 10% of GDP to 50% of GDP
 - b. Built in functions:
 - i. Redistributive
 - ii. Intertemporal stabilization
 - iii. Interregional insurance
 - c. Taxation assignment:
 - d. Central budget can run deficit while local ones should be balanced
- Presence of transfers and subsidies as a management tools externalities
- Specific allocation of competences

¹ Literature of fiscal federalism usually envisages such a solution for a state not an international organization, as In European Union case. That is why presence of monetary union and the use of common currency is taken by default.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Features listed above are typical for the model of fiscal federalism. However, it is not necessary to meet all criteria cumulatively. From the fiscal policy perspective, the most important are presence of central and local budgets, features of central budget, presence of transfers and subsidies as management tools for externalities. These features allow for flexible allocation of policies entitlements between central and local budgets.

The role of central budget studied Stiglitz (Stiglitz, 2004) who concluded that provision of national public goods and services as well as provision of stabilization functions should be domain of central budget (see: Fatas, 1998; De Grauwe, 2012; Borzel & Hosli, 2003). For effective resources should be provided. This leads to a question of the proper assignment of taxes to the appropriate level of state administration? This dilemma is also called a tax-assignment problem (see: Tiebout, 1965; Gordon, 1983). Literature on fiscal federalism envisages that, to ensure proper financing, revenues from non-benefit taxes should be collected by the central government, while local ones should collect revenues from benefit taxes as a payment for quality of public goods and services they supply (see: Oates, 1999 or Mueller, 2004). The role of the central government is supreme in relation to local ones. That is why it should have an influence on local decisions thorough system of transfers and subsidies as a main tool for triggering externalities (Boadway, Shah, 2009).

Table 1. presents a detailed look at the advancement of the pre-crisis European integration in the context of fiscal federalism.

As showed above main differences between the model of fiscal federalism and the advancement of pre-crisis European integration are: insufficient size of the central budget, possibility of running deficit by central budget and lack of intertemporal stabilization and interregional insurance functions.

Table 1. Fiscal federalism features in European Union

Feature	Fiscal Federalism	European Union
Multilevel system of governments	Exist	Exist
Presence of transfers and subsidies	Exist	Exist
Size of central budget	At least 5-7% of GDP (optimum 20% - 25%)	≈ 1% of GDP
Budget characteristic	Central: possible deficit Local: balanced	Central: balanced Local: possible deficits

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Redistribution mechanism	Exist	Exist
Budget functions	Central: redistribution, intertemporal stabilization, interregional insurance Local: allocative	Central: redistribution, interregional insurance (very limited) Local: intertemporal stabilization, allocative
Taxation	Central gov.: non benefit taxes Local gov.: benefit taxes	Central gov.: 0,3% of VAT Local gov.: all types of taxes

Source: based on Rosiak, T. (2014b).

Although the main task of recent reforms was to strengthen the euro area, and not constructing fiscal federalism within euro area, many of new solution bring it closer to the analyzed model. First of all the European Economic Governance Package, the so called sixpack, has made a shift of powers, especially in the area of budgetary procedures, towards European institutions. However Grosse (Grosse, 2013) calls it negative federalism, which builds mainly disciplinary functions without creating new incentives for externalities. The ESM has expanded the function of interregional insurance. Nevertheless the size of the central budget remained the same and stabilization capabilities, however extended, remained rather limited compared to the size of the European Union's economy.

Table 2. EU reforms in the fiscal federalism context

Area of FF	Impact of reforms on EU integration development
Increase in the size of the EU budget	NO
Possibility of running deficit by central budget	NO
Building-in an intertemporal stabilization function	YES – to a limited extent by ESM
Building-in interregional insurance function	NO
Centralization of fiscal policy	YES – to some extent by centralization of some aspects of budgetary procedures
Centralization of economic governance	YES – by better coordination of structural policies through sixpack (European Semester + MIP)

Source: based on Rosiak, T. (2014b).

As shown in Table 2 the main goal for fiscal capacity will be provision of interregional insurance function and enforcement of intertemporal stabilization function. It is worth to mention that full compliance with the fiscal federalism's conditions would be possible only in the case of shift of powers, where local budgets would be balanced and the central one could run a deficit.

Fiscal Capacity for euro area

Fiscal capacity will be the second mechanism, after ESM, with abilities to stabilize the euro area's economy through transfers. All previous solutions (e.g. Sixpack, Twopack, Fiscal Compact and Pact Euro plus) imposed restrictions on national budgetary procedures and thus limited the demand generated by national governments (Heins & de la Porte, 2015, p. 4).

The legitimacy of its creation is motivated by the same rationale that is imposed by the literature of fiscal federalism referring to the functions performed by the federal budget - the ability to stabilize the economy and influence (through transfers) structural reforms conducted in the euro area. More precisely, the ability to stabilize the economy would rely on the incorporation of two functions that fiscal federalism envisioned in the central budget, and that the EU budget did not have: the intertemporal stabilization and interregional-insurance. As was shown in Table 2 ESM provides only intertemporal stabilization function and with a limited capacity.

Necessity to establish a mechanism for the fiscal capacity of the euro area was expressed in two reports from 2012 named 4 Presidents Reports² (*Towards...*, 2012a; *Towards ...*, 2012b). The June Report defined the broad lines of the further integration of the euro area. Lowering euro area's vulnerability to shocks and an improvement of its absorption capabilities was indicated as a main goal. Referring to the integrated budgetary framework, clearly identified and named was the need to build a fiscal union that would ensure the stability and security of the euro area. Authors consider, also in the medium term, the possibility of joint debt issuance, which also contributes to a further fiscal integration and the need to redefine the role of the central budget in new institutional and economic realities. At the end, there is expressed the need for further development of a road map that would lead to the creation of a genuine Economic and Monetary Union.

The December Report goes deeper into the topics raised in the June Report, focusing mainly on aspects of coordination of budgetary policies and joint economic governance. It has also developed a general framework of implementation of the vision from the first report. It has been divided into 3 stages. The goal of the first one, planned from the end of the year 2012 and for the year 2013, was to found the fiscal stability of the euro area and to

² These two Reports were developed by President of the European Council – Herman Van Rompuy with close collaboration with: José Manuel Barroso, President of the European Commission Jean-Claude Juncker, President of the Eurogroup Mario Draghi, President of the European Central Bank.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

break down the relationship between the liquidity of banks and public debt. The second, planned for the years 2013-2014, assumed the implementation of integrated financial framework and further support of structural reforms. The third stage, covering the period after 2014, is the most important one from the point of potential fiscal federalism in the European Union, because it envisages improvement in flexibility of the EMU's functioning by creating a central mechanism for shock absorption.

All monetary unions have their fiscal capacity mechanisms (*Towards...*, 2012b, p.9). Vulnerability to shocks and the lack of effective mechanisms of shock absorption seems to confirm the need to implement such an instrument also within the EMU. In the euro area the additional function that would implement such a mechanism would be a promotion (through various financial incentives) structural reforms which could contribute to higher economic growth in the future. However, form of the fiscal capacity has not been clarified yet. The December Report only sets out, that the contribution and the payment from the fiscal capacity will match the position of the member country in its economic cycle. Vetter (Vetter, 2013, p.1) proposed 4 possible forms of fiscal capacity:

1. A common budget,
2. An insurance mechanism against strong cyclical fluctuations,
3. A common unemployment insurance scheme,
4. An equalization scheme for interest burdens.

The idea of separate euro area budget is not new and quite popular among economists studying European Union's problems (see: Verdun, 2015). Implementation of the fiscal capacity in the form of a separate budget for the euro area (1) would require an indication of its revenue sources. From a few concepts of revenue sources one may indicate: membership fees proportional to the size of the member country's economy or in form of taxation. There are two possible ways of tax collection: by introducing a new tax e.g. financial transaction tax (see: or as part of the nationally collected tax e.g. part of an income from collected VAT. Each approach has its drawbacks. The new membership fee or a portion of VAT revenues will adversely affect the condition of tight local budgets. The financial transaction tax would require fairly complex algorithms for receiving this revenue from various countries (the proportion of the financial markets in different countries relative to GDP vary considerably). No matter the source, economists estimate that euro area budget would need approximately 2% of GDP in revenues (see: Wolff, G., 2012) .

Budget form of fiscal capacity would incorporate interregional insur-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

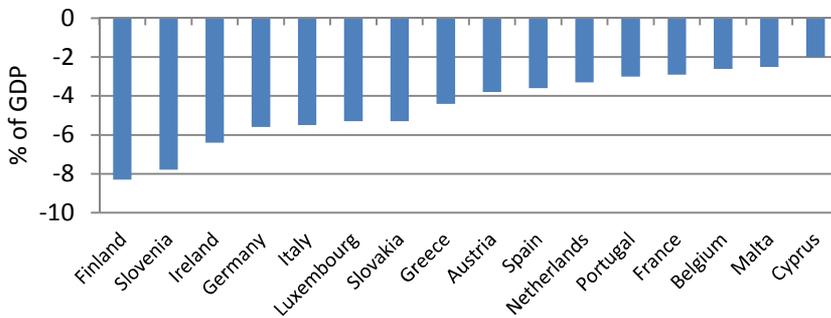
ance function. Another advantage of this solution would be the possibility to install automatic stabilizers, which, on the one hand, allow for a quick response to economic fluctuations (automatism) and the support for the counter-cyclical fiscal policy stance on the other. From the point of view of the European integration process, creation of a new, separate budget could be considered a step back (the current shape of the central budget of the European Union is in fact the result of the consolidation of budgets of European Communities). Other reforms such as the Fiscal Compact or the Euro Plus Pact are intergovernmental agreements, so as for now they can be perceived as a desintegrating mechanisms as well or as a part of bigger disintegration process within European Union (Vollaard, 2014, p.4). However, documents include a commitment to incorporate them into the EU law. On the other hand, fears about the collapse of the euro area seem to be exaggerated. The EU citizens are becoming more utilitarian in their understanding of the euro and its institutional framework, so they rather would not vote for withdrawal from the euro area or the European Union (see: Ioannou et al., 2015, p.169)

Insurance mechanism against strong cyclical fluctuations (2) could be financed from contributions made by the member states in time of economic growth. Payments would be realized if a negative shock occurred. The problem, which is associated with this solution is the selection of an appropriate methodology to determine the moments of mobilizing resources and their total amount. They should, on the one hand, correspond best to the realities of the euro zone and be acceptable to all 19 states on the other. Vetter (Vetter, 2013) suggested that assistance should be provided in a country where the negative output gap will reach 2% of GDP. Country experiencing such problems could then receive a payment from the insurance mechanism in the amount of e.g. 25% of the shortfall.

The most significant disadvantage of this solution is the need to develop additional scenarios for years in which almost all euro area countries fell into recession. This occurred in 2009, when all euro area countries fell into recession, as well as in 2012 and 2013, when nearly half of them had negative economic growth.

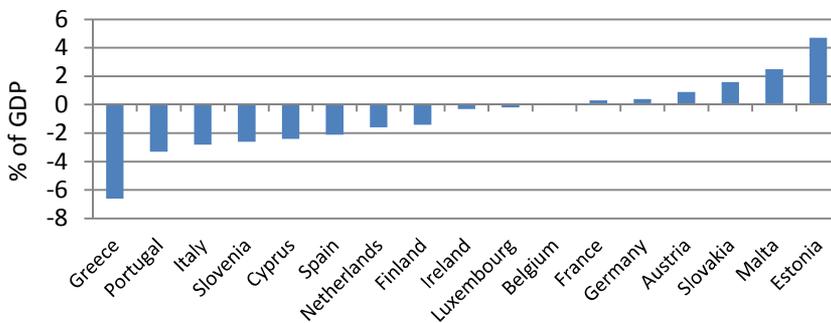
**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Figure 1. GDP growth in euro area member countries (17) in 2009



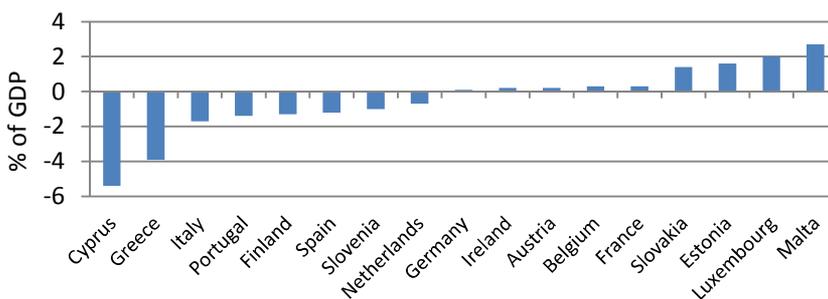
Source: own calculations based on Eurostat (2015)

Figure 2. GDP growth in euro area member countries (17) in 2012



Source: own calculations based on Eurostat (2015)

Figure 3. GDP growth in euro area member countries (17) in 2013



Source: own calculations based on Eurostat (2015).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

It is possible that in such a situation, when over half of member countries need assistance, financial capabilities of the insurance mechanism would not be sufficient, as the number of contributor-countries would be too low.

The advantage of the common unemployment insurance scheme (3) is its automatism. It can be set up in a way that enables launching the stimulus upon exceeding a certain level of unemployment in the region, and not necessarily in a whole member country. That is why assistance would be given directly where it is needed the most and resources of the unemployment insurance scheme are managed most reasonably. The problem, which arises, is that most often companies do not lay off its employees in the first place, when economy is affected by the negative shock. It is therefore possible that the aid flowing from such a scheme would stimulate the economy too late, that is, when the worst consequences are already being felt – employment reduction are made and increased number of people are unemployed.

The last possible form of fiscal capacity - interest equalization scheme of government bonds (4) would have to eliminate unjustified differences in interest rates on government bonds of euro area countries. This would be provided through a specially established European agency. An explanation for setting an interest equalization scheme of government bonds are the consequences of the recent crisis, when interest rates on bonds of euro area countries have varied considerably. As a result of this situation, some countries have suffered significant losses (i.a. Greece, Portugal, Spain), some have gained (e.g. Germany, the Netherlands). What is interesting, countries like Belgium, that theoretically should be in the group of losers, have also benefited.

Interest equalization scheme of government bonds would give member states a chance to issue some portion of the debt (e.g. 10%) by the European agency. This would significantly increase liquidity of government bonds market in Europe and lower interest rates for countries in the process of debt refinancing. The program could also provide a larger tranche for a country, which will experience problems with the debt issuance (when its cost could increase considerably). Other, similar solution envisages issuing, agency collateralized debt obligations (CDO) with varying degrees of risk covered by the purchase of approx. 60% of the bonds issued by the euro area countries, by a special European.

Both of these approaches can solve the problem with excessive fluctuations in bonds' interest rates and help to stabilize public debt borrowing

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

costs. However, they are based on the assumption that each crisis has to negatively affect borrowing costs while for example German economy being in recession in 2009 did not suffer from higher costs of borrowing. In that case assistance would not have been provided although stimulus action, especially in certain regions, would probably help their economies to recover.

Conclusions

European Union shares a lot of characteristics with the model of fiscal federalism. However it does not benefit fully from all profits, which can be provided. This is mainly because of insufficient size of central budget, which is not equipped with functions that could help in stabilizing an output in the euro area i.e. function of intertemporal stabilization and interregional insurance.

European leaders took actions to strengthen the European Union and especially the euro area. In general conducted reforms can be classified as those which have preventive and reactive nature. Of rather preventive nature are: Sixpac, Twopack, Fiscal Compact and The Euro Plus Pact. Among existing solutions of reactive nature there is only ESM. However its potential impact on the whole euro area's economy is rather limited. That is why ESM is not the only mechanism for stabilizing European economy and The President of European Council – Herman van Rompuy launched the project which purpose is to create a fiscal capacity.

No matter which solution will be implemented EU authorities should put maximum effort to ensure:

1. Automatism – to avoid the temptation of discretionary decision making
2. Minimum lags – fiscal capacity should provide assistance when it is the most needed (e.g. before wave of redundancies happen)
3. Maximum financial impact on the economy - usually a fiscal multiplier is the greatest at the beginning of a crisis / recession (this is actually a follow-up of point 2)
4. Capacity - the solution should solve not only the economic problems of small countries or a small group of countries.

Taking into account stabilization functions which fiscal federalism provides through central budget, separate budget for euro area seems to be the best form of fiscal capacity. However creating a separate budget for the euro area can bring significant negative consequences for the European integration process as a whole.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Giving comments about possible forms of fiscal capacity I indicated problem of revenue sources only in the case of the budget. In fact, concerning high ratio of debt in most euro area countries, one may expect that financing for other solutions will be the issue as well. This is why skepticism about fast launching of fiscal capacity for euro area seems to be justified.

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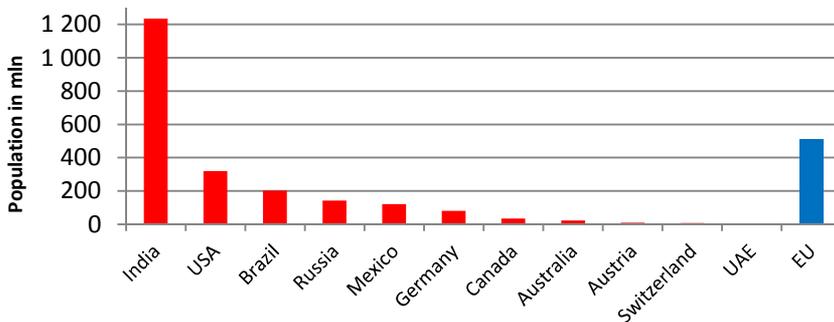
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Appendix 1

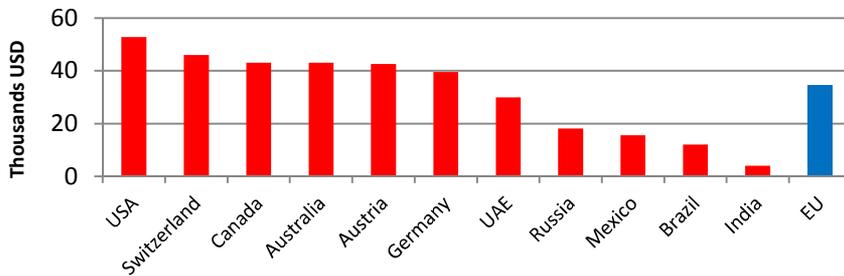
Figure 4. Population in selected federations in 2013



Source: own work based on CIA World Factbook (2015)

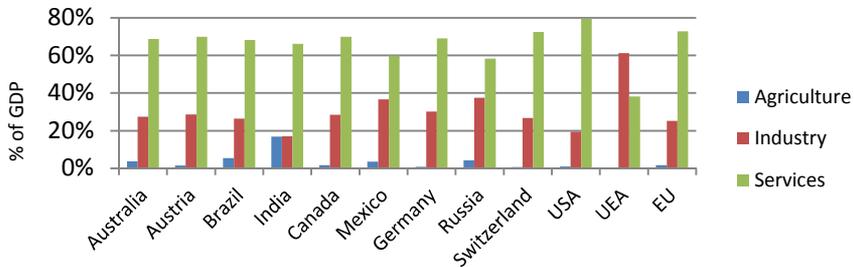
**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Figure 5. GDP per capita (PPP) in selected federations in 2013



Source: own work based on CIA World Factbook (2015)

Figure 6. GDP composition in selected federations in 2013



Source: own work based on CIA World Factbook (2015)

Table 3: Administrative units subordinated to the federal government in selected federations

Country	Administrative units	Total number of administrative units subordinated to the federal government
Russia	Provinces (46), republics (21), autonomous okrugs (4), krais (9), federal cities (2), autonomous oblast (1)	83
Germany	States (16)	16
USA	States (50), federal district (1)	51
Australia	States (6) territories (2)	8
Brazil	States (26), federal district (1)	27
Canada	Provinces (10), territories (3)	13
Mexico	States (31), federal district	32

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

	(1)	
Austria	States (9)	9
United Arab Emirates	Emirates (7)	7
Switzerland	Cantons (26)	26
India	States (28), union territories (7)	35
European Union	Member countries (28)	28

Source: own work based on CIA World Factbook (2015)

Note: Russian statistics do not include annexed territories in 2014

**Proceedings of the 8th International Conference on Applied Economics
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Contemporary Nature of Stock Exchange from the Perspective of Demutualization Process

JEL Classification: *G15; L21; L31*

Keywords: *demutualization; stock exchange; company; government; society*

Abstract: As a part of the demutualization process, stock exchanges are transformed from a traditional membership (mutual) structure into an entrepreneurial structure. Changes in the legal and organizational structure take place and they diversify their activities in order to meet the market needs. Statistical data confirm that two thirds of stock exchanges are of for-profit type and as many as 40% are listed exchanges. But we cannot conclude that stock exchanges, after the demutualization process and going public, operate more efficiently than the stock exchanges not subjected to these processes. On the other hand, analyzing the structure of the products on stock exchanges, it may be noticed that most of the exchanges have a diversified range of services.

However, it should be emphasized that the activity of stock exchanges is partly seen as a public good even if they are managed by private people. But the efficiency increase of stock exchanges does not necessarily translate into the quality increase of their socio-economic functions and short-term pursuit for profits may pose a threat to the functioning of the economy and society.

Introduction

In the classical terms, stock exchange is defined as “any organization, association, or group of people, whether incorporated or unincorporated, which constitutes, maintains, or provides a market place or facilities for bringing together purchasers and sellers of securities or for otherwise performing with respect to securities the functions commonly performed by a stock exchange as that term is generally understood, and includes the market place and the market facilities maintained by such exchange” [Di Noia, 1999, p. 17, following: American Securities Exchange Act]. Stock exchange is aimed at providing centralization for trading securities as well as determines the flow of information, disseminating and triggering competition among the participants of stock exchange.

Historically, stock exchanges were institutions of non-profit type, organized as a cooperative or functioning as state institutions. Their activity was carried out in the interest of public activity through the implementation of macro-economic functions: allocation, valuation of securities and control [Kulpaka, 2007, p. 51]. As a result of electronization of stock trade and transformation of the organizational and legal form of stock exchanges, so-called demutualization, there has been a change in the rules of their functioning. At present most stock exchanges operate as commercial enterprises, directed towards profits. In the view of the described phenomena the problem appears concerning the essence of modern stock exchanges and threats connected with a change of their organizational and legal structures.

Methodology of the research

The purpose of the article is to analyze the changes in the functioning of stock exchanges due to the organizational and legal form and the consequences of these changes. The research hypothesis was stated that the demutualization processes determined changes in the rules of functioning of stock exchanges and created threats from the point of view of socio-economic functions.

In order to verify the hypothesis, we use literature studies that allowed recognizing the key theoretical issues and presenting the essence of the phenomenon of demutualization as well as threats associated with the transformation processes of the legal form of stock exchanges. In the article we use the cause and effect analysis for the presentation of the transformation process of the organizational-legal form of stock exchanges and the result-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

ing effects, along with a logical analysis consisting in the search for a logical relationship between the causes and consequences of these changes. In addition, based on the data published by the World Federation of Exchanges (WFE), the analysis of statistical data on stock exchanges and their financial results was performed. The data refer to 57 stock exchanges - members of WFE.

**Changes in the ownership structure of stock
exchanges - demutualization processes**

According to the Anglo-Saxon model, the traditional organizational structure of stock exchange is a cooperative established by the members of stock exchange. In contrast, the continental (European) model is a stock exchange operating on the basis of the legal act, under the State control [Ramos, 2003, p. 13]. In the cooperative structure usually the members are financial institutions who are intermediaries in securities trading representing the interests of investors (brokers) or their own (dealers). This form of exchange is a result of the fact that the capital market on which an efficient trading of securities should take place must be located in a very specific place, functioning at fixed times, according to the established rules of reporting and implementation of contracts and with a guarantee of the settlement of transactions (delivering cash and securities). In order to meet the conditions presented and to prevent an overflow on the trading floor, such brokers should have been selected who represented the interests of everyone concerned by the trade. Rationing of the access to the exchange was conducted through the sale of "places", that is by membership fees - high initial and lower annual fees [Steil, 2002, p. 2]. Nevertheless, non-members wishing to use the opportunities offered by the concentration of capital in one place had to pay the members of stock exchanges for representing their interests. In this way the members of the stock exchange have become the intermediaries (brokers) for transactions realized by the investors.

The technological factors and liberalization of the regulations concerning the capital flow and circulation forced changes in the form of operation of stock exchanges and thus determined the demutualization processes. The open outcry system used previously was replaced with the electronic trade in which the investors make investments in securities on their own [Gorham, 2011, p. 3]. The computerization of stock trading eliminated the intermediary role of brokers which was connected with the process of disintermediation. In turn, the liberalization of regulations on the capital move-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

ment and trade led to a gradual expansion of possibilities and at present, in some regions even to freedom in the activity of investment institution.

Demutualization is a process of moving away from the traditional cooperative (mutual) structure of stock exchanges [Steil, 2002, p. 6]. The basis of demutualization is the separation of property rights and membership of stock exchange. In this process the owners become third parties who are not the members of the stock exchange. It should be emphasized that a full demutualization of stock exchange is a complex process. One cannot specify a single event that causes an immediate demutualization. Generally, this process consists of four steps [Jacquillat, 2006, p. 155]. The first stage is considered as organizing the exchange in a cooperative form. The second stage is the transformation process of stock exchanges into for-profit organizations but the members of stock exchange are its owners and supervisors. The next step is to change the legal and organizational structure for the joint-stock company in which the owners of stock exchange, apart from its members, are the external entities. The fourth step is to issue its own shares. At this stage the owners are the individual stock market investors and institutional investors. The shareholders become more diffused.

Literature mentions two basic reasons for demutualization. The basic reason is to reduce the control of exchange members (especially local, national ones) as the strategic owners. Stock exchanges operating in a competitive financial market, in order to be competitive, must reduce the costs for the issuers of securities and increase the investment portfolios for the investors. In contrast, the members of stock exchanges leading to maximization of their own profits from brokering do not always care about the competitiveness improvement of exchanges. The main justification is the belief that the private structure enables a faster response to new challenges in the environment [Jacquillat, 2006, p. 159].

Another reason for demutualization is raising capital - by selling shares - necessary for expansion and investment in technology. Studies show that the increase in capital in relation to demutualization is the secondary purpose or it may be no purpose at all [Steil, 2002, p. 6]. Most stock exchanges which conducted demutualization had no urgent need to obtain new capital. Moreover, in case of the lack of capital its increase may occur from membership payments without a necessity to involve the external owners.

Demutualization implies a departure from the traditional cooperative structure of stock exchanges. At the same time the exchanges acquire new non-members owners of exchange. Due to a different share of external owners the exchanges may be varied. The World Federation of Exchange

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

proposed the classification of exchanges comprising of five categories. The first category are private, limited companies. These are stock exchanges registered as private companies, generally with a paid up share capital. In these exchanges the intermediaries are usually the sole owners of the exchange and their ownership, intermediations rights and activities are strongly linked. The second category are private, limited companies after demutualization, but not listed. The demutualization of exchange is a process by which a not-profit member-owner organization is transformed into a for-profit shareholder corporation. Ownership is more open. The third category is the publicly listed exchanges. The stock exchange goes public when its shares are listed on an exchange and are freely negotiable. The fourth category includes exchanges registered as associations or mutuals. These member cooperatives generally have no share capital. Access to membership is restricted. The last category regroups exchanges with "other" legal status. The example are exchanges which have a government or semi-government agency structure and belong to the state [Devai & Naacke, 2012, p. 38].

**Characteristics of the functioning of stock exchanges
after the demutualization process**

Changing the organization of stock exchanges causes that the exchanges are more of an entrepreneurial example than a mutualized management structure. Assuming the formula of companies, their purpose of activities becomes to maximize profits. The group of stakeholders who are interested in the financial result generated by the exchanges are not members yet but the new owners-shareholders.

Stock exchanges after the demutualization process take a form of commercial business entities engaged in service activities. They provide services in the areas: issuers servicing, financial instruments trading (on cash and derivatives market), information dissemination and other which may include clearing and settlement services, sales of software for trade analysis, organizing trainings etc. [Gorczyńska, 2012, p. 33-35]. Each of the presented areas generates revenues and costs. Exchanges that want to be leaders must function effectively, diversifying their activity among the areas that provide the greatest opportunities for growth and thus revenues, at the same time resigning from providing the services that are not competitive. Therefore, they open new trading markets, e.g. for innovative small and medium-sized businesses, create new products as well as they acquire the functions from a value chain that were previously served by separate

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

institutions. In addition, the exchanges target their efforts on using even newer and more efficient information technology and telecommunications as well as selling new products. These activities are aimed at attracting the largest possible number of clients - issuers and investors, and simultaneously optimizing costs.

Stock exchanges expand their business within the frames of the internal development or the external development - consolidation. Product diversification in the external development takes a form of horizontal consolidation. Exchanges of similar profile of activity (e.g. exchanges of derivatives) may consolidate, as exemplified by the CME Group formed by the merger of exchanges: the Chicago Mercantile Exchange (CME), Chicago Board of Trade (CBOT), the New York Mercantile Exchange (NYMEX), COMEX and the Kansas City Board of Trade. The exchanges of different product profiles may also consolidate, such as derivatives exchanges and cash exchanges, e.g. Deutsche Börse Group, in which Deutsche Börse merged with Eurex. Today, the mergers between the exchanges in various countries dominate, resulting in the formation of transnational exchanges (e.g. NYSE Euronext, NASDAQ OMX). This leads to the phenomenon known as denationalization of international stock exchanges or international integration of exchanges [Chesini, 2007, p. 151].

Stock exchanges also "absorb" the activity that has not been included in the value chain so far. They do this by vertical mergers. This type of consolidation usually involves a combination of stock exchanges (quotation system, trading) with clearing and depository institutions, i.e. post-trade integration. Vertical integration among the stock exchange, clearing and deposit chamber took place in the Deutsche Börse (DB), Amsterdam and Brussels.

Both, horizontal and vertical consolidation are aimed at costs reduction, but also at attracting more and more business entities involved in the stock market transactions, therefore at increasing the competitiveness of the merging exchanges.

**Threats associated with the activities of stock exchanges after the
demutualization processes - outline of the problem**

Demutualization leads to the fundamental changes in the management and ownership of stock exchanges. In the area of property it is connected with an increasing role of external owners, including the institutional ones from a financial sphere. These investors are associated with the so-called

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

impatient capital, searching for possibilities to obtain extraordinary profits in the short term [Ratajczak, 2012, p. 283]. The growing relevance of the owners presented and changes in the structure of exchanges aimed at profit may be connected with threats in the execution of socio-economic functions.

Generally, within the frames of the cash market a classic function of exchanges takes place - allocation, in which capital is transformed between its holders and those who notify a demand for it. After the demutualization processes, exchanges target their actions at the short-term, profitable business spheres. This is the sphere of derivatives market. Derivatives, in its original essence, were supposed to hedge risks (including currency exchange risk) of financial transactions carried out by the operators internationally, however, they have become a form of rapid, profitable but also risky earnings. Analyzing the global volume of options and (single) futures trading calculated using the amount of contracts in million in the years 1996-2010, it increased more than 10-fold, reaching a record of 436,785,502 option contracts in the year 2007 and 1,058,862,743 futures contracts. [<http://www.world-exchanges.org/statistics/annual/derivative-markets/derivatives>]. Consequently, within the frames of the presented phenomena, "(...) more and more resources are invested in financial activity rather than the production of goods and services, that generate high private returns disproportionate to its social utility" [Tobin 1984, p. 14].

The activities of stock exchanges focused on short-term earnings can be connected with a danger of underfunding the countries or sectors of the economy. The owners from the financial sphere often treat their participation in the real economy as one of periodic and alternative forms of capital investment but not as a real long-term commitment in the ownership with the intention of developing the particular organization [Ratajczak, 2012, p. 283]. Therefore, as a result of tendency towards earning money quickly, instead of allocating capital in the development of industries in the economy, the capital will go to the most profitable projects which are not necessarily relevant for the economy development of the particular country. In an international scale this phenomenon may lead to capital outflow from the countries perceived as weak from point of view of investments (short-term ones). Due to investment opportunity, and therefore the allocation of capital globally, an excessive concentration of capital inflow may occur in some countries and a lack of access to it in the other ones. Moreover, in the case of a large inflow of foreign capital to the relatively illiquid financial mar-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

kets may lead to losing the influence in the domestic markets in these countries. [Kowalak, 2006, p. 49].

The dynamic development of derivatives markets is a threat to the individual investors too. Derivatives are profitable in the short term, but they are also risky speculative instruments. Their multi-level structure concerning profits depending on the price of another asset has blurred the picture of risk [Gorczyńska, 2011, p. 83]. Their complexity is so high that even those who, on behalf of other market participants should assess the risk involved, such as rating agencies, are also the victims of asymmetric information. This has resulted in violation of the fundamental rules of trust between sellers (e.g. new financial products) and buyers. Currently, the old Latin maxim *caveat emptor* ("let the buyer beware") gains a new special significance [Freeman, 2010 p. 165].

The development of the derivatives markets may also lead to pathological phenomena concerning a long-term investment. In general, for cash equities there is a relationship between the ownership and direct realization of managerial functions or the ownership by ceding management functions to the hired managers. In case of derivatives, the ownership without the awareness of being a co-owner is possible as well as the ownership which generally is not accompanied by any rights or obligations. The owner of derivatives may even be interested in bankruptcy of the entity whose activity is the source of derivative creation, or more often may be interested in a significant variability of the events affecting valuation of the derivatives held and in a possibility of speculative rent collection more than in stable development [Wigan, 2009, p. 165].

The pursuit for short-term profits may lead to the actions that threaten the security of trading on the stock market. Competition among the exchanges and between exchanges and OTC markets (ATS-s) may result in lowering the requirements for listed securities or business entities (institutional) accepted for direct trade. Indeed, stock exchanges, in order to attract new investors and increase turnover, are able to minimize the regulations defining access to the stock market. This was the case in the US where some exchanges such as the NYSE hindered trading of securities listed outside the stock exchanges, NASDAQ market did not impose such restrictions on its participants [Stoll, 2008, p. 17].

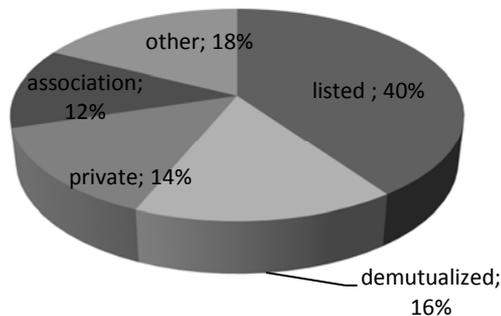
The contemporary industry of stock exchanges is characterized by competition. It is obvious that in a long-term perspective the ineffective exchanges will lose their market share. It should be clear that the stock exchange cannot only be seen as a commercial institution focused on increas-

ing its efficiency. Stock exchanges are business entities providing "specific goods". According to the traditional approach, these services are public goods even if the exchange is private [Di Noia, 1999, p. 18-19]. Through the services of trading, issuing, listing, they execute the function of allocation, valuation of securities and control - functions of socio-economic character.

Characteristics of the activity of stock exchanges by organizational and legal form in numbers

In order to verify the considerations presented in the theoretical part, data analysis was performed on the selected aspects of the functioning of stock exchanges. Firstly, we examined the extent to which the stock markets are exposed to the demutualization processes. For this purpose we analyzed the quantity and structure of exchanges according to their organizational and legal form in figure 1.

Figure 1. Breakdown exchanges by legal status (members of the World Federation of Exchange) in 2012



Source: R. Devai & G Naacke (2012, p. 8).

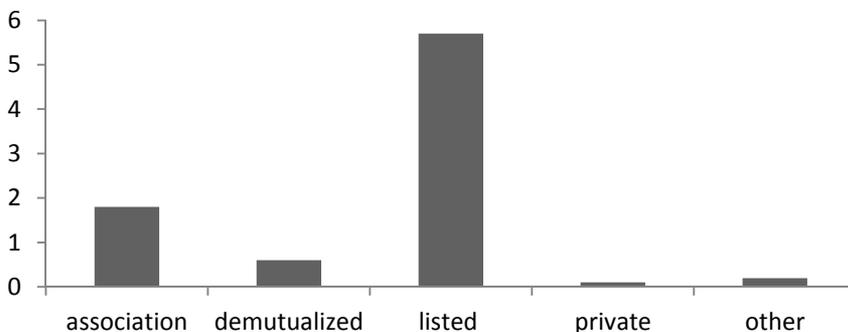
The largest group by legal form are listed exchanges (23 stock exchanges), that is 40%. They are dominated by NYSE Euronext, NASDAQ OMX Group, CME Group and Deutsche Boerse, which represented 57% of total revenues of this group in the year 2012. The next part (18%) are the stock exchanges of "other" legal status. They are represented by, among others, Abu Dhabi Securities Exchange, Moscow Exchange, The Egyptian Ex-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

change. 16% are demutualized stock exchanges (9 exchanges). The demutualized group is dominated by China Financial Futures Exchange, Korea Exchange, National Stock Exchange of India and Taiwan Stock Exchange that accounted for 80% of the revenues. The private exchanges consist of 8 exchanges (14% of all exchanges). They are dominated by SIX Swiss Exchange and Taiwan Futures Exchange. The smallest group comprises of association/mutual exchanges (7 members, 12% of all exchanges). It is represented by 5 exchanges in Mainland China (Dalian Commodity Exchange, Shanghai Stock Exchange, Shanghai Future Exchange, Shenzhen Stock Exchange and Zhengzhou Commodity Exchange) that amounted to 99% of revenues of associations in the year 2012. All in all, a dominant part of stock exchanges has been exposed to the demutualization process. 74% of exchanges are for-profit, but only 26% are not-for-profit organizations. As many as 40% of are listed exchanges - exchanges that are on the highest stage of demutualization.

When analyzing the stock exchanges by legal status it is worth comparing the economic and financial results of each form of exchanges. It should be noted that the financial results, in addition to the legal form, are influenced by other factors. The comparison was made according to annual net income and return on equity capital (ROE) of exchanges by legal status.

Figure 2. Net income of stock exchanges by legal status in 2012 (USD billion)



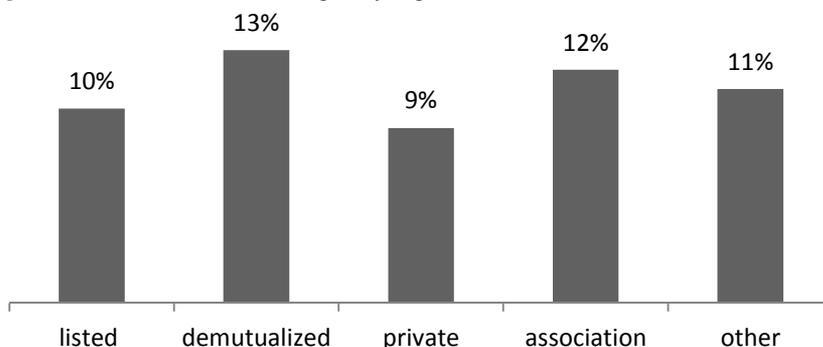
Source: R. Devai & G Naacke (2012, p. 18).

In accordance with figure 2 presented, the largest net income is generated by the listed exchanges. In 2012 it amounted to approx. 6 billion USD. The next group of exchanges (in terms of net income) were association exchanges (less than 2 billion USD). Other exchanges generated net income of less than 1 billion USD. Such high net income generated by the listed

exchanges is connected with the fact that these exchanges constitute the largest percentage of operating exchanges and have the largest equity (of about 70 billion USD). Furthermore, within the frames of these exchanges the world's largest stock exchanges operate as: NYSE Euronext, NASDAQ OMX Group, CME Group and Deutsche Boerse. The global distribution of costs and revenues among each legal status reflects the weight of listed Exchange, which accounted for 80% of revenues in 2012 (in comparison with 40% of the membership).

Apart from net income, it is worth looking at other financial data. Figure 3 shows ROE (return on equity capital) of stock exchanges by legal status.

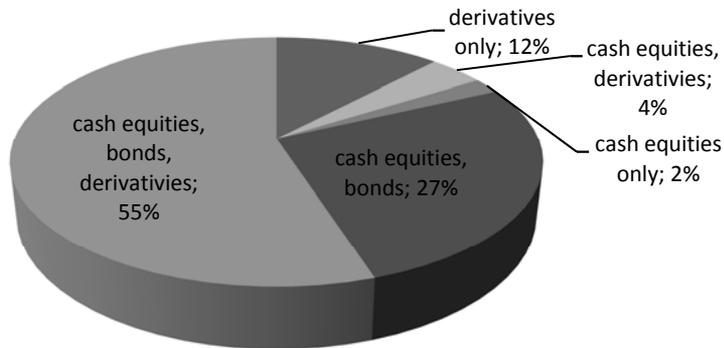
Figure 3. ROE of stock exchanges by legal status in 2012



Source: R. Devai & G Naacke (2012, p. 25).

When analyzing ROE for the individual exchanges we cannot see any significant differences in the level of this indicator. It is at a comparable level of approx. 10% for each type of exchange, with the highest 13% for the demutualized exchanges. The listed exchanges received one of the lowest ROE although their net income was the highest. This level of indicator is linked to the fact that these exchanges have the highest level of equity capital. The fact may be interesting that there are no significant differences in ROE between the non-profit and for-profit exchanges. As a matter of fact, the non-profit exchanges received even higher ROE (11%) than the for-profit ones (9%) [R. Dévai & G Naacke, 2012, p. 25]. Thus, the presented data do not allow drawing the conclusion that the stock exchanges after the demutualization process and the issuance of own shares operates more efficiently than the stock market not exposed to these processes.

Figure 4. Breakdown of exchanges by products in 2012



Source: R. Devai & G Naacke (2012, p. 10).

Apart from the financial data we should also examine the structure of products offered by stock exchanges. Among the analyzed members of the WFE (figure 4), most stock markets offer a wide range of products. 55% of the stock exchanges offered three classes of assets, i.e. cash equities, bonds, derivatives; 27% within the frames of classes of assets: cash equities, bonds and 4% within cash equities and derivatives. Only 14% were stock exchanges with one product that offer derivatives only, and only 2% cash equities.

Stock exchanges, in addition to product diversification, expand their range of services. Beside the classic services of listing and trading they run a post-trade activity. 77% out of all the members of the WFE are the exchanges performing the functions of clearing, settlement and depository services. The remaining 23% are non-active exchanges in the post-trade services but have a stake in the company providing the post-trade services. The example is The Central Counterparty Austria (CCP.A) which offers all clearing services for the Wiener Boerse (Wiener Boerse is with OEKB - Oesterreichische Kontrollbank), the joint-owners of CCP.A. Also Johannesburg Stock Exchange owns 44.55% of the Central Securities Depository.

Consequently, the stock exchanges, as a result of the process of demutualization and electronicisation of trading, transform from the institutions offering cash market products into organizations offering a wide range of products and services beyond the classic listing and trading.

To sum up, the analyzed statistical data confirm that a dominant part (two-thirds) of stock exchanges was exposed to demutualization and as many as 40% ones are listed exchanges - the exchanges on the highest stage

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

of demutualization. It cannot be concluded that the exchanges after the demutualization process and the issuance of own shares operate more efficiently than the stock exchanges not exposed to these processes. In turn, analyzing the product structure of stock exchanges one can see that most of the exchanges have a diversified range of services.

Conclusions

The conducted analysis created the basis for verification of the hypothesis that the demutualization processes determined changes in the rules of functioning of stock exchanges as well as created threats from point of view of socio-economic functions.

Stock exchanges make changes in the legal and organizational structure as well as diversify their activities in order to meet the market needs. It should be noted, however, that the activity of stock exchanges is partly seen as a public good even if they are managed by private people. In contrast, the increase in the efficiency of stock markets does not necessarily translate into the increase of quality of their socio-economic functions, and a short-term pursuit for profits may pose threats to the functioning of economy and society. General social problems are usually solved by the system of public supervision over the stock market [D. Switzer 2013, p. 104]. Therefore, the role of the state is important so that within the frames of creating the structures of stock exchanges there should be a system of public supervision established paying attention to the interests of society and economy.

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Comparative Analysis of Economic Efficiency of Polish and German Listed Companies*

JEL Classification: *G32*

Keywords: *efficiency; measure of efficiency; DEA; Polish and German joint-stock companies*

Abstract: The main subject of theoretical-empirical study presented in this paper is economic efficiency of companies listed on the Polish and German capital market. The discussed research problem was investigated in the form of a comparative analysis and realized in two parts. The discussion presented in the first part depicts mainly theoretical reflections on the essence and assessment measures of companies' economic efficiency. The second part presents the results of a comparative empirical research on economic efficiency of the companies listed on the Warsaw Stock Exchange and included in the WIG30 index as well as the companies listed on the Frankfurt Stock Exchange, which belong to the DAX index. The research period comprises years between 2004-2013. A comparative analysis of economic efficiency of the companies was conducted using a traditional ratio analysis and the nonparametric DEA method. The results of the empirical research confirm that German companies achieved significantly higher values of basic economic categories in the analysed decade, financial results in particular; however, their generated profits did not reflect in higher values of profitability ratios. Polish companies performed much better as they also showed higher efficiency from the DEA's point of view.

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Introduction

Conducting a comparative research on the problems of economic efficiency of the companies listed on the European stock exchanges is a natural consequence of adopted and realized micro- and macroeconomic objectives of the EU economic development. One of them is the growth of economic efficiency of public limited companies. It translates into the economic growth of national economies and improvement of life of societies.

The problem also concerns the companies listed on the Polish trading floor compared to the companies listed in stock exchange indexes in developed countries including Germany. While analyzing data from the International Monetary Fund which concern economic growth, it must be noted that in the recent years the Polish economy has achieved, and according to the forecast, it will still achieve much higher values of the real GDP than the German economy¹.

Economic efficiency plays a leading role in shaping of the investment potential of public limited companies listed on the capital market in a given country. The potential is diversified and it seems that German companies, which function in a developed market, will have a high development level of production factors, in particular, much higher values of wealth and capital in comparison with Polish enterprises. On the other hand, it seems likely that they do not exploit production and service reserves significantly, which may result in a lower level of economic efficiency in German listed companies as compared to Polish entities.

The main aim of the study is to determine the level and character of spatial diversification of economic efficiency in the companies listed on the Warsaw Stock Exchange and Frankfurter Wertpapierbörse. In order to achieve this objective a specific research hypothesis was formulated and it stated that in economic practice there are significant differences in the level of economic efficiency of the analysed Polish and German public limited companies, and they mainly concern return on total assets.

¹ According to the IMF data, the real GDP in 2013 amounted to 1.6 in Poland, whereas in Germany 0.5. Moreover, the IMF forecasts show that between 2014-2015 the economic growth rate will respectively amount to: for Poland 3.1 and 3.3, and for Germany 1.7 and 1.6.

Methodology of the research

The conducted empirical research refers to the companies listed on the Warsaw Stock Exchange and included in the WIG30 index as well as the companies listed on the Frankfurt Stock Exchange (germ. Frankfurter Wertpapierbörse – FWB)², which belong to the DAX index. The analysis comprised financial statements of 60 companies classified for both indexes on 20.11.2014. In order to meet the objective of the study the author decided to concentrate on a ten-year research period i.e. years between 2004-2013. Empirical data was obtained from the EMIS (Emerging Markets Information Services) database, stock market bulletins, Polish and German stock exchanges' websites as well as the websites of the analysed companies.

The analysed research problem is realised in two parts. Discussion in the first part includes the assessment of the companies' efficiency based on a traditional ratio analysis using accounting measures. It was assumed that two analytical dimensions can be included in the applied system of the efficiency assessment. These are the following:

- a) an absolute dimension i.e. accounting balance sheet and result categories, and
- b) a relative dimension (return ratios)³.

The other dimension of company's efficiency assessment allows to use standard formulas of return on sales ratio (ROS), return on equity ratio (ROE) as well as return on total assets ratio (ROTA), which are respectively a relation between net profit to return on sales, equity and total assets. For the sake of comparison of stream data with balance sheet data while constructing last two ratios, a methodical solution that was used, accepted a balance sheet value of equity and total assets as an average state in a given period:

² Frankfurter Wertpapierbörse (FWB) is the largest of seven stock exchanges in Germany and one of the most important financial centres in the world securities market. The organization of public trading is controlled by Deutsche Börse AG.

³ It is worth noting that return, similarly to efficiency, is classified in absolute or relative values. Compare Bednarski, 2003, p. 59; Bednarski, 2007, p. 96.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

$$ROE_n = \frac{EAT_n}{\bar{E}}, \quad ROTAn = \frac{EAT_n}{\bar{A}},$$

where:

EAT_n – net profit in a given financial year,

\bar{E} – average accounting value of equity in a given financial year,

\bar{A} – average accounting value of total assets in a given financial year.

Additionally, measures of descriptive statistics i.e. classical and positioning measures of location and diversification were also used in the empirical research.

The second part of the research describes the application of the DEA (Data Envelopment Analysis)⁴ method which enables to calculate economic efficiency measures in a synthetic way. The efficiency ratio measured by this method can be described as a quotient of the weighted sum of inputs (see Dyckhoff & Allen, pp. 411-436):

$$e = (\sum_{r=1}^s \mu_r \times Y_r) / (\sum_{i=1}^m v_i \times X_i),$$

where:

e – measure of efficiency,

s – number of outputs,

m – number of inputs,

μ_r – weights describing significance of individual outputs,

v_i – weights describing significance of individual inputs.

It is stated in the literature that the DEA method is one of the most efficient ways of efficiency assessment in various economic entities (compare Cummins et al., 2010, p. 1526; Kao, 2014, p. 117; Lim et al., 2014, p. 361; Sahoo et al., 2014, pp. 921-922). It shows a number of attractive statistical features, including among others:

⁴ In the Polish literature the DEA method is known as the frontier analysis method or data envelopment analysis. It must be stressed that there are numerous publications in which the DEA method was applied to assess the efficiency of various entities e.g. power houses, hospitals, insurance companies, colleges, farms, joint-stock companies, industry sectors; or to evaluate efficiency of investment on the capital market. This method is most commonly used in the banking sector. Compare Halkos & Tzeremes, 2013, pp. 1658-1668; Fiordelisi et al., 2011, pp. 1315-1326; Chortareas et al., 2013, pp. 1223-1231; Rogowski, 1996, pp. 4-48; Ferús, 2006; Hülsmann & Peters, 2007.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

- it enables to analyse companies' activity which is characterized by a huge amount of inputs and outputs,
- it is not necessary to apply rank order scaling of inputs and outputs, thanks to which a subjective researcher's impact on the results is eliminated,
- it allows to consider various inputs and outputs included in diverse units, not only the monetary ones,
- it is not necessary to check functional dependence between inputs and outputs (no need for determining a production function),
- volume of inputs possible to minimize, or outputs possible to achieve with certain inputs are evaluated,
- it enables to discover extreme values that can be overlooked while using other methods because of the effect of data averaging (compare Rogowski, 1996, pp. 4-48).

Depending on the purpose of the analysis and assumed research assumptions, the DEA method offers an opportunity to calculate three forms of efficiency measures i.e. input-oriented efficiency, output-oriented efficiency, and efficiency without orientation. Moreover, there is the possibility to estimate efficiency measures in three categories: constant economies of scale, changeable economies of scale, and non-growing economies of scale (see Banker et al., 1984, pp. 92-1078; Fäare et al., 1985; Kleine, 2002, p. 210).

Table 1. Inputs and outputs in the DEA model

Variants	Inputs	Outputs
Variant I	<i>E, TA</i>	<i>ROTA, ROE</i>
Variant II	<i>E, TA, ΔE, ΔTA, D/E</i>	

Mark: *E* – equity; *TA* – total assets (total capital), *ΔE* – dynamics of equity, *ΔTA* – dynamics of total assets (total capital), *D/E* – debt-equity ratio, *ROTA* – return on total assets, *ROE* – return on equity.

Source: autor's own study.

For the need of the study a variant oriented toward inputs with steady economies of scale was applied. The choice of this model was dictated by the main research objective of the study that focused the analysis of factors determining economic efficiency on minimization of inputs. Classical

measures of return (equity and total assets) in entities were accepted as outputs whereas as inputs⁵ the author accepted:

- in the first variant – only accounting values of total assets and equity,
- in the second variant – accounting values of total assets and equity, ratios of their dynamics and ratios of capital structure, measured by a relation of debt to equity (debt-equity ratio) (see Table 1).

The essence and measures of company efficiency

The concept of „efficiency” is one of the most popular notions in economics and science of management as well as in general economic practice. However, it is often interpreted and understood ambiguously and used in diverse ways in management practice.

According to an encyclopedic definition, efficiency is perceived as a relation of outcomes to outlays (see *Wielka Encyklopedia PWN*, 2002, p. 53). The notion of efficiency often relates to a rule of rational management, taking a form of two variants: effective (maximization of outcome) and economical (minimization of outlay) (see Matwiejczuk, 2000, p. 27).

In the discussion on actions oriented toward obtaining new outcomes some attention must be paid to an attribute of their efficiency, combining effectiveness with efficiency, expediency and cost-effectiveness. Moreover, in the literature efficiency is often linked with such notions as: productivity, profitability, rationality or even purposefulness. In such a context it may be understood as not only an outlay-outcome relation, but also as an ability to adjust promptly to changes, to implement a strategy and to accomplish objectives, or as a tool for assessment of efficiency and effectiveness of actions (see Skrzypek, 1999, pp. 11-12).

The evolutionary development of defining efficiency is presented by M. Holstein-Beck who lists six categories composing a comprehension of content and range of the notion of efficiency. They include:

- productivity (in a techno-economic dimension by H.Emerson),
- competence (in an organizational-bureaucratic dimension by M. Weber),
- effectiveness (in a praxeological dimension by T. Kotarbiński),
- functionality (in a humanistic dimension by R. Beckhard),

⁵ What must be stressed here is the contractual character of the notions „inputs” and „outputs”. As far as connection of the term „output” with returns is justified in this study, the term „inputs”, which usually refers to costs, is used only to perform the role of customary terminology used in the terminology of DEA method.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

- communication (in a personality dimension by D.J. Lawless), and
- morality (in a behavioral dimension by K. Obuchowski).

However, in the light of the record of the organisation and management theory, it is assumed that efficiency is a primary category in relation to the above-mentioned notions (see Skrzypek, 2007, p. 214).

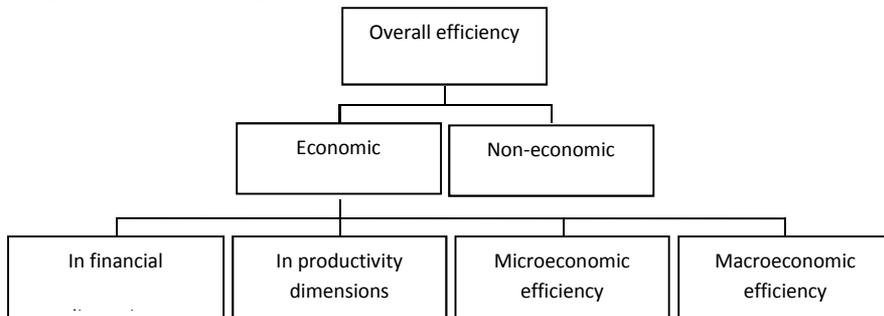
Taking the diversity and the inconsistency of defining the category of efficiency into consideration it must be pointed that there are two key approaches: purposeful and systemic, which significantly differ (compare Bielski, 2002, p. 109). The first one focuses on a degree of achieving set objectives and is identified with a notion of *effectiveness* (efficacy, purposefulness), the latter one focuses on a degree of using resources, which is described as *efficiency* (productivity, efficacy, cost effectiveness). As proof of the existence of differences in perceptions of these two approaches one can quote a statement saying that „effectiveness relates to doing things in a right way, whereas efficiency relates to doing the right things” (see Clark, 2005, p. 5). Being more precise, effectiveness is identified with cost effectiveness in the theory of competent activities. In economic reality, a desired condition is „a combination of effectiveness and efficiency with cost-effectiveness. Since it can happen that one can act efficiently but uneconomically and also one can do harm or act for benefit efficiently and economically” (see Niedzielski, 2011, p. 20).

Contemporary management of organisation also requires including a criteria of social righteousness (social effectiveness) (compare Nowosielski, 2008) as well as value for a client to the assessment of management competence. Simultaneously, what must be pointed out is a need for exclusion of allocative efficiency (allocation of resources according to customer preferences), or price efficiency (low prices while obtaining outlays and/or high prices while selling products) (compare Szydło, 2008; Szymańska, 2010).

The presented variety of approaches proves that scientific research on various aspects of efficiency must definitely be further conducted and discussed.

The subject of particular interest that is presented in the study is economic efficiency that derives from a rule of rational management and is defined as a difference between outcomes and outlays incurred in order to obtain these outcomes. It can be observed in financial and/or productivity dimensions and concern a single enterprise and/or the whole economy (see Diagram 1).

Diagram 1. Basic categories of efficiency



Source: autor's own study.

The foreign literature also presents the notion of overall efficiency that comprises technical efficiency and allocative efficiency (compare Aparicio et al., 2015, p. 882). It is also pointed out that there are a lot of studies on economic efficiency in technical and productive dimensions, whereas too little attention is paid to efficiency in a financial dimension, mainly when assessment of profits, costs etc. is concerned (compare Silva, 2014, pp. 108-112).

A very interesting approach to a modern perception of economic efficiency is the one presented by E. A. Helfert. The author points out that a basic economic objective of rational management is administration of selected resources at a strategic level in a way that in the long run an economic value will be created, ensuring not only covering but also a good return of incurred outlays without exceeding a level of risk accepted by owners (see Helfert, 2004, p. 427).

Economic efficiency is a category used, first of all, as a criterion of assessment of activity of the whole company as well as its specific areas. The importance of this category results from the fact that it prejudices the essence of enterprise as an economic entity, conditioning its functioning and determining its development (see Osbert-Pociecha, 2007, pp. 337-349). It concerns an ability to enhance a company's market position and improve its financial results. Moreover, acting in line with economic efficiency while taking decisions in enterprises is compatible with maximization of benefits for owners (see Wrzosek, 2005, p. 459).

The measurement of economic efficiency is an extremely complex and difficult problem of theory and practice of the assessment of enterprises' functioning and development. They result from diverse objectives, forms

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

and conditions of enterprise functioning, adverse expectations of stakeholders and changing concepts and practice of management.

In economic theory and practice an efficiency relation refers mainly to analysing outcomes with set outlays or using outlays in order to obtain assumed outcomes.

Efficiency understood as mutual relations between outlays and outcomes can be presented on the basis of three basic formulas:

- 1) efficiency as a difference between outcomes and outlays (profitability),
- 2) efficiency as a quotient of outcomes to incurred outlays (cost effectiveness), and
- 3) efficiency as a quotient of difference between outcomes and outlays to incurred outlays (rate of return).

When outlays and outcomes can be presented in measurable units, their collation enables to obtain the efficiency ratio that allows to make assessment in comparison with, e.g., a set base level, plan or efficiency of other units. Measures of efficiency are based on three approaches (see Szymańska, 2009, p. 159):

- a) ratio – constructing relations between various volumes (based on return, cost-effectiveness, productivity ratios),
- b) parametric – determining technical dependence between outlays and production, showing a maximum amount of product that can be obtained at a specific level of outlays – e.g. SFA (Stochastic Frontier Approach) method, TFA (Thick Frontier Approach) method, DFA (Distribution Free Approach) method, and
- c) nonparametric – using a procedure of linear programming – DEA method (Data Envelopment Analysis), FDH method (Free Disposal Hull) (see Charnes et al., 1978, pp. 429-444).

In spite of the fact that while assessing enterprises' efficiency a dynamic growth of interest in DEA and SFA methods (compare Lampe & Hilgers, 2015, pp. 1, 12) is observed, it must be stressed that ratio analysis still remains a relatively simple method of insight into economic operations and results of functioning of economic entities, as it concentrates on constructing relations between these volumes (compare Sierpińska & Jachna, 2014, pp. 144-145). It is very important, however, that these values are correctly estimated and interpreted, which is conducted on the basis of comparing obtained results with accepted reference bases. The literature presents a number of ratios used in assessment of economic efficiency of enterprises, which allow to conduct an analysis in a very broad range. These ratios in-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

clude accounting, financial or market ratios that can be expressed in an absolute or relative dimension (see Table 2).

Undoubtedly, the efficiency measures that are most often analysed are return ratios, mainly because of their role and importance in assessment of financial situation formulated by creditors, owners and the State Treasury. Their application to management practice in enterprises faces certain constraints connected with, among others, accounting policy, focus on the past, disregarding risk and capital cost and structure. Measures of profitability and efficiency based on cash flow as a rule eliminate imperfections of accounting ratios concerning using various accounting rules, however, they have some disadvantages. Most of them were created in consulting companies which advertised them aggressively, creating temporal fads, moreover, they are very often used only to measure short-term achievements (see Dudycz, 2005, pp. 163-169). Market valuation, on the other hand, considered the most objective, is dependent on the situation in capital market, speculative operations, or established policy of stock market investors.

The weaknesses of efficiency assessment measures presented above seem, nonetheless, natural, especially in the light of inability to create an overall system of measurements of achievements and financial efficiency of enterprises, which could reflect their diversity and multiplicity as well as complexity of mechanisms shaping such efficiency.

Based on the empirical studies conducted on the basis of German concerns, it can be stated that only one third used market measures in the assessment of efficiency. Although nearly three quarters formulated their action objectives as value maximization, numerous enterprises used traditional profitability measures in financial controlling, taking accounting profit into account (compare Pellens et al., 1997, pp. 1933-1939). On the basis of the analysis of the biggest German public limited companies (from DAX index) it shows that in the majority of cases (more than 90%) relative measures of enterprise value were used and they were calculated on the grounds of the accounting profit (see Fischer & Wenzel, 2005, p. 25). Similar conclusions were drawn by other authors as well (see Hermann et al., 1999, pp. 399-406).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 2. Examples of accounting, financial and market ratios used in assessment of economic efficiency of enterprises

		Symbol	Designation
		Accounting ratios	Absolute
EBITDA	Earnings Before Interest, Taxes, Depreciation and Amortization		
NOPAT	Net Operating Profit After Tax		
EPS	Earnings Per Share		
Relative	ROI		Return on Investment
	ROA		Return on Assets
	ROE		Return on Equity
Financial ratios	Absolute	DFL	Degree of Financial Leverage
		DOL	Degree of Operational Leverage
		FCF	Free Cash Flow
		FCFE	Free Cash Flow to Equity
		GCF	Global Cash Flow
		DCF	Discounted Cash Flow
	Relative	NPV	Net Present Value
		CVA	Cash Value Added
		IRR	Internal Rate of Return
		CFROI	Cash Flow Return on Investment
Market ratios	Absolute	WACC	Weighted Average Cost of Capital
		EVA	Economic Value Added
		EVC	Economic Value Creation
		MVA	Market Value Added
	Relative	SVA	Shareholder Value Added
		TSR	Total Shareholder Return
		VCI	Value Creation Index

Source: autor's own study based on Jaki (2012, pp. 150-154).

Empirical research results

The results of the conducted empirical research confirm the diversity of shaping of basic economic categories in Polish and German public limited companies in the period between 2004-2013. It is proved by calculated average values of equity and total assets as well as sales revenue (see Table 3).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 3. Average values of equity and total assets as well as sales revenue of companies included in WIG30 and DAX indexes between 2004-2013 (in million EURO*)

Specification	Index	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Total assets	WIG30	4,4	4,7	5,5	6,7	6,6	6,9	7,6	7,5	8,2	8,5
	DAX	120,9	131,8	147,7	178,9	187,6	152,6	167,5	179,5	177,7	161,4
Equity	WIG30	1,0	1,1	1,4	1,8	1,6	1,8	2,1	2,1	2,3	2,4
	DAX	11,8	13,7	15,1	16,0	14,4	15,3	17,6	18,5	19,7	19,8
Sales revenue	WIG30	0,8	1,0	1,5	1,7	2,1	1,7	2,1	2,4	2,5	2,2
	DAX	31,1	32,8	36,3	35,5	36,6	33,3	37,7	40,9	44,4	43,3

* To calculate balance sheet data from companies listed in WIG30 an average NBP exchange rate on balance sheet date was used, whereas to calculate items of profit and loss account the used value was an arithmetic average of NBP exchange rates binding on the last day of specific months in a given year.

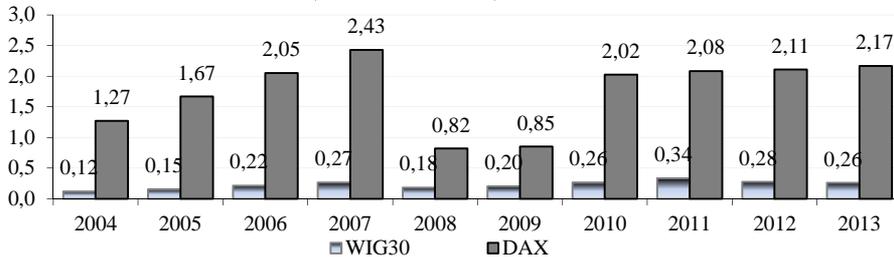
Source: autor's own study based on EMIS database, <http://www.boerse-frankfurt.de> and websites of analysed companies.

The figures presented in table 3 show unanimously that in the analysed decade companies included in WIG30 index achieved much lower values of equity and total assets as well as sales revenue than companies from DAX index. Differences in the value of total assets amounted to about 150 billion Euros on average, equity to about 15 billion Euros, whereas sales revenue to about 35 billion Euros. The biggest positive changes in values of these economic categories were observed between 2004-2007. A subsequent two-year period reflects some kind of market collapse that is described as crisis situation (compare Dach, 2011, pp. 33-36), whereas years between 2010-2013 show a relative growth of values of selected items of balance sheet and profit and loss account.

What should be underlined here is shaping of accounting measures of economic efficiency in absolute terms i.e. financial results of examined companies. The analysis of financial statements between 2004-2013 pointed at a certain regularity connected with a significant dominance of German companies over Polish enterprises (see Figure 1).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Figure 1. Average values of financial results of companies from WIG30 and DAX indexes between 2004-2013 (in billion EURO)



Source: autor's own study based on EMIS database, <http://www.boerse-frankfurt.de> and websites of analysed companies.

Moreover, three similar research subperiods were noted (between 2004-2007, 2008-2009 and 2010-2013), in which analysed measures showed diverse tendencies. What should be stressed here are more radical changes in values of financial results of companies from DAX index contrary to companies from WIG30 index, in particular in 2008 and 2010, in comparison with the previous year. What is also worth noting are differences in a reverse trend of economic efficiency that was observed in the last three years. When German companies showed an increase of economic efficiency, the Polish ones noted a decline in the average values of financial results.

While analyzing calculated measures of descriptive statistics it must be stressed that in German companies a more considerable diversification of financial results values was observed in the analysed decade than in companies from WIG30. It is also confirmed by values of standard deviations as well as minimum and maximum values in each analysed research period (see Table 4). In particular this situation was visible between 2011-2012, when differences between minimum and maximum achieved financial results amounted to a dozen billion Euros.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 4. Summary statistics of financial results values in companies included in WIG30 and DAX indexes between 2004-2013 (in billion Euros)

Specification	Index	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Standard deviation	WIG30	0,15	0,19	0,27	0,34	0,31	0,28	0,30	0,56	0,31	0,32
	DAX	1,28	1,76	1,77	2,17	1,98	2,36	1,82	3,23	4,42	2,61
Minimum	WIG30	-0,06	0,00	-0,02	0,00	-0,44	-0,15	0,01	-0,25	-0,11	-0,04
	DAX	-0,37	-0,31	-0,27	-0,37	-3,84	-4,54	0,32	-2,22	-5,26	-2,76
Maximum	WIG30	0,47	0,63	0,91	1,05	0,95	0,87	1,14	2,75	1,17	1,21
	DAX	4,63	7,41	7,02	7,97	5,73	8,40	6,84	15,41	21,72	9,07
Median	WIG30	0,06	0,05	0,10	0,11	0,10	0,08	0,15	0,17	0,18	0,12
	DAX	0,68	1,07	1,66	1,92	0,90	0,50	1,22	1,10	1,22	1,26

Source: autor's own study based on EMIS database, <http://www.boerse-frankfurt.de> and websites of analysed companies.

Based on the above-mentioned economic efficiency measurement conducted on accounting result categories in absolute terms it can be claimed that German companies achieved higher efficiency than the Polish enterprises. Presented in table 5 results of empirical research confirm, however, that economic efficiency of Polish companies measured in relative terms, in majority of cases is definitely higher than in German companies. It is also indicated by calculated average values of return on sales, equity and total assets ratios. Moreover, in companies from WIG30 index a bigger diversification of efficiency measures, especially one expressed by return on sales ratios, was observed.

It must be noted that in companies from WIG30 in each analysed year calculated average values of return on sales ratios were a dozen or several dozen percentage points higher than in companies from DAX index (see Figure 2). What is more, average values of return on total assets and equity ratios of the Polish companies, except four cases, exceeded measures of companies from the German stock market by a few percentage points. It confirms significant disproportions between average values of ROS, ROE and ROTA ratios in companies included in WIG30 and DAX indexes between 2004-2013.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

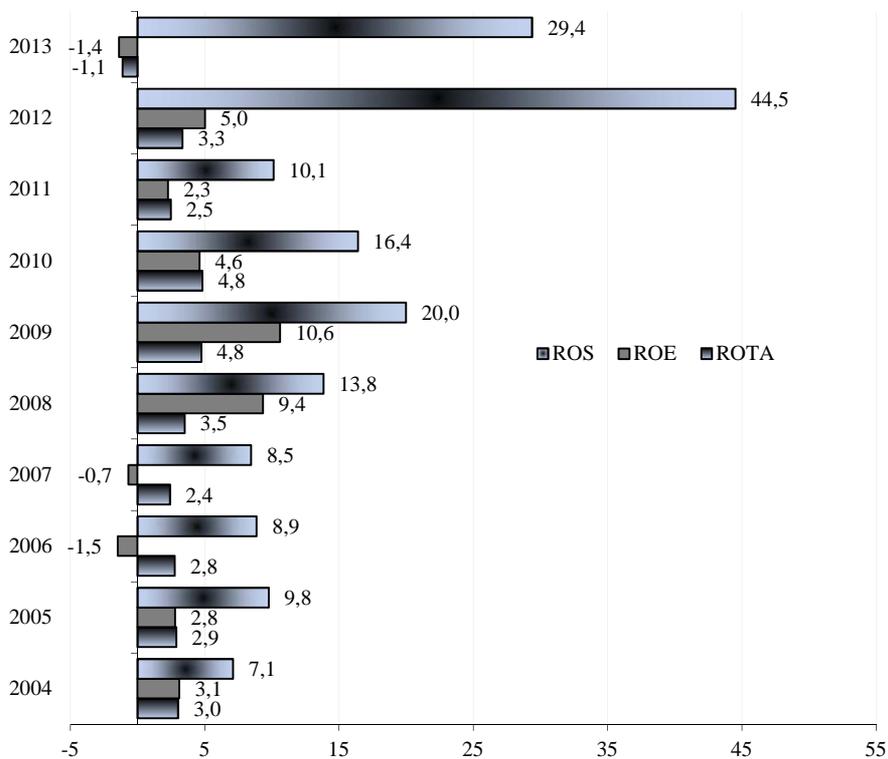
Table 5. Summary statistics of return on sales (ROS), return on total assets (ROTA) and return on equity (ROE) in companies included in WIG30 and DAX indexes between 2004-2013 (in %)

Ratios	Specification	Index	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	
ROS	Mean	WIG30	12,4	16,0	16,6	17,9	17,2	20,5	23,6	17,9	50,7	39,1	
		DAX	5,3	6,3	7,8	9,5	3,4	0,5	7,2	7,8	6,1	9,7	
	Standard deviation	WIG30	14,9	12,5	15,1	14,3	30,7	30,6	28,9	23,4	184,4	114,4	
		DAX	5,3	5,8	7,3	11,6	17,3	14,6	5,2	8,8	7,6	19,3	
	Minimum	WIG30	-27,7	0,6	-6,5	0,5	-57,3	-14,5	1,3	-60,0	0,2	-12,2	
		DAX	-5,3	-4,6	-3,4	-4,8	-72,3	-63,2	1,9	-3,0	-11,6	-5,1	
	Maximum	WIG30	36,5	37,7	45,7	45,6	136,3	159,2	149,5	79,7	989,6	616,1	
		DAX	18,4	26,2	36,1	51,7	42,1	24,1	20,3	38,0	30,1	100,0	
	Median	WIG30	9,0	11,5	12,5	14,3	13,0	17,1	16,6	16,4	12,6	16,6	
		DAX	4,7	5,5	6,2	6,6	4,4	2,7	5,3	6,0	5,7	5,8	
	ROE	Mean	WIG30	16,8	17,1	16,4	18,0	18,0	14,8	18,7	15,3	14,9	12,7
			DAX	13,7	14,3	17,9	18,7	8,6	4,2	14,0	13,0	9,8	14,0
Standard deviation		WIG30	18,3	13,3	13,0	10,2	31,4	16,0	22,8	15,9	14,8	12,7	
		DAX	10,9	8,2	9,3	11,7	26,1	14,8	6,4	11,6	18,3	35,0	
Minimum		WIG30	-16,6	0,9	-19,2	0,9	-38,9	-13,1	3,7	-28,6	-15,1	-5,4	
		DAX	-9,7	-5,4	-4,9	-7,2	-93,5	-36,5	3,1	-14,7	-74,3	-48,1	
Maximum		WIG30	79,1	58,1	48,0	45,0	150,9	74,3	127,5	60,6	74,0	58,2	
		DAX	43,9	29,0	43,4	56,5	74,0	29,3	27,2	37,4	32,2	184,2	
Median		WIG30	16,1	15,0	16,3	16,5	12,3	12,9	12,9	13,8	13,0	11,4	
		DAX	11,9	12,8	16,7	16,4	9,6	7,4	13,7	12,6	13,3	12,1	
ROTA		Mean	WIG30	7,1	7,1	8,0	7,9	6,6	6,1	9,1	6,9	7,0	5,7
			DAX	4,0	4,2	5,3	5,5	3,1	1,3	4,2	4,4	3,7	6,8
	Standard deviation	WIG30	5,5	7,1	9,6	7,8	10,9	7,8	14,1	10,8	11,3	7,7	
		DAX	4,7	4,3	5,3	6,4	9,6	4,2	3,2	5,0	4,5	19,4	
	Minimum	WIG30	-0,1	0,6	-5,7	0,3	-13,3	-6,8	0,7	-20,1	-10,3	-2,6	
		DAX	-3,4	-3,0	-2,5	-3,4	-35,2	-10,7	0,1	-3,0	-11,4	-3,8	
	Maximum	WIG30	16,3	23,0	28,9	30,5	41,2	30,4	74,7	46,4	58,8	38,2	
		DAX	18,8	18,0	20,7	30,4	30,4	12,8	13,7	20,6	11,3	108,0	
	Median	WIG30	6,1	3,6	5,5	6,9	4,1	4,7	5,3	4,7	4,9	4,6	
		DAX	2,6	3,1	3,9	3,9	2,8	1,0	3,6	4,1	4,0	4,0	

Source: autor's own study based on EMIS database, <http://www.boerse-frankfurt.de> and websites of analysed companies.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Figure 2. Variations in average values of return on sales, return on total assets and return on equity in companies included in WIG30 and DAX indexes between 2004-2013 (in pp)



Source: autor's own study based on EMIS database, <http://www.boerse-frankfurt.de> and websites of analysed companies.

Special attention should be drawn to deviations between the analysed enterprises between 2008-2009, when the WIG30 companies, despite a market collapse, noted an increasingly higher return on sales and insignificant declines in return on total assets. In the DAX companies, on the contrary, observed declines in profitability ratios amounted to over 50 percentage points. Presented results confirm the hypotheses assumed at that time that effects of insolvency of American institutions immediately reached Europe, Germany in particular (see Romanie, 2008).

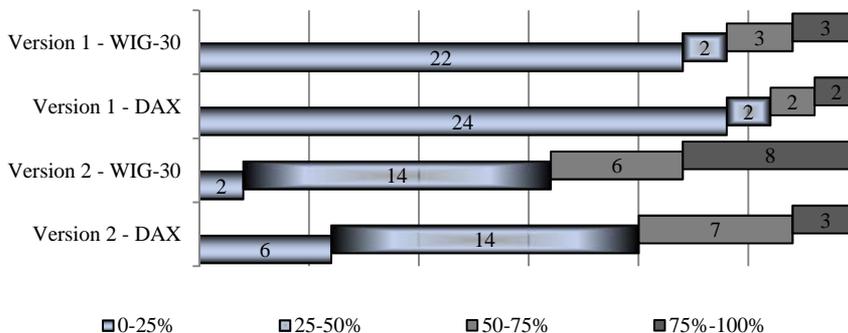
What is also worth stressing is the situation in the last analysed period when German companies significantly improved their economic efficiency

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

in every analysed area, and especially the one measured by means of return on equity ratio. As a result of a positive process the efficiency of the companies from DAX index in 2013 turned out to be higher than in the Polish stock market companies.

The results of the analysis of efficiency measures calculated by means of DEA Frontier software⁶ for 10 examined periods (between 2004-2013)⁷ showed that according to the first version of the model, the majority of WIG30 and DAX companies were characterized by efficiency lower than 25%⁸, whereas in the second version at the level between 25-50% (see Figure 3). Significant differences between Polish and German entities, in favour of the first group, were apparent in relation to DEA measures that confirm a high efficiency (75-100%).

Figure 3. Structure of analysed companies included in WIG30 and DAX indexes by their efficiency between 2004-2013



Source: autor's own study based on EMIS database, <http://www.boerse-frankfurt.de> and websites of analysed companies.

The detailed analysis of the examined entities from WIG30 index proved that according to the second variant the higher efficiency was observed in seven public limited companies: CCC, CYFROWY POLSAT, KGHM, LPP, PZU, SYNTHOS and TVN (see Table 6).

⁶ Free version available on the website within the study: Cook, W.D. & Zhu, J., 2008, *Data Envelopment Analysis: Modeling Operational Processes and Measuring Productivity*.

⁷ Specific efficiency measures were calculated on the basis of mean values of specific inputs and outputs for the period between 2004-2013.

⁸ Taking into consideration the constraints of the DEA method (positive values of inputs and outputs), negative values of specific inputs and outputs were replaced by a zero value. Compare Feruś (2006, p. 50).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 6. Average values of efficiency measures (DEA) in the analysed companies included in WIG30 and DAX indexes between 2004-2013

WIG30	DEA measures		DAX	DEA measures	
	Version 1	Version 2		Version 1	Version 2
<i>ALIOR</i>	4,2%	14,5%	<i>ADIDAS</i>	25,7%	38,9%
<i>ASSECO POLAND</i>	7,5%	42,0%	<i>ALLIANZ</i>	1,4%	28,0%
<i>AZOTY</i>	7,6%	40,9%	<i>BASF</i>	5,8%	50,6%
<i>BOGDANKA</i>	12,5%	64,7%	<i>BAYER</i>	5,1%	36,3%
<i>BORYSZEW</i>	29,6%	29,6%	<i>BEIERSDORF</i>	100,0%	100,0%
<i>BZ WBK</i>	3,0%	41,0%	<i>BMW</i>	3,5%	34,5%
<i>CCC</i>	100,0%	100,0%	<i>COMMERZBANK</i>	0,9%	7,4%
<i>CYFROWY POLSAT</i>	51,0%	100,0%	<i>CONTINENTAL</i>	13,4%	29,4%
<i>ENEA</i>	1,0%	24,5%	<i>DAIMLER</i>	1,6%	25,6%
<i>ENERGA</i>	1,6%	26,0%	<i>DEUTSCHE BANK</i>	1,2%	21,1%
<i>EUROCASH</i>	78,5%	96,6%	<i>DEUTSCHE BÖRSE</i>	56,7%	67,6%
<i>GTC</i>	3,0%	34,1%	<i>DEUTSCHE LUFTHANSA</i>	11,0%	29,3%
<i>HANDLOWY</i>	1,9%	31,5%	<i>DEUTSCHE POST</i>	9,0%	41,0%
<i>ING</i>	2,7%	33,9%	<i>DEUTSCHE TELEKOM</i>	0,6%	10,0%
<i>JSW</i>	2,0%	33,8%	<i>E.ON</i>	1,7%	29,9%
<i>KERNEL</i>	51,0%	67,4%	<i>FRESENIUS</i>	16,1%	28,5%
<i>KGHM</i>	4,8%	100,0%	<i>FRESENIUS MEDICAL CARE</i>	13,1%	34,6%
<i>LOTOS</i>	1,8%	26,6%	<i>HEIDELBERGCEMENT</i>	6,7%	23,8%
<i>LPP</i>	50,0%	100,0%	<i>HENKEL</i>	16,8%	48,5%
<i>MBANK</i>	2,2%	25,3%	<i>INFINEON TECHNOLOGIES</i>	0,0%	0,0%
<i>ORANGE</i>	0,7%	30,9%	<i>K+S</i>	100,0%	100,0%
<i>PEKAO</i>	4,3%	64,0%	<i>LANXESS</i>	51,4%	51,4%
<i>PGE</i>	1,4%	58,6%	<i>LINDE</i>	11,1%	44,8%
<i>PGNIG</i>	2,3%	47,7%	<i>MERCK</i>	24,3%	66,0%
<i>PKN ORLEN</i>	2,5%	51,9%	<i>MÜNCHENER RÜCK</i>	3,9%	46,5%
<i>PKO BP</i>	4,7%	71,6%	<i>RWE</i>	11,0%	74,7%
<i>PZU</i>	6,5%	100,0%	<i>SAP</i>	43,6%	100,0%
<i>SYNTHOS</i>	100,0%	100,0%	<i>SIEMENS</i>	4,2%	59,4%
<i>TAURON</i>	2,0%	36,8%	<i>THYSSENKRUPP</i>	0,3%	0,9%
<i>TVN</i>	66,7%	100,0%	<i>VOLKSWAGEN</i>	2,7%	55,3%

Source: autor's own study based on EMIS database, <http://www.boerse-frankfurt.de> and websites of analysed companies.

In these cases efficiency measures were at the level of 100%. A similarly high efficiency from DEA's point of view (nearly 100%) was noted in EUROCASH. On the other hand, the lowest degree of efficient usage of capital outlays was noted in ALIOR.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

While conducting a thorough analysis of the entities from DAX index it must be stated that there were only two cases (K+S and SAP) in which one hundred per cent efficiency was achieved in the examined period. The lowest efficiency from DEA's point of view (below 10%) was observed in three enterprises: COMMERZBANK, INFINEON TECHNOLOGIES and THYSSENKRUPP.

Conclusions

On the basis of conducted empirical research it cannot be unequivocally stated that the Polish public limited companies, contrary to the German enterprises, were characterized by higher economic efficiency. It is a fact that the companies included in DAX index achieved definitely higher values of basic economic categories, financial results in particular, accounting measures of efficiency in absolute terms. On the other hand, generated profits did not translate into higher values of return ratios which make up accounting dimension of economic efficiency in relative terms. On these grounds the companies from WIG30 looked much better, both in relation to return on sales, total assets or equity. Similarly, however, less radical conclusions can be drawn on the basis of efficiency analysis by means of DEA measures. On the basis of this nonparametric approach, it must be stressed that German companies achieved, on average, lower efficiency ratios in relation to the companies from the Polish stock market.

The assumed research hypothesis can be considered empirically confirmed. However, the conclusions from the above-mentioned analysis cannot be generalised, but the results can be a significant contribution to further scientific research.

What can be undoubtedly stated is the fact that problems presented in the study which concerned a choice of forms, methods and tools of economic efficiency assessment in enterprises determine obtained results and thus, further conclusions and taking specific investment decisions. However, conducting a multi-factor and multi-dimensional analysis of company efficiency while using various approaches and accounting, financial and market measures, is indispensable to create assessment that will enable enterprises to develop and implement a system of efficient and effective management.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

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Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

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18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015
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**Role of Institution, Government to Robust
International Entrepreneurial Activities
and Economic Growth: New Evidence**

JEL Classification: *C13; O47*

Keywords: *International Entrepreneurial activities; Economic growth; Development*

Abstract: This paper contributes to the development of the field of international entrepreneurial activities by providing answers to the following questions. Is higher human development generates opportunities to entrepreneurial activities that yields economic growth? What is the effect of the level on economic development on the relationship between entrepreneurial activities and countries growth? Do economic policies generate opportunity that yields higher international entrepreneurial activities?

The employed Generalized Method of Moments (GMM) estimation methodology is selected based on the long term dynamic of the entrepreneurial activities. Analysis is employed using panel data across two groups of countries based on their stage of development during the period 2004-2008. Empirical results provide a positive significant evidence for the role of human development to accelerate entrepreneurial activities and growth in innovative driven countries. The outcomes point towards the role of policies supporting entrepreneurial activities as a vital tool to accelerate development and growth via channels such as: better education levels, enhancing research and development, attractive taxes policies and stable monetary policy. This paper provides a comparative analysis of the empirical results and presents prospective explanations for the observed relationships between

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

different groups of countries to study the dynamics of change with relative short time series.

Introduction

Entrepreneurial activities have been studied and explained by prominent researchers making the notion even more (e.g., Baron & Ward, 2004; Markman & Baron, 2003; Mitchell et al., 2004). According to Schumpeter, 1934; Kirzner, 1973, entrepreneur role can be explained as an innovator, risk-taker and arbitrageur who participate to economic growth through creativity, new products and services, ability to compete at the international level. In social sciences, entrepreneurship is the creation of a new organization. However, the entrepreneur's role still remains uncertain as it is based on the human behaviour which is complicated and depends on the entrepreneur cognitive abilities, the surrounding environment that affects personality and the economic policies implemented in the country.

Existing literature has investigated the spill over factors to entrepreneur's activities and the constraints that hinder its dynamics and outcomes. But this might not tell the full story. Awareness has begun to shift to develop entrepreneur capital skills (see, e.g., Bloom et al. 2010, Bruhn, et al. 2010). This paper is assessing whether the human capital development can drive entrepreneurial activities to enter markets and what its dynamic role to growth? Finding an answer can be a good advice for developing countries and policy makers.

Empirical studies attempt to assess the relationship between entrepreneurial activities and economic growth which is ambiguous across countries. This vague relation attracts researchers to uncover these direct and indirect factors affecting entrepreneurial activities, via adding the role of human capital development. To accelerate entrepreneurs' role, researchers urge policy makers to adopt new tools that can increase human capital (Audretsch et al., 2001; Mueller, 2007; Shane, 2009; Henrekson and Johansson, 2010). This research investigates these missing links across countries and the spill over factors responsible for the growth. The extensive differences in economic performance across countries are considered a lucrative arena for research and policy makers for determining the main factors that develop these countries and help in enhancing their growth. I think that the differences between countries are rooted in the policies and regulations that encourage firms to operate successfully not only in the local but in the international market. The paper tries to answer whether

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

technological innovation, economic growth, and improvements in productivity is correlated with human development using different groups of countries. The study's contribution is based on finding the links between entrepreneur's activities, economic growth across countries based on classifying countries according to their human development index.

The study is of value to policy maker as it highlights the important role of human capital development. Moreover, the findings provide a set of policies for governments to undertake tenable actions to accelerate the effectiveness of the institutional setting. The structure of the paper is designed as follows: section 2 provides an overview of literature. Section 3 describes the model, data and variables used in this study; section 4 presents the empirical results and analyses and finally section 5 concludes the main points of the paper.

Literature review

Scholars from different fields are investigating the multiple impacts of entrepreneurship through different channels either operational, functional, production, per capita income, employment, standard of living, innovation and to help decision makers to robust their economies. This section tries to focus on the hypothesis of the changing role of the entrepreneurship across theories. It starts by defining the relation between human capital and entrepreneurship, entrepreneurship, followed by the role of entrepreneurial activities on economic growth.

Human capital development and international entrepreneurship

Differences in human capital is based on the type of investment that the individual can acquire through education, knowledge, skills and experience through formal and informal learning that increase individual impact on different levels (Becker, 1964, 93). Higher human capital increase individual wage, firms' productivity, and national economic growth, an evidence that shows the strong relationship between entrepreneurs and human capital (Schultz, 1961; Romer, 1989). Later, Teece (2011) suggests the existing of a strong relation between entrepreneurship and human capital, and argue the importance of a well-educated individual in the reformation of the economy. The role of human capital can be perceived across countries through measuring its impact on the national level. Measuring human capital is a vital starting point in terms of designing and implementing policies regarding human resources. Measurements are classified into conventional and non conventional.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The conventional standard to measure human capital stock has been classified into three approaches: Output-, Cost-, and Income-based approach. First, the output approach is adopted by Romer (1990) as he proposes the ratio between skilled-adults and total adults to measure the stock of human capital at the national level. Later, Romer (1990) and Barro & Lee, (1993) measure the stock of human capital using “school enrolment rates” as a proxy. Moreover, the importance of education and training in the human capital field enhance the entrepreneurs’ qualities and help in creating new ventures depending on their education and experience (Griliches & Regev, 1995; Jones et al. 2010; Mosey and Wright, 2007). Later, Von Krogh and Wallin (2011) suggest that there is a relationship between time spent in schooling and lifetime earning as a result of opportunity costs. Despite the drawback of this approach, the students’ effectiveness cannot be achieved except after enrolment in the production activities.

Second, Cost- based approach is based on the total amount of money invested in human capital. Jorgenson & Fraumeni (1989) employed a discounted income analysis, but this approach face difficulties in splitting what is for investment and what is for consumption. But the third approach which is the Income-Based Approach, provide a link between the stocks of human capital utilizing an individual’s income (Mulligan & Sala-i-Martin, 1995). They show that individual with higher stocks of human capital and various skills are able better to make use of their resources in entrepreneurship activities than in a salaried job (Williams, 2004). However, this approach face a drawback as it ignores other factors that can affect the individual income, such as family health, fertility and child morality (Lewin et al., 1983; Woodhall, 2001).

To overcome the drawback of the conventional measures, in 1990, a new Human Development Index (HDI) by the United Nations Development Programme (UNDP) has been developed. The index is based on health, knowledge, and standard living with many sub-variables such as life expectancy at birth, adult literacy rate, gross enrolment ratio, and GDP per capita. In September 2006, the OECD launched a new Entrepreneurship Indicators Programme (EIP) to build internationally comparable statistics on entrepreneurship and its determinants. This indicator is closely attached to education-related factors such as high-level qualification, graduation and enrolment rates, invested time in education, and investment in education (Hansson, 2008). These non conventional measures encourage researcher and policy makers to recognize the driving force to growth.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Furthermore, Porter (1990) and Porter et al. (2003) relate the country stage of economic development with its competitive advantage, as the country transfer between the following stages of development starting with: (1) factor-driven stage; a stage that depend on the inherited natural resources factors and the created factors by the human; (2) investment / efficiency-driven stage and (3) innovation-driven stage; (4) wealth driven stage. First, countries in factor-driven stage compete through producing products depending on its low cost. Almost countries with abundant natural resources practice this stage, as they neither develop knowledge for innovation nor use knowledge for trading. In the second stage, countries must increase their production efficiency and educate the labor force to be able to adapt in the preceding technological development phase. Countries in this second stage (investment/ efficiency) must use their efficient productive practices and be able to compete in the international markets relying on their economies of scale (Acs Z. J. et al. 2007; Acs Z. J. et al.2008). Emerging markets are opt to lower barriers to entry, deregulation and trade liberalisation, and change their institutions and enforce encouraging business laws, Chang, (2012), Yamakawa, Peng & Deeds, (2008). While, the innovation-driven stage, countries in this stage are very sensitive to the international changes such as exchange rate, price level, countries opt to compete depending on their high level in technology and economies depend on the private sector. Finally, the wealth driven stage, is characterised by the ability of the countries to keep the previous achievements, D. Greasley and L. Oxley (1996).

In table one countries are classified according to their stage of development in stage three many countries are characterised with offshore financial centers, sound economic policies and qualified labour deepen the entrepreneurial activities and increase entry density through creating more competitive advantages. In factor driven stage countries which are endowments with resources but they lack qualified labour, sound economic policies and attractive investment environment these factors enhance countries potentiality to compete internationally. In the light of globalization and the fast technological development the role of international entrepreneurship is changing. The international entrepreneurship concept is better defined as "...a combination of innovative, proactive, and risk-seeking behaviour that cross national borders and is intended to create value in organizations" (McDougall & Oviatt, 2000; Oviatt & McDougal, 2005). Emerging countries discourse to internationalisation and venturing need to consider entrepreneurship as a key driver of economic development, (Song, Wang and

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Parry, 2010). Entrepreneurs may have an extraordinary role in sustaining national growth and development. However, national differences still exist due to the stage of development inside the country. Researchers investigate the key reasons of these differences and they refer it to national political/legal, economic, and social contexts (Baughn & Neupert, 2003; Lee & Peterson, 2000).

Economic growth and International Entrepreneurship

International entrepreneurship has been defined as the ‘discovery, enactment, evaluation, and exploitation of opportunities—across national borders—to create future goods and services’. Historical views links entrepreneurship and economic growth with various fields of economics and management study, including economic history, industrial economics and management theory. The interrelation between various sciences field attracts researchers to uncover these relations. Schumpeter (1934) in his seminal book *The Theory of Economic Development* argued that not all businessmen are entrepreneurs; they must be innovators and a catalyst to the production process by adopting new technology. Furthermore, researchers have begun to study the endogenous factor affecting growth through technical change resulting from decisions of profit-maximizing agents. The latest class of models developed in this tradition has risen from the works of Romer (1986, 1990), and Lucas (1978). Later, endogenous growth models highlight the importance of knowledge as determinant to economic growth, while the new class of endogenous growth model pioneered by Romer (1990) identified some attributes of entrepreneurship by modelling the process of invention and deriving the motives for invention from the microeconomic level.

Researchers on pre-20th century economic history show that entrepreneurs adopted new production techniques, reallocated resources to new opportunities, diversified output and penetrated new markets via competition. In the mid-20th century, entrepreneurship role declined in the light of the production large-scale and efficiency. In the last two decades, the knowledge and information revolution has renewed theoretical thinking linking entrepreneurship to growth with new theories emerging from the field of industrial evolution or evolutionary economics (Jovanovic, 1982). The evolutionary economics view entrepreneurs as agents of change, bring new ideas to markets and accelerate growth through a process of competitive firm selection. Wennekers and Thurik (1999) showed that the general

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

innovative role of entrepreneurs includes not only newness (implementing inventions), but also new entry (start-ups and entry into new markets).

Empirical studies of entrepreneurship and its relationship to economic growth are all relatively recent. Carree and Thurik (1999), followed by Audretsch et al (2002), concluded that those OECD countries present an evidence for higher increases in entrepreneurship, exhibited through business ownership rates, and they are the ones that have enjoyed lower unemployment and greater rates of economic growth. In most of these studies, the commonly used proxy for measuring entrepreneurship was business start-up rate. Acs and Armington (2002) have investigated the relative contribution of new start-ups to job creation. Their findings suggest that new firms may have a far greater role in new job creation than previously thought. Creating jobs can be directly linked to economic growth and supporting entrepreneurial activities is a powerful force driving innovation, productivity, job creation and economic growth. The effect of entrepreneurial activity on economic growth depends upon the level of per capita income and economic growth. Depending on macro data available, one could use proxies capturing a single feature and its level as a measurement of entrepreneurship. However, “recent empirical studies suggest that entrepreneurship – measured as start-up rates, the relative share of SMEs, self-employment rates, etc. – is instrumental in converting knowledge into products and thereby propelling growth” (Braunerhjelm, 2010). The relation between entrepreneurial activities and economic growth has received increased attention of researchers and policy makers, particularly in developing countries as they endure high unemployment rate. Entrepreneurship has been a solution to high unemployment and stagnant economic growth (Carree & Thurik, 2001; Van Stel et al, 2005; Thurik et al, 2007). Later, ACS and Szerb (2007) measure the relation between the entrepreneurial activity and economic growth in poorer countries and show the negative impact between them. It is important to assess the relationship between economic growth and entrepreneurship across countries, in particular since the ambiguities within this relationship can insight policy makers.

The importance of economic growth attributes to set a sound governmental policies, transparent institutional structure, and wealth to generate entrepreneurial activities which are the sources of development and economic growth. Thus, adopting policies to promote knowledge and improve labor skills to encourage entrepreneur activities, particularly through fiscal policies, is a long term plan. Entrepreneurship determinants on the macro level are explained by demand side determinants (named push factors),

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

representing technological developments, the industrial structure of the economy, government regulation, and the stage of development, (Wennekers and Thurik 1999; Wennekers et al., 2002). While, the supply side determinants (named pull factors), represents demographic characteristics of the population, income levels, educational attainment, unemployment level, cultural norms, access to finance, and the degree of taxation. Recent studies by Blanch flower et al, (2000) found that the level of education has a negative effect on the probability of an individual selecting self – employment. They reasoned this as the highly educated people may not be willing to be risk taker, and this result is supported by van der Sluis et al, (2005). Consequently, innovation and entrepreneurial activity are the drivers of long-run economic growth.

Methodology of the research

The purpose of this paper is to shed some light on the possibility of obtaining a better understanding of causal linkages between the entrepreneurial activities and economic growth by analysing the main tools that accelerate growth in a panel context. The countries under study are classified based on the stage of economic development. The first stage is the factor driven stage, economies are considered to be at the lowest stage of economic development, in this group countries utilize the abundant primary resources to increase its international competitiveness and to adjust to several institutional setting to become transparent, accountable, and creditable country. The more the economy develop its resources targeting more efficiency in utilizing resources the more it become able to gain competitive advantage, than they turn into efficiency driven economies. As for stage three; it is innovation driven stage creating new knowledge for international competitiveness. The list of countries is grouped according to their development stage, see table 1. As is evident from Table A, there is a considerable variation in entry density across countries and time periods. In the country with the lowest entry density (Burkina Faso) there were only 0.06 new registrations per 1,000 people within 4 years, whereas in the country with the highest entry density (Cyprus), provide 26.71 new registrations per 1,000 people within 4 years.

The econometric analysis of this kind should account for a number of specific steps. First, a non-stationarity of the time series variables must exist and appropriate panel unit root tests must be performed. Secondly, if the time series are non-stationary, a panel cointegration approach is needed

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

to test if a long-run equilibrium relationship exists between non-stationary variables. Then there is a high probability that the included variables are endogenous so that the models should consider the existence of Granger causality¹. The following are the steps followed in this paper:

Unit Root tests: Panel data techniques could also be preferable because of their weak restrictions; indeed, they capture country-specific effects and heterogeneity in the direction and magnitude of the parameters across the panel². In this study, the considered tests employed five different unit root tests including LLC's test, Breitung's t-statistic, IPS-W-statistic, ADF-Fisher Chi-square, and PP-Fisher Chi-square tests, whereas a robustness check has been carried out on single cross section units to investigate the existence of structural breaks. The paper didn't perform a panel unit root tests with structural breaks because it is almost impossible to have homogeneous breaks in time series in a significantly heterogeneous panel like the one we have considered especially for variables such as firm density income and economic growth.

Panel co-integration analysis: To determine whether the regressions are spurious, the results of the panel co-integration tests must be examined. Given the results, it is appropriate to test the co-integrating relationship between the three variables. In this study it employed Pedroni's co-integration tests that suggest two types of residual-based tests for the test of the null of no cointegration in heterogeneous panels³. These tests reject the null of no cointegration when they have large negative values except for the panel-v test which rejects the null of cointegration when it has a large positive value. However, according to Pedroni (2004), r and pp tests tend to under-reject the null in the case of small samples.

¹ From the advantage of using panel cointegration is that it allows for heterogeneity between countries. Moreover, the number of observations available while testing the stationarity of the residual series in a level regression is greatly increased in a panel framework and this can increase the power of the cointegration tests (Rapach and Wohar, 2004).

² One of the primary reasons for the utilization of a panel of cross section countries is important to tests them integration between variables involved in the research conducted.

³ For the first type, four tests are based on pooling the residuals of the regression along the within-dimension of the panel (panel tests); for the second type, three tests are based on pooling the residuals of the regression along the between-dimension of the panel (group tests). In both cases, the hypothesized cointegrating relationship is estimated separately for each panel member and the resulting residuals are then pooled in order to conduct the panel tests.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

GMM technique: Generally, the GMM technique can be adapted to estimate the panel variables, using lags of the endogenous variables as instruments in order to arrive at unbiased and consistent estimates of the coefficients. In a panel of N countries covering T years, this approach estimates the model parameters directly from the moment conditions that are imposed by the model. GMM doesn't require distributional assumption, like normality, it can allow for heteroskedasticity of unknown form, and it can estimate parameters even if the model cannot be solved analytically from the first order condition.

In this study it utilize single equation approaches assuming there is homogeneity between cross section units for the long-run relationship whereas short-run dynamics are allowed to be cross-section specific. While this restriction may seem too severe for some variables, on the other hand, allowing all parameters to be panel-specific would considerably reduce the appeal of a panel data approach. The data collected information on 58 countries, divided into three groups: group one 21 countries, second group consist of 18 countries, and third group consist 19 countries, as listed in Table 1 in the Appendix. But group three observations are not sufficient to be estimated, thus factor drive countries are not applicable for estimation. The considered specification of the dynamic model for firm density is lagged endogenous model to reflect the entrepreneur activities with joint dynamics variables as follows:

$$\ln(ED_{i,t}) = \alpha_i + \lambda \ln(ED_{i,t-1}) + \beta_1 \ln(GDPG_{i,t}) + \beta_2 \ln(RD_{i,t}) + \beta_3 \ln(GDPD_{i,t}) + \beta_4 \ln(TAX_{i,t}) + \beta_5 \ln(Trade_{i,t}) + \beta_6 \ln(SES_{i,t}) + \varepsilon_t \quad (1)$$

The following table 2 summarizes the variables used in the estimation of the model, and the instrumental variable included in the estimation, with their respective to descriptive statistics.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 2 .Variables with description and source

Variables	Descriptive	Source/ Database
<i>Dependent</i>		
ED	Entrepreneur index (Entry Density)	World bank
<i>Macroeconomic Measures</i>		
Internal factors		
GPDG	GDP growth (annual %)	World development
GDPD	GDP deflator (base year varies by country)	Indicator
ICTGEXP	ICT goods exports (% of total goods exports)	
RD	Research and development expenditure (% of GDP)	
UNEMPL	Unemployment, total (% of total labor force)	
SES	School enrolment, secondary (% gross)	
TAXR	Total tax rate (% of commercial profits)	

Source: own work.

Conclusions

Unit root tests have been computed under two different specifications, represented by the inclusion of individual effects or individual effects and trends as reported in Table 3. The unit root hypothesis cannot be rejected when the variables are taken in levels and any causal inference from the series in levels would therefore be invalid. However, when using the first differences, the null of unit roots is strongly rejected at the 1% significance level for all series. Therefore, it is concluded that all the series are non-stationary and integrated of order one. This finding is confirmed by all the tests employed in all the three alternative country samples that are under examination. The variables properties need to avoid the possibility of spurious regressions. In order to assess the stationary of the variables employed, this paper employs five different unit root tests including LLC's test, IPS-W-statistic, ADF-Fisher Chi-square, and PP-Fisher Chi-square tests. The results of these tests are reported in table 3 indicating the statistics significantly of the variables, as they are stationary at the level values especially for the LLC's test at the 10%.

The unit root hypothesis cannot be rejected when the variables are taken in levels and any causal inference from the series in levels would therefore be invalid. However, when using the first differences, the null of unit roots

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

is strongly rejected at the 1% significance level for all series. Therefore, it is concluded that all the series are non-stationary and integrated of order one. Therefore, a long-run relationship exists between economic growth and entrepreneurial activities.

An analysis of cointegration on multivariate models including economic growth for the three group of countries, which strongly supports the existence of a long-run relationship demonstrating that the inclusion of the relation between economic growth and entrepreneurial activities represented in the firm density and to reinforce the statistical robustness of the linkages between the variables are examined here. Tests conducted on the period 2004 -2008 for multivariate models were with full heterogeneity results are presented in table 4. The panel cointegration tests revealed the existence of a long-run co integrating relationship between the economic and the energy dimensions in all the enrolment to secondary schools, research and development, ICT goods exports, trade and pricing policy in the innovative stage countries.

Empirical Results

Empirical results provide the answer for the first question showing the direct and significant relation of entrepreneurs on economic growth and trade. Using panel fixed effects to test for main variables affecting the firm density, results for the countries under study presented in table 5 shows the positive significant relationships between ED and economic growth with the level of significance at 1%. The sign of the coefficients estimated support previous literature and previous empirical studies. In this study economic growth effect is more in the innovative stage than efficiency stage countries, as estimates of the coefficient of economic growth is (0.1) while efficiency stage countries estimates is (0.02) reflecting the relative contribution of ED on economic growth. In addition, the trade and entry density shows a positive and significant relationship, as estimates of the coefficient of trade is (0.13) in innovative stage countries while it is (0.05) in efficiency stage explaining the effect of ED on trade. Future more, taxes have a negative impact on entry density in innovate drive countries but it is insignificant, while efficiency driven countries it provide negative and significant relation at 1%. This reflects the sensitivity of each group to the tax policy as in efficiency driven countries tries to increase investment and provide more incentives.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Moreover, to assess the relation between school enrolment and entry density, as literature shows that countries that are characterized with higher human development, higher school enrolment, higher income level, and better health standards have direct effect on economic growth. Empirical results in the two groups provide the positive and significant effect of school enrolment and entry density in innovate driven countries as estimates of the coefficient of school is (0.4) while in the efficiency driven stage countries the relation is negative and its estimates of coefficient is weak. Such results reflects one of the reasons of reaching innovative driven stages and the important contribution of a qualified education increase the human capital investment and consequently increase the labor productivity.

In addition to the importance of entrepreneurial activities the economic policies participates to create an attractive business environment to increase entry density. Last model results presented in table 5 model 5 and 6 shows the positive significant effect of inflation rate on entry density, as estimates of coefficient is (3.18) in innovative stage countries and (0.082) in efficiency driven countries.

Implication and limitation

This paper has analyzed the factors explaining the role of entrepreneurial activities across countries in a dynamic panel data frame work in a macroeconomic using macroeconomic perspective. Three analyses are carried across innovative and efficiency driven countries, the study used a dataset of for the 39 countries, thus allowing a number of considerations on different results emerging from alternative subsamples.

Results shows how to develop an economy and shift it to the stage of innovation as requires a system based on skilled labour, a system that acquire knowledge, develop it, maximize its utilization and able to create competitive advantage in any sector. The ability of countries to invest and build their economic systems based on knowledge this gives them the advantage to create competitiveness within the global environment and accelerate their outcomes. Investing in education, R&D which led to the stage of efficiency in this stage country will be able to create competitive advantage and develop their economies to reach take off stage. Innovative stage countries, such as Finland, were able to shift from intensive resource industries to an economy specialized in information technology during the period from 1970 to 1990. On the other side, Factor driven countries are suffering

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

from the loss of skilled of labour, a problem that hinder development in these countries and create a loss in managerial skills and skilled labour.

Based on the finding and research implications, the following policy measures are recommended. Research and development, qualified education system, sound economic policies are important determinants in attracting entrepreneurs and increase economic growth. In this point of view, decision makers need to improve and increase the budget allocation to research and development that is channelled to increase technological advancement. Financial support programs & grants are needed to support firms to develop new products. Moreover, monetary policy play a vital role in attracting entrepreneurship, as higher rate of inflation increases the cost to start a business, increases the country risk. Decision maker are required to control inflation as higher rate has a negative impact on economic growth and entrepreneurial activities.

Worth mentioning that this paper didn't focuses on the other side of the picture by including factor driven countries but this limitation is refereed unavailability to source of macroeconomic variables. In the future, a similar study can be conducted with increased number of observations and extending the time frame and adding more control variables.

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18-19 June 2015, Economics and Finance**

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18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Appendix

Table 1. list of countries according to their level of development during the period between 2000- 2010

Stage one			Stage Two			Stage Three		
Cou ntry	Average of New Firms (2004- 2008) ⁴	Average of Entry Density (2004- 2008) ⁵	Co un- try	Average of New Firms (2004- 2008)	Average of Entry Density (2004- 2008)	Coun- try	Average of New Firms (2004- 2008)	Average of Entry Density (2004- 2008)
Al- bania	1,810	0.76	Bra- zil	260863	2.04	Bel- gium	28230.4	4.12
Alge- ria	9,893	0.45	Bul- ga- ria	35762	7.07	Can- ada	181800	8.09
Arme- me- nia	5,343	1.3	Chil- e	23604	2.18	Costa Rica*	33331.6	11.61
Au- stria	3,590	0.86	Cze- ch Re- pu- blic	17707	2.43	Cy- prus*	19966	26.71
Azer- bai- jan	4,861	0.91	Hun- ga- ry	28323	4.1	Den- mark	23902.8	6.63
Bo- livia	2,321	0.39	In- do- ne- sia	25917	0.17	Fin- land	11048.4	3.16
Bur- kina Faso	825	0.06	Ka- za- khst an	30819	2.94	France	129950	3.15
Cam- bodia	1,185	0.16	Ko- rea, Rep .	53690	1.56	Ger- many	64698.2	1.18
Croa- tia	7,649	2.42	Lat- via	9685	6.13	Hong Kong, China*	74211.4	14.46
Egyp- t	6,862	0.78	Li- thu- ania	5117	2.07	Ice- land	2977.6	14.96

⁴ New Firms: Is the number of newly registered limited-liability firms during the calendar year.

⁵ New Density: Is the number of newly registered limited liability firms per 1,000 working-age people (those ages 15-64).

*Countries categorized as offshore financial centres by the IMF and the Financial Stability Forum (FSF) are marked in red.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Ethiopia	2,011	0.05	Malaysia	39901	2.61	Ireland*	17066	6.23
Georgia	4,842	2.37	Netherlands	32660	2.92	Israel	19824	4.66
Jordan	1,823	0.68	Peru	36957	2.03	Italy	73827	1.91
Kyrgyz Republic	2,217	0.69	Romania	95722	6.17	Japan	119392	1.43
Moldova	4,259	2.07	Russian Federation	441669	4.38	New Zealand	65207	24
Pakistan	4,222	0.46	Slovak Republic	13831	3.57	Panama*	7277.8	3.59
Sri Lanka	4,160	0.33	South Africa	37293	1.21	Singapore*	21874.6	6.39
Tunisia	5,387	0.79	Thailand	29217	0.65	Spain	134399	4.9
			Turkey	49039	1.01	Sweden	23858.4	4.03
						Switzerland*	15797.2	3.08
						United Kingdom	383600	9.48

Source: World Bank Entrepreneurship Snapshots (WBGES), the data is available at: <http://econ.worldbank.org/research/entrepreneurship>.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 3. Panel unit root results for entrepreneur entry density during 2004 – 2008

STAGE THREE	Dependent variable	Independent variables						
	LOGED	LOGG DPG	LOGG DPD	LOG SES	LOG POP	LOGUN EMP	LOGICT GEXP	LOGTR ADE
Method LLC-t*								
Level	1.84829	0.426	19.94	4.33	9.89	10.96	0.715	-1.73
First difference	-13.27***	8.28** *	-5.31***	8.98* **	14.58** *	-6.40***	-8.23***	-7.78***
IPS-W- Stat								
Level	3.80114	-1.7*	1.83	4.12	7.94	6.95	3.12	2.6
ADF- Fisher Chi- square								
Level	5.17774	45.65	6.33	4.12	0.64	1.03	7.33	9.35
First difference	67.0011**	91.48* **	62.22*	43.76	62.15 *	23.1	65.34*	47.71
PP - Fisher Chi-square								
Level	4.31069	27.87	0.47	4.42	0.44	0.75	6.38	9.64
First difference	97.5165***	84.69* **	85.41* **	76.28 ***	115.4 ***	29.14	73.39**	74.15* *
Stage two 19 Coun- tries								
	LOGED	LOGG DPG	LOGC PI	LOG SES	LOG POP	LOGU- NEMP	LO- GICTGE XP	LOGTR ADE
Method LLC-t*								
level	11.08	-1.68*	1.29	-2.27	42.26	7.52	1.73	5.92
First difference	-2.34**	13.23* **	12.18* **	18.09 ***	57.48 ***	18.93* **	8.25***	6.69** *
IPS-W- Stat								
level	4.86	8.35	1.33	-1.00	22.53	4.95	1.38	2.98
ADF- Fisher Chi- square								
level	2.39	26.96	13.54	29.70	0.003 6	2.28	13.27	2.08
First difference	13.514	133.3* **	56.73* **	44.69 **	162.1 2***	70.745 ***	87.31** *	71.65* **
PP - Fisher Chi-square								
level	2.39	26.96	14.77	46.03	0.001	0.179	13.27	0.05
First difference	8.31	133.3* **	92.95* **	53.29 ***	251.6 8***	76.25* **	87.31** *	71.27* **
Stage 1 – 18 coun- tries								
	LOGED	LOGG DPG	LOGG DPD	LOG SES	LOG- POP	LOGU- NEMP	LO- GICTGE XP	LOGTR ADE

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Method -LLC-t*

level	9.87	10.47	3.29	10.7	7.34	NA	5.3	15.46
First difference	5.87***	3.98** *	23.59* **	14.53 ***	33.75** *	NA	3.76***	6.34** *

IPS-W- Stat

level	6.44	3.13	4.38	0.844	3.58	NA	2.69	2.14
-------	------	------	------	-------	------	----	------	------

ADF- Fisher Chi- square

level	0.88	5.48	2.69	1.014	1.09	NA	2.16	9.00
First difference	19.93*	-3.01*	78.48* *	142.0 7***	246. 4***	NA	42.13	44.23

PP - Fisher Chi-square

level	0.59	5.48	2.19	1.041	0.11	NA	0.061	8.68
First difference	23.93*	-3.01*	84.59* *	196.8 5***	246.42* **	NA	42.14	61.18* *

Selection of lags based on Modified Akaike Information Criterion; Newey -West automatic bandwidth selection and Bartlett kernel; Probabilities for Fisher tests are computed using an asymptotic Chi square distribution. All other tests assume asymptotic normality; null: Unit root (assumes common unit root process).

* Significant at 10%. ** Significant at 5% level. *** Significant at 1% level.

Table 4. Heterogeneous panel Co integration tests for multivariate models

Series: LOGED LOGTPOP LOGSEP			
Panel v-Statistic	-2.58	Group rho-Statistic	3.232525
Panel rho-Statistic	0.610	Group PP-Statistic	-6.93***
Panel PP-Statistic	-5.69***	Group ADF-Statistic	-6.26***
Panel ADF-Statistic	-5.25***		
Series: LOGED LOGTPOP LOGGDPD			
Panel v-Statistic	-1.36	Group rho-Statistic	2.15
Panel rho-Statistic	-0.27	Group PP-Statistic	8.74***
Panel PP-Statistic	-6.85***	Group ADF-Statistic	-8.75***
Panel ADF-Statistic	-6.86***		
Series: LOGED LOGSEP LOGGDPG			
Panel v-Statistic	5.58***	Group rho-Statistic	1.93
Panel rho-Statistic	-0.44	Group PP-Statistic	-6.61***
Panel PP-Statistic	-6.61***	Group ADF-Statistic	-6.08***
Panel ADF-Statistic	-6.08***		
Series: LOGED LOGTPOP LOGICTGEXP			
Panel v-Statistic	-2.025	Group rho-Statistic	0.82
Panel rho-Statistic	-1.34*	Group PP-Statistic	16.88***
Panel PP-Statistic	-12.11***	Group ADF-Statistic	14.49***
Panel ADF-Statistic	10.56***		
Series: LOGED LOGGDPD LOGICTGEXP			

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Panel v-Statistic	0.488	Group rho-Statistic	0.12
Panel rho-Statistic	-1.90*	Group PP-Statistic	-22.31***
Panel PP-Statistic	-15.60***	Group ADF-Statistic	-22.31***
Panel ADF-Statistic	-15.60***		
Series: LOGED LOGGDPG LOGUNEMP			
Panel v-Statistic	-1.68	Group rho-Statistic	1.69
Panel rho-Statistic	-0.64	Group PP-Statistic	-11.59***
Panel PP-Statistic	-8.68***	Group ADF-Statistic	-10.49***
Panel ADF-Statistic	-7.98***		
Series: LOGED LOGICTGEXP LOGTRADE			
Panel v-Statistic	-1.48*	Group rho-Statistic	0.63
Panel rho-Statistic	-1.49*	Group PP-Statistic	-19.55***
Panel PP-Statistic	-13.83***	Group ADF-Statistic	-25.65***
Panel ADF-Statistic	-17.76***		
Series: LOGED LOGSES LOGTRADE			
Panel v-Statistic	3.34***	Group rho-Statistic	2.16
Panel rho-Statistic	-0.26	Group PP-Statistic	-16.57***
Panel PP-Statistic	-11.90***	Group ADF-Statistic	-10.57***
Panel ADF-Statistic	-8.03***		
Series: LOGED LOGTRADE LOGUNEMP			
Panel v-Statistic	-0.66	Group rho-Statistic	0.34
Panel rho-Statistic	-1.63	Group PP-Statistic	- 40.23***
Panel PP-Statistic	-27.11***	Group ADF-Statistic	- 51.62***
Panel ADF-Statistic	-34.46***		
STAGE TWO COUNTRIES			
Series: LOGED LOGGDPG LOGUNEMP			
Panel v-Statistic	-1.019	Group rho-Statistic	2.18
Panel rho-Statistic	-0.14	Group PP-Statistic	-2.61**
Panel PP-Statistic	-2.84**	Group ADF-Statistic	-2.86**
Panel ADF-Statistic	-2.99**		
Series: LOGED LOGPOP LOGSES			
Panel v-Statistic	-2.68	Group rho-Statistic	2.41
Panel rho-Statistic	-1.2	Group PP-Statistic	-4.17***
Panel PP-Statistic	-1.92*	Group ADF-Statistic	-4.01***
Panel ADF-Statistic	-2.04*		
Series: LOGED LOGSES LOGICTGEXP			
Panel v-Statistic	0.49	Group rho-Statistic	1.58
Panel rho-Statistic	-0.21	Group PP-Statistic	-6.188***
Panel PP-Statistic	-4.59***	Group ADF-Statistic	-6.188***
Panel ADF-Statistic	-4.59***		
Series: LOGED LOGGDPD LOGICTGEXP			
Panel v-Statistic	2.74	Group rho-Statistic	1.94
Panel rho-Statistic	-0.33	Group PP-Statistic	-7.02***

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Panel PP-Statistic	-5.68***	Group ADF-Statistic	-7.018***
Panel ADF-Statistic	-5.68***		

Series: LOGED LOGUNEMP LOGICTGEXP

Panel v-Statistic	-1.15	Group rho-Statistic	2.07
Panel rho-Statistic	-0.23	Group PP-Statistic	-13.11***
Panel PP-Statistic	-9.61***	Group ADF-Statistic	-8.54 ***
Panel ADF-Statistic	-6.66***		

Series: LOGED LOGUNEMP LOGICTGEXP

Panel v-Statistic	-3.32	Group rho-Statistic	2.13
Panel rho-Statistic	-0.18	Group PP-Statistic	- 13.36***
Panel PP-Statistic	-9.77***	Group ADF-Statistic	- 8.31***
Panel ADF-Statistic	-6.52***		

Series: LOGED LOGTRADE LOGICTGEXP

Panel v-Statistic	-3.166	Group rho-Statistic	1.82
Panel rho-Statistic	-0.43	Group PP-Statistic	- 39.08***
Panel PP-Statistic	-26.37***	Group ADF-Statistic	- 21.01***
Panel ADF-Statistic	-14.71***		

Series: LOGED LOGTRADE LOGUNEMP

Panel v-Statistic	-0.17	Group rho-Statistic	1.18
Panel rho-Statistic	-0.94	Group PP-Statistic	- 20.14***
Panel PP-Statistic	-14.15***	Group ADF-Statistic	- 20.14***
Panel ADF-Statistic	-14.15***		

Series: LOGED LOGICTGEXP LOGTRADE

Panel v-Statistic	3.14***	Group rho-Statistic	2.88**
Panel rho-Statistic	0.38	Group PP-Statistic	-18.48***
Panel PP-Statistic	-13.08***	Group ADF-Statistic	-13.33***
Panel ADF-Statistic	-9.76***		

STAGE ONE COUNTRIES

Series: LOGED LOGTPOP LOGDPD

Panel v-Statistic	-3.28	Group rho-Statistic	2.62
Panel rho-Statistic	0.26	Group PP-Statistic	-8.034***
Panel PP-Statistic	-6.3***	Group ADF-Statistic	-8.034***
Panel ADF-Statistic	-6.30***		

Series: LOGED LOGGDPG LOGICTGEXP

Panel v-Statistic	-3.26	Group rho-Statistic	3.69
Panel rho-Statistic	1.13	Group PP-Statistic	0.13
Panel PP-Statistic	-1.04	Group ADF-Statistic	0.13
Panel ADF-Statistic	-1.04		

Series: LOGED LOGGDPG LOGSES

Panel v-Statistic	-2.68	Group rho-Statistic	4.22
Panel rho-Statistic	1.55	Group PP-Statistic	0.39
Panel PP-Statistic	0.86	Group ADF-Statistic	0.14
Panel ADF-Statistic	-1.03		

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Series: LOGED LOGGDPG LOGGDPD			
Panel v-Statistic	-2.51	Group rho-Statistic	4.22
Panel rho-Statistic	1.55	Group PP-Statistic	0.41
Panel PP-Statistic	-0.85	Group ADF-Statistic	0.1
Panel ADF-Statistic	-1.008		
Series: LOGED LOGICTGEXP LOGTRADE			
Panel v-Statistic	-3.28	Group rho-Statistic	4.477
Panel rho-Statistic	1.76	Group PP-Statistic	3.50
Panel PP-Statistic	-1.13	Group ADF-Statistic	4.399
Panel ADF-Statistic	1.17		
Series: LOGED LOGTRADE LOGGDPG			
Panel v-Statistic	-3.29	Group rho-Statistic	3.65
Panel rho-Statistic	1.09	Group PP-Statistic	0.14
Panel PP-Statistic	-1.03	Group ADF-Statistic	0.14
Panel ADF-Statistic	-1.03		

Heterogeneous assumptions: no intercept and no deterministic trend. Lag selection: based on Modified Akaike Information Criterion; Newey -West automatic bandwidth selection and Bartlett kernel. Alternative hypothesis: Alternative hypothesis: common AR coeffs. (Within-dimension): Panel v-Statistic, Panel rho-Statistic, Panel ADF-Statistic. Alternative hypothesis: Alternative hypothesis: common AR coeffs. (Between -dimension): * Significant at 10%. ** Significant at 5% level. *** Significant at 1% level.

Table 5. Estimation Results

Explanatory Variables	Stage Three countries	Stage Two Countries	Stage Three countries	Stage Two Countries	Stage Three countries	Stage Two Countries	
							1
Lag Firm Density	0.089***	0.088***	0.288**	*	-1.82***	0.08***	0.19***
	0.0004	0.0004	0.00001	1	0.000002	0.00003	0.00000
GDP growth	0.096***	0.016***	0.091**	*	-1.4***	0.035***	0.11***
	0.00004	0.000003	0.00001	2	0.000009	0.000002	0.00000
R& D	3.16***	0.55***	3.04***	7.84***			
	0.00005	0.000001	0.00002	0.000005			
TRADE	0.13***	0.05***					
	0.00003	0.000002				0.000001**	
Taxes	-0.00007	-0.69***				*	0.75***
	0.000000	0.000000				0.000002	0.00000
	7	2					2

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

CPI					3.18***	0.082** *
					0.00009	0.00000 7
High School enrol- ment			0.4***	0.0000002** *		
			0.0002	0.0000005		
constant	-1.22***	0.0068** *	- 2.98***	- 3.67***	-13.5***	- 0.43***
No of observation	-0.00012	-0.00005	- 0.00077	- -0.00003	0.00003	0.00003
Hansen	43	43	43	43	43	43
J – Test	24	37	24	37	25	31

Note: numbers in () are standardized errors, (*), (**) and (***) indicate 10 %, 5% and 1% level of significant, respectively

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
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**Budgetary Allocation and Poverty situation
in Nigeria: the Implication for Economic
Insecurity**

JEL Classification: *E62*

Keyword: *Budget; Poverty; Insecurity; unemployment*

Abstract: In any federal entity which is polarised along religion and tribal line, disagreement on how to share the national cake would pose enormous threat to a peaceful coexistence. Unemployment and poverty are endemic among Nigerian youth in spite of numerous approaches to curtail the menace. This study examines the relationship between budgetary allocation the level of poverty Nigeria. The study uses time series data covering 1999-2012 periods. The paper applied bound approach to cointegration. The study also used Vector Autoregressive model and Vector Error Correction Model to examine the dynamic causality among the variables. The study reveals that causality exists between budgetary allocation and the poverty rate in Nigeria. The paper therefore concludes that budgetary allocation can be used as a tool for poverty reduction. The study recommended that the need for realistic budgetary allocation formula becomes imminent. In such arrangement more weight should be accorded to the population size, internal revenue efforts and social development factors while inequality to the states ought to be reduced. This would ensure economic security which is fairly inadequate in the present arrangement.

Introduction

Achieving equitable revenue allocation in Nigeria constitutes the perennial problems which has not only defied all past attempts at permanent solution, but also has a tendency for evoking high emotions on the part of all concerned (Ojo, 2010). It is an issue which has been politicised by successive administrations in Nigeria both military and civilian regimes. Indeed, in virtually all federations in which the constitution shares power between the central and regional or state governments and, for each level to be within a sphere co-ordinate and independent enough resources need be allocated to each tier to justify their existence (Wheare, 1963). The ways government budgets are allocated have an important impact on economic development thereby bring government closer to the people (Gupta, Clements, Guen-siu and Leruth, 2001). Before the discovery of crude oil and the time when agriculture was the mainstay of Nigerian economy, contending issues relating to derivation principle is silent in the revenue allocation. However, with the discovery of oil and the subsequent oil boom of 1970s made Nigeria solely dependent on oil sector as a source of foreign exchange and neglected the traditional sector with hitherto accommodates over 70 per cent of the productive youth, in addition of been the source funding to the public authority.

The repercussion of skewed revenue allocation among the federating states of Nigeria constitutes the perennial problems which have not only defied all past attempts at permanent solution, but also has a tendency for evoking high emotions on the part of all concerned (Ojo, 2010). The distribution of the problem is not equal. The magnitude of economic crisis within geo-political zone reflects the relative low budgetary allocation received from federal government. This amount to say geo-political zones with the relative high budgetary allocation enjoys more welfare and economic stability. This study tends to investigate the relationship between budgetary allocation and poverty situation in Nigeria. The paper is divided into five sections including this introduction. Section two contains data and methods employed in the study, section three reviews the literature analysed the data on budgetary allocation dynamics. Fourth section presents a glance on Nigeria's poverty situation; and the last section concludes the study.

Methodology

This study employed descriptive statistics in analysing the data. Descriptive statistics is an event or outcome of events that are described without drawing conclusion(s). It is primarily concerned with the collection, organisation, summarising, analysis and presentation of an array of qualitative and quantitative data (Monga, 2009). The data for the relevant variable (budget and poverty) covers 1999 – 2010 period. The choice of the period is not unconnected with the return of democratic dispensation as well as commitment of the elected leaders to implement series of market-based policies aimed at winding the engine of growth.

Budgetary Allocation Dynamics

In a federal system of government, revenue allocation involves two schemes. The first is the vertical sharing between the federal or inclusive government and the other tiers of governments. The subject of these sharing schemes is the federally collected revenues. This is because the revenues generated within the jurisdictional areas of the units – states and local governments – are not subject to the national sharing formula (Ogbole and Robert, 2012).

Ricardian Equivalence Hypothesis exhibits that dynamics in the budget allocation has a first order effect on savings in any society. Since, a reducing tax does not affect households' lifetime wealth because future taxes will go up to offset current tax decrease (Ibrahim and Ibrahim, 2014). Therefore, current private saving rises when taxes fall, households save the income received from the tax cut in order to pay for the future tax increase. Consequently, a budget deficit would not cause a twin deficit of budget deficit and trade deficit; instead it would perpetuate dualism in the economy (Asrafuzzaman, Roy and Gupta, 2013). Meanwhile, a participatory budgetary process may not yield immediate victories for citizens but it may serve to enhance communication and trust between government officials and citizens (Cole 1975; Adams, 2004), leading to reinvigorated levels of popular participation. Such efforts may also serve the long-term goal of enhancing governmental accountability and responsiveness because public officials may begin to attribute more importance to citizen input (LaFrance and Balogun, 2012).

The debate on Nigeria's fiscal federalism and relations hinges on the fundamental question of who gets what of the national cake, when and

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

how. This is fundamental, given that Nigeria as a monolithic economy gets over 80% of its revenue from crude oil, by virtue of the constitutional provision, this revenue must be disbursed to the three tiers of government. It also explains why the formula for revenue allocation has continued to be at the heart of public debate and why public officeholders are hardly held accountable for the misuse of revenues derived from the national oil wealth. It is obvious that the nature and conditions of the financial relations in any federal system of government are crucial to the survival of such a system. A major source of inter-governmental disputes under a federal system centres on the problems of securing adequate financial resources on the part of the lower levels of government to discharge essential political and constitutional responsibilities (Olaloku, 1979). The existence of a federal system with its accompanying political units necessitates a revenue sharing arrangement to enable its units to carry its constitutional assigned responsibilities (Chijioke, Innocent and Jeffery, 2012).

Meanwhile, it is imperative to note that Nigeria's revenue sharing debates have revolved basically around three issues. Firstly, the relative proportions of federally collected revenues in the federation account that should be assigned to the centre, the states, the localities and the so-called 'Special Funds' (vertical revenue sharing); Secondly, the appropriate formulae for the distribution of centrally devolved revenues among the states and the localities (horizontal revenue sharing); Thirdly, the percentage of federally collected mineral revenue that should be returned to the oil-bearing states and communities on the account of the principle of derivation and compensation for the ecological risks of oil production (Ogbole and Robert, 2012).

Horizontal revenue allocation deals with the distribution of funds within the same tier of government among states the federating state on the one hand, or within the local government in a state on the other hand. Several principles adopted in the country with the ultimate goal of finding more acceptable formula, however most of these principles have been contentious, since states usually prefer principles that favour their specific peculiarities, which often constitute the primary source of conflict and agitations (Okojie, 2008). Table below summarizes the horizontal revenue allocation formula from 1980 – date.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 1. Horizontal revenue allocation formula

Principle	Revenue Allocation Act (%)	Babangida Administration (%)		Abacha Administration (%)	Obasanjo Administration (%)	
	1981	Jan 1990	Jan 1992	1994-1998	1999-2004	2005-Present
Equality of state	40.0	40.0	4.0	40.0	40.0	45.23
Population	40.0	30.0	30.0	30.0	30.0	27.05
Social Dev. Factors	15.0	20.0	10.0	10.0	10.0	8.71
Internal revenue efforts	5.0	10.0	10.0	10.0	20.0	8.31
Land and terrain	-	-		10	-	10.7

Source: Imam, 1999; Iyoha, 2000; RMAFC, 2005; Okojie, 2009; Ibrahim and Ibrahim, 2014

It is evident from the Table 1 above that variation in the equality of the state is relatively steady with the notable exception in the year 2005 when it rose from 40% to 45.23%. Meanwhile, the allocated revenue based on population of state decline from 40% in 1981 to 30% through 1980 down to 2004 and it further drops to 27.05% in 2005.

Nigerian government laid down proactive process aimed at making the budget to act as an engine of growth. Accordingly, the constitution of the Federal Republic of Nigeria Section 162 stipulates that all federally-collected revenue should be paid into the Federation Account monthly and shared among the three tiers of government. These revenue components are made-up of oil and non-oil revenues. The oil revenues include proceeds from sales of crude oil and gas, Royalties, Petroleum Profit Tax, Rentals, Gas Flared and Miscellaneous oil revenue. The non-oil revenues include Company Income Tax (CIT), Import Duty, Excise Duty, Fees, tariffs, Customs Penalty Charges. The responsibility of sharing is discharged by Federation Account Allocation Committee (FAAC) at its monthly meetings statutorily chaired by the Honourable Minister of State for Finance, with Honourable Commissioners for Finance and Accountant Generals of the 36 States, and the Director of Treasury representing the Federal Capital Territory (FCT) as members (NPC, 2011).

It should be noted that in order to ensure equitable parameters' for the sharing of the revenues to the three tiers of Government, an independent body was created by the constitution and named Revenue Mobilization

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Allocation and Fiscal Commission (RMAFC) to consider every factor affecting the share of each tier of Government and come up with an acceptable Revenue sharing formula for the Federation.

In the light of above, the current sharing formula is as follows:

Table 2. Sharing formula

Federal Government of Nigeria (FGN)	48.50%
Ecological	1.00%
FCT	1.00%
Stabilization Account	0.50%
Development of National Resources	1.68%
Sub-total	52.68%
State Governments	26.72%
Local Governments	20.60%
Total	100.0%

Source: own work.

Oil producing states (9 States) receive 13% derivation which is deducted up front.

Value Added Tax (VAT) is shared among the three Tiers of Government separately using a different formula as follows:

Table 3. VAT sharing formula

FGN	15%
State Governments	50%
LGAs	35%
Total	100%

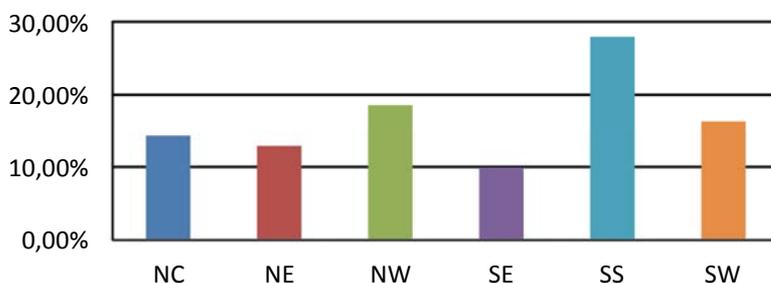
Source: own work.

The Excess Crude Account (ECA) which has now metamorphosed to Sovereign Wealth Fund (SWF) was created by FAAC to warehouse excess oil revenues over the predetermined budgeted benchmark price of crude oil. The policy is in line with the Fiscal Responsibility Act of 2007 and Government responsibility of managing the economy as one entity. It is very clear that the present sharing formula is skewed in the allocation of fund to states. Apart from the statutory allocation earmarked for each state of the federation equally, certain amount (13%) is set aside for oil producing in the name of derivation. This bad omen made some state especially in the

northern part of the country to be operating from hand to mouth (gigantic recurrent expenditure and less for capital project).

In compliance with provision of the above revenue allocation formula, the allocation among the seven geopolitical zones was not far from unequal nor does contain any element of equity. For instance, in 2010 south-south received approximately 28% of budgetary allocation compared to tiny amount allocated to north-west which is approximately 13%. Moreover, north-central received 14%, north-east with 13%, 10% and 16% were allocated to south-east and south-west respectively.

Figure 1. Budgetary Allocation by Geo-Political Zone (2010)



Source: own calculations based on OAGF; 2011.

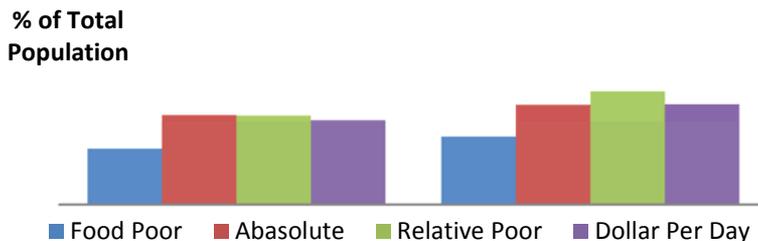
Poverty Situation

The primary objective of any economic policy of Government is to achieve improvement in the living standard of the people, particularly, in terms of alleviation of poverty. Available data from the Harmonized Nigeria Living Standard Survey (HNLSS) 2009/2010, which remains the follow-up to the Nigeria Living Standard Survey (NLSS) 2003/2004, conducted by the NBS reveals that efforts to alleviate poverty was not satisfactory. For instance, relative poverty and absolute poverty rates increased to 69.0% and 60.9% in 2010 respectively from 54.4% and 54.7% in 2004. This implies that the population in relative poverty grew by a compound annual growth rate of 8.56% above the average growth rate of 7.2% per annum since 2004, indicating further that the economy must increase above 8.56% per annum for economic growth to trickle down to alleviate poverty to an acceptable level. However, there was a slight decline in the percentage of population below one dollar per day by Purchasing Power Parity (PPP) from 62.8% in 2004 to 61.2% in 2010 (NBS, 2012). The highlight is in

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Figures 2.1 and 2.2. The need for the costs of governance to reduce drastically, particularly, by cutting down recurrent expenditure, specifically, the number of aids, ministries, departments, agencies, wastages, etc is glaring. It is also supportive to place more emphasis on capital projects.

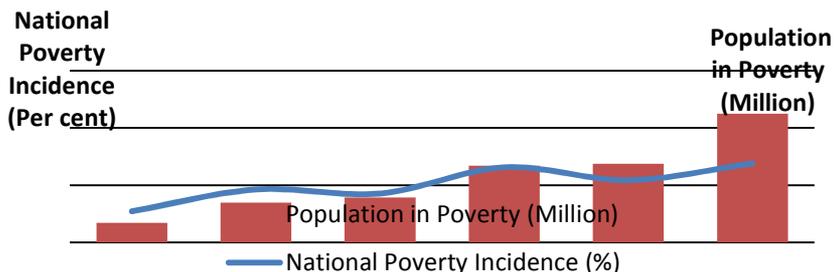
Figures 2. National Poverty Incidence (2004 versus 2010)



Source: NBS, 2012.

The rate of poverty was more prevalent in the rural areas than in the urban areas. Relative poverty and absolute poverty rates were 73.2% and 66.1% respectively in the rural communities in 2010 as against 61.8% and 52.0% in the urban areas. Similarly, the population living below one dollar per day was 66.3 % in the rural areas, compared with 52.4% in the urban areas. The foregoing results pinpoint the need for rural development and economic emancipation of the rural populace. The proposed constitutional review at the National Assembly aimed at ensuring financial autonomy for the Local Government Areas (LGA) in the country through the termination of the Joint State and Local Government Account is a step in the right direction. This is good for rapid growth and development of the grassroots where majority of the poor resides.

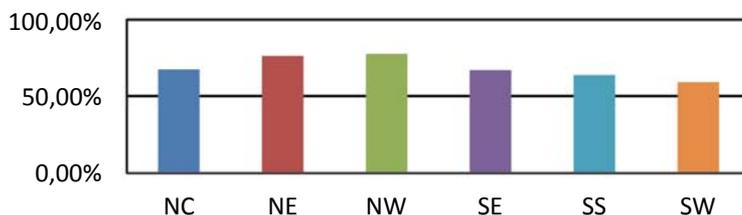
Figures 3. National Poverty and population in poverty



Source: NBS, 2012.

The replica of the imbalance revenue sharing formula is the existence of wide disparities among the federating units. For instance, poverty spread among the geopolitical zones concurred with the unequal budget allocated to the respective zones in the country. The absolute poverty was more severe in north-west accounting for about 78% of the population in that region (see chart below). North-east appeared to be the region with the second highest level of poverty containing about 76% of abject poor, 68% was recorded in north-central, the zone that received highest budgetary allocation (south-south) only recorded 64% of poor, 59% and 67% were recorded in south-west and south-east respectively.

Figure 4. Poverty level by geo-political zones (2010)



Source: own calculations based on NPC, 2012.

The poverty situation prevailing in the geopolitical zones is serious issue and no doubt it poses challenge to the existence as one entity which often adversely affecting national development. It is on record those geopolitical zones with high severity poverty turn into “no go area” to investors as a result of crisis, notably among which is Boko Haram insurgents, to mention but a few. Scholars are of the opinion that Boko Haram crisis was second best predicament since political independence of 1960. Meaning that after civil war of early 1960s there were never major bad omen affecting peaceful coexistence as Boko Haram crisis, superseding the militant struggle in the south-south zone whom are now enjoying amnesty.

Conclusions

This study examines the relationship between equality-based budgetary allocation and the level of poverty in Nigeria. It was found in this paper that successive revenue allocation formula led to skewed budgetary allocation which causes unbalance development, poverty, and insecurity in northern part of the country. The paper concludes that time is ripe for Nigeria to

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

adopt a performance-based revenue allocation in order to minimise waste associated with the equality-based allocation. Therefore, for Nigeria to achieve holistic and sustainable national development, market forces must be allowed to allocate resources freely. Specifically, we recommend for the adoption of New Equitable Empowerment Framework whereby priorities would be placed on the untapped resource in the other areas (state) excluded from derivation with objective of augmenting their budgetary allocation to gauge them on the similar finance strength with states enjoying more of the national pie.

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
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**Systems of General Grants for Local
Governments in Selected EU Countries Against
the Background of the General Theory
of Fiscal Policy**

JEL Classification: *H71; H50; H61; H30*

Keywords: *fiscal policy; general grants; European Union; central government expenditures; public finance*

Abstract: Fiscal policy, including its expenditure aspect, is often discussed and analysed from a variety of angles in the literature on public finances, undoubtedly due to the major importance of this topic. However, not all areas of the expenditure part of fiscal policy have been subjected to in-depth analysis. One of the less discussed tools of fiscal policy consists of general purpose transfers, which are a certain type of expenditure passed from the central budget to local governments. This study focuses on presenting the systems for subsidising sub-national governments in selected European countries and evaluating, based on a synthetic measure, the fiscal policies of France, Italy, the Netherlands, Lithuania, Poland and Finland implemented by means of general transfers, with the aim of identifying the best fiscal policy with respect to subsidising and the characteristic features determining its success. The method of unitisation of statistical feature values was employed in this study to enable comparative analysis. As suggested by the results of the analy-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

sis, spanning the years 2003–2012, the highest-ranked fiscal policy implemented via general-purpose transfers has been developed in the Netherlands.

Introduction

As one of the types of expenditures financed by the state budget, general grants are a tool of fiscal policy that varies greatly from country to country in terms of the manner and extent of application. This can be explained by the fact that while European Union regulations are uniform with respect to such fiscal policy tools as budget deficit and public debt, the member states are not restricted by them when it comes to structuring the state's expenditures. What is more, the scope and principles of awarding general grants as one of the sources of funds for local governments in the individual countries result from their independent decisions concerning the preferred extent of decentralisation and division of public revenues between the central and sub-national level. The main aim of this study is to present the subsidising systems and evaluate the fiscal policy implemented via general grants in six selected European Union countries – France, Italy, the Netherlands, Lithuania, Poland and Finland (chosen because of their diverse systems of organisation of state authorities, local governments and public finances) in order to identify the best system and, on this basis, the desirable features of such transfers. In order to capture the effect of any changes to the rules governing the award of general grants and to enable a more comprehensive assessment of fiscal policy in this respect, a ten-year period between 2003 and 2012 was considered in the study. To enable comparative analysis, the method of unitisation of values of specific statistical features was employed. A synthetic indicator was thus obtained to rank the fiscal policy pursued by the individual states via general grants and to identify the best one.

Subsidies for local governments in contemporary fiscal policy

Fiscal policy and monetary policy constitute parts of the state's financial policy, understood to mean conscious and purposeful activities of persons and institutions that include establishing and achieving specific goals via financial means (measures, actions). Its essence is the ability to collect and spend public funds to achieve objectives of both social and economic nature (Kosikowski, Ruśkowski, 2008, p. 33). Nowadays, it is expressed by the economic programmes for future periods, adopted by public authorities

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

(Chojna-Duch, 2010, p. 44). Since fiscal policy is an inherent part of the financial policy followed by the state, it should pursue the same goals, in particular, achievement of a high level of use of the productive capacity, stabilisation of the fluctuations arising from the economic cycle by stimulating and reducing demand in the economy, creation of favourable conditions for making financial savings through optimisation of the tax burden, offsetting excessive inequalities in the division of revenue between members of society, or curbing unemployment and supporting job creation. Specific fiscal policy tools, including taxes and other public charges, expenditures, budget deficits, public debt and the guarantees issued, should contribute to the accomplishment of such objectives (Owsiak, 2002, p. 279). Although specialist publications stress that the primary general purpose of fiscal policy is to provide the state (or public authorities) with non-returnable financial resources enabling it to fulfil their duties, according to a more frequently expressed view, public expenditure is also a very important instrument of fiscal policy (Ferreiro et al., 2012, p. 652; Owsiak, 2005, pp. 359-361; Palley, 2009, pp. 321-322; Sekuła, 2011, pp. 209-210; Szarowská, 2011, pp. 170). Academically, the concept of fiscal policy is usually considered equivalent to budgetary policy. It is a commonly accepted view that it encompasses both budgetary revenues and expenditures (of central and local governments) and non-budgetary ones, and in the area of expenditure it is expressed by the right, from the viewpoint of socio-economic objectives, choice of directions and the method of their implementation (Pietrzak et al., 2008, p. 290). The literature also quotes studies focusing on the expenditure aspect of fiscal policy and highlights the effect of decisions and actions taken by European Union member states on GDP growth and the unemployment rate. The states pursue their individual, quite freely structured fiscal policies with respect to expenditure, therefore achieving different effects. That is because expenditure is not governed by community regulations, which lay down strict rules as to the budget deficit and public debt (Krčílková, Antoušková, 2009, pp. 343-348).

General grants, an important source of funds enabling local governments to fulfil their duties, constitute a part of state budget expenditures and as such should be considered a tool of fiscal policy. The size of general-purpose transfers and their share in the general structure of expenditure at the central level or GDP depend on the model of public finances adopted in a particular country and the degree of their decentralisation. In view of the fact that decentralisation is a dynamic process increasing the scope and variety of tasks carried out by local governments, it leads to continuous

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

enhancement of the allocation and redistribution functions performed by local finances. This trend is associated with the principles of adequacy and subsidiarity formulated in the European Charter of Local Self-Government, resulting in the necessity of supplementing local government's budgets with funds from the state budget. Establishing the right level and form of this support is becoming an increasingly important issue of state fiscal policy (Guziejewska, 2007, p. 71). On the whole, from the point of view of financial independence, general grants are the preferred type of revenue of local governments as they ensure freedom of choice as to the allocation of expenditures. By contrast, the manner of use of specific grants, an alternative means of supplementing the budgets of local governments from the state budget, is determined by the socio-economic policy pursued by the government and therefore constitutes a more convenient and strictly controlled fiscal policy instrument. An important matter from the point of view of flexibility of transfers from the state budget is how to define the rules of the grant awarding process. The less precise they are, the easier it is to reduce and increase the amount of transfers, treating them as a discretionary tool of fiscal policy (Sekuła, 2009b, p. 756). Funds transferred from the state budget to local governments according to objective and legal criteria, as in the case of general grants, perform a stabilising role in the business cycle. But in the case of this type of transfer it is still possible to take decisions at the central level, resulting in their significant increase or decrease.

Focusing on general grants as a fiscal policy tool, it should be emphasised that it is an essential source of funds for local governments, making it possible to offset the differences in the revenue-generating potential and reduce the disparities in the spending potential of local government units. Thus, general grants enable the redistribution function, as well as allocation of funds at a higher level. They generally result in an increase of expenditures made by local governments, but they should not have an impact on the trends of spending of their funds.

Although state budget expenditures in the form of general grants constitute an element of fiscal policy and an issue of major importance due to their size and share in the general structure of central level expenditure, they have not been given sufficient attention in Polish or foreign literature. Meanwhile, the problem of utilising general grants as a source of funds to finance local governments' tasks, their share in local authorities' revenues and the consequences of utilising this form of budget revenues has been widely discussed. Similarly, specialist literature devotes much attention to fiscal policy implemented via budget expenditures analysed from a variety

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

of angles. Mainly, however, researchers focus on the changes in the size and structure of public expenditures in various phases of the economic cycle (Szarowská, 2011) and demonstrate that some of them fluctuate more strongly over time (Lane, 2002). Other issues generating considerable interest relate to the relationship linking the size and structure of budget expenditures with election cycles (Schuknecht, 2000; Efthyvoulou, 2011). As a fiscal policy tool, budget expenditures, with account taken of their variety and preferred type, are also evaluated with respect to their impact on macroeconomic quantities, such as GDP (Gupta et al., 2005) and unemployment rate (Krčílková, Antoušková, 2009). Nevertheless, researchers usually focus on the directions of expenditures and support for specific areas of public services. Sometimes only one selected type of budget expenditure is analysed (usually investment expenditure) and evaluated in terms of its impact on economic growth (Ocran, 2009). However, expenditures financed by central budgets in the form of general grants, which are an important element of fiscal policy, do not receive sufficient attention – hence the need to fill this gap and give appropriate importance to the issue of subsidisation in the context of implementation of a state's fiscal policy.

**Description of subsidisation systems in Italy, Finland, Lithuania,
the Netherlands, France and Poland**

Determination of the directions and methods of spending of collected funds is an inherent part of fiscal policy. From the state budget level, some of them are transferred to the regional and local government level. Their size and transfer rules and procedures depend on the political system in a particular country, the degree of decentralisation and the resulting system, tasks and sources of revenue of the local government. It is also formally required that delegation of specific tasks to the sub-national level should be accompanied by appropriate partial decentralisation of public revenues and expenditures. Since this requirement is impossible to meet with respect to all local government units, the state budget supports the sub-national government by means of transfers, following specific rules, differing from country to country.

Italy – one of the founding Member States of the European Union – is among the more highly populated countries in Europe. The territorial division of the country is organised into three tiers. The sub-national government system consists of 15 regions with an ordinary status, 5 regions with a special status, 102 provinces and more than 8000 municipalities. The re-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

gions enjoy a high degree of autonomy even though Italy is not a federal state.

The basis for financial support of the sub-national government is defined in Article 119 of the Constitution of the Italian Republic, providing for an equalisation fund without restrictions in respect of the allocation of financial resources, for the territories characterised by a lower per-capita taxable capacity. It can therefore be said that the Constitution introduced the principle of balanced development of regions while empowering the state to subsidise the local government units that need support.

In practice, the principle of adequacy was initially not followed with respect to the Ordinary Statute Regions (OSRs). As recently as in the early 1990s, OSRs had virtually no independence, with up to 95% of their expenditure being financed by central government transfers. Nearly all of these grants were conditional, which means that the central government dictated the terms of use of the resources. Furthermore, the fund spending procedures were highly specific and hedged with multiple restrictions. The resources thus obtained were chiefly spent on the health service. To improve this situation, a number of decisions were taken regarding the regions' revenues, with the aim of increasing their autonomy. As a result, the share of expenditure financed by transfers dropped to 48%. After the reform, the present grant award system employs a more general formula, including analysis of expenditure needs (like in Australia) in addition to calculations based only on the revenue-generating or taxable capacity (like in Canada). The amount transferred to a particular region is the difference between the VAT amount allocated according to the equalisation formula (EVAT) and the VAT amount apportioned to the region based on the estimated consumption by its inhabitants. While there is a certain likeness to the German system in terms of calculation of equalisation transfers, such as using the share in VAT, reference to the fiscal capacity and implementation of horizontal equalisation, the Italian system differs significantly from its German counterpart. In the German system, the purpose of horizontal redistribution is only to equalise the fiscal potential of the constituent states, while the Italian system provides for the needs and costs with respect to health service and the differences in the costs of public service provision. The equalization formula introduced in Italy does not ensure matching a specific level of taxable capacity, so per capita taxable capacity can differ from the mean by more than 10% (Arachi, Zanardi, 2004, pp. 327-330).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Another country under discussion is the Republic of Finland. The basic issues concerning the local government system are regulated primarily by Article 121 of the Constitution of Finland.

In 1960–1980, the period of construction of the Nordic welfare state, municipalities in Finland were assigned a number of new responsibilities. The system of grants as a means of support played a crucial role in the development of the welfare state. Such a system was necessary in order to equalize the municipalities' capacity to introduce new statutory services while maintaining the local taxation at acceptable levels. This was achieved, *inter alia*, by employing categorical grants, awarded under the supervision of central government bodies, as well as specific standards stipulating the manner of management of the tasks for which the grants were awarded. At the same time, the municipalities' self-sufficiency was restricted by this change despite their extensive formal independence and fiscal autonomy of the sub-national government in terms of revenue. This autonomy was expressed by the municipalities' right to levy a tax on personal income without any limitations in terms of tax rates, personal income tax being the major source of revenue for municipalities, beside grants. Until 1993, more than 90% of grants were of the specific matching type, aimed in particular at such areas as education, social assistance and healthcare. The types of expenditures qualifying for support were precisely specified by provisions of the law. Not all expenditures were co-financed by the state, even if they were associated with a particular task. Since 1969, the grant rates have been determined according to a multi-criteria capacity classification system, categorising municipalities with respect to their demand for state support. The main classification criterion was the tax base per capita (weight of criterion: 50%). The other criteria included: net charge for the performance of obligatory tasks, poor financial situation of a municipality, certain unfavourable structural factors, such as a dispersed population, or structural changes, e.g. a high unemployment rate. Based on these criteria, an annual classification of municipalities was prepared. Those in the first class received the highest (in relation to the costs) percentage rate of support, while municipalities that fell into the tenth class were awarded the lowest percentage rate of support. The classification system was completely abolished at the beginning of 1996 to be gradually replaced, starting from 1993, by a system based on general grants and non-matching sector grants. The reason behind the reform was the wish of municipal authorities to achieve a greater independence and freedom of decision-making. The new system reduced the sector control over municipali-

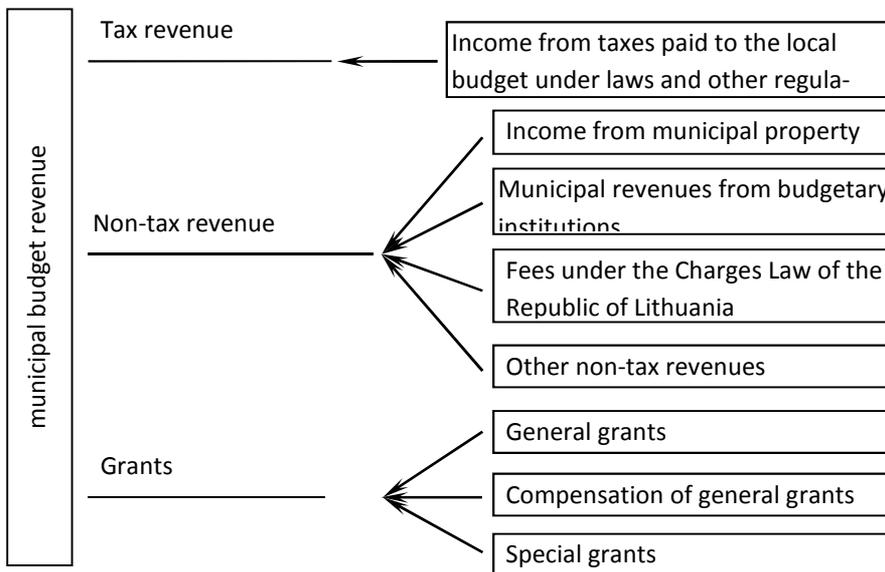
**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

ties and gave them greater autonomy in the provision of services. At present, general grants consist of three parts, the first of which is based on the population criterion, the second is a supplement calculated on the basis of income tax, and the last is of discretionary nature. The two types of sector grants, i.e. for social assistance/healthcare and education/culture, are of non-matching and general nature, although they are officially referred to as sector specific grants (Oulasvirta, 1997, pp. 398-400). At the national level, replacing specific matching grants with general non-matching grants facilitates coordination of the economic policy by the government. Compared with the previous system, the new one makes it easier to reduce the aggregate amount of grants. Wishing to avoid serious political consequences (loss of votes), politicians at the national level are inclined to shift responsibility for unpopular decisions involving expenditure cuts onto the sub-national government and local politicians. On the other hand, local governments enjoying autonomy at the time of recession have the power to make their own decisions concerning the expenditure cuts required by the central government (Oulasvirta, 1997, pp. 412-413).

Another country, the Republic of Lithuania, has a relatively new sub-national government system, created after 1990. The Lithuanian self-government was developed with the objective of supporting and boosting the independence of municipalities by increasing their competences. Putting this idea into practice has given rise to problems with funding. These issues are particularly complicated because of the strongly diversified potential of Lithuanian municipalities, leading to unequal opportunities to generate revenues and capacities of providing services to the population. These problems are partly solved by revenue transfer from the state budget in the form of grants. Due to the fact that the transfer takes place between public authorities' budgets, it is also known as the interbudgetary redistribution of funds.

The act on the sources of revenues of municipality budgets in Lithuania provides for three sources of revenues: tax revenues, non-tax revenues and grants from the state budget (Fig. 1). The first two are classified as own revenues, whereas the last type constitutes state support for performance of the municipality's tasks, with the proviso that any unused funds must be returned to the state budget at the end of the year. In terms of quantity, budgets of the Lithuanian municipalities consist mainly of tax revenues and grants from the state budget. In 2009–2013 the latter accounted for ca. 50–60% of revenues of municipality budgets.

Figure 12. Sources of municipal budget revenues of the Republic of Lithuania



Source: Ginevičius et al. (2014, p. 183).

The Lithuanian law provides that general grants from the state budget should be allocated to the following purposes:

- reducing disparities between actual and planned personal income tax receipts; the recipients are municipalities with lower actual tax receipts per capita in the previous month (relative to the average for all units);
- reducing disparities in the structure of expenditures that arise from objective (demographic, social, etc.) factors, beyond the control of local authorities.

General grants are awarded for:

- implementation of tasks assigned;
- education of children, young people and adults;
- implementation of programmes adopted by the parliament and central government.

Equalisation grants are transferred to the budgets of municipalities to compensate for the changes in their revenues and expenditures resulting from the decisions of the government and parliament (Ginevičius et al., 2014, p. 184).

The increase in inequalities between municipal revenues observed in recent years calls for a better redistribution of revenue, because it is thought

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

that the existing system of local government funding does not provide a solution to this problem.

The next country presented here, the Netherlands, is a constitutional monarchy. In respect of the position of sub-national government and its financial system in the structure of the state, the local government system in the Netherlands is characterised by a small proportion of own revenues in overall revenue and a heavy dependence of local authorities on central budget transfers. The main sources of funds for the Dutch municipalities are general and specific grants from the state budget. They jointly account for nearly 5.6% of GDP (2009), of which general grants constitute 3.1%, specific grants 2.3%, and local taxes only 0.8%. The Dutch provinces also rely heavily on general and specific grants, accounting for ca. 0.25% and 0.4% of GDP, respectively. These data refer to the national average. In some provinces, revenue from property is of primary importance, arising from ownership rights to energy companies (Bos, 2012, p. 14).

General grants are transferred to municipalities and provinces via the municipal fund and provincial fund, respectively. Their size depends on the changes in expenditure from the state budget, which means that the municipalities and provinces jointly participate in budget cuts or additional expenditure. For example, €1 billion of additional state budget expenditure translates into a global increase in the revenue of municipalities and provinces by ca. €200 million. A sample structure of municipalities' revenues is presented in Table 1.

Table 18. Size and composition of the revenue of Dutch municipalities in 2009

Type of revenue	€ billion	%	% GDP	€ thousand/ inhabitant
Transfer from municipality fund	17.7	37	3.1	1.1
Specific transfers by central government, including:	12.9	27	2.3	0.8
- Social assistance,	9.4	20	1.6	0.6
- Other.	3.5	7	0.6	0.2
Sale of goods and services	11.3	23	2.0	0.7
Taxes	4.4	9	0.8	0.3
Property income	1.9	4	0.3	0.1
Total revenue	48.1	100	8.4	2.9

Source: Bos (2012, p. 43).

Grants from the municipal fund are calculated for the individual municipalities using a complicated formula, including a number of objective criteria. The aspects taken into consideration include the size of population, taxable capacity, as well as external factors, such as the role in the region or

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

the social and material structure of the population. The indicators used in calculation of a grant are determined on the basis of formulae including, in particular, the number of households drawing welfare benefits, the size of ethnic minority populations, the number of young and elderly persons, population density and the area of the historical centre of the municipality. The grant calculated from such a formula is increased by a fixed amount for the Frisian Islands and the country's four main cities. The average general grant was ca. €1000 per capita and between €600,000 and €2,500,000 for the individual units. In practice, large municipalities receive higher per capita grants than smaller units. This is due to greater demand for social services: as demonstrated by studies, cities tend to attract lower-income persons. Equally complex formulae are used in the case of the provincial fund and specific grants (Bos, 2012, pp. 43-44).

The French Republic, in common with the Italian Republic, is one of the founding Member States of the European Union. In both these countries public task funding was initially highly centralised; its decentralisation was achieved in the course of reforms. At present, transfers from the state budget are an important and increasingly significant part of the revenue of local government units in France. In the past they used to consist largely of specific grants, but today they are subventions that can be freely disposed of by local authorities (Śmiechowicz, 2008, p. 421-422). Sub-national government revenues are mainly composed of tax revenues (50% of the entire funds) and transfers from the state budget (35%). The latter are awarded for different purposes and take on different forms. The functioning of the system is additionally complicated by the fact that the individual grants are not allocated for single, specific aims. This complexity makes it difficult to analyse the whole system. The three main targets for state budget transfers are:

1. Financing of tasks assigned to local governments. Whenever the central government sets a task for a local government unit, it also allocates funds for its implementation – from tax revenue or in the form of grants. Since public tasks assigned to the sub-national government are usually financed by transfers from the state budget rather than from tax resources, the proportion of central budget transfers in overall revenues shows an increasing trend (Jamet, 2007, p. 22). Moreover, the amount of grant is calculated from a formula at a rate more favourable than the inflation rate.
2. Compensation for tax exemptions. If the central government decides to exempt a certain group of taxpayers from a specific local tax or to re-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

duce the tax rate, it compensates the local government for the lost revenue. Most of these exemptions apply to property tax and business tax paid annually by natural and legal persons carrying on economic activity.

3. Equalisation. The state uses transfers to reduce the disparities between local governments in their “purchasing power” defined as the expenditure to revenue ratio. The amount of equalisation to be distributed between the individual local governments is determined every year by the central government based on the indicators of their respective revenues and expenditures.

In the original system, the individual grants were linked to their specific purposes. Over time, however, when it became increasingly difficult to compensate exactly for various shifts and exemptions by means of transfers, the individual grants were combined into larger ones. The present system, which has resulted from these changes, is of an intermediate nature. It consists primarily of the general grant, referred to by the acronym DGF (Fr. *dotation globale de fonctionnement*), but individual types of grants still exist as well. DGF accounts for more than 60% of funding from the state budget and includes the transfer for all the three target areas. Local governments are entitled to use it at their own discretion. One part of the grant constitutes an amount proportional to the amounts paid the year before, depending on the size of the population and also including compensation for the elimination of the pay-related portion of the business tax in 1999. The other part is intended to promote equalisation; it depends on the deficiency of taxable capacity and tax revenue from households. It includes the urban equalisation grant, rural equalisation grant and state equalisation grant.

There are other grants beside DGF, financing the individual expenditures, e.g. the decentralisation grant – DGD (Fr. *dotation globale de décentralisation*). Financed by the central government, it has the form of a lump-sum grant. The principle of awarding DGD is that the amount of transfer should cover all additional costs incurred as a result of decentralisation of tasks, which are delegated to the regional-level governments. For example, in 2004 DGD accounted for 20% of the revenues of regions (Josselin et al., 2013, p. 325).

The sub-national government in Poland, the last country considered here, was formed roughly in the same period as the Lithuanian system: its 25th anniversary is celebrated in 2015.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The obligatory sources of local government revenues are referred to in various Polish laws, including the most important one – the Polish Constitution. According to the division presented therein (Article 167), there are three types of local government sources of revenue: own revenues, general grants (termed general subsidies in the constitution) and specific grants from the state budget. The three different groups of revenues were designated with respect to the control of receipts and spending of funds obtained from a particular source: the extent of control is the greatest for own revenues and the smallest for specific grants. The significance of general grants is varied in the local governments budgets: the lowest in provinces (ca. 16% of budget revenues) and the highest in land counties, where they account for ca. 43–45% of revenues.

Under Polish law, own revenues include receipts from shares in personal income tax (PIT) and corporate income tax (CIT), which constitute part of the state budget revenues. This inclusion is of formal nature only, because such receipts do not have the characteristic feature attributed to own revenues, i.e. fiscal autonomy, which relates to the scope of powers to establish and control the revenues that enable a unit to manage its finances independently; in terms of autonomy, they bear the most resemblance to general grants.

The primary aim of fund transfer in the form of general grants is to supplement a particular unit's own revenues. What distinguishes them from specific grants is the freedom as to the way of fund disposal – the decision concerning the allocation of funds from general grants rests with the legislative body.

As of 2004, general grants consist of three components:

- equalisation,
- balancing (regional in provinces),
- educational.

The first and third components, i.e. equalisation and educational, are transferred from the state budget. The second one derives from payments from wealthier units and constitutes an element of horizontal equalisation of revenues.

The first component is referred to as an equalisation general grant. Its purpose is to offset the difference of revenues earned by local government units at a particular tier and to assist economically weaker units. Another component – the balancing general grant (regional in provinces) – consists of payments made by units characterised by a high fiscal capacity. Because of the method of collection and division (transfers from wealthy units to

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

poor ones), it is commonly referred to as a 'Robin Hood charge' (Polish: *janosikowe*). This type of general grant is highly controversial, not only in Poland, due to its functioning in the local government finance system and method of calculation of wealthy units' payments. Objections to the compulsory contributions to the Robin Hood charge were also raised, for example, by the German state of Hesse.

The last component of the general grant is the educational general grant. In terms of the amount it is the largest part of the general grant, especially in counties and communes. Its overall amount for all the local government units is specified by the budget act. In the case of the educational component the idea behind the solution is dubious, i.e. financing of education by means of grants. The essence of general grants is to minimise disproportions or supplement funds, rather than finance local government units' functions. Formally, it is not appropriate to link the educational general grant revenues with expenditure on education due to the features of the general grant (unspecified purpose of expenditure). This is the case in practical terms, however, due to the considerable share of education expenditure in overall spending. To emphasise this relationship, the term 'education-specific grant' is often used. Hence, subsidising expenditure on education is considered contrary to the general idea of general grants, but rationally justified.

In practice, therefore (Sekuła, 2009a: 109):

- the equalisation general grant constitutes a means of vertical division of funds between local government and the state,
- the balancing/regional general grant is a tool of horizontal redistribution between units of the same tier,
- the education general grant is an instrument for financing education functions.

Methodology of the research

In order to investigate the general grants awarded to local governments as part of the fiscal policy pursued by the state, the authors analysed the expenditure on general grants in six selected EU countries – Italy, Finland, the Netherlands, Lithuania, France and Poland – having diverse systems of organisation of central and sub-national government, different principles of division of public revenue between the central and local governments and diverse socio-economic policies and, consequently, different scopes of public expenditures.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The fiscal policy and its effects are of long-term character. Therefore, the analyses performed as part of this study cover the data for a relatively long period of ten years between 2003 and 2012. Focusing on this period, it is possible to identify the financial effects, expressed by the size of expenditure on general grants from central budgets, of the changes introduced to the principles of subsidising local government units by the public authorities in the countries investigated.

The research was based on the data collected by Eurostat – the statistical office of the European Union – and, because of the absence of certain information relating to Poland, on *Sprawozdania z wykonania budżetu państwa (Reports on state budget implementation)* for 2003–2012. To examine the fiscal relationships between the national and sub-national government sectors in the individual states, the authors used the value of expenditures in the form of general grants transferred from the central government to local governments. Such expenditures were determined on the expenditures basis of *Classification of the functions of government, COFOG*, which classifies expenditures according to a system of divisions (functions), groups and classes. The expenditures under discussion are recorded in the *General public services* division as a group titled *Transfers of a general character between different levels of government*. The COFOG classification is based on the historical European System of Accounts – ESA 95. For this reason and to take advantage of the more comprehensive range of data concerning other quantities used in the study, i.e. the revenues and expenditures at the central level and the revenues of local governments in the countries analysed, the Eurostat data were used, collected according to the ESA 95 methodology. The quantities describing the populations of the individual countries were also obtained from Eurostat. Because of the political system of the countries investigated and the financing policies with respect to the size of general grants, this study uses Eurostat statistical data that apply to the local government level. Since the aforementioned statistics do not specify the size of general grants to the local governments in Poland, the missing data required for analysis were obtained based on *Sprawozdania z wykonania budżetu państwa (Reports on state budget implementation)* and converted into EUR using weighted average EUR exchange rates for the respective years.

Structuring budget expenditures is one of the aspects of fiscal policy. As previously mentioned, these expenditures include the amounts transferred from the state budget in the form of grants for local governments. In order to evaluate the fiscal policy pursued by the aforementioned countries with

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

respect to the structure of expenditure for grants, the authors employed the method of unitisation of values of the statistical features included in the study to enable further comparative analysis. The normalisation procedure transforms the data to enable calculation of a synthetic indicator, which is the arithmetic mean of all variables, assuming values between 0 and 1 after conversion. It is performed for each feature separately, in a slightly different manner for positively and negatively correlated explanatory variables, in accordance with the following formulae:

$$z_s = \frac{x - \min x}{\max x - \min x}; \quad z_d = \frac{\max x - x}{\max x - \min x}; \text{ where:}$$

z – normalised variable,

s, d – positively and negatively correlated explanatory variables, respectively,

x – value of the analysed feature for a particular country,

$\max x, \min x$ – maximum and minimum values of variable x .

Five variables were used in this study:

x_1 – size of transfers of a general character from the state budget to local governments (€ million/resident) – positively correlated explanatory variable,

x_2 – size of transfers of a general character from the state budget to local governments relative to state budget expenditure (%) – positively correlated explanatory variable,

x_3 – size of transfers of a general character from the state budget to local governments relative to state budget revenue (%) – positively correlated explanatory variable,

x_4 – size of transfers of a general character from the state budget to local governments relative to overall revenues of local governments (%) – negatively correlated explanatory variable,

x_5 – size of transfers of a general character from the state budget to local governments relative to local governments' property income (%) – negatively correlated explanatory variable,

The choice of variables reflected the purpose of the study (expenditure on general grants as part of the state fiscal policy) and the availability of data on the Eurostat website.

Size and importance of state budget expenditure on general grants for local governments in selected EU countries

In order to normalise quantitative features, they first need to be collected and summarised. The data for variables x_1 – x_5 are presented in Tables 2–6.

Table 2. Transfers of a general character from the central government budget to local governments in selected EU countries in 2003–2012 (€ per capita)

Country	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	mean
France	724	807	830	689	658	767	688	1118	642	651	757
Italy	328	378	503	537	497	560	549	551	851	833	559
Lithuania	222	228	213	243	294	357	410	521	533	538	356
Netherlands	1030	894	907	1017	1130	1218	1322	1339	1333	1298	1149
Poland	189	178	211	232	255	302	273	308	305	312	256
Finland	320	331	342	364	385	402	411	494	529	564	414

Source: own calculations based on Eurostat; <http://ec.europa.eu/eurostat/data/database>

Table 3. Transfers of a general character to local governments in relation to state budget expenditure in selected EU countries in 2003–2012 (%)

Country	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	mean
France	11.98	12.84	12.99	11.03	10.19	11.53	10.20	15.30	9.36	9.38	11.48
Italy	5.22	5.92	7.61	7.67	6.97	7.76	7.07	7.24	11.39	11.04	7.79
Lithuania	22.09	20.25	16.51	15.98	15.85	16.17	19.33	23.52	22.52	22.99	19.52
Netherlands	12.56	11.00	10.93	11.67	12.10	12.37	12.40	12.03	12.78	12.52	12.04
Poland	14.12	13.50	13.50	13.07	12.79	12.67	13.37	12.43	12.70	13.34	13.15
Finland	4.43	4.40	4.42	4.63	4.79	4.69	4.53	5.20	5.47	5.65	4.82

Source: own calculations based on Eurostat; <http://ec.europa.eu/eurostat/data/database>

Table 4. Transfers of a general character to local governments in relation to state budget revenue in selected EU countries in 2003–2012 (%)

Country	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	mean
France	14.34	14.58	14.77	12.33	11.56	13.75	14.10	19.99	11.71	11.47	13.86
Italy	5.87	6.68	8.93	8.55	7.53	8.58	8.40	8.47	13.07	12.40	8.85
Lithuania	24.10	22.79	17.38	16.60	16.35	17.85	24.97	28.92	26.18	24.55	21.97
Netherlands	13.99	11.75	10.91	11.31	11.89	12.17	13.98	13.75	14.11	14.01	12.79
Poland	17.80	17.13	16.26	15.62	14.59	15.02	17.10	16.32	15.30	15.91	16.10
Finland	4.42	4.41	4.41	4.66	4.60	4.59	5.46	6.48	6.23	6.54	5.18

Source: own calculations based on Eurostat; <http://ec.europa.eu/eurostat/data/database>

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 5. Transfers of a general character to local governments in relation to local governments' revenues in selected EU countries in 2003–2012 (%)

Country	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	mean
France	27.36	28.70	28.30	22.34	20.39	23.06	19.71	31.69	17.77	17.70	23.70
Italy	9.67	10.78	13.91	14.47	12.62	13.89	13.09	13.59	21.44	20.83	14.43
Lithuania	51.56	47.26	42.39	41.14	41.71	39.02	47.31	52.19	54.16	53.36	47.01
Netherlands	21.23	18.49	18.45	20.19	21.22	21.93	22.54	23.06	23.10	22.77	21.30
Poland	29.89	25.64	25.26	24.27	23.33	22.70	24.50	23.93	23.68	24.27	24.75
Finland	6.18	6.11	6.02	6.00	5.93	5.73	5.75	6.58	6.80	7.13	6.22

Source: own calculations based on Eurostat; <http://ec.europa.eu/eurostat/data/database>

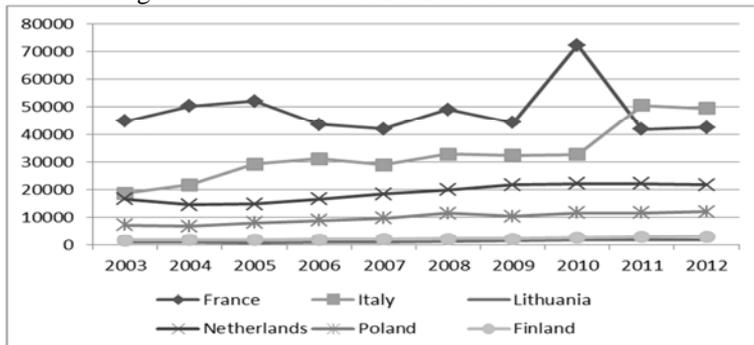
Table 6. Transfers of a general character to local governments in relation to local governments' property income in selected EU countries in 2003–2012 (%)

Country	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	mean
France	2344	2606	2536	1976	1843	2022	1664	2820	1559	1574	2094
Italy	660	716	918	845	745	778	813	954	1245	1308	898
Lithuania	3455	2932	2187	2173	2174	2751	5025	5722	5647	5001	3707
Netherlands	573	487	520	514	518	550	682	806	793	772	621
Poland	1461	1248	1118	576	531	595	798	1798	1603	1640	1137
Finland	203	192	192	198	174	169	187	240	245	258	206

Source: own calculations based on Eurostat; <http://ec.europa.eu/eurostat/data/database>

The size of transfers from the central budget to local governments varied greatly between the countries analysed (Fig. 1). This is not surprising in view of the diverse capacity of public finances, influenced by a number of factors (area of the country, population size, GDP generated). Interestingly, however, the size of general grants changed in a variety of ways in the individual countries over the period investigated.

Figure 1. General grant amount in 2003–2012 in € million.



Source: own calculations based on Eurostat, Ministry of Finance data.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The general trend (Fig. 1) shows an increase in this type of expenditure in the central budgets in the majority of the countries, most significant in the Netherlands. However, it can be observed that in one of the countries – France – the size of general grants at the end of the period analysed was lower than in 2003, although France is the country with the highest expenditure on local government financing in the form of general grants. It is worth emphasising that the size of fund transfers varied significantly in that country from year to year and accounted for a smaller share of overall central budget expenditure than in e.g. Lithuania, Poland, the Netherlands or Italy (Table 3).

Meanwhile, the importance of the general grant as a type of expenditure financed by the central budget increased markedly in Italy, where general purpose transfers from the state budget to local governments accounted for a mere 5% of the overall expenditure in 2003 to increase more than twofold ten years later (Table 3). By comparison, Finland maintained a stable expenditure policy in that period. While the proportion of expenditures in the form of general grants increased by more than 1 percentage point in the period examined, in 2012 they still accounted for less than 6% of the central budget expenditure and were the lowest both in absolute terms and as a share in the central budget expenditure among all the countries analysed. General grants were the heaviest burden for the central budget of Lithuania (accounting for 23% of the expenditure in 2010), although in absolute terms they were the lowest among the countries investigated. At the same time, the data contained in Table 4 suggest that general grants absorbed a far greater proportion of state budget revenues than similar transfers in other countries investigated; this proportion was the lowest in Finland, where such grants accounted for only a small share of central budget expenditure.

By analysing the size of general grants per resident and their share in the revenues of sub-national governments, it is possible to evaluate this type of local government revenue as the source of financing of its tasks. As indicated by the data in Tables 2 and 3, the Dutch local governments received the most funds per resident – these amounts were more than four times as high as in Poland, where the amount of general grants per capita was the lowest, despite increasing steadily. The size of this type of transfer was quite similar in Lithuania and Finland. Far greater values were observed in France and Italy. What is worth mentioning, the extreme values – the highest for the Netherlands and the lowest for Poland – were widely different from the arithmetic mean of nearly €700 per capita in 2012.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Analysis of the data presented in Table 5 also shows the sharp contrasts in terms of the importance of general grants as a source of revenues of local governments in France, Italy, Lithuania, the Netherlands, Poland and Finland. In Lithuania such grants played a key role in the financing of local government units, ranging between 39% and 53% of their revenues, whereas in Finland it was just a supplementary source of funds of almost marginal importance, accounting for 6–7% of local government revenue. However, in most of the countries under consideration, general grants are an important but not principal means of meeting the expenditures incurred by the sub-national level of government. Any changes in the calculation procedures resulting in an increase or reduction of the amounts transferred from the state budget are directly reflected in the scope of the financed local governments' expenditures.

The data contained in Tables 2–6 were normalised using the formula presented in the section devoted to methodology. The results of this procedure are shown in Table 7.

Based on the selected methodology and the variables used in the study, with respect to fiscal policy carried out by means of general grants for the local government, the Dutch system was given the highest rating. As regards one of the variables – the size of transfers per capita – the values were the highest among the countries under discussion. In the case of two other variables, expressing the share of general grants in the revenues and expenditures of the state budget (a measure eliminating the effect of the country's wealth on the size of general grants), Lithuania was a clear leader. The figures for the Netherlands were average in this respect.

Table 7. Normalised values of measures included in the study

variable	x_1	x_2	x_3	x_4	x_5	mean
France	0.56	0.45	0.52	0.57	0.46	0.512
Italy	0.34	0.20	0.22	0.80	0.80	0.472
Lithuania	0.11	1.0	1.0	0.0	0.0	0.422
Netherlands	1.0	0.49	0.45	0.63	0.88	0.690
Poland	0.0	0.57	0.65	0.55	0.73	0.500
Finland	0.18	0.0	0.0	1.0	1.0	0.436

Source: own calculations

The next two variables are negatively correlated explanatory variables. It was assumed that the right solution involves high general grant amounts, hence x_1 – x_3 as positively correlated explanatory variables; on the other hand, general grants are not meant to replace own revenues, so their share

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

in the revenues of local governments should be of supplementary character, with the greatest emphasis on own revenues characterised by extensive fiscal autonomy, represented here by property income. In the case of two variables (x_4 and x_5) Finland is an undisputed leader, although the Netherlands, despite the common opinion concerning low receipts from own revenues, is ranked only worse than Italy but better than e.g. France.

The low rank of Finland, a country whose local governments enjoy considerable independence and a wide range of own revenues, is due to the fact that the receipts from own revenues cannot be considered an instrument of fiscal policy since they do not pass through the state budget.

With the lowest amount of general grants per capita, Poland was third in the final ranking – behind the Netherlands and France.

Conclusions

This study, devoted to the topic of general grants as a tool of fiscal policy, fills a gap in the literature on public finances. The results of the analysis conducted indicate that although the size and scope of general grants are very different in the individual countries in absolute terms, in per capita values and expressed as a proportion of the central budget and local government revenues, this means of support was an important instrument of fiscal policy in all the countries analysed, i.e. France, Italy, the Netherlands, Lithuania, Poland and Finland, accounting for between nearly 5% and nearly 20% of the central budget expenditure. Simultaneously, using the method of unitisation of the statistical features included in the study, a comparative analysis of fiscal policy conducted via general grants was performed to create a ranking of countries, where the policy of the Netherlands was ranked the best and that of Lithuania the worst. By applying the aforementioned method it is possible to formulate recommendations concerning the structure of general grants based on the model of the country that received the highest ranking. The results obtained may contribute to further, extended studies of the fiscal policy implemented in the form of general grants with respect to both territory and the range of variables included in the analysis.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

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18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
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Keywords: *energy security; fuel and energy resources; sustainable development; energy efficiency; energy consumption*

Abstract: Energy security is an important issue for Ukraine's sustainable development. The main goal of the article is to show the state of energy security of Ukraine, analyze its tendencies and challenges, reveal the impact of energy security on sustainable development of a country. The state of the energy security of Ukraine was analyzed with the help of data collection, processing and analysis. Data was taken from State Statistics Service of Ukraine, Ministry of Energetics and Coal Industry of Ukraine, other sources, and analyzed with the help of tools of statistics and economic analysis.

Ukraine, being a developing country and experiencing war, political and economic crisis, struggles for energy security support. The present state of energy availability and consumption in the country influences its sustainable development and political stability, and is a significant restraint in country's survival. Despite the fact, that Ukraine has enough resources' deposits to provide itself with energy, it provides less than 50% of own demands and is dependent on Russia's resources.

Production of energy in Ukraine is decreasing, but energy consumption remains high. Ukrainian industries are energywasteful and energy inefficient; the country has the leading positions in energy intensity of GDP. The article shows relation of energy sources and energy security of Ukraine to sustainable development, reveals dependency of Ukrainian energy security and indicates its main threats and ways out.

Introduction

Energy security is an important issue in development of every country and is an important constituent of a country's overall security. Energy resources of a country represent all its various resources, which are available for industrial and household usage. Energy security and energy usage trends define the technological development of a country, influence its overall performance and reveal the level of its sustainable development. Ukraine, being a developing country and experiencing war and subsequent political and economic crisis at the moment, struggles for energy security support. The present state of energy availability and consumption in the country influences its sustainable development within the limits of all three constituents: economic, ecological and social. Besides, the political stability of the country's substantially depends on energy security as well. Thus, the problem of energy security in Ukraine may become a significant restraint in country's survival and development. Therefore, the main goal of the research is to show the state of energy security of Ukraine, analyze its tendencies and challenges, reveal the impact of energy security on sustainable development of a country.

Methodology of the research

The state of the energy security of Ukraine was analyzed with the help of data collection, processing and analysis. Data was taken from State Statistics Service of Ukraine, Ministry of Energetics and Coal Industry of Ukraine, reports and researches of other governmental and local departments and NGOs, and analyzed with the help of tools of statistics and economic analysis.

Ukraine is a country, which has deposits of all kinds of fuel and energy resources (natural gas, oil, coal, peat, uranium and others). However, present resources' reserves and the amount of their extraction are not enough for provision of Ukraine with the necessary amount of the fuel and energy, and thus do not guarantee the level of country's energy security (State Geological and Mineral Resources of Ukraine, n.d.).

Ukraine provides only about 47% of its demands with own fuel and energy resources (State Geological and Mineral Resources of Ukraine, n.d.). The main resources, extracted by Ukraine, are coal and peat, natural gas, crude oil, uranium (State Geological and Mineral Resources of Ukraine,

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

n.d.; State Statistics Service of Ukraine 2013 *Fuel and Energy Resources of Ukraine. Statistical Publication*) (table 1 and 2).

Table 1. Fuel and energy resources of Ukraine

Resource	Deposits	Proved (Explored) deposits	Extracted in 2012	Energy production in 2012, TOE	Imported in 2012	Imported in 2012, TOE
Coal and peak	117.5 bln tonnes of coal; 1.853 bln tones of peak	48% (coal) 36% (peak)	85.946 mln tonnes (coal) 5 mln tonnes (peak)	40 256 (coal)	-	9 926
Natural gas	7 254.3 bln m ³	37%	20.185 mln tonnes	15 403	32.939 mln tonnes	26 590
Crude oil	1.643 bln tonnes	39%	3.29 mln tonnes (with gas condensate)	3 414	1.5 mln tonnes	1 625 (crude oil) 8 270 (oil products)
Uranium	105 000 tons U	Less than 50%	960 tons U	23 653	n/d	n/d

Note: TOE - tonne of oil equivalent ; n/d – no data available

Source: created by author, using data in (State Geological and Mineral Resources of Ukraine, n.d.; State Statistics Service of Ukraine 2013 *Fuel and Energy Resources of Ukraine*; World Nuclear Association, 2015, *Nuclear Power in Ukraine*; State Statistics Service of Ukraine, 2013, *Energetychnyi balans; Vydobutok vugillya v Ukrayini nyni vedetsya v 160 shahitah. Infografika* 2013; Website on Nuclear and Radiation Safety and Non-Proliferation, n.d.; *Ukrayina rozpochala promyslovyi vydobutok uranu*, 2011; *Torf*, n.d.; Ministry of Energetics and Coal Industry of Ukraine, 2015; *Prognoznyye zapasy uglya v Ukraine — 117,5 mlrd. tonn, razvedannyye — 56,7 mlrd. tonn*, 2005; *Oblasna programa rozvytku torfyanoyi galuzi "Torf Kyivshchyny" na 2012-2015 roky. Proekt* 2011)

Table 2. Dynamics of extraction, import, consumption and transit of energy resources

Re-source	Extraction (Production)			Import			Consumption			Transit		
	2014	2013	2012	2014	2013	2012	2014	2013	2012	2014	2013	2012
Electrical energy, mln kilowatt per hour	181 945	193 564	198 119	n/d	n/d	n/d	134 653	147 264	150 720	n/d	n/d	n/d
Coal, thousand tonnes	64 995	83 698	85 946	n/d	n/d	n/d	31 562	37 642	61 207	n/d	n/d	n/d
Natural gas, mln cubic meters	20 170	20 998	20 185	19 466	27 974	32 939	42 465	50 358	54 775	62 197	86 126	84 261
Oil, thousand tonnes	2 729	3 051	3 290	305	659	1 505	n/d	n/d	n/d	15 013	15 577	14 557

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Oil products (petroleum, diesel fuel, masut), thousand tonnes	1 533	2 514	3 709	n/d	n/d	n/d	8 561	10 124	10 526	n/d	n/d	n/d
	Relation of 2014 to 2013, %	Relation of 2013 to 2012, %	Relation of 2014 to 2012, %	Relation of 2014 to 2013, %	Relation of 2013 to 2012, %	Relation of 2014 to 2012, %	Relation of 2014 to 2013, %	Relation of 2013 to 2012, %	Relation of 2014 to 2012, %	Relation of 2014 to 2013, %	Relation of 2013 to 2012, %	Relation of 2014 to 2012, %
Electrical energy	94%	98%	92%	n/d	n/d	n/d	91%	98%	89%	n/d	n/d	n/d
Coal	78%	97%	76%	n/d	n/d	n/d	84%	61%	52%	n/d	n/d	n/d
Natural gas	96%	104%	100%	70%	85%	59%	84%	92%	78%	72%	102%	74%
Oil	89%	93%	83%	46%	44%	20%	n/d	n/d	n/d	96%	107%	103%
Oil products (petroleum, diesel fuel, masut)	61%	68%	41%	n/d	n/d	n/d	85%	96%	81%	n/d	n/d	n/d

Note: n/d – no data available

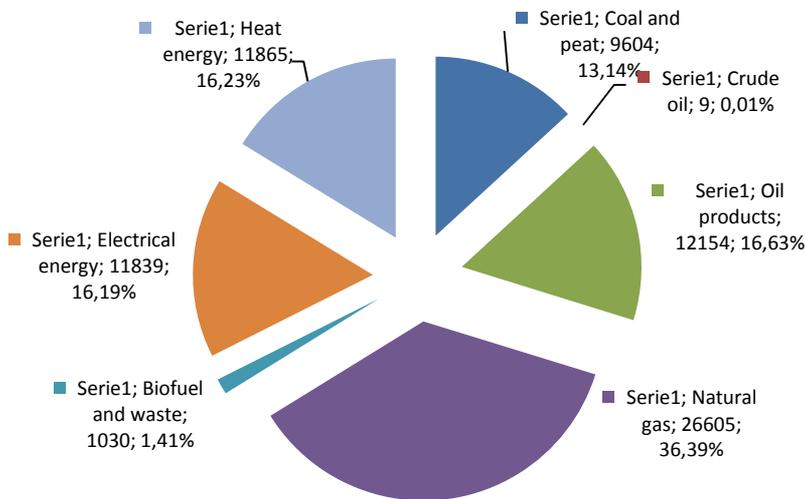
Source: created by author, using data in (Ministry of Energetics and Coal Industry of Ukraine, 2015).

The structure of final consumption of energy resources in Ukraine is presented on figure 1.

Of all the consumed resources, natural gas has the leading position in final consumption (with share of 36.39%), while crude oil is the least used source of energy (with share of only 0.01%). Biofuel and waste remain not a popular energy source in Ukrainian consumption with a share of 1.41% in the total energy consumption. Oil products, coal and peat, heat energy and electrical energy have approximately the same shares, which vary from 13.14% to 16.63%. It is necessary to note, that atomic, hydro, wind and sun energy (which are listed as the sources, used in Ukraine, but are not represented on the graph at figure 1) are used mostly for production of heat energy and thus are not a source of energy for final consumption, but are resources for intermediate consumption.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Figure 1. Structure of final consumption of energy resources in Ukraine

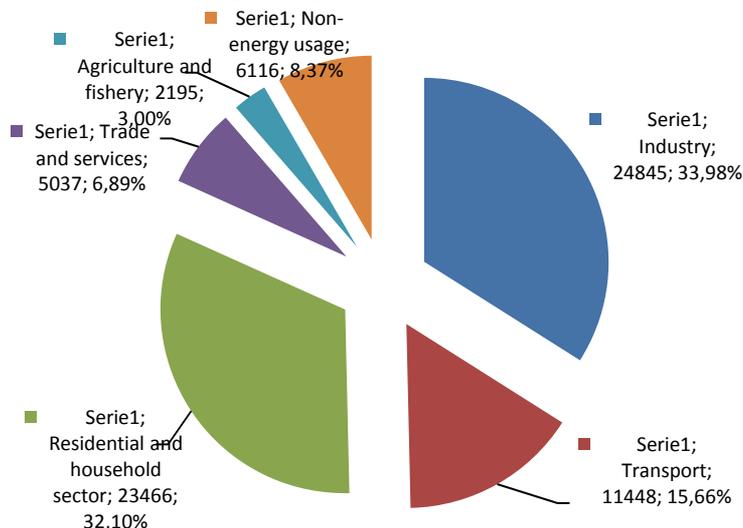


Note: the numbers, which represent consumption of resources, are measured in thousand TOE (tons of oil equivalent)

Source: created by author, using data in (State Statistics Service of Ukraine 2013 *Fuel and Energy Resources of Ukraine*)

Pattern of energy usage in 2012 (figure 2) shows that industry and residential and household sector consume the majority of energy resources (33.98% and 32.10% respectively). Agriculture, trade and services require minor energy costs. Transport consumed 15.66% of all energy resources (74% of the "transport energy" was consumed by automobile transport). Trade and services required only 6.89% of all energy consumed in Ukraine. Share of agriculture and fishery was only 3%, among which almost all the energy was consumed by agriculture with the exception of 11 thousands TOE (which is only 0.5% of all the energy consumed by this sector). Non-energy usage includes usage of energy resources mainly as raw materials. Its share in total consuming of energy resources was 8.37% in 2012 (State Statistics Service of Ukraine, 2013, *Energetychni balans*).

Figure 2. Pattern of energy usage in Ukraine in 2012



Note: the numbers, which represent consumption of resources, are measured in thousand TOE (tons of oil equivalent)

Source: created by author, using data in (State Statistics Service of Ukraine, 2013, *Energetychnyi balans*)

Coal is the main energy resource of Ukraine, which significantly supports its energy security. Deposits of coal in Ukraine amount 7.5% of world deposits, placing the country among the top 5 countries with the largest coal deposits (after China, the USA, India and Russian Federation) (SSIE "Geoinform Ukrainy", n.d.; State Geological and Mineral Resources of Ukraine, n.d.). The amount of coal, extracted annually in Ukraine, makes about 1.5% of world extraction. Luhansk and Donetsk regions produce 70% of Ukrainian total coal (43% and 27% respectively) (*Vydobutok vugillya v Ukrayini nyni vedetsya v 160 shahtah. Infografika*, 2013).

Production of coal in 2014 was 22% less than in 2013, and 24% less than in 2012. Such significant decrease can be explained by the antiterrorist operation, which started in 2014 in Luhansk and Donetsk regions of Ukraine and continues in 2015. Consumption of coal also decreased, however, the rate of such decrease differs from the rate of production decrease (16% less in 2014 compared to 2013).

Natural gas remains an important energy source in Ukraine. However, the country cannot provide itself with the necessary energy. Russia is the main importer of gas into Ukraine. In 2013 Russia provided 25.8 bln cubic

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

meters of imported gas (or 92% of total imported gas) to Ukraine, which is nevertheless 15.1% less than in 2012 (*Ukraina v 2013 godu importirovala gaza na 12 mlrd doll*, 2014). In 2014 Ukraine reduced import of gas from Russia down to 14.5 bln cubic meters (which is 1.8 times less than in 2013), and increased import of gas from EU by 2.4 times (from 2.1 bln cubic meters to 5 bln cubic meters) (*Ukraina v 2014 godu pochti v dva raza sokratila import gaza iz Rossii i uvelichila iz ES*, 2015).

75.5% of total potential hydrocarbon (gas and oil) resources is deposited overland, while 24.5% is on shelf of the Black and the Azov Seas. Ukraine takes the third place in Europe (after Great Britain and Norway, excluding Russia) by oil deposits, however, oil extraction is much less than in specified countries and many other European and non-European countries (State Geological and Mineral Resources of Ukraine, n.d.).

Extraction of natural gas and oil also decreased in 2014. As some of the sources of these resources are on shelf of the Black and the Azov Seas, this was also influenced by annexation of Crimea by Russian Federation in 2014.

In 2014 the amount of consumed oil products was 5.6 times more than the amount of produced oil products. This relation increases with every year, despite the fact that Ukraine reduces the amount of consumed oil products annually: in 2014 the amount of consumed petroleum, diesel fuel and masut decreased by 15% compared to 2013, and by 19% compared to 2012. The amount of produced petroleum, diesel fuel and masut was reduced in 2014 by 39% compared to 2013, and by 59% compared to 2012.

Ukraine extracts about 500-800 tonnes of uranium annually, which provides only 30% of the country's atomic energy needs. The rest of required uranium is imported mainly from Russia (Website on Nuclear and Radiation Safety and Non-Proliferation, n.d.; Pavlenko, 2014). Ukraine has 4 nuclear plants with 15 power generating units in Zaporizhzhya, Mykolayiv, Khmelnytsky, and Rivne, which today work at full capacity to provide the country with the necessary energy (World Nuclear Association, 2015, *Nuclear Power in Ukraine*). Ukraine has 12 assured uranium deposits, the resources of which can provide Ukrainian nuclear plants for 100 years. The biggest deposits are located in Kyrovograd region, which is in the centre of Ukraine (Website on Nuclear and Radiation Safety and Non-Proliferation, n.d.). However, there are problems of Ukrainian uranium ore enrichment, storing and processing of waste products, maintenance and replacement of nuclear equipment and its component parts.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

According to Energy Balance of Ukraine in 2012 Ukraine also produced energy from alternative sources: wind and sun energy. The share of such energy sources in total energy resources is miserable – 53 thousand TOE compared to 122 488 thousand TOE (total produced energy) (or 0,043%). Production of energy from biofuel and waste products was 1565 thousand TOE in 2012 (or 1.28% from total produced energy) (State Statistics Service of Ukraine, 2013, *Energetychnyi balans*). State Agency on Energy Efficiency and Energy Saving of Ukraine says that "Ukraine has a considerable technically achievable potential to produce fuels from renewable energy sources and alternative fuels ... which is above 98,0 mln. tons per year" (State Agency on Energy Efficiency and Energy Saving of Ukraine, n.d., *Potential*). However, the total amount of energy, produced from sustainable sources in 2013, could substitute only 200.4 thousand tons of fuel, which proves significant underload of Ukraine's capacities. Still, the amount of sustainable energy, produced in 2013, was 1.5 times more than the same indicator in 2012 (1144.9 thousand Gcal in 2013 compared to 382.9 thousand Gcal in 2012.) (State Agency on Energy Efficiency and Energy Saving of Ukraine, n.d., *Suchasnyy stan*).

The dynamics of capacity and production of electrical energy from sustainable sources in Ukraine (table 3) shows, that these indicators grow significantly every year. The total capacity of sustainable energy sources increased in 2013 by 83% compared to 2012, and by 710% compared to 2010. The total production of electrical energy from sustainable sources increased in 2013 by 95% in relation to 2012, and by 529% in relation to 2010. These sources are registered sources, which are of state and private property and have the right to use "green" tariffs for consumption of sustainable energy.

The increase of sustainable energy sources cannot acknowledge the strengthening of energy security of Ukraine, as, firstly, the share of sustainable energy sources in total amount of sources is very small, and secondly, some of the objects of sustainable energy sources are situated in Crimea (4 sun power stations and 1 wind power station, the delivery of energy from which was stopped in April 2014) and Luhansk region (1 wind power station), part of the territory of which is not under control by the Ukrainian government (State Agency on Energy Efficiency and Energy Saving of Ukraine, n.d., *Suchasnyy stan*).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 3. The dynamics of capacity and production of electrical energy from sustainable sources in Ukraine

Type of energy	Installed capacity, MW				Production of electrical energy, mln kW-hour			
	2013	2012	2011	2010	2013	2012	2011	2010
Wind power engineering	334,083	193,835	146,415	76,575	636,473	257,501	89,037	49,171
Solar power engineering	748,42	371,562	188,224	2,535	562,81	333,59	30,052	0,508
Low hydro-power engineering	75,312	73,453	70,816	62,526	285,986	171,943	203,41	192,515
Biomass	17,2	6,2	4,2	4,2	32,446	17,662	9,603	0,002
Biogas	6,538	n/d	n/d	n/d	5,012	n/d	n/d	n/d
Total	1181,553	645,05	409,655	145,836	1522,727	780,696	332,102	242,196
	Relation of 2013 to 2012, %	Relation of 2012 to 2011, %	Relation of 2011 to 2010, %	Relation of 2013 to 2010, %	Relation of 2013 to 2012, %	Relation of 2012 to 2011, %	Relation of 2011 to 2010, %	Relation of 2013 to 2010, %
Wind power engineering	172%	132%	191%	436%	247%	289%	181%	1294%
Solar power engineering	201%	197%	7425%	29523%	169%	1110%	5916%	110789%
Low hydro-power engineering	103%	104%	113%	120%	166%	85%	106%	149%
Biomass	277%	148%	100%	410%	184%	184%	480150%	1622300%
Biogas	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d
Total	183%	157%	281%	810%	195%	235%	137%	629%

Source: created by author using data in (State Agency on Energy Efficiency and Energy Saving of Ukraine, n.d., Suchasny stan).

Production of energy in Ukraine is decreasing against the increasing world energy production (*Global Energy Statistical Yearbook 2011*). However, energy consumption in Ukraine remains high.

Energy efficiency of Ukrainian industries is backward and outdated, compared to other European countries. For example, energy costs reach 10% of all costs in metallurgical industry, and 40-70% in chemical industry (depending on the type of products). Besides, partial work load of many industrious companies influence quantity of energy costs, as they often make manufacturing overhead costs (Sukov and Kabash, 2014).

Ukrainian industries are energywasteful. Despite the fact, that energy intensity decreased significantly in Ukraine for the past 10 years, the country still has the leading positions in energy intensity of GDP among the world

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

countries (*Global Energy Statistical Yearbook 2011*; Sukov and Kabash, 2014). Primary energy use (kg of oil equivalent per capita) in Ukraine was 2,884 in 2010, and 2,766 in 2011.

**Relation of energy sources and energy security of Ukraine
to sustainable development**

Energy security and development of energy sector in a country are directly connected to all constituents of its sustainable development: economic, ecological and social. Provision of access to energy sources, improvement of energy consumption, increase of sustainable energy sources are the goals of UN Initiative "Sustainable Energy for all", which are planned to be reached by 2030 (United Nations, n.d.).

Developed energy sector and, as a result, stable energy security attest development and stable work of industries in a country, provision with necessary energy resources industries and household sector, and thus influence economic development of a country.

Economic development of a country is connected with income of population, availability of goods and services, purchasing power. Stable supply of energy for needs of population reflects satisfaction of people's basic needs and rights, standards of living, social and human development of country's population.

Development of energy sector in a country may lead to environmental problems, as energy factories and plants are real and potential sources of pollution. As an example, accident on Chernobyl atomic energy station in 1986 significantly influenced environment and people's health.

According to analyzed data (tables 1-3), Ukraine's energy sources cannot be considered sustainable, as extraction of resources and industries' performance are accompanied with ecological and social problems, power loss and resources waste.

Coal, being the most significant source for Ukrainian industries, is not a sustainable energy source. Coal mining is a source of the range of ecological problems in Ukraine, among which are the following: air pollution, change of geological, hydrological and hydrochemical state of the territories, on which the coal producers operate (Ogarenko, 2007). Earth surface slump, underflooding, change of mesophytic plant formations, mineralization of water-bearing stratum and soil take place in the areas, where coal mines are situated. These changes lead to consequent damage of buildings, constructions and communications, make soil and water unsuitable for in-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

dustrious, agricultural and household usage, pollution of water and change of species. Operation of coal mines and spontaneous combustion of ore residues emit carbon and sulfur dioxide, hydrogen sulfide, nitric oxide into atmosphere. The operation of coal-mines leads to annual emission of 5.6 bln cubic meters of methane into atmosphere. The most polluted regions in Ukraine are Luhansk, Donetsk, Dnepropetrovsk. One spontaneous combustion of disposals can emit 150 tonnes of carbon dioxide, 1.5 tonnes of sulfur dioxide, 0.4 tonnes of hydrogen sulfide, 0.1 tonnes of nitric oxide for 1 day into atmosphere (*Osnovni Problemy Rozvytku Vuhil'noyi Haluzi i Rehionu Donbasu*, 2002).

Coal industry has the leading position in traumatism and mortality among other industries in Ukraine. Every mined ton of coal takes lives of 2 miners (for comparison 1.1 in Russia and 0.03 in the USA). Besides, there are a lot of illegal mines, which, first of all, lack safety engineering, secondly, illegally use labour force and underpay workers, thirdly, illegally extract natural resources of Ukraine (Makogon, 2008).

Extraction of gas and oil is also connected with environmental and economic problems. The environmental effects of gas and oil extraction deal with water and soil pollution. Examination of pollution processes showed that about 60% of groundwater pollution is related to accidents in waste water run and drain and well-drilling, and more than 30% of pollution is related to defects and breakage of subsurface equipment. Soil and water pollution lead to health problems and increase governmental costs for relevant programs (*Ekolohichni Problemy Naftovydobuvnoyi Promyslovosti*, n.d.).

The possibility of shale gas extraction in Ukraine brought to heated discussions about the prospects and problems of using such resource. On the one hand, Ukraine has considerable shale gas storage, which can support the country's economic security and improve its independence from Russia. Besides, the source of gas will be closer to consumers than the imported gas, and thus will decrease the final costs for its transportation and usage. The exact amount of shale gas resources has not been defined yet: the range of possible values is between 1.2 and 7 trillion cubic meters. According to (Yakusheko and Yakovlev, n.d.) Ukraine takes the 4th place in Europe by available shale gas resources, being just after Poland, France and Norway. On the other hand, shale gas extraction requires advanced technologies installation, considerable investments, and has serious impact on state of environment. The main environmental consequences of shale gas develop-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

ment and extraction are increase of seismic activity risks, groundwater, water, soil and air pollution (Barannik, n.d.).

Some countries banned specific technologies of shale gas extraction on their territories because of possible negative environmental effects, which will affect people's health and lives (Bonine et al., 2013). However, large scale extraction of shale gas can totally change the energy map of the world. This change acquires political and economic shade, and may neglect the potential ecological problems, related to shale gas extraction (Yakushenko and Yakovlev, n.d.). Safety of technology for shale gas extraction is directly connected to its expenses. Thus, the extraction of shale gas in Ukraine should be carried out according to transparent principles and observance of all necessary safety measures.

Using atomic energy is always connected with risks for human lives and environment. One of the biggest environmental catastrophes in the whole world – the accident at Chernobyl atomic energy station – happened in Ukraine in 1986. The effects of the accident were enormous, as they irradiated thousands of people and contaminated the territories of Ukraine, Belarus, Russia, Scandinavia and parts of Europe (World Nuclear Association, 2014). The health effects were radiation sickness, rapid increase of cancer diseased (including thyroid cancer, leukaemia, etc.) among adults and children, cataracts, heart diseases, autoimmune thyroiditis and others (United Nations Scientific Committee on the Effects of Atomic Radiation, 2008).

Current environmental problems, which are related to using atomic energy, deal with nuclear waste processing. There are three types of waste, produced by Ukrainian atomic stations: gas-aerosol, thin and hard. They are processed according to specific for each type technologies (Website on Nuclear and Radiation Safety and Non-Proliferation, n.d., *Povodzhennya*). Ukraine also has some repositories for storing radioactive waste and certain amount of waste is sent back to Russia for reprocessing (World Nuclear Association, 2015). Management of radioactive waste requires significant costs, and needs constant improvement and modernization.

Non-productive and productive loss of energy and water is another problem of both: sustainability of energy sector and energy security. The loss leads to unjustified increase of energy tariffs and additional costs of the government (*Tekhnichne pereosnashchennya...*, n.d.).

Thus development of energy sector and energy security of the country are directly connected with its sustainable development. The interconnection of the three constituents are evident. On the one hand, development of sustainable energy sources in Ukraine is one of the important factors of

strengthening energy security of the country. On the other hand, strengthening energy security of Ukraine provides the ways of further sustainable development of the country, its economy and society. Besides, development of energy sector is connected with increase of resources extraction, risks of environmental pollution and human health.

Dependency of Ukrainian energy security, threats and ways out

Ukraine is not an energetically secure country. Despite the fact, that the country has all necessary resources for provision itself with necessary amount of energy, dependency of Ukrainian energy security on Russia remains significant. The reasons for energy insecurity are connected with the general problems of energy state in the country and its economic and political development.

The main threats for the energy security of Ukraine deal with external and internal factors. Internal factors are very close to the problems of other post-Soviet countries (Pluzhnik and Saprykina, 2013). External factors deal with the old energy connections, established when Ukraine was a part of the Soviet Union. Some of the threats are:

- high depreciation and obsolescence of equipment and fixed capital stocks of power engineering objects. A lot of plants and factories still use old equipment or equipment, which is set up for processing only certain type of resources. Unsatisfactory state of equipment and other assets increases costs and energy intensity of fuel and energy resources (Kasich and Yakovenko, 2013);
- energywasteful economics of Ukraine. Despite the fact, that energy intensity decreased significantly in Ukraine for the past 10 years, the country still has the leading positions in energy intensity of GDP among the world countries (*Global Energy Statistical Yearbook 2011*, Sukov and Kabash, 2014);
- instable prices for imported gas and oil (*Transatlantic energy security and the Ukraine-crisis: A blessing in disguise?*, 2014);
- absence of diversification of energy resources' import sources;
- current events in Ukraine: annexation of Crimea and antiterrorist operation in the East of the country.

Crisis in Ukraine undermined its energy security. Significant energy resources are situated on the occupied territory, which is not currently under control of the Ukrainian government. The electric stations suffer of coal deficit, as the coal was supplied from coal-mines from Donetsk and

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Luhansk regions. Ukraine continues to deliver coal from the occupied territories, but the deliveries are not stable, and the amount of coal is less than required (*V Minenergo otchitalis o postavkah uglya iz DNR i LNR*, 2015). The coal deficit led to power cut-offs all over Ukraine and the necessity to import coal from other countries (*Zapasy uglya na ukrainskih TES umenshayutsya*, 2015). However, the coal, imported to Ukraine from South Africa according to the recent treaties, does not have the necessary characteristics and caused additional costs to Ukraine (*Ukraina neset ogromnyie ubyitki iz-za afrikanskogo uglya*, 2015).

Due to the current situation, Ukraine is also concerned about loss of potential gas deposits in Crimea and Donetsk region (shale gas deposits in Donetsk region, gas and oil deposits on Crimea peninsula) (*The energy dimensions of Russia's annexation of Crimea*, 2014; *Korysni kopalyny Ukrainy*, n.d.).

The war conflict in Ukraine may lead to gas crisis not only in the country, but in Europe as well. According to NATO reviews (*Transatlantic energy security and the Ukraine-crisis: A blessing in disguise?*, 2014; *Russian-Ukrainian-EU gas conflict: who stands to lose most?*, 2014), Russian gas company Gazprom provided Ukraine with more than half of the gas it needed, and supplied more than 1/3 of EU imported gas. Half of the imported gas to EU is going through Ukraine, which can be threatened with the escalation of the conflict. Loss of control of certain areas by Ukraine creates possible risks to energy security of other European countries, as the gas pipelines pass through that territory (Carney, n.d.). Ukraine itself struggles with paying the increased prices for gas because of the economic crisis as a war's consequence.

The main document, which set the directions of energy sector development, is Energy Strategy of Ukraine on period till 2030. It was adopted by the Cabinet of Ministers of Ukraine in 2006 and was renewed several times later. In 2013 the new Energy Strategy of Ukraine on period till 2030 was adopted, which foresees satisfaction of energy needs of the country and strengthening its economic security taking into account environmental effects of energy sector operation. The document contains information on all energy resources, their extraction and usage, suggests measures on energy saving, increase of energy efficiency, increase of sustainable energy sources' share in total amount of energy needed. Prognostic energy balance on 2030 expects increase of all resources extraction (coal, oil, gas, production of heat and water energy). The amount of sustainable energy is expected to increase by 80 times in 2030 compared to 2010 (Cabinet of Min-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

isters of Ukraine, 2013). However, a lot of regulations of the Strategy have declarative nature and require adoption of other documents and programs. The strategy itself did not take into account the possible crisis in 2014-2015, which is happening at the moment.

State Agency on Energy Efficiency and Energy Saving of Ukraine developed National Plan of Actions on Renewable Energy on period till 2020. The main goal of the Plan is to increase the renewable energy sources and make the share of renewable energy in total amount of consumed energy 11%. The renewable energy sources, stipulated in the Plan, are biomass, wind energy station, sun photoelectrostations, geothermal energy, hydroelectric power stations (State Agency on Energy Efficiency and Energy Saving of Ukraine, n.d.).

There are also other programs and plans, which deal with energy sector and security of Ukraine. They are adopted locally in the cities or by enterprises and organizations (*Stalyj energetychnyj rozvytok*, n.d., DTEK, 2012). The measures, which are foreseen by all the programs (governmental and local) for strengthening of energy security of Ukraine (Kasich and Yakovenko, 2013), are the following: switch to alternative energy sources and/or increase of their share in total sources of energy; modernization of gas, electrical and heat systems (which will decrease the amount of energy used); development of idle gas fields; breaking up the monopoly of gas market.

Conclusions

Energy security is an important issue for Ukraine's sustainable development. The main energy resources in Ukraine are: coal and peat, crude oil, oil products, natural gas, atomic energy, hydroenergy, wind and sun energy, biofuel and waste, electrical energy, and heat energy. Ukraine's energy sources cannot be considered sustainable, as extraction of resources and industries' performance are accompanied with ecological and social problems, power loss and resources waste.

Despite the fact, that Ukraine has enough resources' deposits to provide itself with energy, the state of country's energy security is not satisfactory. Ukraine provides less than 50% of own demands and is dependent on Russia's resources. There are other threats to Ukrainian energy sector development, including current war situation and the need of restructuring.

The adopted Energy Strategy in Ukraine suggests the positive changes for Ukrainian energy sector, however, its realization is complicated with

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

numerous external and internal factors. Structural reforms should be made in all directions of energy policy, which will help the country to resist the internal and external threats to its security. Any changes in the course of strengthening energy security of the country should be conformed to sustainable development concept regulations.

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18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
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**Shared State Taxes and Tax Policy of Local
Self-governments in Connection With
Tax Morale**

JEL Classification: *H21, H23, H24, H26*

Keywords: *tax morale, legal morale, tax regime, tax system*

Abstract: Based on our assumption, tax morale significantly depends on a country's legal, historical, social and cultural background and circumstances.

In the first part of the paper, we discuss the legal dimension of the tax morale – including the interconnection of law, ethics and moral. Furthermore, we analyze the facts breaching tax liabilities under the scope of the criminal law and the actions violating the tax morale but not qualified as infringement of the criminal law.

In the second part of the paper, we provide empirical evidences which factors (e.g. personal characteristics, commitment for paying local taxes, knowledge about the distribution of paid taxes between central and local authorities, etc.) determine significantly the individual level of tax morale.

The paper discusses these complex connections either from the viewpoint of law or economics in order to find out whether it is possible to develop the tax morale of individuals, or can the legislator adequately rule the different forms of tax evasion.

Introduction

In this paper there are three equally important purposes: (1) to define “tax morale”; (2) to give an overview about the changes in the proportion of shared state taxes (personal income tax [PIT] and vehicle tax) between state and local budget since the change of regime; (3) to present the Hungarian tax morale with some actual data and to give empirical evidences in connection with individual tax morale.

My intention was that besides historical and social circumstances other factors – such as Machiavellian personality, commitment and faith to state and local government – have also very significant impact on the level of the individual tax morale.

Shared state taxes and local business taxes – declining share of local governments in the Hungarian tax system

The state has the sole right to specify and allocate state taxes, and has the right to give power for local governments to lay down the rules of local business taxes, and the state furthermore has the right to monitor the activity of local governments. So the taxing power of local governments is derived and limited by the state.

Accepting the importance and role of taxation at level of local government several alternatives may be distinguished depending on who should tax, what are the shares of tax revenue, etc. Local governments may derive revenue from local taxation by any of the following (Davey-Péteri, 2004, p. 217.):

- Laying taxes independently;
- Imposing a locally decided surcharge on a revenue laid and collected by other levels of government;
- Receiving a fixed share of state taxes collected within their jurisdiction.

Different models can be mentioned to analyse the fiscal connection between state budget and local government budget. We can mention a model in one hand, *where all incomes of local government rise from the state*. In this model only the central state tax system exists, there are no possibilities for local governments to lay down rules of local business taxes, they have no taxing power. Disadvantage of this model can be, that local government is naked, but advantage can be the better monitoring regime of state tax system, the state is able to monitor more efficiently the way of incomes in the case of local governments too.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The second model is the *solidarity model*, the local government has taxing power, has the right to lay down the rules of taxation, but some taxes are centralized by the state budget, where the state has the sole right to decide the share of local governments for the tax incomes. One advantage of this model is that structural differences can be lower by this way, but disadvantage is, because governments – cardinally the rich governments (they have enough incomes from other sources) are not interested in increasing their incomes as a certain share will be the income of state budget.

The third model, liberal model, where local governments are free to lay down the rules of taxation, the state has no right to centralise tax incomes from the local government, the main incomes are the local business taxes for the local governments. The fiscal responsibility of local government is the greatest in this model, but one risk of this system can be the conflict between fiscal interest and economic policy of local and state authorities.

In Hungary, there is a mixed model, where the characteristics of liberal and solidarity model are being combined, certain taxes are incomes of state budget, and then the decision is for the state to allocate the tax income between the level of central and local budget. The cooperation and harmony is realised between the levels, the local governments has taxing power and besides they gain tax incomes from state budget as well (the so-called shared state taxes).

Hungary has been a pioneer in local government reform among transition economies. Through a series of legal reforms introduced since 1990, Hungary has established local governments with full autonomy, legal and regulatory framework for ensuring and tightened budget constraints by regulating municipal bankruptcy. So in Hungary after the *change of regime this mixed model is used, but the borders of the framework is continuously being modified by the state*.

Increase or decrease the autonomy of local government was the two-directional tendency since the change of regime by the state. This tendency has an effect on fulfilling task and on fiscal frame too.

As an example for this tendency we can mention the allocation of personal income tax (PIT) and vehicle tax. When personal income tax was introduced in 1987, the allocation of this tax income was very simple: it was the income of the so-called “tanács” (the forebear of local government). In 1990 there was a claim to change this allocation structure, the state had to decide two issues:

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

- How to allocate personal income tax between state and local government budget?
- Will it be still the income of the local government, or shall we introduce a quota, guarantee sufficient income for the state and local government too?

The Budget Act of 1991 (Act CIV. of 1990 on the State Budget of Hungary) introduced a different allocation system in Hungarian Law. In 1991 the local government received the income raising from paid personal income tax by local taxable person in 1989.

In my opinion local governments are able to levy taxes on unseen income and to collect these revenues in greater proportion in generally, because of e.g. the local relationships are generally tighter.

In the 90's, the proportion of shared state taxes descended, in 1993 the local governments received the 30% of PIT, while in 1998 only 20% of PIT was returned to local level. Since 2000 this proportion of local government was permanently below 10%. Since 2013 the local governments has not receive a certain percentage of PIT as earlier, only the revenue comes from the leasing of soil remains at local level.

At the beginning vehicle tax was also a shared state tax, which was collected within the jurisdiction of local governments and was the revenue of local budget. In the 90's there were different shares between local and state budget (100-0%, 50-50%). In 2015 the revenue from vehicle tax is divided between local and state budget as follows: state budget has a proportion 60%, local government's share is 40%.

Local taxes in Hungary

In Hungary the 1990 Law on Local Taxes declares the possible types of local taxes local governments may levy, maximum size of local tax rate is also set centrally. Local governments are entitled to introduce any or all of the following taxes: property tax, communal tax, tourism tax and business tax.

Property tax can be imposed on residential and non-residential buildings and plots. Local governments may decide free whether the assessment of tax burden will be area-based or value based. A value-based property tax is applied only by a few local authorities recently. *Communal tax* is levied on private residents, it is a special property tax, since it can be levied on household dwellings (owned or rented).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Tourism tax is one of the most conventional local taxes in Hungary, it can be levied based on turnover (per capita accommodation fee).

*The business tax*¹ is a turnover tax levied on manufacturer's and retail sales' net turnover.

What is tax morale – How can we measure tax morale?

For the question how can we define tax morale, it is impossible to give an exact answer, even if we know the diversified specialized literature. To get closer to the definition of tax morale at first we have to define ethic and morale. Ethic is a main form of social norms, a collection of accepted norms which had been accepted during more and more generations and which are synthesized on the base of common observations. In other words it is a community's judgment about what is right and what is wrong, helping to differentiate between the bad and good in the society.² The word morale comes from Latin "mos", principally meaning "will" in its objective sense, which manifests itself in ethic and in the law. In other sense it also means the will, approach and grain of the individual, of course strongly connected with habit, ethic and law.

In the specialized literature firstly Frey-Weck-Hannemann (1984) defined tax morale³ in 1984. Nowadays several publications are concerned with the question of tax morale⁴. Földes (2004) defined tax morale as a zero-sum game of dividing the contribution to the total public good between the members of society (which means particularly that any fraud on tax by one member of society cause a loss to another one).

Méder et al. (2012) define the basic problem of taxation as following: "... there is no tax paying instinct". The question of paying or not paying taxes is relatively new in our history and in this sense it differs from the other forms of cooperation in more ways. The significant problem of mak-

¹ Business tax has a dominant place in the Hungarian local tax system, it constitutes more than 80% from total local tax incomes of local governments.

² Laws and bills are in connection with ethic. Morality and legality are connected, but they are not the same. Ethic concerns people in their deepest nature, will and conscience, it is in the inside personality, which cannot be judged by court. Legality means the responsibility of law (Turay, 2000).

³ Tax evasion is usually explained by the Laffer curve, which shows income from taxes as a function of marginal tax rate. Frey-Weck-Hannemann (1984) states that tax morale is as much important as tax rate concerning tax revenue.

⁴ Tax morale is a complex phenomenon, it concerns law, macroeconomics, behavioural economics, sociology, etc.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

ing people paying taxes: the individual is unable to punish the cheaters efficiently. The isolated individual would be only able to punish the cheater if he himself didn't pay tax.

Although the definition of tax morale has been used by several authors, we can say that there is no universally accepted definition. Shadowing the situation we can say that the interpretation of more, strongly related definitions (hidden economy, informal economy, 'grey' economy, informal working) are disputed and can be separated to more branches. This is also the case for the dominant and significant factors of informal work. We can separate two main branches in the literature: according to the first, the rational estimation on the relative gain from tax fraud is the decisive (see Slemrod – Yitzhaki, 2002). The other considers the role of tax morale as a prior (see Torgler, 2003).

Earlier researches by Allingham-Sandmo (1972) and Yitzhaki (1974) consider tax evasion as gambling. They examined how much of the income is declared by people who are avoiding paying taxes at a given probability of tax evasion and at a given rate of punishment. Hungarian researches are initiated after the regime change in this area⁵. The main courses of the researches were hidden economy, norm following behaviour and the new tax system developed by the changing economic system⁶. A study from 2004 analyzes the tax obedience and the informal economy among 900 medium and large sized companies processing in light industry, building industry and trade (300 companies in each sector) for the years of 1996, 1998 and 2001 (Semjén, 2004).

We can say that the number of specialized literatures studying the measurement of tax morale is significant, too. Among these we can highlight the research of the Hungarian Central Bank. According to this examination of income tax declarations and VAT payments they conclude that the amount of rateable value lost due to tax evasion equals about one-quarter or one-third of the Hungarian annual GDP. This is considered a significant loss in international aspect, too⁷.

Some research considers the tendency of the number of enforcements in taxation as a tool of measuring tax morale. According to this, tax morale

⁵ However we should also mention the name of Schmidt, who had examined tax payers' behaviour and the causes in the 1940's.

⁶ We can mention the paper by Gergely (1998).

⁷

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

has been declined. Nowadays in Hungary approximately more than 360 000 enforcements are still in process. Furthermore debts in connection with enforcements were up to a thousand billion forints till the end of July, 2013⁸.

The third possible aspect of examining tax morale is comparing the non- or just partly tax-paying self-employed people with the employees in the same scope of activity. Among the employed people 14% are self-employed (individual entrepreneurs). They deny the plus burden of taxation and pay significantly less than the normal employees⁹.

Fazekas et al. (2010) searched the answer for the following question in their study¹⁰: to which degree does the rate of rational estimation and tax morale play a role in informal working in Hungary?

In case of examining the tax morale the implementation of game theory (running ultimatum, dictator or trust games) become more frequent. The empirical observations verify that tax morale plays an important role in tax evasion because the moral behaviour of individuals is typically not independent from the behaviour of reference groups (see Méder, 2012 and Simonovits, 2010).

The historical and socio-cultural determination of tax morale

According to our assumption, today's low Hungarian tax morale is caused by our history and socio culture. If we take a look at the first half of the 20th century, we can see the deep impression of tax evasion in society. A sentence by the attorney-general from the novel Rokonok by Móricz written in the beginning of 20th century: "In Hungary there is one significant problem, one huge problem: In Hungary people don't like to pay taxes... Nobody likes... neither me." We can see that the situation after a hundred years is the same. People think of taxation in a negative way. They don't consider this as a contribution to social welfare, but as a distraction, for which they don't receive a reward as a return. Moreover, some segments of society draw off from paying taxes totally, and put the burden on the trustworthy tax payers.

⁸ <http://vallalkozoi.negyed.hu/vnegyed/20130903-romokban-az-adomoral.html>

⁹ <http://blog.ucmsgroup.hu/az-adovaltozasok-hatas-a-az-adomoral-tekintetenben/>

¹⁰ The study is based upon a representative sample from 2008. According to their result the high probability of being caught decreases the probability of informal working; but the fear of unemployment increases this rate. The level of tax morale is in indirect relation with the unemployment rate.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

In the historical part of this study we consider the acts of economic policy only after World War II. In the next paragraphs we will examine in which system the Hungarian taxation worked during the years of socialism and what effect did this have on the morality of tax-system after changing the regime.

The effects of socialist economic policy on tax morale

Before the regime change the tax of state corporations were calculated on the bases of their centrally determined profit. The tax rates were usually progressive and if the profit of corporations had exceeded the centrally defined amount than tax rates could have been up to a 100%. With this act the system broke down the effort to improve the efficiency of corporations. Moreover, profitable corporations couldn't keep their plus to make investments or pay dividend. If the state had found that the profit exceeded the given limit they could have taken this money away immediately.

Besides corporations the income of individuals were taken into consideration, too. During the years of socialism in Hungary personal income was classified into two groups. On one hand the salary income of employees, on the other hand the income of entrepreneurs and passive income such as interest, rental and dividend. While in the first category the tax burden was low, the others suffered from high tax rates.

Progressive taxation – similarly to the regulation of corporate tax – decreased the willingness of entrepreneurship and people tended to hide their income from these kinds of activities. In this system the suppression of business income became a typical attitude in Hungary.

Taxation and tax morale after the regime change

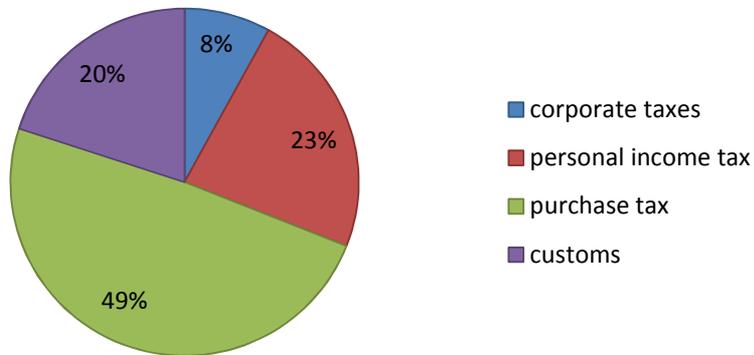
In the late 80's – short before the political change – the economy of Hungary had been radically changed. Most of all taxation was altered and re-developed on OECD practices. Market economy renewed the opportunity for people to develop new entrepreneurships and according to this, taxation on income had also been changed. After the change, both companies and individuals still had to pay their taxes in a progressive way, but there was a significant fall in the tax rates. In case of corporations before the change the rates were about 50-60%, by 1995 they were dropped to 36%. In case of individuals the marginal tax rates fell to 50%.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Contrary to the taxation in the years of socialism, after the regime change the mechanism of self-assessment became a priority. In case of self-assessment the tax payer counts, declares and pays its tax on its own – it is a kind of voluntary way which still exists in this form up today. If we consider that before the regime change both corporations and individuals had huge tax rates on extra profit, they were interested in the suppression of their income. In the same time with the reformation of taxation-system and the significant drop of tax rates, tax payers couldn't immediately accommodate to the new system, they couldn't get rid of their habits and past experiences. In Kornai's (1990) opinion it is basically a failure to build the taxation on self-assessment among these conditions. In this environment self-assessment does not produce the real value of income tax and the state (tax authority) has to find additional information (e.g. enrichment inspect or notice from envy neighbours, etc). Finally Kornai states ironically that in Hungary, where the system is based on self-assessment, a single tax supervisor should be needed in every household, to supervise the flow of everyday income. As a solution Kornai insists on introducing impersonal taxes.

In Musgrave's (1989) works we can find a reference on the separation of personal and impersonal taxes. It states that personal taxes are those taxes which are determined on the basis of solvency of the tax payer. Contrary to this, impersonal taxes are those ones at which we don't examine the character of the tax payer. Impersonal tax is like value added tax that does not consider how solvent is the tax payer (in Hungarian we know it as general purchase tax, which is the VAT in international sense), as everyone pays by the same rate independently from how much he could pay. Moreover we consider wealth tax as an impersonal tax, which neither considers the character of the tax payer. As an impersonal tax Kornai suggested on implementing VAT at one single rate. Contrary to this, after the regime change, Hungarian tax-system relied significantly on the personal income taxes. In 1995 31% of the state tax revenues were corporate tax and income tax (see Figure 1) which shows only a minimal change compared to the data of 1986.

Figure 1. The distribution of Hungarian tax and custom revenues in 1995



Source: Hungarian Court of Auditors.

The society could not get rid of its previously fixed norms and behaviours in the first decade after the regime change and we couldn't see improvement in tax morale (Kornai, 1996).

Suggestions on improving tax morale

International experiences

It is not proven that a simple decrease of high tax rates would result in the increase of willingness to pay tax and in the raise of tax base in the short term. Although several empirical studies found positive relationship between tax burden and grey economy (e.g. Schneider, 2005), it cannot be concluded generally that decreasing the tax burden is not enough to decrease the size of informal economy, and just because of lowering tax rates tax morale won't increase¹¹. So if tax evasion is widespread, decreasing tax rates would not mean enough inspiration, even if tax evasion was inspired by high taxes earlier. Besides this, the connection between high taxes and tax evasion is endogenous which means that tax rates are high as a result of widespread informal economy. Andreoni et al. (1998) introduced softer

¹¹ Scharle Ágota (2002), Tax evasion as innovation in small businesses in Hungary, manuscript

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

definitions in connection with tax evasion like ethic emotions and the satisfaction of taxpayers with the public utilities. The authors made three important observations concerning tax morale¹²: 1. more honest citizens declare more tax; 2. tax evasion is more widespread if citizens consider taxation unfair; 3. tax evasion is more widespread if taxpayers are not satisfied with public utilities.

The effect of the structure of taxes and the focus of supervision can be both significant. On the one hand, in countries, where the rate of employees working in informal economy is significant, the tax on capital income is lower, which directly inspires the suppress of informal work. On the other hand according to OECD (2004), the problem of suppressed incomes is significantly lower in countries, where the emphasis is on the determination of corporate income instead of supervising the amount of work.

The “continuous tax reform” which means changing the rules of taxation from year to year makes an unpredictable economic environment and has a negative effect on tax morale. Closing those gaps which cause huge amount of loss in income and making administrative rules in taxation against tax evasion do not equal with tax reform. Making regulations that increase the will of taxpaying and decrease tax evasion on short term does not necessarily mean the increase of tax morale on long term, because getting acquainted with the new laws and finding new gaps tax evasion may grow again. Tax amnesties can also be easily included in expectations, decreasing further the tax morale.

When transforming the taxation system and considering its effect on tax morale and on horizontal or vertical equality, we have to take into account not only the personal income taxes but the social insurances as well. Moreover in many cases the social insurance systems mean the decisive factor. This is true even if we consider that there is a direct insurance service in connection with the social insurance taxes, which service, in case of pension and health insurance, is proportional with the paid taxes. A good example for this is the effect of the last decade’s single rate tax reforms on economy and tax morale, where differences were explained by the different transformation of social insurance systems and taxes (Keen et al. 2006).

In the opinion of OECD experts the citizens responses reveal socioeconomic and institutional factors that may influence tax morale. (OECD, 2013)

¹² http://epa.oszk.hu/00000/00017/00171/pdf/01_simonovits.pdf, 484.o.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The World Values Survey gives data to help build a better picture of tax morale. The OECD used data from WVS, which covered around 90 countries¹³.

Some very interesting observations can be found in this paper, like: “Individuals are more likely to perceive tax obligations more favourably when their government is seen to be acting in a trustworthy manner”. (OECD, 2013. p. 7.)

When state strengthens and clarifies the links between revenue and expenditure it can help to improve tax more of society. Increase the transparency of tax policy making, increase the number of tax administration procedures: these measures would reduce opportunities for corruption and the willingness the cheat with tax revenues.

Hungarian deliberations and initiations

According to Kornai’s (1990) thoughts Hungarian tax policy should be based on impersonal tax elements. Besides sales tax (which has even reached record level within the EU) we should improve wealth tax. This aspect is in line with OECD’s suggestions. The income from wealth taxes in OECD countries make up for the 2% of GDP. For Hungary it was only 1% in 2008. In this sense the attempt to introduce property tax in 2009¹⁴ wasn’t groundless, although it was annulled by the constitutional court in 2010. In its regulation the court expressed that the tax in itself wasn’t against the constitution, only the method of calculating the rateable value was inappropriate¹⁵.

¹³ Hungary was not involved in the survey, for Eastern Europe Bulgaria, Moldova, Poland, Romania, Russia, Serbia, Slovenia, Ukraine was involved.

¹⁴ The Hungarian Parliament accepted the law on the taxation of high value assets on the 29th of June, 2009.

¹⁵ 8/2010. (I.28.) regulation by the constitutional court:
[http://public.mkab.hu/dev/dontesek.nsf/0/4B835332BADF8C9DC1257ADA00528EA1?
Open Document](http://public.mkab.hu/dev/dontesek.nsf/0/4B835332BADF8C9DC1257ADA00528EA1?OpenDocument)

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

*Suggestions of experts of National Bank to improve taxation and tax morale in Hungary*¹⁶

The tax burden on employees and self-employed has to be equalled. It decreases the attempt to show incomes from work as incomes of entrepreneur activity. Moreover allows decreasing the burden of work and increases horizontal equality, which can raise the justice of taxation and increase tax morale.

Improving trust toward the system of pension. Superannuation tax, in theory, opposite to taxes means that we will have as much pension in the future as much money we paid, so paying this can be considered as an inevitable saving which secures subsistence in old age. Avoiding paying superannuation tax can have more causes. On the one hand it can be motivated by the discredit in the system of pension. People may think that they can take care about their own savings in a better way and these liquid savings act also as a security till then.

Increasing local incomes from taxes. In theory those payments which are in relation with local services can be more acceptable, because the connection between payments and services can be more sensible. According to Tiebout model, individuals are like customers, when they decide about at which self-government's area they should move on the basis of "programs" (Tiebout, 1956). In this sense the local tax payer votes with its feet. It makes possible to produce local utilities efficiently, because tax payers decide about secured public utilities on the basis of local taxes, like customers decide what to buy, considering market price. Until taxes are in harmony with marginal cost - which means the extension of local services for new settlers - the result will be optimal in Pareto sense like in the case of private sector. As an example local entrepreneurship tax offered to companies by the self-government can inspire developments and local services.

Tax amnesty should be avoided. According to international experience (e.g. Greece) tax amnesty can decrease tax morale, and if repeated amnesty is expected then willingness of paying taxes may also fall.

Developing the communication of tax authority to improve tax morale. In 1996 IOTA (Intra-European Organisation of Tax Administrations) has been established to support the cooperation of different tax authorities in different countries. 44 national tax offices joined the organization. The

¹⁶ http://www.mnb.hu/Root/Dokumentumtar/MNB/Kiadvanyok/mnbhu_mnbtanulmányok/MT_65.pdf

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

office of IOTA is in Hungary, Budapest¹⁷. By the help of this organization the practice of national communication techniques is shared, as well as the fair administration and the experience of teaching students about taxation.

According to the results of a research made by the British tax authority, every authority after understanding the mechanism of tax payers' behaviour should have the possibility to change parameters of the tax-system to inspire tax payers to pay their tax more properly. As a result of this research the tax gap was decreased by the help of information about tax payers. The methods are the following:

- decreasing administrative limits and simplifying the processes at those tax payers who fulfilled their payment duties
- making preventive advices and developing education at those tax payers who fulfilled their payment duties only partly
- carrying out proportional penalties at those tax payers who violated their payment duties¹⁸.

Methodology of the research

Due to these negative socio-economic conditions I decided to observe the willingness of tax paying of individuals, and their knowledge about the share of self-governments from the state tax income as well as their opinion about those immoral behaviour which are against the taxation rules. In order to test I used a survey questionnaire which can be found in the annex of the paper.

The questionnaire was filled by 95 persons, mostly part-time students taking part in adult education at the Budapest Business School and some employees of BBS.

The dependent variable was the individual level of tax morale and the explanatory variables were demographic variables, personality characteristics, commitment to local self-governments, willingness of taking different levels of risk, etc. The used statistical methods for testing the relations between the variables were the following: multivariate correlation and regression, analysis of variance, t-tests for testing correlation coefficients. The general level of significance is 5%, unless it is stated otherwise.

¹⁷ Intra-European Organisation of Tax Administrations (2008): IOTA Strategy 2008-2012 (IOTA, Slovenia)

http://www.iota-tax.org/images/stories/documents/statutory_documents/strategy_2008-2012.pdf

¹⁸ http://elib.kkf.hu/edip/D_15441.pdf

Empirical results

Out of the 95 participants 75 answered that there exist shared state taxes. According to them the local self-governments receive on average 29% of the total vehicle tax while this ratio is much lower, only 10.82% on average in case of PIT. (Note, that the right answer was 40% in case of vehicle tax and 0% in case of PIT.) However it is noteworthy that the standard deviation of the answers is rather large either in the case of vehicle tax or in the case of PIT: 31.75 and 17.55 percentage point respectively (which means that the coefficient of variation is above 100% in both cases, meaning that the answers are quite heterogeneous). Generally we can say that respondents are not really aware of the right share of state taxes but they mostly consider lower shares of the total tax revenue of the state, however there are a few exemptions as well (e.g. there were also responders who believe that 100% of the vehicle tax and PIT is received by local self-governments).

Not only the measure of shared state taxes are not clear for most of the responders but even the 20 cases out of the 95 can be considered as too low who answered that there are no shared state taxes in Hungary at all. My assumption was that adult students of economics (not freshmen) who are 30 years old on average know the fact that either the vehicle tax or the PIT are shared state taxes which form the income of tax systems both on state and local level. This significant ignorance may cause the high level of variation in the answers concerning the shares of local governments from the mentioned two state taxes.

It is important to emphasise that exactly half of the responders would accept even higher tax rate if they were sure that the surplus above the official tax rate is the exclusive revenue of the local self-government. As it is visible in Table 1, males have significantly higher willingness to accept higher tax burden for this reason. Compared to the current 16% PIT rate, males would accept even more than two percentage point higher tax rate in order to help the functions of the local self-governments. In case of females this extra tax burden is almost one percentage point lower on average which difference between the two gender is significant ($F=5.31$; $p=0.023$).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 1. Willingness of paying extra tax burden (percentage point)

<i>Gender</i>	<i>Mean</i>	<i>St.dev.</i>
Male	2.13	2.55
Female	1.16	1.55

Source: own calculation.

It is generally accepted that payments in connection with local services are typically more accepted since the relation between the payment and the service is more appreciable (Tiebout, 1956). According to this model the individuals appear as consumers who decide to which local self-government they move based on the possibilities they have to offer. In the view of Tiebout it makes possible to efficiently produce local public goods since the customers choose from the public goods provided by the local communities based on the level of local taxes similarly to the choice of the customers in the market based on the prices of products¹⁹.

As a result, inhabitants and enterprises with the same preferences will be concentrated in the same district. The theory of Tiebout resulted in several models of efficient inter-governmental race for mobile resources of economy.

Table 2 contains the correlation matrix of the observed variables. Those correlation coefficients are marked by bold which are significant at the 5% level. In the following the most important ones are discussed which are interesting for the research topic.

It seems that men support the finance issues of local self-governments more than females, since they are not only willing to pay higher tax burden in order to increase local revenues but they assume that self-governments receive higher shares from vehicle tax and PIT. However this is only an assumption at their side, which is possibly a higher share than the actual real rate, it is noteworthy. I do not consider it as a systematic failure of overestimation by males. In connection with the males' willingness of paying higher tax burden, I think it shows rather the pursuit that males support more the delegation of the use of public resources at the local level.

¹⁹ As long as the payable taxes are in line with the marginal cost of expanding the local services to a newcomer, the result can be considered as Pareto optimal like in the case of private sector. For example the local business tax may support those developments and local services which are offered to entrepreneurs by the self-governments.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 2. Correlation matrix of the examined variables

	<i>Local self-gov. share from vehicle tax</i>	<i>Extra tax from PIT</i>	<i>Extra tax burden for self-gov.</i>	<i>Pay for fictive inv. if the risk is</i>				<i>Mach. score</i>
				<i>0%</i>	<i>25%</i>	<i>50%</i>	<i>75%</i>	
Share from vehicle tax	1							
Share from PIT	0.2382	1						
Extra tax burden	-0.1016	-0.0368	1					
Fictive inv. (risk: 0%)	-0.1875	0.0374	-0.0601	1				
Fictive inv. (risk: 25%)	-0.1402	0.0230	-0.0326	0.6209	1			
Fictive inv. (risk: 50%)	-0.0765	0.0203	0.0415	0.2900	0.6214	1		
Fictive inv. (risk: 75%)	-0.0043	-0.0701	0.0084	0.1648	0.4485	0.8010	1	
Mach score	0.0431	0.0586	0.0750	0.3462	0.2215	0.1685	-0.0024	1
Gender	0.2023	0.3042	0.2325	0.1590	0.1633	0.1724	0.1899	0.144
Age	0.0495	0.0241	-0.1153	-0.2458	-0.1510	-0.2339	-0.1657	-0.273

Source: own calculation.

Responders were asked to imagine the situation that the general PIT burden is 30% and they have realised 1 million HUF income for an extra work which is similar to their general occupation but not part of their job. They have the possibility to buy a fictive invoice of half million HUF which can be considered as cost and this way it reduces the income to its half. The question was, how much percent of the nominal value of the invoice are they willing to pay in case of different risk levels of being caught. The answer at 0% of risk is considered as the individual level of tax morale. The possible maximum for this question is 30% since it would be totally against the rational decision making if anyone paid more than 30% of the nominal value of the invoice in case of 30% tax burden. If someone is willing to pay the total tax burden (30%) to a third party instead of the state then his/her tax morale is considered as zero (0%). If someone refuses to pay anything for a fictive invoice even in a riskless option then his/her tax morale is considered as full (100%). So the answers for the riskless option (between 0 and 30%) were transformed to a scale between 100 and 0%.

Maybe it is surprising that 29.5% of the responders would pay even the total tax burden for a fictive invoice instead of paying it to the state budg-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

et... Even if there is no risk of being caught it must be clear for all that this behaviour is immoral and causes damages for the society.

As it was expected there is direct relationship between the level of Machiavellian personality and the maximum amount paid for a fictive invoice in a riskless option ($r=0.346$). It can be explained by two reasons: on the one hand it is not a dilemma to reach individual gain at the expense of the society for people with strongly Machiavellian personality, while on the other hand these people consider the state leaders typically as opportunistic and self-serving persons which may justify their behaviour of decreasing the tax revenues.

There is a less than intermediate strength, indirect relationship between the age of responders and the maximum amount paid for a fictive invoice in a riskless option ($r=-0.246$). Anyway, it has to be emphasised that it does not mean at all an increasing tax morale as time passes. This research compared the answers of people as cross-sectional data and it shows that the tax morale of older people is significantly higher at the date of observation. Obviously it does not mean that the tax morale of the younger people will be better as they are getting older. The appalling thing is that after several years, as the older people of now will retire and get out of the sphere of active tax payers, their place will be taken by this younger generation with its lower tax morale. All in all, the current situation does not support the increase of tax morale in the next years. In my opinion some important steps are necessary to reverse this negative tendency concerning the tax morale of the younger generation. Without a successful intervention of the state the tax morale will not get better (e.g. "I was not caught so far, why should I pay in the future?") and what is worse, this rather negative tax morale will be the example for the next generations.

The maximum amounts paid for a fictive invoice in case of different levels of risk are not independent of each other. Obviously only those people will pay for a fictive invoice in a risky option who would do this also in a riskless option, however vice-versa it is not necessarily true. It can be seen in Table 2 that strong relationships are only between the low risk options and between the high risk options. There is a more than intermediate strength direct relationship between the maximum amounts in case of the riskless and low risk options ($r=0.621$), while there is a strong direct relationship between the maximum amounts in case of the high risk options ($r=0.801$). Naturally the risk of being caught influences negatively the maximum amount paid for a fictive invoice which can be observed in Table 3.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

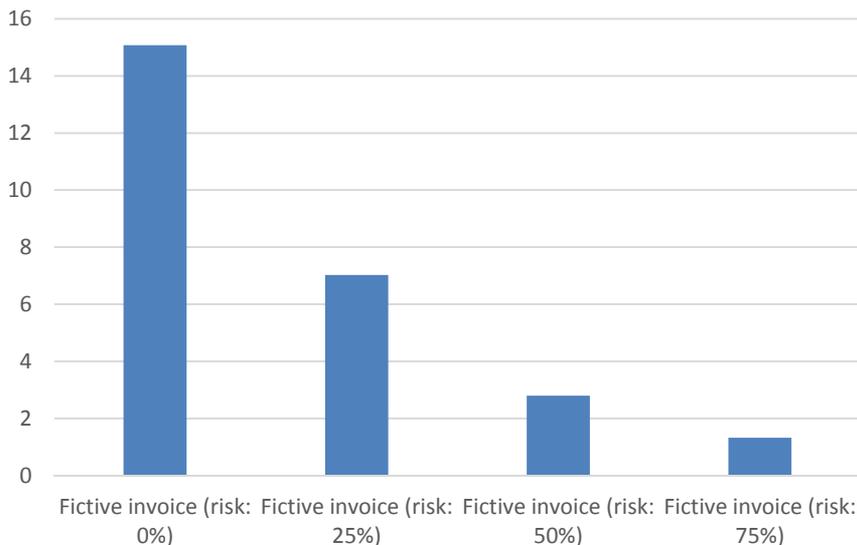
In case of no risk the responders are willing to pay on average even the half of the tax burden for a fictive invoice. If the risk is 25% then this amount decreases to its half. As the risk increases the amount decreases exponentially. This indirect relationship is strong and significant even below the 1% level ($F=48.56$; $p=0.0000$).

Table 3. Relation between the risk of caught and tax morale (percentage point)

<i>Risk level</i>	<i>Mean</i>	<i>St. dev.</i>
Fictive invoice (risk: 0%)	15.07	12.47
Fictive invoice (risk: 25%)	7.03	9.44
Fictive invoice (risk: 50%)	2.80	5.71
Fictive invoice (risk: 75%)	1.33	4.57

Source: own calculation.

Figure 2. The maximum ratio of the nominal value paid for a fictive invoice in case of different levels of risk



Source: own calculation.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Even though the sample is not representative, it is visible that in case of no or minimal supervision the fictive invoice is a real option to reduce the tax base for those who have some extra income. However the willingness for this kind of manipulation intensively decreases if the risk level reaches at least 50%. Considering that there are no exact data for the tax payers about the real risks, these are more-or-less some kind of subjective probabilities, there is a good possibility to reduce tax evasion by strengthening the general belief about the efficiency of supervision and the higher and higher risk of being caught.

The Hungarian National Tax and Customs Administration (NTCA) has introduced a more efficient and more powerful supervision system after its organisational transformation in 2011. In 2012 there were 2029 supervision processes concerning private asset growth which is almost double than in 2011. Out of the 2029 supervisions 1578 (78%) finished with a sanction, resulting altogether 20.6 billion HUF tax difference that is 89% higher than in the previous year. I do not believe that tax morale can be strengthened only by increasing the number of supervision processes or by increasing the level of tax fines, however it may have enough restrictive power for tax payers with “vacillating” tax morale in case of significant risk of being caught.

The regression coefficients of those explanatory variables which are in the closest relation with the tax morale can be seen in Table 4.

Table 4. Explanatory variables of tax morale

<i>Coefficients</i>	b_i	$s(b_i)$	<i>t-value</i>	<i>p-value</i>
Constant	56.974	20.443	2.787	0.006
Mach score	-0.775	0.274	-2.830	0.006
Gender	-9.273	8.175	-1.134	0.260
Age	0.804	0.494	1.627	0.107

Source: own calculation.

The Mach score of the responder influences indirectly and most significantly the individual tax morale. Both variables are measured on a scale between 0 and 100. In case of 1 point higher Mach score (more Machiavelian personality) the tax morale is on average 0.78 points lower according to the regression, which effect is significant below the 1% level ($p=0.006$). It is easy to realise how strong and deteriorative is this effect: compared to a generally well-meaning person (let's suppose a low Mach score of 20) a

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

person with more or less Machiavellian personality (a Mach score of 70 is not rare) has on average cca. 40 points lower tax morale.

Generally speaking the tax morale of males is a little lower than females, however the effect of gender is not significant ($p=0.26$).

In case of the effect of age we can repeat that the tax morale of older generations is currently significantly better than the younger generations (a one year older responder's tax morale is on average 0.8 points higher), which effect is significant at the 10% level.

The multiple coefficient of correlation for the total regression function is $R=0.4$ ($F=5.63$; $p=0.0014$). So we can conclude that the exploration of some further influencing factors is necessary, however the Mach score is a significant determinant of tax morale and possibly the generation effect is also important.

Conclusions

One goal of my study was to create a structure to help defining tax morale which is a complex phenomenon, examined by the tools of law, economy, sociology and psychology. In my paper I analysed the Hungarian tax morale in connection with personal aspects, the taxation of the socialism and the period after the regime change.

We have seen by the help of some historical examples and some actual macroeconomic data that the level of tax morale is quite low in Eastern-Central European countries like Hungary. Based on a questionnaire survey answered by 95 Hungarian people this fact is supported and we observed the main reasons and motivations of this low tax morale.

The questionnaire was filled by 95 persons, mostly part-time students taking part in adult education at the Budapest Business School and some employees of BBS.

Out of the 95 participants 75 answered that there exist shared state taxes. Generally we can say that respondents are not really aware of the right share of state taxes but they mostly consider lower shares of the total tax revenue of the state, however there are a few exemptions as well.

Not only the measure of shared state taxes are not clear for most of the responders but even the 20 cases out of the 95 can be considered as too lot who answered that there are no shared state taxes in Hungary at all. My assumption was that adult students of economics who are 30 years old on average know the fact that either the vehicle tax or the PIT are shared state taxes which form the income of tax systems both on state and local level.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Maybe a less complicated, more transparent and easier to understand tax rules would be able to strengthen the willingness to pay taxes properly.

It seems that men support the finance issues of local self-governments more than females, since they are not only willing to pay higher tax burden in order to increase local revenues but they assume that self-governments receive higher shares from vehicle tax and PIT. In connection with the males' willingness of paying higher tax burden, I think it shows rather the pursuit that males support more the delegation of the use of public resources at the local level.

There is a less than intermediate strength, indirect relationship between the age of responders and the maximum amount paid for a fictive invoice in a riskless option. Anyway, it has to be emphasised that it does not mean at all an increasing tax morale as time passes. This research compared the answers of people as cross-sectional data and it shows that the tax morale of older people is significantly higher at the date of observation. All in all, the current situation does not support the increase of tax morale in the next years. In my opinion some important steps are necessary to reverse this negative tendency concerning the tax morale of the younger generation.

Concerning the personal characteristics, Machiavellian personality shows indirect relation with willingness of taxpaying. The Mach score of the responder influences indirectly and most significantly the individual tax morale. Both variables are measured on a scale between 0 and 100. In case of 1 point higher Mach score (more Machiavellian personality) the tax morale is on average 0.78 points lower according to the regression.

Naturally this survey was not representative, however it is still able to show which points of the system are to be changed urgently. A less complex but more proportional tax system which is easier to understand for most people, with a more transparent and effective redistribution of collected taxes, besides an efficient tax control could significantly increase the general level of tax morale.

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**Proceedings of the 8th International Conference on Applied Economics
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18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
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**Valuation Effect as a Determinant of the
International Investment Position in Central and
Eastern European Economies**

JEL Classification: *F36; F41; F62; G15*

Keywords: *international finance; valuation effect; international investment position; Central and Eastern European economies*

Abstract: The aim of this paper is to evaluate the significance of the valuation effect in determining the dynamics of the net international investment position of CEE economies. For this purpose an analysis of BoP and IIP time series for the four largest CEE economies (Poland, the Czech Republic, Hungary and Romania) for the years 2005-2013 was carried out. The exercise revealed that the valuation effect (VE) is, in the short run, the key determinant of net IIP changes (for most observed years). Nevertheless, in the long-run its influence decreases as valuation gains and losses tend to cancel each other out. As the VE is relatively volatile, it is important to analyse its dynamics over the mid and long-term when evaluating the IIP. The significance of the VE for determining net IIP dynamics turned out to be non-investment-type specific because valuations of both the short-term and long-term investments contributed in a large part to the change in the net IIP. Similarities in the dynamics of the VE in CEE countries prove that the VE depends to a large extent on the general price fluctuations in financial markets that nowadays exhibit strong correlations across countries.

Introduction

Economic transactions between residents and nonresidents influence the level of foreign assets and liabilities compounding the international investment position (IIP) of a national economy. The IIP, being an international balance sheet of the economy, is one of the closely analysed variables when evaluating an economy's external position. The net IIP, measured as a difference between the levels of foreign assets and liabilities, indicates whether the economy is a net debtor or creditor to the rest of the world; which in turn defines risks to which the economy is exposed in an international context. However, international transactions are not the only determinant of net IIP fluctuations. The other factor underlying the changes in the net IIP are valuation adjustments to existing stocks of assets and liabilities.

Empirical research indicates a significant role for the valuation adjustment in determining the IIP in developed countries and in some developing countries. Lane and Milesi-Ferretti (2001) estimate foreign assets and liabilities for 67 countries (excluding Central and Eastern European transition economies) for the period 1970–1998 based on balance of payments data and explore the sensitivity of the estimates to the valuation adjustment. They indicate that the valuation effects are quantitatively important for a number of countries in the sample. Higgins et al. (2007) prove a large role for the valuation effect in determining the net IIP of the United States during the period 2001–2005. Gourinchas (2008) indicates that short-term fluctuations in a country's external asset position appear to be increasingly driven by the valuation component. He measures the cumulative valuation effect (since 1950) in a sample of industrialised countries and concludes that it is significant and has been growing in recent years: reaching 50% of GDP in the UK in 2000, 20% of GDP in the US and Canada in 2004 and slightly less in Australia. Macias and Nash (2007) point out that the valuation adjustment explains 55% of the change in the Spanish net IIP between 1993 and 2004. Devereux and Sutherland (2010) measure the importance of the valuation term in a sample of 23 OECD countries during the period 1980–2006. As the ratio for the variance of the valuation term to the variance of the change in net IIP is well above 50% for most countries, they conclude that the evolution of the net IIP is dominated by valuation gains and losses resulting from changes in asset prices and exchange rates. Gourinchas and Rey (2013) measure valuation effects for 10 countries in the 1970s, 1980s, 1990s and 2000s. Their research indicates that the importance of the valuation effect has been increasing over time and the aver-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

age magnitude of the current account transactions tend to be dominated by the average magnitude of valuation effects for determining the IIP adjustment in most of the countries analysed (the US, the UK, Ireland, Brazil, Russia, India, Switzerland).

During the decade after the accession to the European Union, the financial integration of Central and Eastern European economies (CEE) with the rest of the world advanced, which significantly influenced their IIP. Throughout this period changes in the valuation of foreign assets and liabilities were important in terms of determining the net IIP of CEE countries amid price fluctuations in international financial markets. The aim of this paper is to evaluate the significance of the valuation effect for determining the dynamics of the net IIP in CEE economies. Within the empirical research conducted the following hypotheses were verified:

- the valuation adjustment of foreign assets and liabilities as the key determinant of the net IIP dynamics in CEE economies,
- the significance of the valuation effect in determining the dynamics of net IIP in CEE economies as investment-type specific because investments of a short-term nature tend to be associated with a larger valuation effect.

In order to verify the hypotheses a statistical decomposition of a time series for balance of payments and IIP data was conducted. The time span of the analysis covers the years 2005-2013. The sample consists of the four largest CEE economies based on GDP¹ ranking; i.e. Poland, the Czech Republic, Hungary and Romania².

The structure of the paper is as follows. The first section depicts methodological aspects related to measuring fluctuations in the net IIP. In the next section fluctuations in the external investment position of CEE economies are presented and decomposed into contributing factors. The third section describes the significance of the valuation adjustment for major types of international investments. The conclusions from the analysis are presented in the final section.

¹ GDP at market prices in 2013 amounted to 389.7 billion EUR in Poland; 149.5 billion EUR in the Czech Republic; 142.2 billion EUR in Hungary, and 98.0 billion EUR in Romania (Eurostat data).

² Research project supported with funds from the National Science Centre.

Methodology of the research

A change in the net IIP position is the outcome of changes in stocks of foreign assets and foreign liabilities, which are in turn determined by foreign transaction flows and valuation adjustments. There are two approaches to measuring the determinants of net IIP changes. The first approach is to look at financial flows between residents and nonresidents, which include official reserve asset transactions. The second approach emphasizes flows resulting from current transactions as the reason for net IIP changes. Through balance of payments accounting identity, financial flows (including reserve asset transactions) are a counterpart to current transactions (including current and capital account transactions as well as errors and omissions). As a consequence a deficit / surplus stemming from current transactions in the balance of payments is associated with a surplus / deficit in financial flows, which in turn leads to a decrease / an increase in the net IIP of an economy³.

$$\Delta N I I P = C A B + K A B + E O + V E \quad (1)$$

$$C A B + K A B + E O = -(F A B + R E S) \quad (2)$$

where:

- $\Delta N I I P$ – change in the net international investment position,
- $C A B$ – current account balance,
- $K A B$ – capital account balance,
- $E O$ – errors and omissions,
- $F A B$ – financial account balance,
- $R E S$ – reserve asset transactions (balance on official settlement transactions).

³ Changes in the net IIP can also be analysed on a relative basis (by looking at changes in the ratio of net IIP to GDP). The concept of the dynamics of external positions measured on a relative basis is presented in Lane and Milesi-Ferretti (2007a, pp. 73-74; 2007b, pp. 531-533,565-567).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The valuation effect (adjustment) is defined in the paper as a change in the net IIP which does not stem from foreign transaction flows. As a consequence the valuation adjustment is derived as the difference between the actual change in the net IIP and the balance on financial flows for a given period:

$$VE = \Delta NIIP + (FAB + RES) \quad (3)$$

where:

VE – valuation effect, with the rest of the notation as presented above.

**Fluctuations in the net external investment position of CEE economies
– an analysis of the underlying factors**

The abovementioned concept is exemplified below using the IIP data of CEE economies in the years 2005-2013. All four analysed CEE economies were net international debtors throughout the period as foreign liabilities surpassed foreign assets. What is more, in the analysed period the economies experienced a drop in the net IIP as the increase in foreign liabilities outpaced the growth in foreign assets⁴. In absolute terms, the mismatch between the growth in assets and liabilities was most noticeable in Poland (243.8 billion USD) and least significant in Hungary (17.5 billion USD)⁵. Among current transactions, the major contributor to the decrease in the net IIP in all CEE countries was the current account deficit (ranging from 29.2 billion USD in Hungary to 174.2 billion USD in Poland). At the same time, the capital account closed with a positive balance in all countries (mainly as a result of capital transfers from the European Union), positively affecting the net IIP level. Statistical discrepancies closed with a negative balance in all countries.

The combined current and capital account deficit (including errors and omissions) was reflected through an inflow of capital, leading to a positive

⁴ For a detailed analysis of the IIP dynamics in CEE economies during the period 1998-2007 see Sobanski (2010, pp.150-170).

⁵ In relative terms, the decrease in the net IIP for the analysed period amounted to 6.6% of GDP in Poland, and 1.5% of GDP in Hungary.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

balance in the financial account (adjusted for official settlement transactions). In the whole period analysed the financial flow ranged from 24.8 billion USD in Hungary to 170.3 billion USD in Poland. Whereas in the early years of the period the financial flow was a negative contributor to the net IIP adjustment in all CEE economies, later, the situation started to change. From 2009 the contribution of the financial flow began to diminish or even reverse to the positive side in some countries as a result of prevailing current account reversals (in Hungary, even turning trade deficits into trade surpluses).

The other factor influencing the net IIP was the valuation effect. The direction of its influence was different across the economies analysed. In Hungary, valuation adjustments led to an improvement in the net IIP for the years 2005-2013 (by 7.3 billion USD); whereas in Poland, the Czech Republic and Romania, to its deterioration (by 73.6, 20.8 and 7.9 billion USD respectively).

Table 18. Factors underlying changes in the net IIP of CEE economies for the years 2005-2013

billion USD	2005	2006	2007	2008	2009	2010	2011	2012	2013	2005-2013
Poland										
1. Change in net IIP	0.7	-	-	-1.3	34.9	35.2	26.3	56.3	29.8	-243.8
2. Current account	-7.2	13.2	26.5	35.0	17.2	24.0	25.8	18.3	-7.1	-174.2
3. Capital account	1.0	2.1	4.8	6.1	7.0	8.6	10.0	11.0	12.0	62.6
4. Errors and omissions	-0.8	0.3	-3.3	12.2	10.0	10.5	-9.9	-4.1	-8.2	-58.7
5. Valuation effect	7.7	27.7	49.9	39.7	14.7	-9.3	52.0	44.9	26.5	-73.6
6. Total (2.+3.+4.+5.)	0.7	38.4	75.0	-1.3	34.9	35.2	26.3	56.3	29.8	-243.8
7. -(Financial account + reserve asset transactions) (2.+3.+4.)	-7.0	10.8	25.0	41.0	20.2	25.9	25.7	11.4	-3.3	-170.3
Czech Republic										
1. Change in net IIP	2.8	17.9	26.5	-1.4	14.2	-3.5	6.5	-7.3	9.4	-52.2
2. Current account	-1.2	-3.1	-7.9	-4.8	-4.8	-7.6	-6.1	-2.6	-2.9	-41.0
3. Capital account	0.2	0.4	1.1	1.6	2.7	1.7	0.8	2.7	3.8	15.1
4. Errors and omissions	-1.7	-1.8	1.3	0.2	-2.6	-1.1	0.8	0.3	-0.7	-5.5
5. Valuation effect	5.5	13.4	21.0	1.6	-9.4	3.4	11.0	-7.7	9.1	-20.8
6. Total (2.+3.+4.+5.)	2.8	17.9	26.5	-1.4	14.2	-3.5	6.5	-7.3	9.4	-52.2

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

7. -(Financial account + reserve asset transactions) (2.+3.+4.)	-2.7	-4.4	-5.5	-3.0	-4.8	-7.0	-4.6	0.4	0.2	-31.3
Hungary										
1. Change in net IIP	0.5	23.5	11.7	16.4	11.9	20.6	16.3	2.3	6.2	-17.5
2. Current account	-8.2	-8.4	10.0	10.9	-1.0	0.3	1.1	2.3	5.5	-29.2
3. Capital account	0.7	0.7	1.0	1.7	2.3	2.4	3.3	3.3	4.9	20.2
4. Errors and omissions	-2.6	-2.7	-0.3	-3.5	-1.2	-1.3	-3.5	0.5	-1.0	-15.7
5. Valuation effect	10.6	13.1	-2.4	-3.6	12.0	19.3	15.4	-3.7	-3.2	7.3
6. Total (2.+3.+4.+5.)	0.5	23.5	11.7	16.4	11.9	20.6	16.3	2.3	6.2	-17.5
7. -(Financial account + reserve asset transactions) (2.+3.+4.)	10.1	10.4	-9.3	12.8	0.1	1.4	0.9	6.1	9.4	-24.8
Romania										
1. Change in net IIP	-4.9	21.2	31.1	17.3	10.7	2.2	-5.1	-8.9	-2.1	-99.1
2. Current account	-8.5	12.8	23.1	23.7	-7.0	-7.3	-8.3	-7.5	-1.8	-99.9
3. Capital account	0.7	-0.0	1.1	0.9	0.9	0.3	1.0	2.5	4.3	11.8
4. Errors and omissions	0.6	0.5	-1.3	-2.1	-1.7	-0.1	0.6	1.1	-0.7	-3.1
5. Valuation effect	2.3	-8.9	-7.8	7.5	-3.0	9.3	1.6	-5.0	-3.9	-7.9
6. Total (2.+3.+4.+5.)	-4.9	21.2	31.1	17.3	10.7	2.2	-5.1	-8.9	-2.1	-99.1
7. -(Financial account + reserve asset transactions) (2.+3.+4.)	-7.2	12.3	23.3	24.9	-7.8	-7.1	-6.7	-3.9	1.8	-91.2

Other remarks: A negative change in the net IIP results from the relative increase of foreign liabilities as compared to assets (i.e. a larger increase in liabilities than assets or a smaller decrease in liabilities than assets). Current account, capital account, errors and omissions, financial account, and reserve asset transactions represent respective balances from the balance of payments. The valuation effect represents the change in the net IIP resulting from valuation adjustments to stocks of foreign assets and liabilities.

Source: own compilation on the basis of International Monetary Fund data (International Financial Statistics, Balance of Payments Statistics) [accessed on: 03-12.05.2014; 03-07.11.2014].

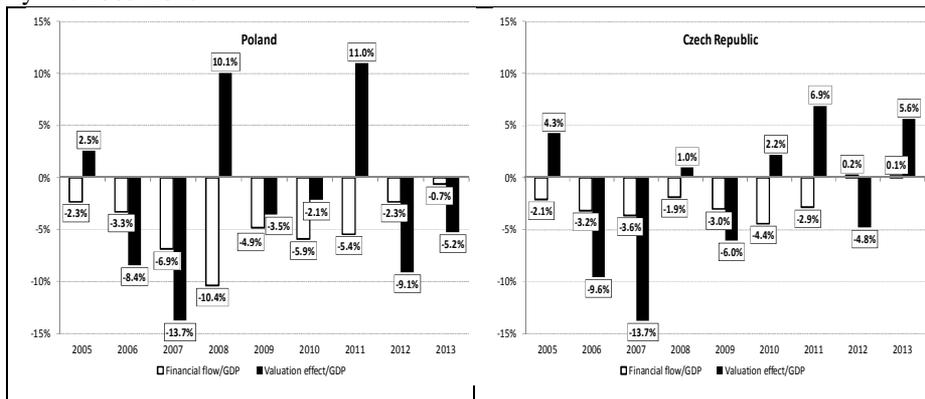
The significance of the valuation effect is even more apparent when one analyses the annual data. The VE was the major determinant of the IIP changes in most observed years in Poland, the Czech Republic and Hungary; and in one third of cases in Romania. The average annual contribution of the VE to net IIP fluctuations far exceeded 50% in Poland, the Czech Republic and Hungary (amounting to 60%, 69% and 56% respectively) and

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

was close to 40% in Romania⁶. The significance of the valuation adjustment is also apparent when compared to the size of the respective economy. On average it amounted 3.5% of GDP each year in Romania and more than 6% of GDP in the remaining CEE countries⁷.

The contribution of the VE was relatively volatile as it changed the sign from a positive to a negative one (and vice versa) several times. In the years preceding the outbreak of the world financial crisis, valuation adjustments increased the net foreign liabilities of CEE economies, which was a reflection of the rising prices of financial instruments across the globe. For instance, in 2007 the net IIP deteriorated by almost 14% of GDP in Poland and the Czech Republic simply as a result of valuation amendments to existing stocks of foreign assets and liabilities. In the years 2010-2011 the VE positively affected the net IIP; leading to a drop in the net foreign liabilities of CEE economies (this was especially apparent in Hungary, where the positive contribution exceeded 11% of GDP in each year).

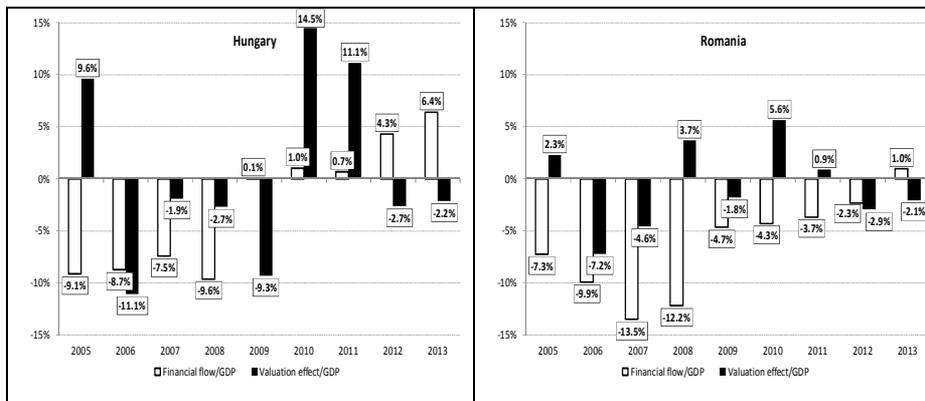
Figure 11. Decomposition of changes in the net IIP of CEE economies for the years 2005-2013



⁶ The contribution is estimated as the relation of the absolute value (modulus) of the VE to the sum of the absolute values of the VE and the financial flow.

⁷ The average is calculated based on the absolute values of the VE.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**



Other remarks: The financial flow represents the contribution of the financial account balance and official transactions in reserve assets to changes in the net IIP. The VE represents the change in the net IIP resulting from valuation adjustments to stocks of assets and liabilities. Both variables are presented on a relative basis, i.e. as a share of GDP.

Source: own compilation on the basis of IMF data (IFS, BoPS), OECD data, and Euro-money Institutional Investor Company data (CEIC) [accessed on: 03-12.05.2014; 03-07.11.2014].

The valuation adjustment for different types of international capital flows in CEE economies

The VE for the net IIP can be decomposed into the valuation effect on the assets side as well as the liabilities side of the investment position. As both assets and liabilities are not uniform categories it is advisable to further analyse different categories of investments, compounding assets and liabilities separately. One can differentiate between foreign direct investments, portfolio investments, other investments and derivatives. Additionally, reserve assets play an important role on the assets side of the IIP.

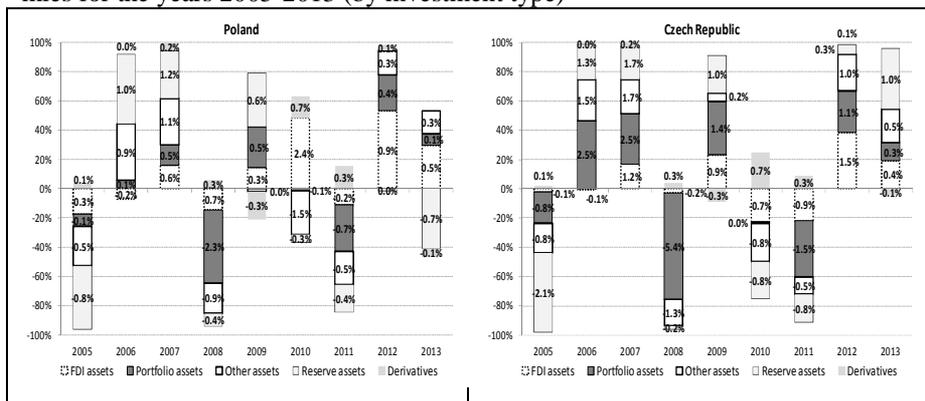
In general, there is no clear indication in CEE countries that a specific type of international investment was dominant in creating exposure to the valuation effect for the net IIP. Exposure by investment type was differentiated across countries and time as well as between assets and liabilities.

In the largest CEE economy, i.e. Poland, the average annual valuation effect (2005-2013) for all types of assets did not surpass 0.6% of GDP. In the Czech Republic portfolio assets were among most affected by valuation adjustments (1.5% GDP on average). In Hungary valuations of FDI, derivative assets and other investments fluctuated by more than 2.5% of GDP on average. However, it should be taken into account that the huge valuation adjustments to FDI stocks occurring since 2006 are in large measure due to

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

a change in the methodology of presenting transactions of SPEs⁸ in this country. In Romania, valuation adjustments were much less significant than in other countries, as foreign assets were of much lower importance in the national economy (one exception being official reserve assets).

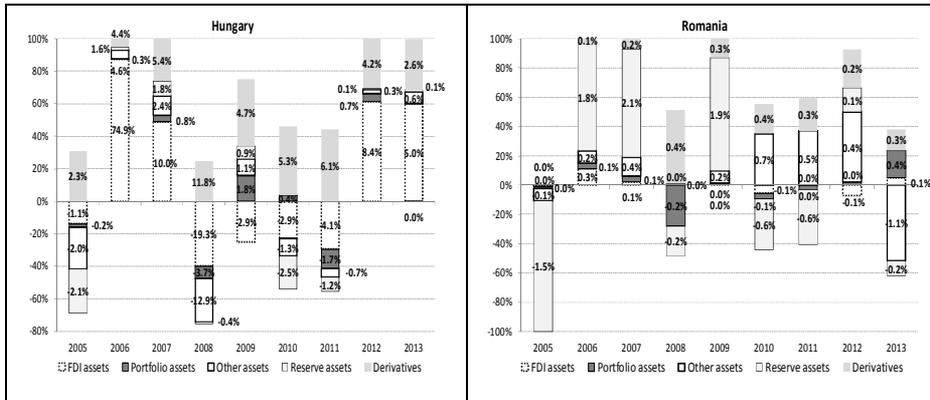
Figure 12. Decomposition of the valuation effect on foreign assets of CEE economies for the years 2005-2013 (by investment type)



⁸ The change in methodology followed an amendment to corporate tax law in 2002 that ended offshore status for tax purposes. From 2006, the MNB (Hungarian Central Bank) reported the balance of payments and international investment position data to international institutions in accordance with international statistical standards to allow for international and bilateral comparisons of statistics. As a result, data on flows and stocks of SPEs (enterprises set up in Hungary solely for tax optimisation purposes) are recorded on a gross basis. Thus, comparability of data for 2006-2013 with data for previous periods is limited. See [MNB, 2014a; ECB, 2007, pp. 359-360; UN Economic Commission for Europe, Eurostat and OECD, 2011, pp. 60-63].

SPEs activities are of a relatively large size in comparison to Hungarian GDP. According to the MNB the total gross loan portfolio of SPEs hovers in the range of 20-40 per cent of GDP [MNB, 2014b, p. 31]. However, one should take into account that the operations of SPEs playing a passive role in the intermediation of financial resources within international capital groups can lead to misinterpretation when analysing the real economic impact on the domestic economy. SPEs' operations are mainly limited to gathering funds from foreign sources and channelling them abroad. As a consequence, gross credit and debit flows resulting from SPE operations are of a similar magnitude and net flows over an extended period are close to zero [MNB, 2014a, 2014b].

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**



Other remarks: The height of the bar for each year is equal to 100% and is measured on the y-axis. The height of a section of the bar represents the share of a given type of asset in the total VE in a given year. Numbers provided within a bar or alongside represent valuation effects for the respective assets presented as a share of GDP in a given year.
Source: as in Figure 1.

CEE economies are net international debtors and their foreign liabilities exceed by far their foreign assets. For this reason the influence of the VE in respect of liabilities on the net IIP is usually much more significant than that of the valuation adjustment for assets. This was clearly observable in the period analysed.

In all CEE economies the changes in FDI valuations were at the forefront of liability fluctuations (with an annual average influence of 4.6% of GDP in Poland, 9.6% in the Czech Republic, 15.3% in Hungary⁹ and 2.3% in Romania)¹⁰. For portfolio liabilities the VE was also differentiated across countries: from 0.3% GDP in Romania to 5.0% in Hungary. The average annual adjustments to the valuation of other liabilities amounted to app.

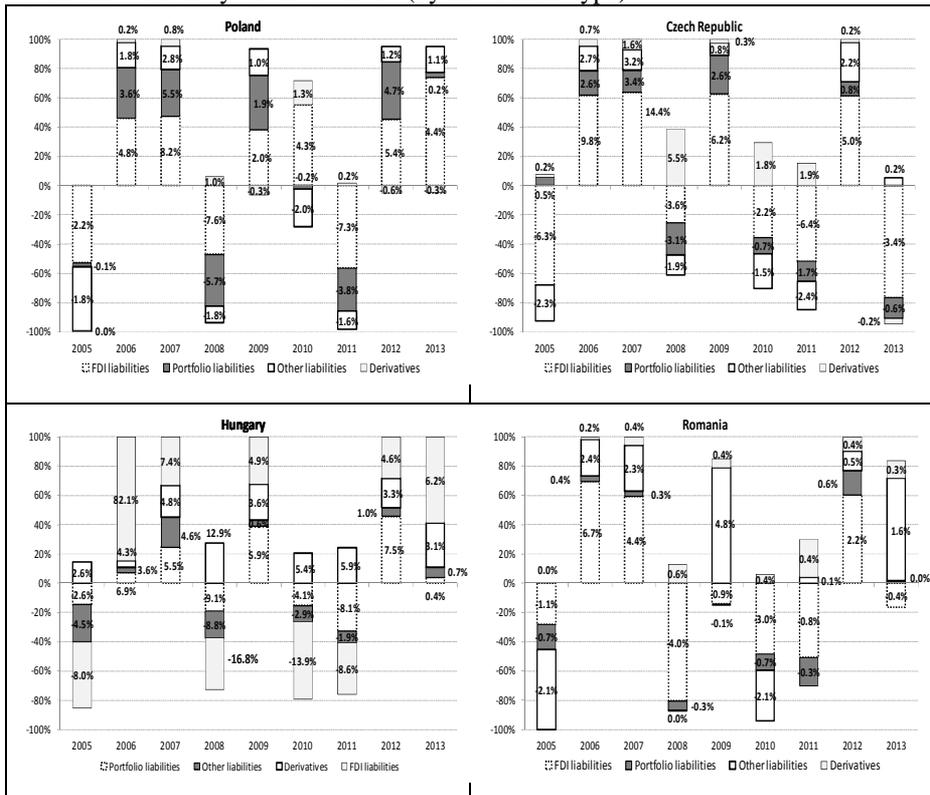
⁹ See comment in the previous footnote.

¹⁰ The size of the valuation effect may depend to a large extent on the method of valuation applied to a given type of foreign investment. Damgaard and Elkjaer (2014) and Kumah et al. (2009) indicate that the valuation method and the estimation technique can significantly affect a country's international investment position. Damgaard and Elkjaer (2014) exemplify this using the IIP data on FDIs for Denmark. Danish unlisted FDI equity liabilities vary from 22% to 156% of GDP depending on the estimation technique being applied under the price to earnings valuation method. To make cross-national comparisons easier the IMF implemented the Balance of Payments and International Investment Position Manual, sixth edition (IMF, 2009). However, as Damgaard and Elkjaer (2014) point out, the manual recommends seven methods for valuing unlisted FDI which makes international comparisons difficult.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

1.5% of GDP in Poland, the Czech Republic and Romania, and around twice as much in Hungary. Liabilities on derivatives were of less importance except for Hungary, where the average valuation adjustment amounted to 4.6% of GDP (close to the VE on assets) – which is again a reflection of the important role of SPEs in Hungary.

Figure 13. Decomposition of the valuation effect on foreign liabilities of CEE economies for the years 2005-2013 (by investment type)



Other remarks: The height of the bar for each year is equal to 100% and is measured on the y-axis. The height of a section of the bar represents the share of a given type of liability in the total VE in a given year. Numbers provided within a bar or alongside represent valuation effects for the respective liabilities presented as a share of GDP in a given year.
Source: as in Figure 1.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

It worth mentioning that the sign relating to the VE (both on assets and liabilities) was frequently changing from year to year. The pattern of the sign changes was similar across countries, which proves that the VE depends to a large extent on the general price fluctuations in financial markets which are positively correlated across countries (and not just on the country specific structure of the IIP).

One should bear in mind that the relative significance of valuation adjustments for a given type of investment (expressed as a percentage of GDP) is an outcome of the valuation variability and the size of the investment stock. In order to isolate the influence of the size of investment stock and look specifically at price fluctuations, one can measure valuation adjustments in relation to prevailing stocks of these investments. Using this approach, it is quite apparent that in all CEE countries derivatives (not surprisingly) experienced the largest price fluctuations, followed by FDIs and portfolio investments. For these two latter types of investments, equity instruments were the major reason for valuation adjustments.

Conclusions

During the last decade CEE economies experienced a change in foreign assets and liabilities that contributed to a significant decrease in the net IIP. The path of these changes was not smooth because the underlying factors were affecting the net IIP in opposite directions and in a variable manner. One of these factors was the valuation adjustment to existing stocks of assets and liabilities.

The valuation effect was the key determinant of the net IIP changes in the short run (i.e. for most observed years). Nevertheless, in the long-run (i.e. from the perspective of the whole analysed period) its influence decreases as valuation gains and losses tend to cancel each other out, whereas surpluses of financial flows tend to persist. Because the VE is relatively volatile (the sign relating to its influence frequently changes from positive to negative), when evaluating the IIP it is important to analyse its dynamics over the mid and long-term.

The significance of the valuation effect for determining the net IIP turned out not to be investment-type specific because valuations of both the short-term and long-term investments contributed in a large part to the change in the net IIP. At the same time, the importance of the VE by investment type was differentiated across countries and time as well as between assets and liabilities. Although no specific type of international in-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

vestment was dominant in creating exposure to the VE consistently, the prices of derivatives, followed by FDIs and portfolio investments, were the most volatile in percentage terms. For the latter two types of investments, the equity component was the major contributor to price fluctuations.

There are similarities in the dynamics of the VE in CEE countries, which proves that the VE depends to a large extent on the general price fluctuations in financial markets that nowadays exhibit strong positive correlations across countries (not just on the country specific structure of the IIP). Undoubtedly, the significance of the valuation effect in the analysed period was positively affected by sudden fluctuations in the prices of financial instruments amid the world financial crisis starting in 2008.

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**Proceedings of the 8th International Conference on Applied Economics
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18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
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Tax Incentives for Innovation

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Abstract: Tax incentives for innovation, including in particular the incentives for R&D investments, are universally used policy tools. Their availability and generosity have significantly increased over the past three decades. The observed proliferation of R&D tax incentives raises the question of the effectiveness (as well as other potential unknown advantages) of these policy instruments. The purpose of this paper is to carry out an analysis of the reasons (1) why R&D tax incentives became such a popular policy tool and (2) why there was an increase in generosity of this kind of incentives in recent years. As far as the theoretical base for the analysis is concerned, the paper refers particularly to (1) the inter-jurisdictional competition theories relating to tax competition and (2) the (quasi-) public-good nature of knowledge and innovation. The analysis is carried out with the use of the existing data and research on the subject. The results indicate that these are the changes (processes taking place) in the international environment that have considerably stimulated the proliferation and the increase in generosity of R&D tax incentives.

Introduction

Tax incentives for innovation, including in particular the incentives for R&D investments, constitute one of the main instruments for the science, technology and innovation (STI) policy. Although there are advanced

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

economies that still do not offer any tax arrangements for innovation (e.g., Estonia¹, Germany, New Zealand and Switzerland), R&D tax incentives can be regarded as universally used. The availability and generosity of these incentives have increased significantly, both in a long-run perspective (i.e., since the mid-1980s.) and over the past decade (see OECD, 2014, pp. 164-169; Westmore, 2014, pp. 126-127). The observed proliferation of various types of tax incentives for innovation as well as the increase in their generosity raise a question about the reasons for such a state of affairs. The answer to this question is all the more puzzling if one takes into account the fact that tax incentives for innovation – as indirect policy instruments – seem not to be more effective than direct policy tools, and their use may involve significant risks (described later in this article). The purpose of this article is to analyze the potential factors stimulating the increasing prevalence and generosity of the most popular tax incentives for innovation.

While reviewing the existing tax incentives one can observe that in recent years countries have become more creative in using novel incentives to spur research and innovation² (compare Atkinson, 2012, p. 172). However, these are the R&D tax incentives (and among them the R&D tax credit) that are the most commonly used. For this reason, as well as for the reason of data availability, the analysis carried out in this paper is delimited to the R&D tax incentives, with a particular focus on the R&D tax credit.

Methodology and structure of the research

The article addresses the reasons for proliferation and increasing generosity of R&D tax incentives. As a growing prevalence of a given policy tool is usually related to the advantages of its use, and in particular – to its effectiveness, the first problem analyzed in this paper addresses the relationship (and more precisely – the disparity) between (1) the effectiveness of the implementation of R&D tax incentives and (2) the increasing preva-

¹ It is worth mentioning that Estonia, despite the lack of tax incentives for innovation, achieved the largest increase in innovative performance among the European Union member states over the period 2006-2013 (European Commission, 2014b, p. 20).

² 'For example, some countries – including Denmark, the Netherlands, and Norway – have begun to extend R&D tax credits to cover process R&D activities, effectively extending the R&D tax credit from goods to services industries as well. [...] Several countries have recently adopted or expanded tax incentives designed to spur the commercialization of R&D. These incentives [...] allow corporate income from the sales of patented products (or in some cases from innovation-based products) to be taxed at a lower rate than other income' (Atkinson, 2012, p. 172).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

lence and generosity of this policy tools. The analysis is carried out with the use of the existing data and research on the subject. At this point, it is necessary to emphasize that the disparity indicated above is closely connected to the methodological approaches used while evaluating the effectiveness of the R&D tax incentives. The results of the existing evaluations of the R&D tax incentives effectiveness³ that are used for the analysis, represent a method based on a comparison between the amount of incremental industrial R&D and the loss in tax revenue.⁴ ‘The implicit assumption in this method is that the size of the subsidy has been determined and that the only question to be answered is whether it is best administrated as a tax credit or a direct subsidy’ (Hall & Van Reenen, 2000, p. 457).

The analysis carried out in the first part of the paper leads to a formulation of a hypothesis that the increased prevalence and generosity of the R&D tax incentives has been caused mainly by changes (or factors) external to the economic systems of individual countries, that is, by the changes in the international environment.

The second part of the article is devoted to the verification of the hypothesis presented above and contains the analysis of the factors that might have influenced the process of proliferation and the increasing generosity of R&D tax incentives. The analysis is carried out through the lens of the changes taking place in the international economy (listed later in this article), with the use of existing data and research.

As far as the theoretical background is concerned, the analysis, on one hand, relates to the inter-jurisdictional competition theories that focus on tax competition. On the other hand, it relates to the fact that technology and innovation have some characteristics of a public good (even though they can hardly ever be regarded as pure public goods). The basic downside of tax competition is that attempts by governments to attract (a given kind of or various kinds of) business investment may lead to inefficiently low levels of local public goods, termed in the literature as ‘under-provision’ of public goods or ‘allocative inefficiency’ (compare Lee, 2009, pp. 9-10). However, once the tax competition is directed at attracting investments to the R&D sector, it may at the same time positively influence supply of public goods (through the stimulation of technology and innovation development that – as it was mentioned above – are quasi-public goods). Moreo-

³ Covering mainly the effectiveness of the R&D tax credit.

⁴ B. Hall and J. Van Reenen (2000) provide a detail description of possible approaches to evaluating the effectiveness of any tax policy designed to correct the insufficient supply of quasi-public goods.

ver, the R&D financed by the state indirectly by the implementation of tax breaks may lead to the creation of a radical innovation and thus positively influence the state budget through other channels than corporate taxes.

On a more general level, the analysis of the factors that might have influenced the process of proliferation and the increasing generosity of R&D tax incentives is rooted in (1) the growth theory approaches for explaining the relation between growth and technology, that is: the neoclassical approach and the neo-Schumpeterian (evolutionary) approach⁵; (2) the concept of international competitiveness of countries, developed by, *inter alia*, X. Sala-i-Martin et al. (2013, pp. 3-51) and indicating innovation as one of the most important competitiveness factors.

Proliferation and generosity of R&D tax incentives versus their effectiveness and the balance of potential benefits and risks

The proliferation of R&D tax incentives and their increasing generosity raise expectations that (1) these policy instruments (in comparison with other policy measures) are characterized by better effectiveness and/or (2) there are some unique advantages of using them or the potential risk associated with their use is lower. The aim of this section is to check whether these expectations coincide with the reality.

The existing research results on the effectiveness of R&D tax incentives, in most cases, confirm that these policy tools are effective.⁶ However, they do not indicate that R&D tax incentives are characterized by any outstanding performance. That is to say, it is possible to achieve similar level of effectiveness through implementation of other policy tools. A literature overview concerning the effectiveness of R&D tax incentives⁷ is presented by B. Hall and J. Van Reenen (2000); they indicate methodological weaknesses of individual studies, as well as present their own research results. In general, Hall and Van Reenen confirm that fiscal incentives fulfill the function of R&D stimulators and conclude that 'a dollar in tax credit for R&D stimulates a dollar of additional R&D' (Hall and Van Reenen, 2000, p.

⁵ Although these are competing approaches, they agree on basic issues such as the importance of technology and innovation for economic growth, as well as the positive role that can be played by government policy for science and technology (Verspagen, 2006, p. 492).

⁶ The effectiveness of R&D tax incentives is dependent not only on the method of its evaluation but also on the design of R&D tax incentives (for details concerning the relationship between design and effectiveness see e.g. Elschner et al., 2009).

⁷ Focusing mainly on R&D tax credit.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

449). However, it is worth pointing that the conclusion cited above constitutes also a kind of evidence that the tax credit for R&D (which is the most popular among fiscal R&D incentives) cannot be regarded as a more effective R&D stimulator than direct policy tools. The dollar which a given state is losing in taxes (because of the implementation of R&D tax incentives) is simply spent on a given firm's R&D project. Hence, it is almost the same as in case of – for example – R&D grant: one dollar granted to a given firm with the aim to support some R&D project reduces the budget of a given state by 1 dollar. In this case, the only arguments in favor of the implementation of the R&D tax incentives (instead of direct measures) are: the fact that private companies have usually better knowledge (or intuition) concerning successful projects (so that they make better choices), as well as the fact that the administrative cost of the implementation of indirect measures is lower than in case of the direct ones. However, direct measures are more likely to support projects with a higher social rate of return (Bérubé and Mohnen, 2009, p. 207), and that can constitute a kind of 'recompense' for the downsides mentioned above.

What the above indicates is that the increasing prevalence of R&D tax incentives cannot be explained by their unique effectiveness.⁸ It is all the more so, if one takes into account the fact that there are also less optimistic studies as far as the effectiveness of tax R&D incentives is concerned; for instance, C.-H. Yang et al. (2012, p. 1586) indicate that:

'The R&D preferential policy of a tax credit has indeed induced additional R&D investment undertaken by firms in Taiwan, while the R&D-enhancing effect is much lower compared with experiences in developed countries surveyed by Hall and Van Reenen (2000). This casts the susceptible view regarding the effectiveness of R&D tax credit policy from the view of public finance.'

In addition, there are also studies finding that one euro of foregone tax revenue on R&D tax credits raises expenditure on R&D by less than one euro (for examples of such studies see: European Commission, 2014a). Apart from that, the empirical studies that compare the effectiveness of R&D grants and tax credits give ambiguous results; for example:

⁸ However, one should remember that the methodology of the R&D tax incentives effectiveness evaluation does not refer to the potential social return from R&D whereas, for example, J.W. Fedderke and B.G. Teubes (2011, p. 1787) argue that 'it is possible that the social return from R&D might be sufficient to allow R&D incentives to more than pay for themselves'.

‘A firm level research of Norwegian firms conducted by Hægeland and Møen⁹ suggests that tax credits appeared to have a slightly larger effect than direct support measures [...]. Empirical findings from a panel of 19 OECD countries¹⁰ indicate that direct support seems to have a larger impact than (volume-based) R&D tax incentives [...]. Instrument design and implementation might be more important determinants of additionality than whether the instrument is a direct subsidy or a tax incentive’ (European Commission, 2014a, p.39).

As the effectiveness of R&D tax incentives does not explain the reasons for their increasing prevalence and generosity, there is a question whether these instruments are characterized by unique advantages and/or whether the risk associated with their use is smaller than in case of direct measures. When a government decides to implement R&D incentives, then it has a wide range of instruments to choose, as tax incentives are only one way of stimulating the amount of R&D undertaken within the country. The use of all the potential R&D stimulators has its advantages and disadvantages, and the R&D tax incentives seem not to be any exemption (i.e., any distinguishing instrument) in this respect.

A. Carvalho (2012, p. 125) presents a brief literature overview on the pros and cons of R&D tax incentives in comparison with direct policy measures, and the OECD publications provide numerous descriptions of the risks associated with the use of these instruments (see, e.g., OECD, 2014, p. 164). The list of the most important downsides of R&D tax incentives, *inter alia*, includes (Carvalho, 2012; OECD, 2014; Busom et al., 2014):

- Greater (than in case of direct measures) risk of so called dead weight loss (i.e., risk of supporting projects which would have been carried out anyway);
- Risk of enterprises relabeling other activities as R&D;
- Risk related to the fact that private firms are likely to choose R&D projects with the highest private rate of return (whereas it would be desirable to spend public money on R&D research projects with the highest social rate of return);
- Risk related to high unpredictability as far as the amount of ‘tax loss’ is concerned, which means that governments, while using the instrument, face the problem of poor budget control;

⁹ Hægeland & Møen, 2007.

¹⁰ Westmore, 2013.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

- Risk of tax competition for R&D that could result in a zero-sum game at international level, and thus reduce government revenues in all countries involved.

Appendix 1 contains a comparison of advantages and disadvantages related to the use of tax incentives and direct measures. Briefly, it can be said that the pros and cons of using R&D tax incentives, in comparison with direct policy measures, do not explain the phenomenon of proliferation and increasing generosity of R&D tax incentives. Only the risk of tax competition created by the use of R&D tax incentives indicates that the popularity of these policy tools may be caused by factors that are external to the economic systems of individual countries and induced by the changing international environment.

**The increasing prevalence and generosity of R&D tax incentives
versus the changes in the international environment**

Some of the important factors that influenced the development of R&D tax incentives (as the STI policy tool) could be described as external to the economic systems of individual countries, because they are related to the changes in the international environment. These changes include: advancing globalization (and the associated trade liberalization), increasing FDI flows, regional integration of countries and the increasing role of innovation (and consequently – innovation policy) in the countries' economic development. The changes indicated above resulted in an additional set of factors for the implementation of R&D tax incentives by the national governments, and thus led to the increasing prevalence and generosity of these incentives.

The first factor influencing the development of R&D tax incentives is closely related to the globalization and regionalization processes and the growing importance of the foreign direct investment (FDI) inflows in the economic development of countries. On one hand, the globalization (and regionalization) of the world economy have made FDI incentives more important from the national governments' economic policy point of view.¹¹ On the other hand, the globalization and the accompanying trade liberalization have reduced the importance of market size as a factor determining the

¹¹ The increasing prevalence of investment incentives as a tool to attract FDI took place in the 1990s. As a result, in the mid-1990s more than 100 countries have already provided various investment incentives, and their number has been increasing rapidly (see Blomström & Kokko, 2003, p. 4).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

location of FDI. As a result, even small countries have gained the opportunity to successfully compete for FDI, provided they focus their actions on other FDI determinants, including the implementation of an attractive set of incentives. In consequence, the number of countries competing for the inflows of FDI considerably increased, and thus the competition became more intense. Moreover, the countries competing for inward FDI often try to attract the inflow of FDI to the R&D sector, as such investments are regarded to be the most profitable, because of the potential transfer of knowledge and/or technology.¹² From this point of view, R&D tax incentives can play a double role, that is, not only the role of R&D investment incentives (implemented to encourage domestic companies to develop R&D activities) but also the role of incentives for FDI in the R&D sectors.

The above processes and factors influence the generosity and proliferation of R&D tax incentives. They are closely related to one of the downsides of R&D tax incentives implementation, i.e.: the risk of tax competition between regions and/or countries. So, paradoxically, the generosity and popularity of R&D tax incentives is related, *inter alia*, to the development of its negative feature. It is the more so, as there is also one more reason for the R&D tax competition. The globalization and regional (or interregional) integration processes in the world economy made it much easier for the domestic companies to move their businesses abroad in a situation when the cost of running a particular business in another country is lower. Because of that, the R&D tax incentives may also be used to prevent the potential transfers of innovative domestic companies to other countries.

The process of regional integration in Europe that led to the establishment of European Union (European Communities), contributed to the emergence of another factor which influenced the increasing R&D tax incentives prevalence and/or generosity. This factor is related to the creation of innovation policy, coordinated at a supranational level. The policy guidelines formulated within the framework of the European Union innovation policy – because of their supranational character – can be regarded as an additional external factor that contributed to the development of R&D tax incentives in Europe. In 2000, the European Union member states launched the Lisbon Agenda that, *inter alia*, called for an increase in R&D expenditure (up to 3% of GDP), with a special focus on the private share of R&D expenditure which was to reach two thirds of the total expenditure by

¹² The experiences of Intel provide a good example of such competition. R.D. Atkinson and S.J. Ezell (2013, p. 174) describe the incentives offered by Israel, India, Vietnam and China in order to attract this multinational company.

2010. R&D tax incentives, as policy instruments stimulating private R&D expenditure, appeared to be useful as far as meeting the above innovation policy guidelines is concerned (compare Carvalho, 2012, p.128). Nevertheless, not all the countries managed to meet the objective set out in the Lisbon Agenda; some of them still have a low level of R&D expenditure and/or a relatively small private share of R&D expenditure. Hence, taking into account the fact that the strategy 'Europe 2020' (which replaced the Lisbon Agenda) as well set the target for the EU member states to invest 3% of GDP in R&D (and that private R&D investments are regarded to be better than public), the policy effect, stimulating the R&D tax incentives development in the European Union, still exists. Of course, similar stimulating effect can be also achieved at the national level by setting ambitious goals as far as the level of private R&D investment is concerned.

Conclusions

This article explores the reasons for the increasing prevalence and generosity of R&D tax incentives. The analysis carried out in the paper partly confirmed the hypothesis that the increased prevalence and generosity of the R&D tax incentives has been caused mainly by changes (or factors) external to the economic systems of individual countries, that is, by the changes in the international environment.

There is no doubt that the changes (processes) taking place in the world economy – such as: advancing globalization, increasing FDI flows, regional integration of countries, the increasing role of innovation in the countries' economic development – influenced the growth of prevalence and generosity of R&D tax incentives. These changes resulted in an additional set of factors for the implementation of R&D tax incentives by the national governments, and thus stimulated the proliferation and generosity of the above instruments. First of all, some of the changes contributed to the emergence and/or intensification of tax competition, and the tax competition led to the increased generosity and prevalence of R&D tax incentives. Furthermore, in case of European Union, the coordination of innovation policy at a supranational level appeared to be an additional external factor for proliferation and increasing generosity of R&D tax incentives in Europe. Nevertheless, it cannot be taken for granted that the changes in the international environment constituted the main cause for the proliferation and generosity of R&D tax incentives, as the decisions of the national governments concerning the implementation of R&D tax incentives could be also related to

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

the believe that the social return on innovation was so high that it exceeded the tax loss related to R&D tax incentives implementation (and thus there was no need to take into account other potential advantages of this policy instrument).

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Appendix 1

Advantages and disadvantages of tax incentives versus direct measures

	Advantages	Disadvantages
Direct measures	<ul style="list-style-type: none"> - Best suited to encourage high risk projects and to meet specific policy goals - Adequate to target R&D activities with the highest discrepancy between social and private returns - Competition between firms ensures that public resources are directed to the best R&D projects - Can be used to target specific technologies or scientific areas to overcome cyclical or sectoral slowdowns - Encourage cooperation and technology transfer - Better budget control 	<ul style="list-style-type: none"> - High administrative costs - Administratively not feasible to process a high number of applications - Firms may not undertake R&D projects not approved for public funding - Tendency to reward lobbyists and bureaucrats
Tax incentives	<ul style="list-style-type: none"> - Encourage an increase of R&D across the whole spectrum of firms (but can be used to target specific groups of firms) - The private sector can decide what is the most productive way to invest - Non-discriminatory nature in terms of research, technology fields or industrial sectors - Less risk of governmental failure in 'picking winners' (choosing the wrong R&D projects) - Encourage companies to report their profits more accurately - Avoid misappropriation of funds and rent-seeking activities by government's civil servants - Avoid an up-front budget since support is by means of forgone tax revenues - Lower administrative costs of planning, allocation and management - Least burdensome way of increasing business R&D 	<ul style="list-style-type: none"> - Poor budget control - Greater risk of dead weight loss (supporting projects which would have been performed anyway) - Less additionality in the case of very large companies - Risk of firms relabeling other activities as R&D - Government are not more successful than the private sector in 'picking winners' - Private firms will choose R&D projects with the highest private rates of return - Risk that the globalisation of R&D may reduce local R&D spillovers to society

Source: Carvalho (2012, p.125)¹³.

¹³ Carvalho based this comparison on research results coming from numerous sources; for details see his article.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
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The Role of the State in Creating a Green Economy

JEL Classification: *E12; F62; F63; F64; O20; O38; O44; P48; Q01; Q28; Q30; Q32; Q43*

Keywords: *sustainable development; environment; state; a green economy; energy*

Abstract: Starting from the crisis on the real economy in 2008 it has been developed an intense discussion, supported by a number of declarations on the global scale, about the need for changes in the economy. A huge impact on this state of affairs was the analysis of the causes and effects of the economic downturn and the challenges of the future. As a result, some states have taken action to remedy the situation. Many of them were aimed at structural changes in production, consumption and environmental friendly investment. At the same time gained in importance the concept of "low carbon economy" and "green economy".

The aim of this paper is to present the role of the state in the economy in terms of creating conditions for a green economy. The thesis of publication is: implementation of structural changes connected with creating a green economy requires the involvement of the state.

Introduction

As a result of the crisis 2008-2010, there were raised voices regarding the need for changes in both the basic paradigms of modern economics, as well as the structural framework of national economies. In the first case a

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

dispute flared up between opponents and supporters of liberalism. With regard to the second issue has gained in importance of the green economy concept. This is an economy based on the reduction of energy consumption, based on traditional energy resources, increasing energy and resource efficiency and increasing the share of energy from renewable sources.

Intensive efforts for green economy were taken especially in the United States. Green economy has also become one of the elements of the anti-crisis program adopted in the European Union. As justification for the introduction of structural transformation to a green economy can be identified: building new competitive advantages, the use of research potential, environmental considerations, the creation of new development framework. Creating a green economy, however, faces some obstacles: low demand for green products and services, higher cost of production of such goods, playing down the role of increased efficiency in the use of natural resources.

The purpose of this paper is identification states role in creating of a green economy.

Methodology of the research

The research method is based on the analysis of strategic documents, anti-crisis plans, measures taken by the state, as well as examples of practical actions initiated by countries, in terms of the real possibilities of implementation. At the same time it presents guidelines for the implementation of the state policy in the field of creation of a green economy introduced by international organizations.

The role of the state in the economy

After several decades dominated by the neoliberal doctrine, espousing reduce the role of the state in the economy, the crisis 2008-2010 revealed weaknesses of its assumptions. The sources of the crisis are justified both in the doctrinal concept, as well as the structure of the economy. No less important role played implications of market weakness. According to professor Grzegorz W. Kołodko: "Only the power of intelligent synergy with invisible hand of the market and the visible head of state creates opportunities for far-reaching economic success" (Kołodko, 2010, p. 95).

The state plays an important role in correcting scarcity of the free market in areas (Winiarski, 2006, pp.31-32):

- raising the efficiency of the economy in a societal scale,

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

- limit excessive inequalities in the distribution of the social product,
- stabilizing the economy.

There are also emphasized (Czaja, Becla, 2012, p. 134):

- the need for regulation in the economy,
- the existence of market failures in the competition,
- the existence of external effects.

Some of them revealed due to the economic crisis 2008-2010 especially in banking and financial sector. The effects of the crisis were the result of agreement for financial system to live its own live, because of limited regulations of innovation in that area (Flejterski, 2010, p. 138).

The state is obligated to ensure appropriate living conditions of citizens. That means not only working and livings opportunities, but also environmental quality. That have to be done through public concern about these elements, because of the enterprises activity and their pursuit of profit, which can be unrestricted, especially in use of the natural resources. This infinitive must be subjected to a rationalization. And that is, among others, the reason for which underlines the issue of sustainable development, defined as: "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (*Our common future*, (http)).

Significant is also quite common opinion, that the state is the largest economic entity, which regulates the functioning of other actors and institutions (Kaczmarek, 2004, p. 87). This conclusion corresponds with other: "We need a smart combination of the principles of economic freedom with a pragmatic, resulting from the principles of rationalism role of the state and the appropriate scope of the public sector" (Żyżyński, 2010, p. 41).

It should be emphasized that as a result of globalization, there appear new threats, which, because of its scope, require the active role of the state (Dach (ed.), 2008, pp. 16-17):

- environmental hazards, f. ex. destruction and environmental pollution, climate change;
- economic risk;
- social risk - increase in unemployment, poverty and hunger.

In some areas the role of the state is marginalized because of internationalization of economic relations and trade liberalization. On the other hand, it causes many negative effects and their limitation is possible only in cooperation of the states. This particularly applies to environmental issues.

A Green Economy – definition and main goals

The concept of a green economy has gained in importance as a result of the crisis of the real economy, which started in 2008. Its genesis dates back to 1989, when it was used for the first time in the report "Blueprint for a Green Economy", prepared for the Great Britain government (*Blueprint for Green Economy*, London, 1989). A green economy is linked to the reduction of energy consumption based on traditional energy resources, increase and resource efficiency and increase the share of energy from renewable sources. Presently is identified with the reduction of energy consumption, based on traditional energy resources, energy and resource efficiency, growth the share of energy from renewable sources.

The concept was mainly developed in 2008 and 2009 by international organizations such as the United Nations Programme for the Environment (UNEP) and the Organization for Economic Cooperation and Development (OECD) through various programs, reports and declarations. One of the most important paper in this issue is New Economics Foundation report "A Green New Deal", which indicated the need to overcome the "triple crunch" crisis: financial, associated with climate changes and the crisis resulting from high oil prices (*A Green New Deal*, 2008). Please note that never before such proposal, based on establishing a direction for economic development strongly associated with environmental considerations, not gained such importance, as in the case of the recent crisis. Although, a milestone in this issue was Brundtland Commission report – "Our Common Future" (1987) and establishing the principle of sustainable development (*Our Common Future*, 1987).

Explaining the reasons for this situation will help answer the question of what is a green economy. According to working definition, prepared by United Nations Environment Programme (UNEP), a green economy "results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities. In its simplest expression, a green economy can be thought of as one which is low carbon, resource efficient and socially inclusive" (UNEP, ([http](http://))). It is emphasized, that it can be regarded as a more pragmatic approach to the implementation of sustainable development (Burchard-Dziubińska, 2013).

Creating a green economy is aimed at achieving the following objectives (Szyja, 2013):

- increase of energy and raw materials efficiency,
- reduction of greenhouse gases (especially carbon dioxide),

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

- reduction of the level of pollution resulting from production processes,
- increase energy security,
- mobilizing the potential of innovative,
- acquiring new competitive advantages.

Implementation of these purposes is linked to the performance of green industrial revolution, that will generate global demand and create jobs, inter alia, through the development of clean and efficient technologies, increase the use of renewable energy, promotion of environmentally friendly transport systems (Szyja, 2011, p. 72).

In this sense a green economy includes the following elements:

- green products and services,
- green investments,
- green sectors of the economy,
- green public procurement,
- green tax reform,
- green jobs.

The first one group are products, that throughout the life cycle have a limited impact on the environment. Green investments are related to the energy self sufficient constructions or energy, raw materials efficient machines and equipments. It have been proposed to investment in natural capital, sustainable agriculture, human capital, infrastructure, innovation (Allen, 2012, p. 7).

In turn, green sectors of the economy are not only agriculture, forestry, and animal husbandry, but especially renewable energy, the production of environmentally friendly technologies.

Green public procurement, according to the European Commission, is “a process whereby public authorities seek to procure goods, services and works with a reduced environmental impact throughout their life cycle when compared to goods, services and works with the same primary function that would otherwise be procured” (*Public procurement for a better environment*, 2008, p. 4).

Green tax reform can help to cut down environmental externalities through appropriate structures of tax rates, tax exemptions (Aidt, 2010, pp. 31-43).

According to the International Labour Organization green jobs are those that (Szyja, 2013, s. 199):

- contribute to reducing the consumption of energy and natural resources,
- reduce greenhouse gas emissions,

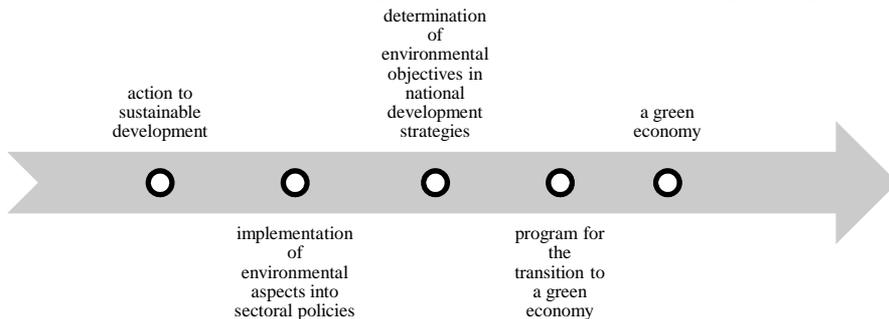
**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

- reduce the amount of waste and pollution,
- foster the protection of ecosystems and restore their original state.

As Edward B. Barbier emphasized: “Transitioning to a green economy requires a mix of short- and long-term policies, a different mix of policies and instruments for rich as opposed to poor countries, and overcoming the political difficulty of implementation”(Barbier, 2012, s. 887). In turn Cameron Allen (UN Division for Sustainable Development) argues that, therefore, national governments should adopt their own definitions of a green economy in accordance with national priorities and circumstances (Allen, 2012, p. 3).

The success of the specific elements of a green economy depends on the involvement of three groups of actors, that means states, businesses and societies in their commitment to implement. A particularly important role is played by the first one, because of the tools and instruments that are available to and associated with the formation of economic policy. No less important is the process to achieve a state of the green economy, which requires a systemic approach (picture 1).

Picture 1. Phases on the way to a green economy in the context of planning



Source: Author's own

Most European countries have implemented some elements of sustainable development principle, both in terms of planning solutions, as well as through specific practical ones. However after crisis have been proposing green growth policy toolkit, which includes a step-by-step guide, for example four categories of policy tools, promoted by international institutions (AfDB, OECD, UN, World Bank, 2012, p. 17):

- Incentivize - tools for pricing pollution and natural resource use, tools to complement pricing policies, tools to foster inclusiveness;

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

- Design - tools to manage uncertainty;
- Finance – financing and investment tools;
- Monitor – monitoring tools.

**Overcoming the crisis through the development of
a green economy**

Because of the crisis on the U.S. mortgage market, states were obliged to counteract. This public commitment was something new in the face of neoliberal mainstream with the release of Milton Friedman. This occurred as a result of public disillusionment arbitrary enterprises and limited regulatory systems of financial markets. In these circumstances, some countries adopted anti-crisis programs. Furthermore politico-economic union like the European Union did made the same step to overcome the negative effects of the economic downturn. A new and simultaneously element of these plans were measures, aimed at structural transformation of economies to more environmentally friendly. This course of states involvement was justified by the following arguments:

- reduce the potential for similar events in the future;
- meet the challenges of the future such as: energy crises, climate changes;
- create new capabilities for the development of economies;
- development of innovation potential associated with clean technologies;
- reduce the addiction to natural resources, especially petroleum, gas;
- increase the efficiency of production processes;
- create new jobs;

Below will be given examples of activities taken in this particular aspect.

January 8, 2009 President Obama announced “The American Recovery and Reinvestment Act”. The value of the anti-crisis plan was 787 billion USD, of which nearly 80 allocated to projects connected with clean energy. Direct expenditures have been focused especially on: energy efficiency, reduce pollution of air and water, modernization of the power grid, reduce carbon dioxide emissions, transport, research and innovation, renewable energy sources. Mentioned funds have been transferred to government agencies, state authorities, scientific institutions and company, in the form of loans, guarantees, grants.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

It is worth mentioned a few examples of projects. There have been developed project under the Department of Energy called SunShot, which aims to reduce the price of solar power to 1 USD / watt (up to 75%) in 2020 through advance in systems that convert light energy (photovoltaic technologies), increase productivity and optimize the use of solar and streamline procedures for obtaining permits for solar energy systems. Another instance is Clean Cities Program, covering nearly 100 cities. It has been designed to reduce the consumption of traditional liquid fuels and increase the use of renewable fuels and develop new technologies in the field of transport. In turn, DOE's Advanced Technology Vehicle Manufacturing (ATVM) encourages companies in the expansion of production facilities for electric vehicles.

In addition to the funds it have been started to develop standards for example for fuel consumption and emission:

- introduce new requirements for car models from the years 2012 to 2016. In 2016, the cars have to pass no less than 35.5 miles per one gallon of gasoline, it is almost 15 km per 1 liter (6.7 liters per 100 km),
- set measure for medium and heavy truck models 2014-2018,
- introduce The National Emissions Standards for Hazardous Air Pollutants for Utility Boilers.

Furthermore there have been established economic goals, connected with environment for the implementation through 35 federal government agencies (Szyja, 2013, p.154):

- reduce fuel consumption by 2020 by 30%,
- reduce of water consumption in the economy for 2020 by 26%,
- increasing to 50% the proportion of waste recycled as early as 2015,
- growth share of public contracts which meet the requirements of a balanced and sustainable development to 95%.

“The European Economic Recovery Plan”, announced at the end of 2008, has highlighted the need of a coordinated action at national and the EU levels respond to the economic crisis. The EERP was based on two pillars, one related to fiscal policy, the second to the direct structural transformation. Thus, the first was connected with the Pact for Stability and Growth, and the second with the Lisbon Strategy. One pillar have been focused on boosting the economy in the short term by an immediate budgetary impulse amounting to 200 billion EUR. The second has been concerned the orientation of "short-term action to reinforce Europe's competitiveness in the long term". In this regard, it has been undertaken development of "smart investment", which means investing in growth of energy

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

efficiency to create jobs and save energy; investments in clean technologies in order to promote, among others, the construction sector and the automotive industry. The Plan has also identified an important number of green initiatives with a focus on energy-saving and climate-change related measures. In this last means each efforts should have been focused on greening the economy through involvement in two areas, development of green energy infrastructure and energy efficiency. For energy projects in the period 2009-2010 was booked 3,980 billion EUR, respectively for gas and electricity infrastructure (2,365 billion EUR), offshore wind farms (565 million EUR) and the capture and storage of carbon dioxide (1.050 billion EUR) (*Driving European Recovery*, ([http](#))). At the same time it has been modified regulations, which allow for an increase of up to 8 billion EUR for investments in energy efficiency and renewable energy in residential buildings (*European Parliament legislative resolution of 6 May 2009*, ([http](#))).

Some member states adopted their own anti-crisis programs, including “green” elements of recovery instruments. It was possible, because of launching legislative and financial instruments on the EU level for example (Szyja, 2012, p.184]:

- consensus, among governments of the member states and the European Bank Investment, on loan guarantees and loans of innovative eco-products,
- use of the European Cohesion Fund to finance thermo-modernization and renewable energy source of buildings in all member.

According to the European Commission, the total sizes of the "green" parts of states packages differed between countries. The share "green" efforts ranged from 1.3% in Italy to 13% in Germany, and 21% in France. In most cases the 'green' elements was identified with energy efficiency, renewable energy, development of public transport and infrastructure and car scrapping schemes. In form of the type of instrument, member states used public investment, loans and loan guarantees, and subsidies (*Non paper „Green elements from member states recovery plans”*, ([http](#))). For example significant amount of anti-crisis package in Belgium, Czech Republic, Estonia, France, Slovenia, Germany, Spain was allocated to increase of energy efficiency in buildings. In turn Denmark put on green transport, Finland on green technologies, Portugal on energy from renewable sources (*Green Growth: Overcoming the Crisis and Beyond*, 2009, p.15-18). In Poland, the government did not indicate in the package directions of actions and instruments to assist the implementation of structural transformations strictly

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

to the "green economy". Indirectly pointed to the need to accelerate investments co-financed from EU funds, which concern, inter alia, solutions to municipal and supporting renewable energies.

States involvement in the area of creating a green economy due to several reasons. The first one refers to strategic dimension of projects mainly in the energy sector. This is connected with energy security and attempts to be independent of gas or oil supplies from abroad (table 1.).

Table 1. Energy dependency rate, EU 28, 2008-2012 (% of net imports in gross inland consumption and bunkers, based on tones of equivalent)

Specification	2008	2009	2010	2012
Crude oil	84,9	84,1	85,1	88,2
Natural Gas	61,7	63,4	62,1	65,8

Source: EUROSTAT

http://ec.europa.eu/eurostat/statisticsexplained/index.php/Energy_production_and_imports

It should be emphasized, that between 2008 and 2009 import of crude oil declined, however it was short-lived as well as a decrease of gas supply in 2009 and 2010. In 2013 import of oil from different regions of world was in EU on the level: former Soviet Union - 39,8%, Europe - 18,76 %, America - 4,61%, Africa - 24,05%, Middle East - 12,89% (*Market Observatory for Energy*, 2014).

The second one is the high capital investment. It is due to the high costs and long payback period. Following is connected with little companies interest due to the high investment costs and uncertain benefits, especially in sectors related to environmental technologies and renewable energy (*The Global Environmental Goods and Services Industry*). According to World Economic Forum public action can help to introduce additional capital through other financing mechanisms by absorbing potential losses to other financiers, as well direct equity investment from the public sector can be valuable for projects with heightened technology risks (*The Green Investments Report*, 2013, p. 77).

Next the states have more possibilities to invest in research than individual companies, because of due to the financial possibilities and relationships with scientific centers (Vaitilingam,(http)).

Another one points to empower the public to the attitudes and behavior more environmentally friendly. This requires education from first class in primary school. "Individuals must be ready to learn, to change their habits" (Kink, Reinumägi, 2011, p. 183).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

No less important is to reinforce consumers with various kinds of subsidies, which would encourage them to buy green products and services. As well states should arrange solutions for entrepreneurs to invest in more sustainable production.

And the last one is the need to introduce some structural changes in economy – greening up economy. That means not only development of green sectors, like renewable energy or green technologies, but also introducing ecological transformation of traditional sectors like automotive. For example, in the United States the government addicted state assistance for General Motors and Chrysler, inter alia, from the introduction of efficiency technologies in production processes and environmentally friendly vehicles, which would be offer buyers. However, this example shows a conditional form of state influence on the company. It is also important to carry out the transformation of the economy and the individual sectors because on the one hand to external factors f.ex. climate change and on the other the pursuit of commercial entities to make profits through new types of products and services. It is essential noticing, both the need for and benefits of changes aimed at environmentally friendly solutions.

International organizations, in many publications, indicate specific solutions for the implementation of a green economy. OECD stresses the need for action in two areas: reinforcing economic growth and the conservation of natural capital, encompassing policies targeted at incentivising efficient use of natural resources and making pollution more expensive. Both require such activities as fiscal and regulatory settings (f. ex. tax and competition policy) and a mix of price-based solutions (OECD, 2011, pp. 11-12). UNEP highlights prioritising government investment and spending in support of a green economy, limiting government spending in areas that deplete natural capital, using taxes and market-based instruments to promote green investment and innovation, and investing in capacity-building, training and education. And UNESCAP emphasize the need of reforming the economic incentives framework, promoting sustainable infrastructure investment, and facilitating investment in natural capital (Allen, 2012, p. 6). World Bank divide green growth policies into three broad categories: the “getting the price right” policies; the “complement or replace prices” policies where markets signals can’t be relied upon to effect the desired changes; and “activist” policies such as innovation or industrial policy (World Bank, 2011, p. 23).

Also remarkable is to reach, on an international level, an agreement for green growth. The green growth is identified by "green investments", based

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

on the development of technologies for the use of energy efficiency and reduce carbon emissions (*Declaration on Green Growth*, 2009). It is essential to create more effective climate change policy. However at the same time it should be pointed to “green race” in the production and sale of environmental technologies, primarily related to renewable energy. In this race are involved mainly The United States, China and German. Especially the second one is characterized by high growth of wind energy capacity (IEA, 2013, p. 10). It is possible due to the involvement of the state through measures like production subsidies and export support, which was a subject of petition of the United States in WTO. In many cases it is a serious threat for companies from other countries, particularly in USA. They need support from the state to compete. At the same time the involvement of the state may result of the public policy and (Henzelman, Schaible, Stoever, Meditz, 2011, pp. 33-34):

- accelerate the development of selected environmentally friendly technologies through R & D activities,
- accelerate the market introduction of modern but expensive products in order to benefit,
- create companies in the green sector,
- form of response to international agreements.

In the declaration of Rio +20 have been noted, that the green economy have to be implemented by public policies, each country can choose an appropriate approach in accordance with national sustainable development plans, strategies and priorities which should include, inter alia (*Report of the United Nations Conference of Sustainable Development*, 2012, p.11):

- respect each country’s national sovereignty over their natural resources taking into account its national circumstances, objectives, responsibilities, priorities and policy space with regard to the three dimensions of sustainable development;
- be supported by an enabling environment and well-functioning institutions at all levels with a leading role for governments and with the participation of all relevant stakeholders, including civil society;
- promote sustainable consumption and production patterns;
- continue efforts to strive for inclusive, equitable development approaches to overcome poverty and inequality;

In Author opinion the main obstacles in introducing green economy is to overcoming the gap between expenses incurred in the short term for environment friendly investment and the economic and social benefits achieved in the long term. In this regard, the state should take action to convince

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

companies and the public to make the effort now incurring expenditure, which will bring the desired results in a long time.

Conclusions

A green economy can be identified with new direction of development. It should be emphasized that many in this field has already been done, mainly because of anti-crisis programs, which were introduced to overcome the effects of the economic downturn.

The role of the state in the development of a green economy is essential, because of its instruments and measures, which are necessary for shaping supply and demand in the field of environmental solutions. Both consumers and producers require support, because of high cost of green technologies, energy from renewable sources and green products. At the same time, there is need to finance research and innovation to lower price of such goods. The future of green economy depends also on global commitment on climate changes and ways of dealing with them, which depend on the cooperation of the states.

The further research will concern the involvement of enterprises in the process of transition to a green economy.

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
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**Can Inflation Forecast and Monetary Policy
Path be Really Useful? The Case of Czech
Republic***

JEL Classification: *E52; E58; E61*

Keywords: *inflation forecasts; inflation forecast targeting; policy path; inflation expectations*

Abstract: Producing and revealing inflation forecasts is believed to be the best way of implementing a forward-looking monetary policy. The article focuses on inflation forecast targeting (IFT) at the Czech National Bank (CNB) in terms of its efficiency in shaping consumers' inflation expectations. The goal of the study is to verify accuracy of the inflation forecasts, and their influence on inflation expectations. The research is divided into four stages. At the first stage central bank credibility is examined. At the second stage – accuracy of the inflation forecasts. The next step covers a qualitative analysis of IFT implementation. Finally the existence of the interdependences of inflation forecast, optimal policy paths and inflation expectations are analyzed. Credibility of the central bank, accuracy of the forecast and decision-making procedures are the premises for the existence of relationship

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

between forecasts and expectations. The research covers July 2002 - end of 2013. Its methodology includes the qualitative analysis of decision-making of the CNB, quantitative methods (Kia and Patron formula, MAE forecasts errors, quantification of expectations, non-parametric statistics). The results show the existence of interdependences between inflation forecasts and expectations of moderate strength. The preconditions of such interdependences are partially fulfilled. The research opens the field for cross-country comparisons and for quantification of IFT implementation.

Introduction

Modern monetary policy focuses on expectations which are the crucial interest of modern monetary policy. The central banks search for the tools that are helpful in shaping inflation expectations and that enhance their forward-looking attitude. Producing and revealing inflation forecast is such a tool. An ability to guide market expectations can be analyzed in the context of the central bank credibility. The central bank is credible when the private sector believes that the central bank will realize what it said (Mackiewicz-Łyziak, 2010, p. 12). The most obvious central bank declaration is inflation target. When the market expectation are on the inflation target level, the central bank is perceived as credible. The article focuses on the central bank inflation forecasts and consumer expectations. They are analyzed jointly, and the context of inflation forecast accuracy and IFT implementation are added.

The main research question of this paper is whether the households believe inflation forecasts. The hypothesis assumes that inflation forecasts published by CNB in the years 2002-2013 are accurate (1) and correlated with inflation expectations of households (2). The main objective of this research is to verify this hypothesis. The research has a broader context as well. Its starting point is the qualitative analysis of the inflation forecast targeting implementation and examination of the central bank's credibility. These are important preconditions of using forecasts for shaping expectations.

The research presented in the article is the first complex analysis of the inflation forecasts and their usefulness for the consumers and the central bank.

Theoretical background

Modern monetary policy is, and should be, forward-looking. The forward-looking nature of inflation and monetary policy focuses on inflation expectations which are emphasized in modern monetary theory. Its framework is broadly described in the related literature (Mankiw, 1990, pp. 358-360, Goodfriend & King, 1997, pp. 24-40, Galí, 2003, pp. 157-160). The starting point for developing a new neoclassical synthesis model was the price setting model (Calvo, 1983, pp. 384-393), where inflation depends on current inflation expectations and output gap. An expected price level change should be taken into account while readjusting prices, as the economic agents know that it may not be possible to change the prices in the following period. The ability of a central bank to influence expenditure, and hence pricing decisions, is strongly dependent upon its ability to influence market expectations regarding the future path of overnight interest rate, and not merely their current level (Woodford, 2003, p. 16).

The modern monetary policy strategy – inflation targeting – is believed to be the best way to implement a forward-looking, focused on expectations, monetary policy. Inflation forecast produced by the central bank on the basis of theoretical framework is immanent part of inflation targeting which can even become inflation forecast targeting (IFT), where inflation forecast plays the role of an intermediate objective of monetary policy. One argues that ascribing the function of an intermediate target to the inflation forecast simplifies implementing and monitoring monetary policy (Svensson, 1997, p. 1120).

The main reason why the forecasts are revealed is a need to shape inflation expectations of the public. Publishing the inflation forecast may help to guide longer-term expectations. It can serve as a temporary anchor, especially in situations where the target is missed because of shocks that are out of control of the central bank. An anticipated course of inflation, showed by a credible central bank may limit the expectations' growth (Skořepa & Kottlán, 2003, pp. 154-155).

Perceiving the role of inflation forecast in expectations shaping, in the last decade majority of the central banks started to produce and reveal their own inflation (and GDP) forecast.

Inflation forecasts are made on different instrument-rate assumptions. The most important assumptions are: constant instrument rate during the entire forecast horizon (CIR), market expectations of the future interest rate (ME) and endogenous rate. These assumptions imply the different decision-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

making procedure (CIR - the rule of the thumb, endogenous rate – following optimal monetary policy path). Implementing the optimal monetary policy requires the optimal (specific) targeting rule related with a flexible strategy (target variables for both inflation and the output gap), and operating in a way that expresses the identity between the marginal rates of transformation (MRT) and substitution (MRS). MRS is based on the preferences of Monetary Policy Committee and MRT is based on the structure of the economy (Svennson, 2002, p.p. 773-777). That is why the policy path includes the forecasts of the target variables such as inflation and output gap and instrument-rate path consistent with them. It can be described as the current and future interest rate path that is consistent with achieving inflation target (Svennson, 2003, p.p. 451-460). In the research only the inflation forecasts are analysed and we assume that inaccurate forecasts imply inaccurate policy path.

Methodology of the research

This research focuses on the case of the Czech Republic. The CNB has produced its own macroeconomic forecasts with endogenous interest rate from July 2002. It imposes the starting point of the research.

Table 1. Forecasting inflation in CNB

Feature	Description
DIT introduction	1998
Forecast disclosure	from April 2001
Output	forecast of inflation and GDP, fan chart (inflation, GDP, policy path from 2008 and exchange rate path from 2009)
Policy path	from July 2002 given in descriptive way form 2008 policy path disclosure on the fan chart
Forecast frequency	quarterly: January, April, July, October; from 2008: February, May, August, November
Forecast horizon	first, 6 quarters, then up to 8 quarters
Transmission horizon	4-6 quarters
Main model	- QPM: Quarterly Projection Model up to May 2008, - g3 from August 2008
MPC in forecasting procedure	discrete involvement

Source: own work.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Forecasting inflation in CNB occurs within the multi-model approach and its whole system is called FPAS. It consists of a vast number of models including auxiliary models, satellite models and one core model. These models have been divided over the forecasting system due to the time horizon. This division covers three periods: short, medium and long term. The result of the forecasting system is a long-term projection of CPI inflation and, since 2008 also core inflation projection (MPRI). The components of the whole system are given in Table 2.

Table 2. The components of the FPAS

Horizon	Type of model
Short term	<i>Monitoring and Near-Term Forecasting Models</i>
	<i>Signal extractions models</i>
Medium term	<i>DSGE model g3</i>
	<i>Dynamic Optimizing Multisector Model with Stock-Flow Relationships</i>
Long term	<i>Satelite models</i>

Source: own work.

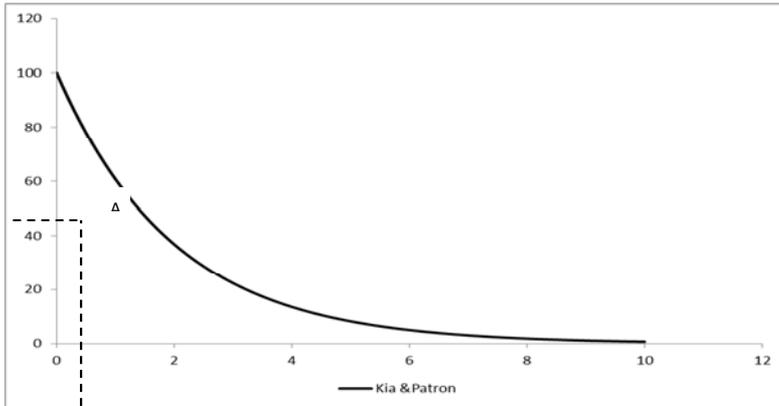
Figure 1. Steps of the research

Step of the research	Description	Research tool
I	Credibility of central bank	Kia, Patron formula, Analysis of past inflation deviation from the inflation target
II	Accuracy of the forecasts	Absolute forecasts errors, Analysis of past inflation forecasts deviation from the inflation target
III	Analysis of the IFT implementation	Qualitative analysis
IV	Interdependences of inflation forecasts and inflation expectations of consumers	Non-parametric statistics for forecasts and expectations

Source: own work.

The research on the inflation forecasts of the CNB is divided into four specific steps which are shown by Figure 1.

Figure 2. Kia and Patron formula



Source: own calculations.

At the first stage, the credibility of the CNB is analyzed. The credibility is understood as the fulfillment the central bank's formal declaration - inflation target. This fulfillment was checked on the basis of calculating the mean absolute deviations of past inflation from the inflation target. The study includes two measures. The first one is a simple absolute deviation of inflation from the inflation target, as follows $|\dot{y} - \pi|$, where \dot{y} is inflation rate and π is the inflation target. The authors have adopted their own interpretation of the deviations of the inflation from the inflation target. This interpretation assumes that the central bank is credible when the simple mean absolute past inflation deviation from the inflation target is in the range $\langle 0, 1 \rangle$. The next credibility measure is Kia and Patron formula (Kia & Patron, 2004, p. 11) of inflation deviations from the inflation target:

$$\frac{100}{e^{0,5|\dot{y}-\pi|}}$$

The use of the exponential function shows that with increasing deviation of inflation from the inflation target the credibility of central bank decreases exponentially (faster). The interpretation of credibility here is consistent with the previous measure. The deviations from the inflation target at 1% imply the value of the formula close to 60,65 points. That is why the authors assume that the central bank is credible when the value of Kia and Patron formula is between 100 and 60 points. Figure 2 presents the possible values of Kia and Patron formula for the deviation between 0 and 10. Point A on the graph shows the bank's established credibility limit. The interpretation of the both measures is given in Table 3.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 3. Interpretations of simple mean absolute deviations of past inflation from the inflation target and the Kia and Patron formula

Mean absolute deviation inflation from the inflation target during the year	Kia and Patron formula	Interpretation
<0,1>	<60;100>	Credibility
>1	60<	Lack of credibility

Source: own work.

Accuracy of the forecasts is also based on two measures whose values and ideology are consistent with the previously chosen coefficients of credibility of central bank. The first measure is the absolute deviation of past inflation forecast from the inflation target: $|\hat{y} - \pi|$, where \hat{y} is the inflation forecast. As the next step, the Forecast Absolute Error is calculated as follows $|\hat{y} - \dot{y}|$. The accurate inflation forecasts should be characterized by values smaller than 1 for both measures, which is described in Table 4.

Table 4. Interpretations of MAE and mean absolute deviation of past inflation forecast from the inflation target

MAE	Mean absolute deviation of the past inflation forecast from the inflation target	Interpretation
<0,1>	<0,1>	Accuracy
>1	>1	Lack of accuracy
>1	<0,1>	
<0,1>	>1	

Source: own work.

Besides the quantitative part of the research, qualitative analysis on the actual decision-making procedure of the CNB Board is made. Consistency of the Bank Board in IFT implementation can be a strong explanatory factor of the interdependences between the forecast and the inflation expectations. Analysis of the IFT implementation covers 4 factors (Szyszko, 2011, pp.22-23):

- formal declaration on the importance of inflation forecasts,
- consistency of the decision of the Monetary Policy Committee (MPC) with the inflation forecast result,
- decision timing,
- decision justification.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

These factors show whether the forecasts of inflation or policy path constitute an important premise in decision-making of the CNB. If they do, the possibility of shaping expectations via inflation forecasts and policy path is enhanced.

Consistency of the decision of the Monetary Policy Committee with the inflation forecast result means that its decision was in line with forecasts message. This can be analyzed in two ways consistent with the way of coding inflation forecast message. The first way refers to the central path for inflation. The rule of thumb says here that when the central path in the monetary policy horizon is above the target, the interest rates are to be raised. When the projected inflation in the monetary policy horizon is below the target – the rates should be lowered. When the forecast inflation is within the fluctuation band of the target, the MPC reaction (change of the interest rates or leaving them unchanged) is consistent with the IFT implementation. The central path of inflation at the targeted level means that the rates should be unchanged.

The second way refers to the interest rate path. Here the MPC decision is consistent with the forecast when the rates are changed according to the policy path suggestion. In the case of the Czech National Bank it is more suitable to follow this way of analyzing the Bank Board decisions, as the Bank is producing unconditional forecast with endogenous policy path.

Decision timing shows whether the central bank perceives the forecast as the best information on the future state of the economy. If it does, it makes decisions consistent with the forecast message just after the forecast is made.

Decision justification shows the main rationale behind the decision on interest rates. The central bank sends the message on the importance of forecasts to the public if it refers to the forecast message in the justification.

The last part of the research focuses on interdependences of inflation forecasts and inflation expectations of consumers. The theory assumes that inflation should be an important factor in the formation of expectations. The research is limited to the correlation of both variables and it does not refer to the cause and effect relation. The research covers 46 forecasts (July 2002-2013). The way of coding the data on inflation forecasts and policy path is described in Table 5.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 5. Inflation forecast and policy path

Forecast of:	Options:	Timing
Central path of inflation	<ul style="list-style-type: none"> - the central path is below the lower boundary of fluctuation band, - the central path t is below the inflation target but within the fluctuation band; - it is at the inflation target level; - it is above the inflation target but within the fluctuation band; - the central path is above the upper boundary of fluctuation band 	Beginning of the monetary transmission horizon
Interest rates path	<ul style="list-style-type: none"> - the rates are to be lowered; - the rates are to stay unchanged; - the rates are to be raised. 	First step – just after producing forecast

Source: own work.

The inflation forecast here means not only the central projected path of inflation but the whole policy path as well. This is consistent with the Czech forecasting system. The forecast itself is unconditional – policy path is endogenous. This means that the central path of inflation should be on the inflation targeted level within the monetary policy horizon if the interest rates are changed according to the path. In reality this condition is not fulfilled, as the model does not capture future shocks and the rates are not changed in the way suggested by the path in next steps (they are actualized with the next forecast). This is why both outcomes of the model – central path of inflation and interest rates path – are confronted with inflation expectations of consumers.

The data on inflation forecast are encoded because of two reasons. First of all, consumers inflation expectations are considered. Consumers are not specialists. They do not read the forecasts on their own. They do not understand sophisticated information on inflation forecasts. It is enough to say that qualitative surveys on expectations were abandoned by the central banks, as the households awareness of economic situation was poor and the results of surveys were not reliable. The second reason for encoding the data is connected with the way how the forecast is revealed. No detailed information on levels was given at the beginning of the research period. Forecast and the policy path were presented in the Inflation Report in a descriptive way¹.

As the forecast is produced quarterly and the expectations are examined monthly, the research assumes that one forecast message may influence the expectations formation 3 times. The lags are also assumed: the forecast

¹ For central path of inflation the standard correlation measure is also calculated.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

may influence expectations in the month of its disclosure as well as during the following months.

Consumers' expectations of households are not directly observed. They are examined on the basis of regular qualitative surveys. Consumers answer the question on their inflation perception and expectations. Inflation perception refers to the past inflation and is not the subject of this research.

The question for inflation expectations is: By comparison with the past 12 months, how do you expect that consumer prices will develop in the next 12 months? And the answers to choose from: They will...increase more rapidly, increase at the same rate, increase at a slower rate, stay about the same, fall, don't know (The Joint Harmonized..., 2007, p. 51). Then the answers can be used in two ways. First of all, the balance of answers is calculated. The balance of answers does not directly measure the inflation expectations, thus it cannot be interpreted in a straightforward way. For example, when it is positive it means that the number of respondents who expected prices to increase more rapidly over the next 12 months than in the past exceeded the number of those who expected prices to remain the same or increase more slowly than in the past. (The Joint Harmonized..., 2007, p. 18).

The answers to the surveys' question on expected inflation are also the basis for quantifying inflation expectations using the adjusted Carlson–Parkin method. It assumes that if the number of respondents is sufficiently large, the expected rate of price change is normally distributed. The quantification of qualitative responses makes use of the fact that, in replying to the survey question regarding inflation expectations, respondents compare their predictions with the rate of price change as perceived when the survey is carried out (Łyziak, 2003, pp. 11-13). The latest inflation figure stays here for inflation perception.

Survey data on expected inflation are derived from the *Business and Consumers Surveys* – The European Commission survey on business and household situation. Surveys are held monthly. The Czech Republic has been covered from 1995.

The interdependences between inflation forecast (interest rate path) and expectations are calculated here. Non-parametric correlation measures are used. This is imposed by the range of data availability. The Pearson's correlation of the central path of inflation and the expectations is also tested. However, due to limited consumers' perception of economic data, coded results are more important.

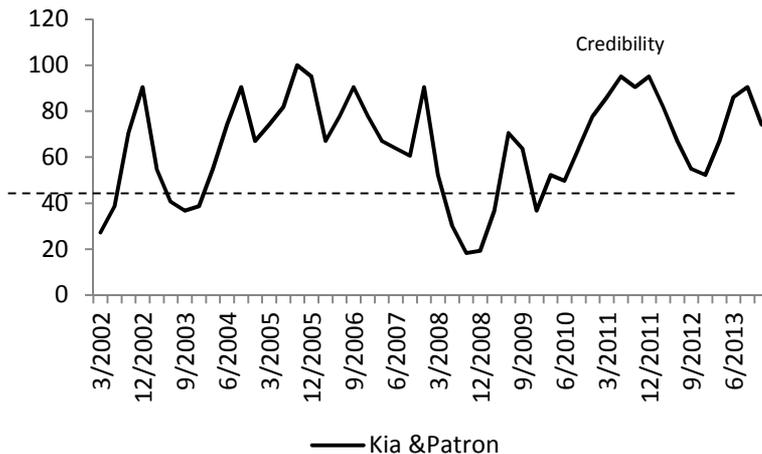
Results of the empirical research

At the first stage of the research the authors analyzed credibility of the CNB in the years 2002-2013. The study was conducted on monthly data. The formation of the values for CNB of Kia and Patron formula are presented by Figure 3.

According to results, the lack of credibility occurred temporarily in five periods: in mid 2002, in the year 2003 and in the first two months of 2004, in mid 2010, at the end of 2002. In other periods CNB can be described as credible. The mean value of Kia and Patron formula is 65,46 points.

The analysis of past inflation deviations from the inflation target, due to similar construction, gave the same results, which allowed the authors to confirm the thesis that in the years 2002-2013 CNB was credible. The summary of this step of the research is presented in Table 6.

Figure 3. The formation of the values of Kia and Patron formula in CNB in years 2002-2013



Source: own calculations based on ARAD database.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 6. Interpretations of a simple mean absolute deviation of past inflation from the inflation target and the Kia and Patron formula in CNB in years 2002-2013

Mean absolute deviation inflation from the inflation target	Mean value of Kia and Patron formula	Interpretation
0,98	65,46	Credibility

Source: own calculations based on ARAD database.

As the CNB during the research period was credible, the information produced by the bank could be the argument in expectations shaping of consumers.

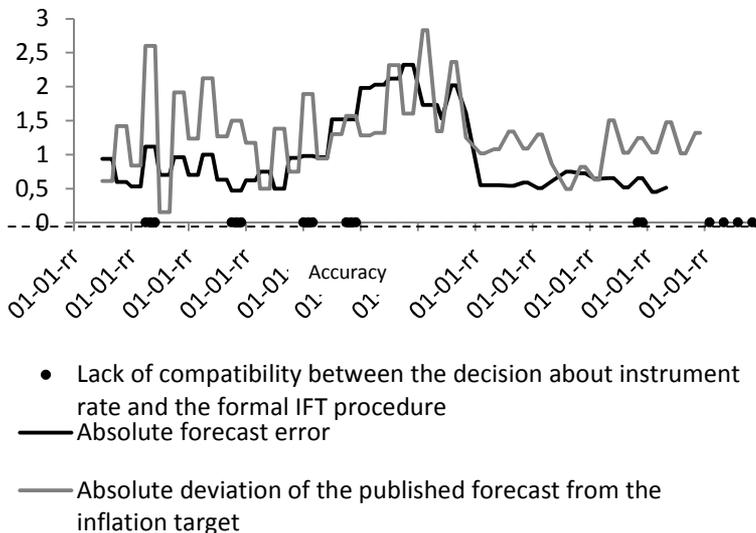
The next step of the research focuses on the forecasts accuracy. According to the idea of optimal policy, the inflation forecast is consistent with the instrument-rate forecast and at the end of the horizon it should be equal to the inflation target. That is why it is important to check how to evaluate the inflation forecasts in relation to the inflation target. At this step of the research the authors analyzed the mean absolute past inflation forecasts deviation from the inflation target in CNB from July 2002 to May 2012 (the period of the study was chosen due to available data). The research was conducted on quarterly data. The value of the mean absolute deviations of past inflation forecasts from the inflation target is 1,31%. The next part of the analysis of inflation forecasts was calculation the absolute forecasts errors. The value of the mean absolute forecasts error (MAE) of the inflation forecasts is 1,07 %. The results show that inflation forecasts published by CNB in the chosen period were inaccurate. The summary of this step of the research is presented in Table 7.

Table 7. Interpretations of MAE and mean absolute deviation of past inflation forecast from the inflation target in CNB

MAE	Mean absolute deviation of the past inflation forecast from the inflation target	Interpretation
1,31	1,07	Lack of accuracy

Source: own calculations based on ARAD database.

Figure 4. Accuracy of the inflation forecasts and their compatibility with IFT procedure in CNB



Source: own calculations based on ARAD database, data and information from *Inflation Reports and Statements* of CNB Board published by CNB in years 2002-2013 and data obtained from bank employees.

The results of the first and the second part of the research create a background for the analysis of interdependences of expectations and forecasts results. The CNB in the period covered by the examination was credible, which is the first step to properly anchored the inflation expectations. Unfortunately, the results also show that the CNB inflation forecasts in the same period were not accurate and were not a good forecast in the sense of predicting future inflation. On the other hand, the value of the mean deviation from the inflation target (which is 1,07 %) implies that the forecasts did not deviate strongly from the inflation target. That is why the forecasts can still be seen as a useful tool according to IFT ideology.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 8. The CNB decisions' deviations

Time	Deviation explanation
IR April 2003	Wrong assumption on the timing of direct taxes change.
IR October 2004	The signs of inflation pressure were not unambiguous; the Board assessed monetary conditions as restrictive enough.
IR January 2006	Appreciation of CZK tightened monetary conditions far enough.
IR October 2006	Asymmetric risk of lower inflation.
IR November 2011	Persisting effect of VAT rise.
IR February 2013	Main rate of the CNB at the level 0.05% (technical zero). The Board announce implementation of alternative instrument: FX market interventions.
IR May 2013	
IR August 2013	
IR November 2013	

Source: own work based on data and information from *Inflation Reports and Statements* of CNB Board published by CNB in years 2002-2013.

The third step of the research focuses on IFT implementation in the CNB. The CNB shows strong commitment to IFT implementation. It starts on the declarations level – the forecast is claimed to be of greatest relevance in decision-making (which is declared at the website of the Bank and in its strategic documents). This declaration meets the practice of the Bank Board as it changes rates accordingly to the message of forecast and does it when the forecast has just been produced. In the examined period (114 meetings of the Bank Board, 46 forecasts discussed) only 9 times the Board ignored the message of forecasts (in terms of interest path). This cases are called decision's deviations. The details of the explanations are given below. They are divided into two groups (presented in Table 8). The first one covers deviations from 2003 to 2011. Their rationale is shock or wait and see attitude of the CNB. The second group covers 2013. The reason for not following the message was technical – the Bank had been already operating at the nominal zero rate. The Board announced the possibility of intervention on the FX market to weaken the Czech koruna. The message of the forecast was ignored because it was not possible to follow it. The methodology of analysis is clear and classifies these cases as decisions' deviations. Except those special situations, the CNB followed the interest path consistent with its macroeconomic forecast. Even in the most turbulent period of the end of 2008 and 2009, the Board's decisions were in line with the forecast path of interest rates. The precondition of using inflation forecasts as the tool that supports expectations shaping is thus fulfilled.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Figure 4 that presents the measures of the forecast accuracy also contains the information on the compatibility of the Bank Board decisions with IFT. It shows that inflation forecasts played a role of intermediate target in CNB, even though most of them were inaccurate.

The results of the research on interdependences between expectations and forecasts results are presented in Table 9. They prove the existence of statistically important (for $p=0,05$) interdependences of inflation forecast and expectations. Their strength is moderate and it rises with the lengthening of the lag. For the inflation forecast the results of non-parametric statistics are also confronted with the standard correlation measure (for quantified inflation forecast) that confirms the results for the coded data

The results concerning the central path (here referred to as CP – central path of inflation) are not surprising. If the forecasts showed that inflation would exceed the goal, the expectations rose.

However, the results on interest path (PP – policy path) are counterintuitive. They show that when the rise of the rates is consistent with the macroeconomic forecast, the expectations of consumers rise as well. Transmission mechanism based on the modern theory draws a negative correlation of interests rates and expectations. The results obtained for the CNB show that the forecast itself guides expectations rather than policy path.

Table 9. Interdependences of forecasts and expectations 2002-2013

Variables	Lag	Spearman	Gamma	Kendall	Pearson
CP/Exp	T	0.376495	0.295921	0.252755	0.348916
	(t+1)	0.393286	0.332547	0.284073	0.416075
	(t+2)	0.404410	0.363186	0.310355	0.462181
	(t+3)	0.417596	0.391468	0.334523	0.491205
PP/Exp	T	0.445988	0.449153	0.361885	
	(t+1)	0.480176	0.479140	0.386046	
	(t+2)	0.508132	0.503340	0.405611	
	(t+3)	0.533420	0.525081	0.423338	

Source: own calculations based on data and information from *Inflation Reports* published by CNB in years 2002-2013.

The results of examination of the interdependences and the CNB's decision-making procedure may not be interpreted unambiguously. First of all, a positive correlation of policy path and expectations of consumers is surprising. Secondly, the strength of interdependences is moderate. The forecast is not the only one factor influencing expectations. A possible explana-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

tion of moderate strength (instead of strong relationship) is inaccuracy of the forecasts. Thirdly, the existence of positive relationships between inflation forecast and expectations proves that consumers do not really perceive that the central bank is effective in its actions. In the case of perfect credibility, inflation expectations are on the target level.

In the years 2002-2013 the CNB could be characterized as a credible central bank, however its credibility was not perfect. The CNB forecasts were inaccurate. It is sure that this non perfect credibility and inaccuracy of the forecast hves an impact on interdependences. It must also be remembered that CNB is implementing a flexible type of IFT. That is why accomplishment of other target variables (like output gap) could be carried out at the expense of the accuracy of inflation forecasts.

It should be mentioned that the research was held for consumers – a less educated group in the economy (as compared with specialists and companies). This is why the unambiguous results are not surprising.

Conclusions

In the model situation, the perfectly credible central bank publishes accurate forecasts which anchor the economic agents' inflation expectations on the target level of inflation. The CNB is not perfectly credible and it publishes inaccurate forecasts – according to methodology of the research. However, those forecasts play the role of intermediate target of monetary policy. They are also correlated with inflation expectations of consumers. The results of the research are far away from the model situation but in practice they are not bad. Anchoring inflation expectations is the main function of inflation forecasts made by central banks implementing inflation targeting strategy. So, predicting the future value of inflation is not the most important. From this point of view, inflation forecasts of the CNB fulfill the main goal of revealing them – they are correlated with inflation expectations. The research confirmed the main body of the hypothesis that inflation forecasts published by CNB in the years 2002-2013 were correlated with inflation expectations of households, regardless of the fact that the hypothesis of the forecast accuracy is rejected. The problem is connected with the forecasting system (that produces inaccurate forecasts), while the other results are consistent: credible central bank that implements IFT may affect expectations via forecasts.

There are several directions of further research. The most obvious is expanding the scope of the research on the other central banks. Such a com-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

parative analysis can be enriched with the countries of the longest experience in inflation forecast targeting. Having the panel of countries that implement IFT and their forecast-expectations interdependences, further questions on the results can be answered:

- Does the strength of correlation depend on consistency in IFT implementation?,
- Does the strength of correlation depend on the forecasts accuracy?
- Do the interdependences depend on the credibility of the central bank and its effectiveness?
- Does the transparency of the central bank influence the relationship of the expectations and the forecast results?

The field for methodological improvement also exists in this kind of research: the data on forecast results may be encoded in a different way. Finally, for that kind of data, the probit model showing not only interdependences but cause-effect relation could be developed.

In the conducted research the authors have calculated the credibility of central bank based on past inflation deviations from inflation target, analyse inflation forecasts by absolute forecasts errors and past inflation forecasts deviation from the inflation target and also interdependences between forecasts and inflation expectations.

Elements of the study were selected so that their ideology was related and due to their simplicity. The obtained values of used measures correspond with each other. These components, along with a qualitative assessment of the use of forecasts, form the implementation of the idea of IFT in the CNB. The results are a contribution to the creation of complex index specifying the degree of implementation of the IFT strategy in central banks.

Regardless of the future expansion of the research, the results obtained here deliver valuable information on the function of forecasts.

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
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**“Fettered” and “Unfettered” Capitalism in
J.A. Schumpeter’s Concept of Tax State
and Economic Development**

JEL Classification: *A13; B15; K20; P7; P20*

Keywords: *Schumpeter; capitalism; Tax State; economic development*

Abstract: Economic development and transformation processes, have become much more intense in economic reality in the last years than they have ever been before. At this time has raised a lot of questions about the causes of the actual Global Crisis, future crises, the factors affecting the modern economy, about the essence of contemporary capitalism, demographic problems and overgrown bureaucracy. The most spectacular threat to capitalism, (based on private entrepreneurship) according to Schumpeter, stems from the high, growing and progressive taxation. Schumpeter saw clearly that the financing of public goods and services (requiring taxes, maybe even relatively high) is something other than a clerical control of the economic system that violates the natural economic mechanism. Moreover Schumpeter says explicitly, that entrepreneur does not have to be one person, he even states that the country (state) itself, or its agenda, can act as an entrepreneur. Therefore can be concluded that we may have to deal with “Tax State” which is typical for “fettered capitalism” and with “entrepreneurial state” which is typical for “unfettered capitalism”. The main goal of this paper is to present two different approaches to economic development concept: Schumpeter’s “fettered” and “unfettered” capitalism in the context of “Tax State” and interventionism.

Introduction

Economic development and transformation processes, have become much more intense in economic reality in the last years than they have ever been before. In the United States during and after Global Financial Crises (2007-2009) over \$16 trillion of USD was allocated to corporations and banks internationally for “financial assistance”. Recently European Central Bank (EBC) decided that it will spend 1,2 trillion of EUR to stimulate European economy. For over a year EBC will be spending 60 billion of EUR monthly because of the Euro Debt Crisis. Having regard to the deflation in Japanese and Swiss economy this appears to be not very optimistic view of the developed economies. On the other side we have BRICS countries (Brazil, Russia, India, China and South Korea) where economic processes begin to create the opportunity for sustainable development.

At this time has raised a lot of questions about boundary between state intervention and the free market capitalist economy, about the causes of the actual Global Crisis, future crises, the factors affecting the modern economy, about the essence of contemporary capitalism (probably with too much fiscalism), demographic problems of Europe and overgrown bureaucracy. Some of the answers could be found in works of Joseph Alois Schumpeter – economist who could predicted in his theories contemporary changes in economies.

Schumpeter writing one of his most recognizable book - *Capitalism, Socialism and Democracy*, claimed that by “extrapolating observable tendencies”, capitalism would eventually produce an “atmosphere of almost universal hostility to its own social order” (Schumpeter, 1943, p. 143). In this work Schumpeter presented the “transition from capitalism to socialism, where the entrepreneurial function as well as the entrepreneurial class would disappear. The large corporation, by taking over the entrepreneurial function, not only makes the entrepreneur obsolete, but also undermines the sociological and ideological functions of capitalist society”. Schumpeter also states that “there is inherent in the capitalist system a tendency towards self-destruction...[it] not only destroys its own institutional framework but it also creates the conditions for another” (Schumpeter, 1943, p. 162).

Moreover, in reference to the ills of modern economies Schumpeter’s early original article on the “*Crisis of the Tax State*” (1918) seems to be very timely. This is confirmed by the work of authors such as: Backhaus (1989, 2003), Chaloupek (2000), Hanusch (1988), Heertje (1981) or even OECD. The reason why Schumpeter wrote “*Crisis of the Tax State*” was

the answer to Rudolf Goldscheid's article on "Staatssozialismus oder Staatskapitalismus" (1917). However Schumpeter's paper must be treated as a reliable element of Schumpeter's concept of politico-economic analysis.

This paper proceeds as follows. First author presents Schumpeter's concept of a "fettered" capitalism. Secondly was presented concept of "unfettered" capitalism and the conclusions. In this paper author used such research methods as: a comparative analysis, analogy and deductive inference. The main goal of this paper is to present two different approaches to economic development theory: Schumpeter's "fettered" and "unfettered" capitalism in the context of "Tax State" and interventionism.

"Fettered" capitalism

Schumpeter in his historical analysis of "fallen capitalism" pointed out so-called "institutional flaws" as a threats to western economies. Pure model of capitalism (as Schumpeter called it "vital and intact or unfettered" capitalism) increasingly become more and more "fettered" capitalism. According to Schumpeter's observation, (in the twentieth century) became apparent gradual process of applying to the dynamism of capitalist development further "embarrassing shackles" in the form of various regulations. Reason for this situation was the steady overgrowth of the public sector. This phenomenon was accompanied by the constantly increasing burden of taxes.

In his study on "The Crisis of the Tax State" Schumpeter describes the transformation of the feudal power system to the capitalist system consisting of two sectors: the "free economy" and the "Tax State". As the expenditures of the sovereign were increased by wars, administration and consumption at the court, the sovereign had to transfer rights and privileges to the guilds and merchants. The mechanism of the Tax State thus is characterized by (Backhaus, 2003, p.342):

- longterm change of the source of revenues from the disposal on natural resources and privileges to indebtedness and subsequently to taxes,
- longterm change of the social structure,
- longterm change of the political system.

Excessive growth of the public sector causes social and general-economic costs associated with conflict, which is a struggle between the public and private sector. Struggle between the intervening state (government) and defending itself against the intervention of a private entrepre-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

neur. At this point Schumpeter draws attention to a particular part of the costs associated with this struggle. These costs relate to legal apparatus (lawyers) functioning on one side of a huge and costly legal apparatus in the service of the bureaucracy and on the other side the army of the most eminent lawyers employed by the private sphere in order to minimize the effects of public regulation. A considerable part of the total work done by lawyers goes into the struggle of business with the state and its organs. It is immaterial whether we call this vicious obstruction of the common good or defense of the common good against vicious obstruction. But not inconsiderable is the social loss from such unproductive employment of many of the best brains. Considering how terribly rare good brains are, their shifting to other employments might be of more than infinitesimal importance (Schumpeter, 1943, p. 198).

The most spectacular threat to capitalism, (based on private entrepreneurship) stems from the high, growing and progressive taxation (Schumpeter, 1918). In his work, author shows that contemporary socio-economic system tends rapidly to a maximum tax burden on the private sphere of entrepreneurship, which leads to a weakening of economic dynamism. Schumpeter describes the transformation of the feudal power system to the capitalist system consisting of two sectors: the “free economy” (unfettered capitalism) and the Tax State (fettered capitalism).

Schumpeter's concept of the Tax State was established under the influence of Rudolph Goldscheid's *Staatssozialismus oder Staatkapitalismus* from 1917. Comparing Goldscheid's and Schumpeter's views of the state and public finance, we can conclude, that Goldscheid's concept has more dynamic character than Schumpeter's concept. Goldscheid's emphasis on the necessity of entrepreneurial initiatives carried out by the state is taken to be a realistic assumption. Schumpeter's concept instead seems to be oriented to entrepreneurial activities and innovativeness not in the state and public administration sector, but in the private sector, the “free economy” (Backhaus, 2003).

Schumpeter's approach of the Tax State applies a long-term perspective, it therefore must consider all of the drivers of the economic development as variables, and it thus has to go beyond standard economic analysis of taxes. What is needed furthermore, is the integration of new economic, political, institutional, historical and sociological aspects. Evolutionary economics and endogenic growth theory may be applied in order to analyze the long-term development of the two sectors of the economy, the “free economy” (unfettered capitalism) and the public sector. It also intensively explore the

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

correlation of both sectors. That is why, the long-term effects of both sides of the public budget – revenues and expenditures – have to be taken into account as variables of the long-term economic development (Backhaus, 1997, p. 273).

Schumpeter wrote that “the fundamental impulse that sets and keeps the capitalist engine in motion comes from the new consumers’ goods, the new methods of production or transportation, the new markets, the new forms of industrial organization that capitalist enterprise creates (...) it’s a process of industrial mutation - if I may use that biological term - that incessantly revolutionizes the economic structure *from within*, incessantly destroying the old one, incessantly creating a new one. This process of Creative Destruction is the essential fact about capitalism.” (Schumpeter, 1943, p. 83.). In “*Capitalism, Socialism, and Democracy*” (Schumpeter, 1943), Schumpeter recognized that the concept of dynamic capitalism was condemned to failure because the increased efficiency of the capitalist enterprise would lead to monopolistic structures and it will cause loss of the idea of entrepreneurship. This monopolistic structures nowadays may come from possible use of intellectual property protection in the form of a patent. But Schumpeter actually argued that innovation should lead to temporary monopoly, not that monopoly causes innovation in enterprise. This monopoly cannot come from intellectual property protection but from the fact that entrepreneur is an innovator whose competitive position comes from innovation implementation in economy.

This concept is also actual in nowadays mega-banks problem. The basic problems with the modern banks are mainly related with the level of concentration in the banking sector, the bonuses of the management (which are the derivative of bank’s motivational systems) but most of all are related with phenomenon that the banking sector is pursuing goals, that are harmful to the long-term economic profitability. According to Schumpeter banks should stimulate innovations implemented by entrepreneurs in the economy. Unfortunately the bankers nowadays seemed to have other priorities than those implied by their function in the economic system (Śledzik, 2014).

In one of his last works Schumpeter further highlights that it is high taxes, which are the expression and the result of decomposition of Western capitalism, are the most important premise of the transformation of capitalism into socialism (Schumpeter, 1949, p. 374). Schumpeter defines “true socialism” as a organization, which ceded control (ownership) of the means of production and production program and the right to request the income derived from the use of the means of production other than labor, to a cen-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

tral authority, which may be (but not necessarily) the government or parliament. Schumpeter even then pointed out the problem, that today in the era regulations introduced by the European Union, International Monetary Fund and the World Trade Organization, is essential. He saw clearly that the financing of public goods and services (requiring taxes, maybe even relatively high) is something other than a clerical control of the economic system that violates the natural economic mechanism. These statements are highly relevant today, when we witnessed boom and bust of the Credit Crunch recession of 2007-2009, and Europe's sovereign debt crises.

“Unfettered” capitalism

According to any standard dictionary if you describe something as “unfettered”, you mean that it is not controlled or limited by anyone or anything. So what Schumpeter had in mind when writing “unfettered capitalism”? According to Schumpeter whereas a stationary feudal economy would still be a feudal economy, and a stationary socialist economy would still be a socialist economy, stationary capitalism is a contradiction in terms (Schumpeter 1943, p. 179). He also writes that: “... capitalist reality is first and last a process of change” (Schumpeter 1942, p. 77). The change is the essence. And this “change” is crucial for the Schumpeter’s concept of “unfettered capitalism”. In the economy “change” should come from entrepreneurship who is an innovator, and should not come from states interventionism, which causes excessive taxes and bureaucracy inhibiting innovation.

Let me note on this particular point that in the late thirties, Schumpeter began to move away from his earlier theory of entrepreneurship, then ultimately at the end of the thirties he presented “new theory”, which is completely different (Swedberg, 1991). In the *Business Cycles* (1939), Schumpeter put much greater emphasis on innovation in the strict sense, than on the entrepreneurship. The „new theory“ of entrepreneurship has been outlined by Schumpeter in four articles: *The Creative Response in Economic History* (1947), *Theoretical Problems of economic Growth* (1947), *Economic Theory and Entrepreneurial History* (1949) and *The Historical Approach to the Analysis of Business Cycles* (1949) (Clemens, 2009). This new concept was less “individualistic”. Schumpeter says explicitly, that entrepreneur does not have to be one person (which is a radical departure from his earlier recognition entrepreneur as an outstanding individualist). Schumpeter even states that the country (state) itself, or its agenda, can act

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

as an entrepreneur. This is crucial for achieving the purpose of this paper. Therefore can be concluded that we may have to deal with “Tax State” which is typical for “fettered capitalism” and with “entrepreneurial state” which is typical for “unfettered capitalism”.

Concerning the problem of stability of the state, Schumpeter indeed pointed out that the modern state had come to existence out of a situation of fiscal need, and that a tendency towards instability in terms of a financial crisis is directly inherent to the capitalist state. Schumpeter intended to argue that a steady economic development of the two sectors may be possible, but that distinct conditions would have to be fulfilled. These conditions may concern the institutional framework, but also the organization of the enterprises and economic activities. Both sectors, the public and the private sector, must be coordinated as being complementary to each other (Backhaus, 2003, p.345). Schumpeter has always insisted that the state (government) is naturally accompanied by capitalism and the market economy. Furthermore, it is necessary for its operation and for the stability of society and its rules. Capitalist economy cannot function without the public sphere, financed by taxation. Tax system is essential to the reproduction of capital as much as money and credit (Vecchi, 1995, p.83-84).

In ‘Schumpeterian capitalism’ creation, ownership and distribution of wealth were in part left up to the state (government). However, in an entrepreneurial society it is individual initiative that plays an important role in propelling the system forward. Entrepreneurial leadership is the mechanism by which new combinations are created, new markets are opened up and new technologies are commercialized that are the basis for prosperity. In an entrepreneurial society, entrepreneurship plays an essential role in the process of wealth creation and philanthropy plays a crucial role in the reconstitution of wealth (Acs, 2007, p.103). It is not the innovations that have created capitalism, but capitalism that has created the innovations needed for its existence. One could gain the opposite impression only from the fact that we know only of an economy replete with development, and here, everything takes place so fast and immediately, that we cannot always distinguish between cause and effect (Backhaus, 2003, p.71).

Furthermore, modern capitalism was perceived as an economic system that had experienced an early phase of expansion, followed by a phase of dynamic high capitalism and then transformed into a phase of an increasingly bureaucratic late capitalism, heralding the possible advent of a non-capitalist transformation (Backhaus, 2003, p.123). ”The essential point to grasp is that in dealing with capitalism we are dealing with an evolutionary

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

process. (...) Capitalism, then, is by nature a form or method of economic change and not only never is but never can be stationary. (...) The fundamental impulse that sets and keeps the capitalist engine in motion comes from the new consumer's goods, the new methods of production or transportation, the new markets, the new forms of industrial organization that capitalist enterprise creates. (...) Economic evolution was said to manifest itself in structural changes: the same process of industrial mutations – (...) – that instantly revolutionizes the economic structure *from within*, incessantly destroying the old one, incessantly creating a new one. This process of Creative Destruction is the essential fact about capitalism" (Schumpeter 1942, p. 82-83). The future course of capitalism should remain basically undetermined, thus history would persist as an open-ended evolutionary process. It's impact cannot be predicted as it creates novel situations which would not have been possible in its absence (Schumpeter 1947, p. 150).

Another interesting issue in the Schumpeterian capitalism is the role of bank and credit in the implementation of innovation in the "capitalist free economy". As Schumpeter says: "capitalism is that form of private property in which the innovations are carried out by means of borrowing money, which in general implies credit creation" (Schumpeter, 1939, p.223) and credit is "nothing but a means of diverting the factors of production to new uses, or of dictating a new direction to production" (Schumpeter, 1911, p.116). The banker, therefore, is not so much mainly a broker in the commodity *purchasing power* as a producer of this commodity (...) he has either replaced private capitalists or become their agent. The banker has himself become the capitalist *par excellence*. He stands between those who wish to form new combinations and the possessors of productive means. He is essentially a product of development, though only when no authority directs the social process. He makes possible the carrying out of new combinations, authorizes people, in the name of society as it were, to form them. He is the "ephor" of the exchange economy (Schumpeter, 1911, p.74). Enterprises that wish to innovate should not finance innovation with financial investment achieved from the previous production. (Schumpeter, 1934). The problem is that the modern "ephor" is not always interested in implantation of innovation in the economy. "Moreover, the fact that *seven* of the most famous banks in the world have admitted massive breaches of US sanctions designed to inhibit Iran from developing an atomic bomb, acts of treason against world security, confirms that the search for corporate banking profits is now without constraint" (Kingston, 2014).

Conclusions

It is extremely difficult to draw the line between “fettered” and “unfettered” Capitalism. But in modern economies which are knowledge based, globalization based, internet based, innovation and technology based and tax, bureaucracy, state interventions based at the same time – the task is not as problematic any more. Tax State analysis should be based on a long-term dynamic view and should be focused on the study of the long-term development of the economic system. Schumpeter says that even states, the country (state) itself, or its agenda, can act as an entrepreneur. This is crucial for achieving the purpose of this paper. Therefore can be concluded that we may have to deal with “Tax State” which is typical for “fettered capitalism” and with “entrepreneurial state” which is typical for “unfettered capitalism”.

What is important, in the context of nowadays US and EU economic problems, is that according to Schumpeter the crisis of the Tax State is not only understood as a financial crisis but – even more important – as a legal and political crisis. Is it not true, that in “unfettered” capitalism banks which has caused financial global crises should not bear the consequences. They should fail and should be replaced (maybe in the process of creative destruction) by new banks with money financing Schumpeterian innovations and development instead of speculation. In this connection fact, that this “financial creative destruction” was impossible to occur in US and in the EU economies, only reinforces the belief that capitalism in these economies is beginning “fettered”. This may proved that Schumpeter was right in his forecast that capitalism would sooner or later be replaced by socialism.

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Decomposing the Net Efficiency of Active Labor Market Programs

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Abstract: Each state intervention in the labor market must be evaluated at the end in terms of efficiency. It is especially important during periods when the resources allocated for this purpose are limited. The most common the gross efficiency is estimated. The gross efficiency is the percentage of people who found employment after the program. Gross efficiency indicators contains a number of apparent effects that distort the effect of intervention. Therefore one estimates net efficiency indicators, which reflects the actual effect of state intervention in the labor market. The aim of this paper is to estimate the net efficiency indicator of active labor market programs using the Oaxaca-Blinder decomposition. Analysis will be carried out on the base of data sets of unemployed participating and not participating in active labor market programs.

Introduction

Labor Market Policy is aimed at solving structural problems of labor market and improving the efficiency of its functioning. Labor Market Policy is based on specialized instruments that adjust the structure of supply of work to the structure of demand for work. It has microeconomic character. Labor Market Policy is a state intervention in the labor market in case of imbalance on the labor market and it doesn't create new places of work. In

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

the process of achieving the objectives of the labor market policy one uses many instruments, which could be divided into active and passive ones. Active Labor Market Programs are in general directed to prepare the unemployed to reenter into the process of work and should be used especially to those with highest risk of unemployment and living in the regions with most difficult labor market situation. The aims of active labor market policy are:

- elicitation of unemployed,
- decreasing the structural mismatching in the labor market,
- increasing the productivity of labor force and verification the willingness of the unemployed to work.

The group of active instruments is composed of:

- career counseling and placement services,
- job search assistance,
- trainings,
- rotation and job sharing,
- subsidised employment.

The group of passive instruments is composed of employment benefits and early retirement.

Each state intervention in the labor market must be evaluated at the end in terms of efficiency. Efficiency indicators are calculated in general for active labor market programs. In most cases gross efficiency indicators are calculated and are interpreted as a percent of unemployed who moved to employment following the end of the active labor market program. Gross efficiency indicators contain several apparent (external) effects for example deadweight loss which is defined as the hirings from the target group that would have occurred also in the absence of the programme (Calmfors, 1994). External effects distort the real causal impact of active labor market program. This is the substantial reason explaining why one should estimate net efficiency indicators of the programs.

Several methods of estimation the net efficiency indicators are proposed. One of the most popular is the Propensity Score Matching method, which is based on counterfactual states theory. The main idea of this method is that for each participant it matches one or more non-participants with equal or similar probability of participating in the programme (Heckmann, Ichimura, Todd, 1997).

When we obtain a control group we can estimate casual state intervention effect on the labor market. Net casual effect is estimated with the formula (Caliendo, 2006):

$$\Delta^{MAT} = \frac{1}{N_1} \sum_{i \in I_1} \left[Y_i^1 - \sum_{j \in I_0} w_{ij} Y_j^0 \right],$$

where:

Δ^{MAT} is the net effect of the state intervention,

N_1 is the number of participants of the program,

I_1 is the subset of participants of the intervention,

I_0 is the subset of nonparticipants of the intervention,

w_{ij} is a weight for j -th unemployed in a control group, which is used to estimation a counterfactual effect for i -th participant.

For each participant a sum of weights w_{ij} of similar nonparticipants must be equal to 1.

An alternative for matching methods are model-based methods. One of them is Oaxaca-Blinder decomposition, which is based on econometric models.

The aim of this paper is to estimate the net efficiency indicator of active labor market programs using the Oaxaca-Blinder decomposition. The substantial part of analysis is the estimation of the impact of each characteristic of the unemployed on the net efficiency indicator.

Methodology of the research

To estimate net efficiency indicators we will use the method called Oaxaca-Blinder decomposition and its modification. For a linear regression, the standard Oaxaca-Blinder decomposition is the difference between two groups in the average value of the dependent variable Y can be written as (Oaxaca, 1973; Blinder, 1973):

$$\bar{Y}_A - \bar{Y}_B = [\bar{X}_A \beta_A - \bar{X}_B \beta_A] + [\bar{X}_B \beta_A - \bar{X}_B \beta_B],$$

where:

\bar{Y}_A is the mean outcome for the group of participants of active labor market programs,

\bar{Y}_B is the mean outcome for the group of nonparticipants of active labor market programs,

β_A is the vector of coefficients in the model of outcome for the group of participants of active labor market programs,

β_B is the vector of coefficients in the model of outcome for the group of nonparticipants of active labor market programs,

\bar{X}_A is the vector of mean values of characteristics of the group of participants of labor market programs,

\bar{X}_B is the vector of mean values of characteristics of the group of nonparticipants of labor market programs.

The decomposition for a nonlinear case $Y = F(X\hat{\beta})$ can be shown as:

$$\bar{Y}_A - \bar{Y}_B = [\overline{F(X_A\beta_A)} - \overline{F(X_B\beta_A)}] + [\overline{F(X_B\beta_A)} - \overline{F(X_B\beta_B)}],$$

where:

$\overline{F(\cdot)}$ represents the mean value of the theoretical values from nonlinear or linear model.

The first part of the decomposition $[\overline{F(X_A\beta_A)} - \overline{F(X_B\beta_A)}]$ represents the differences in characteristics and the second one $[\overline{F(X_B\beta_A)} - \overline{F(X_B\beta_B)}]$ denotes the differences in coefficients.

The most important thing is to find the contribution of each variable to the total difference. If the function F is linear, obtaining detailed decomposition equation is trivial. But in case of nonlinear F function, the key problem is how to estimate the contribution of particular variables to the characteristics and coefficient effects. The solution of this problem is to use two types of approximation. First type of approximation evaluates the value of the function by using mean characteristics. The second type of approximation is based on first order Taylor expansion which linearizes the characteristics and coefficients effects around $\bar{X}_A\beta_A$ and $\bar{X}_B\beta_B$, respectively (Yun, 2003).

The decomposition with weights takes the form (Yun, 2003):

$$\begin{aligned} \bar{Y}_A - \bar{Y}_B = & \sum_{i=1}^k W_{\Delta X}^i [\overline{F(X_A\beta_A)} - \overline{F(X_B\beta_A)}] \\ & + \sum_{i=1}^k W_{\Delta \beta}^i [\overline{F(X_B\beta_A)} - \overline{F(X_B\beta_B)}] \end{aligned}$$

where:

$W_{\Delta X}^i = \frac{(\bar{X}_A^i - \bar{X}_B^i)\beta_A^i}{(\bar{X}_A - \bar{X}_B)\beta_A}$ weights concerning characteristics of unemployed,

$W_{\Delta\beta}^i = \frac{\bar{X}_B^i(\beta_A^i - \beta_B^i)}{\bar{X}_B(\beta_A - \beta_B)}$ weights concerning coefficients,

$$\sum_{i=1}^k W_{\Delta X}^i = 1,$$

$$\sum_{i=1}^k W_{\Delta\beta}^i = 1.$$

Above decomposition may be considered as a general decomposition accounting for differences in the first moment. The only requirement is that the function F must be once differentiable. In many practical applications as a F function, a probit and logit model is used (Even, Macpherson, 1990; Nielsen, 1998; Yun, 2000). A described methodology of nonlinear decomposition technique will let us to estimate the net efficiency indicators for active labor market programs and identify causes of differences in moving to employment between groups of unemployed participants (group A) and non-participants (group B) of active labor market programs.

Data used for the analysis

Data used to conduct the analysis contain information about the unemployed in Toruń City. Analysis was conducted for two periods of time: year 2009 and year 2010. Datasets contained variables describing unemployed:

- Y – binary variable taking value 1 if an unemployed person turned employed and 0 in other case,
- SEX – binary variable taking value 1 for men and 0 for women,
- ENG – binary variable taking value 1 for unemployed with fluent or medium knowledge of English,
- UN_BEN – binary variable taking value 1 if an unemployed person received an unemployment benefit,
- $CHILD0$ – binary variable taking value 1 if an unemployed person had no children,
- $CHILD1$ – binary variable taking value 1 if an unemployed person had one child,
- $CHILD2$ – binary variable taking value 1 if an unemployed person had two or more children (this is a base variable for the group of variables describing number of children),
- $EDUC0$ – binary variable taking value 1 for unemployed with incomplete primary or primary or lower secondary education,

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

- *EDUC1* – binary variable taking value 1 for unemployed with basic vocational education,
- *EDUC2* – binary variable taking value 1 for unemployed with general secondary education (this is a base variable for the group of variables describing education),
- *EDUC3* – binary variable taking value 1 for unemployed with post-secondary and vocational secondary education,
- *EDUC4* – binary variable taking value 1 for unemployed with tertiary education,
- *OCCUP0* – binary variable taking value 1 if an unemployed person had no occupation,
- *OCCUP1_2* – binary variable taking value 1 if an unemployed person had occupation that belongs to the first (Managers) or second (Professionals) large group of occupations from the *Classification of occupations and specialities* (this is a base variable for the group of variables describing occupation),
- *OCCUP3* – binary variable taking value 1 if an unemployed person had occupation belonging to the third large group of occupations – Technicians and associate professionals,
- *OCCUP4* – binary variable taking value 1 if an unemployed person had occupation belonging to the fourth large group of occupations – Clerical support workers,
- *OCCUP5* – binary variable taking value 1 if an unemployed person had occupation belonging to the fifth large group of occupations – Service and sales workers,
- *OCCUP6* – binary variable taking value 1 if an unemployed person had occupation belonging to the sixth large group of occupations – Skilled agricultural, forestry and fishery workers,
- *OCCUP7* – binary variable taking value 1 if an unemployed person had occupation belonging to the seventh large group of occupations – Craft and related trade workers,
- *OCCUP8* – binary variable taking value 1 if an unemployed person had occupation belonging to the eighth large group of occupations – Plant and machines operators and assemblers,
- *OCCUP9* – binary variable taking value 1 if an unemployed person had occupation belonging to the ninth large group of occupations – Elementary occupations,

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

- *MARITAL1* – binary variable taking value 1 if an unemployed person was married,
- *MARITAL2* – binary variable taking value 1 if an unemployed person was single,
- *MARITAL3* – binary variable taking value 1 if an unemployed person had other marital status (this is a base variable for the group of variables describing marital status),
- *AGE* – continuous variable describing age of the unemployed,
- *SENIORITY* – continuous variable describing seniority of the unemployed,
- *PART* – binary variable taking the value equal to 1 if an unemployed person belonged to the group of participants of active labor market programs.

A variable *PART* takes the value equal to 1 for all unemployed who took part in such active programs like: grants for starting business, trainings, intervention works, internships, public works and socially useful works.

Results of the analysis

On the base of datasets we estimated net efficiency indicators for specified active labor market programs. As a *F* function we used three types of probability model:

- linear: $P(Y = 1) = X\beta$,
- logit: $P(Y = 1) = \frac{e^{X\beta}}{1+e^{X\beta}}$,
- probit: $P(Y = 1) = \int_{-\infty}^{X\beta} \frac{1}{2\pi} e^{-\frac{t^2}{2}} dt$.

Results of the estimation of net efficiency indicators and wages describing the impact of each characteristic of unemployed to the value of indicator.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 1. The averages used in calculation the net efficiency indicators

Variable	Year 2009		Year 2010	
	\bar{X}_A	\bar{X}_B	\bar{X}_A	\bar{X}_B
<i>SEX</i>	0.4360	0.5157	0.4485	0.5215
<i>ENG</i>	0.5256	0.3513	0.5485	0.3540
<i>UN_BEN</i>	0.1431	0.2748	0.1336	0.2346
<i>CHILD0</i>	0.7380	0.6569	0.7112	0.6470
<i>CHILD1</i>	0.1197	0.1750	0.1533	0.1803
<i>EDUC0</i>	0.1724	0.2789	0.1548	0.2887
<i>EDUC1</i>	0.1423	0.2458	0.1676	0.2420
<i>EDUC3</i>	0.2289	0.2239	0.2533	0.2216
<i>EDUC4</i>	0.3283	0.1485	0.2859	0.1460
<i>OCCUP0</i>	0.1333	0.1297	0.1395	0.1329
<i>OCCUP3</i>	0.1627	0.1389	0.1572	0.1303
<i>OCCUP4</i>	0.0512	0.0600	0.0710	0.0636
<i>OCCUP5</i>	0.1145	0.1702	0.1557	0.1815
<i>OCCUP6</i>	0.0045	0.0055	0.0034	0.0058
<i>OCCUP7</i>	0.1190	0.2125	0.1395	0.2156
<i>OCCUP8</i>	0.0602	0.0670	0.0483	0.0692
<i>OCCUP9</i>	0.0648	0.0875	0.0596	0.0931
<i>MARITAL1</i>	0.3155	0.4297	0.3539	0.4303
<i>MARITAL2</i>	0.5354	0.3932	0.4781	0.3980
<i>SENIORITY</i>	6.0750	9.0750	6.6345	9.0191
<i>AGE</i>	32.5904	35.8143	33.1247	36.0506

Source: own calculations.

On the base of averages one can state that in the year 2010: the share of men in both groups increased, the share of unemployed with knowledge of English in both groups increased, the share of unemployed receiving unemployment benefit in both groups decreased, the share of unemployed with no children decreased and the share of unemployed with one child in both groups increased. The share of unemployed with tertiary education decreased in both groups. The share of unemployed with incomplete primary or primary or lower secondary education decreased for the group of participants and increased for the group of nonparticipants of active labor market programs. The shares of unemployed with post-secondary and vocational and with basic vocational education increased for the group of participants and decreased for the group of nonparticipants. Due to occupation the highest increase of a share was for unemployed with occupations belonging to the fifth large group of occupations. This situation concerned participants and nonparticipants. The share of married unemployed increased in both

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

groups. The share of single unemployed decreased only for the group of participants. The average seniority increased only for the group of participants. The average age increased in both groups.

Table 2. Results of the estimation of linear model and net efficiency indicator for the year 2009

Variable	β_A	β_B	Difference in characteristic (%)	Difference in coefficient (%)
<i>Intercept</i>	1.1130	0.6578	0.00	226.66
<i>SEX</i>	-0.0126	-0.0200	0.50	1.92
<i>ENG</i>	0.0219	0.0417	1.90	-3.46
<i>UN_BEN</i>	0.0826	0.1899	-5.42	-14.70
<i>CHILD0</i>	-0.0187	-0.0034	-0.75	-5.00
<i>CHILD1</i>	-0.0641	-0.0171	1.77	-4.10
<i>EDUC0</i>	-0.1410	-0.0891	7.48	-7.20
<i>EDUC1</i>	-0.0613	-0.0154	3.16	-5.62
<i>EDUC3</i>	-0.0178	0.0861	-0.04	-11.58
<i>EDUC4</i>	0.0554	0.1582	4.97	-7.60
<i>OCCUP0</i>	-0.1646	-0.0790	-0.29	-5.53
<i>OCCUP3</i>	-0.0560	-0.0334	-0.66	-1.56
<i>OCCUP4</i>	-0.0307	-0.0154	0.13	-0.46
<i>OCCUP5</i>	-0.1250	-0.0084	3.47	-9.88
<i>OCCUP6</i>	0.0702	0.0371	-0.04	0.09
<i>OCCUP7</i>	-0.0941	-0.0028	4.39	-9.67
<i>OCCUP8</i>	-0.0834	0.0394	0.28	-4.10
<i>OCCUP9</i>	-0.1010	0.0124	1.14	-4.94
<i>MARITAL1</i>	0.0677	0.0415	-3.85	5.61
<i>MARITAL2</i>	-0.0092	-0.0080	-0.65	-0.22
<i>SENIORITY</i>	0.0092	0.0110	-13.74	-8.30
<i>AGE</i>	-0.0144	-0.0112	23.11	-57.23
<i>NET EFFICIENCY</i>	0.2008		26.86	73.14

Source: own calculations.

Estimated net efficiency indicator calculated for the year 2009 on the base of linear regression equals to 0.2008. This value represents the real effect of participation in active labor market programs and one can state that participants more often received a job in comparison with nonparticipants. Only 26.86% of the net efficiency indicator is explained by differences in characteristics of unemployed, the rest 73.14% is an unexplained part of the indicator. The biggest positive impact of differences in characteristics on the indicator had age, lack of education or tertiary education,

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

occupation belonging to the seventh large group of occupations. The biggest negative impact of differences in characteristics on the indicator had receiving employment benefit, being married and seniority. The impact of differences in coefficients had in general negative influence on the efficiency indicator of the active labor market programs. The biggest impact had receiving unemployment benefit, possessing post-secondary or vocational secondary education, having occupation belonging to fifth or seventh large group of occupations and seniority.

Table 3. Results of the estimation of logit model and net efficiency indicator for the year 2009

Variable	β_A	β_B	Difference in characteristic (%)	Difference in coefficient (%)
<i>Intercept</i>	2.8787	1.0652	0.00	194,34
<i>SEX</i>	-0.0717	-0.0900	0.62	1,01
<i>ENG</i>	0.0969	0.1827	1.83	-3,23
<i>UN_BEN</i>	0.3730	0.8009	-5.32	-12,60
<i>CHILD0</i>	-0.0874	-0.0540	-0.77	-2,35
<i>CHILD1</i>	-0.3134	-0.0962	1.88	-4,07
<i>EDUC0</i>	-0.6080	-0.4759	7.01	-3,95
<i>EDUC1</i>	-0.2615	-0.1113	2.93	-3,96
<i>EDUC3</i>	-0.0802	0.3466	-0.04	-10,24
<i>EDUC4</i>	0.2793	0.6702	5.44	-6,22
<i>OCCUP0</i>	-0.8171	-0.4408	-0.31	-5,23
<i>OCCUP3</i>	-0.3105	-0.1500	-0.80	-2,39
<i>OCCUP4</i>	-0.1952	-0.0743	0.19	-0,78
<i>OCCUP5</i>	-0.6347	-0.0431	3.83	-10,79
<i>OCCUP6</i>	0.2561	0.1890	-0.03	0,04
<i>OCCUP7</i>	-0.4908	-0.0134	4.97	-10,87
<i>OCCUP8</i>	-0.4389	0.1829	0.32	-4,46
<i>OCCUP9</i>	-0.4998	0.0819	1.23	-5,46
<i>MARITAL1</i>	0.3290	0.2085	-4.07	5,55
<i>MARITAL2</i>	-0.0653	-0.0248	-1.01	-1,71
<i>SENIORITY</i>	0.0437	0.0605	-14.19	-16,36
<i>AGE</i>	-0.0674	-0.0613	23.54	-23,51
<i>NET EFFICIENCY</i>	0.2008		27.25	72.75

Source: own calculations.

Estimated net efficiency indicator calculated on the base of the logit model equals to the indicator calculated on the base of linear model. Differences in characteristics and coefficients are different but have similar

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

tendencies. Share of the explained part is bigger than in the case of linear model and equals to 27.25%. Unexplained part is still large and equals to 72.75%.

Table 4. Results of the estimation of probit model and net efficiency indicator for the year 2009

Variable	β_A	β_B	Difference in characteristic (%)	Difference in coefficient (%)
<i>Intercept</i>	1.7375	0.5973	0.00	201.88
<i>SEX</i>	-0.0452	-0.0576	0.64	1.13
<i>ENG</i>	0.0546	0.1155	1.70	-3.79
<i>UN_BEN</i>	0.2292	0.4967	-5.40	-13.01
<i>CHILD0</i>	-0.0558	-0.0290	-0.81	-3.12
<i>CHILD1</i>	-0.1976	-0.0558	1.95	-4.39
<i>EDUC0</i>	-0.3699	-0.2821	7.04	-4.33
<i>EDUC1</i>	-0.1551	-0.0619	2.87	-4.05
<i>EDUC3</i>	-0.0449	0.2167	-0.04	-10.37
<i>EDUC4</i>	0.1752	0.4120	5.63	-6.23
<i>OCCUP0</i>	-0.4835	-0.2567	-0.31	-5.21
<i>OCCUP3</i>	-0.1773	-0.0926	-0.75	-2.08
<i>OCCUP4</i>	-0.1216	-0.0448	0.19	-0.82
<i>OCCUP5</i>	-0.3759	-0.0261	3.74	-10.54
<i>OCCUP6</i>	0.1691	0.1041	-0.03	0.06
<i>OCCUP7</i>	-0.2921	-0.0078	4.88	-10.70
<i>OCCUP8</i>	-0.2581	0.1111	0.31	-4.38
<i>OCCUP9</i>	-0.3014	0.0467	1.23	-5.39
<i>MARITAL1</i>	0.1933	0.1293	-3.94	4.87
<i>MARITAL2</i>	-0.0249	-0.0155	-0.63	-0.65
<i>SENIORITY</i>	0.0268	0.0353	-14.38	-13.52
<i>AGE</i>	-0.0410	-0.0358	23.59	-32.83
<i>NET EFFICIENCY</i>	0.2003		27.47	72.53

Source: own calculations.

Results received from the probit model are similar to linear model and logit model-based. Net efficiency indicator is slightly smaller than in previous cases and equals to 0.2003. Share of explained part is bigger than in cases of linear and logit model and equals to 27.47%.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 5. Results of the estimation of linear model and net efficiency indicator for the year 2010

Variable	β_A	β_B	Difference in characteristic (%)	Difference in coefficient (%)
<i>Intercept</i>	0.8598	0.5367	0.00	176.24
<i>SEX</i>	0.0225	0.0026	-0.90	5.67
<i>ENG</i>	0.0059	0.0260	0.62	-3.88
<i>UN_BEN</i>	0.1280	0.1585	-7.05	-3.90
<i>CHILD0</i>	0.0836	0.0148	2.92	24.26
<i>CHILD1</i>	0.0631	-0.0006	-0.93	6.27
<i>EDUC0</i>	-0.0453	-0.0982	3.31	8.34
<i>EDUC1</i>	-0.0519	-0.0369	2.10	-1.97
<i>EDUC3</i>	0.0046	0.0585	0.08	-6.52
<i>EDUC4</i>	0.1352	0.1752	10.32	-3.19
<i>OCCUP0</i>	-0.1053	-0.0338	-0.38	-5.19
<i>OCCUP3</i>	-0.0201	0.0198	-0.30	-2.84
<i>OCCUP4</i>	0.0142	0.0106	0.06	0.12
<i>OCCUP5</i>	-0.0366	0.0446	0.51	-8.05
<i>OCCUP6</i>	0.0289	0.0727	-0.04	-0.14
<i>OCCUP7</i>	-0.0194	0.0542	0.80	-8.65
<i>OCCUP8</i>	-0.0264	0.0647	0.30	-3.44
<i>OCCUP9</i>	-0.0733	0.0662	1.34	-7.08
<i>MARITAL1</i>	0.0574	0.0399	-2.40	4.13
<i>MARITAL2</i>	-0.0123	-0.0106	-0.54	-0.37
<i>SENIORITY</i>	0.0115	0.0102	-14.98	6.40
<i>AGE</i>	-0.0144	-0.0096	22.99	-94.08
<i>NET EFFICIENCY</i>	0.1833		17.86	82.14

Source: own calculations.

Estimated net efficiency indicator calculated for the year 2010 based on the linear regression is smaller than the indicator for the year 2009 and equals to 0.1833. moreover one can state that the share of explained part of the indicator significantly decreased and for the investigated year equals to 17.86%. The biggest positive impact of differences in characteristics on the indicator had age, lack of education or tertiary education, occupation belonging to the ninth large group of occupations. The biggest negative impact of differences in characteristics on the indicator had receiving unemployment benefit, being married and seniority. The biggest negative impact of differences in coefficients had receiving unemployment benefit, possessing post-secondary or vocational secondary education, having occupa-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

tion belonging to fifth or seventh large group of occupations and in particular age.

Table 6. Results of the estimation of logit model and net efficiency indicator for the year 2010

Variable	β_A	β_B	Difference in characteristic (%)	Difference in coefficient (%)
<i>Intercept</i>	1.6170	0.4909	0.00	135.37
<i>SEX</i>	0.1006	0.0171	-0.94	5.23
<i>ENG</i>	0.0228	0.1174	0.57	-4.03
<i>UN_BEN</i>	0.5751	0.6575	-7.42	-2.32
<i>CHILD0</i>	0.3540	0.0495	2.90	23.69
<i>CHILD1</i>	0.2717	-0.0105	-0.94	6.11
<i>EDUC0</i>	-0.1999	-0.5158	3.42	10.96
<i>EDUC1</i>	-0.2276	-0.2037	2.16	-0.69
<i>EDUC3</i>	0.0156	0.2255	0.06	-5.59
<i>EDUC4</i>	0.6103	0.7261	10.91	-2.03
<i>OCCUP0</i>	-0.4609	-0.2636	-0.39	-3.15
<i>OCCUP3</i>	-0.0924	0.0771	-0.32	-2.65
<i>OCCUP4</i>	0.0609	0.0276	0.06	0.25
<i>OCCUP5</i>	-0.1637	0.1804	0.54	-7.51
<i>OCCUP6</i>	0.1195	0.3252	-0.04	-0.14
<i>OCCUP7</i>	-0.0813	0.2283	0.79	-8.02
<i>OCCUP8</i>	-0.1249	0.2821	0.33	-3.39
<i>OCCUP9</i>	-0.3381	0.2983	1.45	-7.12
<i>MARITAL1</i>	0.2647	0.1945	-2.59	3.63
<i>MARITAL2</i>	-0.0578	-0.0415	-0.59	-0.78
<i>SENIORITY</i>	0.0527	0.0552	-16.07	-2.71
<i>AGE</i>	-0.0650	-0.0527	24.29	-53.31
<i>NET EFFICIENCY</i>	0.1833		18.21	81.79

Source: own calculations.

Results obtained from the logit model are similar for the year 2009 to the results received from the linear probability model. The net efficiency indicator equals to 0.1833 and a share of explained part is greater in comparison to linear model-based results and equals to 18.21%.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 7. Results of the estimation of probit model and net efficiency indicator for the year 2010

Variable	β_A	β_B	Difference in characteristic (%)	Difference in coefficient (%)
<i>Intercept</i>	0.9882	0.2498	0.00	145.52
<i>SEX</i>	0.0644	0.0065	-0.97	5.95
<i>ENG</i>	0.0187	0.0734	0.75	-3.82
<i>UN_BEN</i>	0.3506	0.4084	-7.32	-2.67
<i>CHILD0</i>	0.2153	0.0335	2.86	23.18
<i>CHILD1</i>	0.1661	-0.0058	-0.93	6.11
<i>EDUC0</i>	-0.1202	-0.3073	3.33	10.65
<i>EDUC1</i>	-0.1344	-0.1212	2.07	-0.63
<i>EDUC3</i>	0.0103	0.1403	0.07	-5.67
<i>EDUC4</i>	0.3741	0.4496	10.82	-2.17
<i>OCCUP0</i>	-0.2787	-0.1445	-0.38	-3.51
<i>OCCUP3</i>	-0.0537	0.0503	-0.30	-2.67
<i>OCCUP4</i>	0.0424	0.0199	0.06	0.28
<i>OCCUP5</i>	-0.0969	0.1151	0.52	-7.58
<i>OCCUP6</i>	0.0767	0.1960	-0.04	-0.14
<i>OCCUP7</i>	-0.0526	0.1433	0.83	-8.32
<i>OCCUP8</i>	-0.0757	0.1742	0.33	-3.41
<i>OCCUP9</i>	-0.2052	0.1832	1.42	-7.13
<i>MARITAL1</i>	0.1597	0.1214	-2.52	3.25
<i>MARITAL2</i>	-0.0358	-0.0248	-0.59	-0.86
<i>SENIORITY</i>	0.0322	0.0324	-15.89	-0.29
<i>AGE</i>	-0.0398	-0.0308	24.09	-64.25
<i>NET EFFICIENCY</i>	0.1834		18.19	81.81

Source: own calculations

Results received from the probit model are, like for the year 2009, similar to linear model and logit model-based. Net efficiency indicator is slightly higher than in previous cases and equals to 0.2003. Share of the explained part is higher than in case of linear model-based calculation and smaller than in logit model-based calculation and equals 18.19%. The impact of each difference in characteristic and coefficients is in general similar except for seniority. The impact of differences in coefficients on seniority varies due to econometric probability model used. In case of linear model the impact is positive and equals 6.40% but for logit and probit model the impact is negative and equals 2.71% and 0.90%, respectively.

Conclusions

As a result of carried out analysis we obtained estimates of net efficiency indicators of active labor market programs. The decomposition allowed to estimate impact of each characteristic of the unemployed to the value of the indicator. Moreover the analysis showed that a type of the probability model doesn't influence significantly the estimates of the net efficiency indicator. Moreover percentage differences in characteristics and coefficients have similar tendencies.

Possible direction of future research is to estimate net efficiency indicator with various methods and compare them. One can use model-based parametric methods and for example kernel-based nonparametric methods or matching-based methods.

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015
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The Economic Cycle and the Innovation Activity of the Polish Industry System

JEL Classification: *L52; P51; O12; O25; O31; O38; O47*

Keywords: *innovation; economic cycle; system; nation; industry*

Abstract: Industrial structures in the “catching up” type of countries usually are not too competitive in nature, and mainly they differ in the low share of high-technology products in the international trade. The aim of the conducted studies was an attempt to search for directions, as well as the power of impact of different phases of the business cycle on the innovation activity of the Polish industrial system. Consequently, this was to allow to determine the boundary conditions for the national network of innovations and its model structure, which would take into account the specificity of Poland. The methodical part of the paper was based on the theory of probability (probit modelling). Based on the analysis performed based on 5209 industrial companies (questionnaire survey) it was stated that in the prosperity phase the implementation of the innovation activity is significantly higher than in other phases of the business cycle. On the other hand, during recession and stagnation, the innovation activity is a less common phenomenon, but is not completely abandoned. Research results did not confirm the occurrence of the counter-cyclical approach to the conducted innovation activity in the national industrial system. The economic situation is thus an important factor, which influences the decision whether to undertake, activate or, in some cases, limit the innovation activity in companies. Therefore, there is a need to take into account the existing market conditions in the programming of the innovation policy within the impact on the phenomenon of the innovation processes in Poland

Introduction

In Europe there is noted the systematic, but slow process of recovery from the economic crisis, what is confirmed by various economic indicators in individual member states of the European Union. This allows an optimistic look into the near future. This does not change the fact that the observed state of slowdown can still take a long time. Entities operating in this cycle phase are under the peer pressure and often decide on strategies of cost reduction in a short period of time, without devoting much time to the exploration of factors responsible for the creation of the long-term competitive advantage, understood as the innovation strategy (Barett et al., 2009). In a short period of time, the lack or limitation of financing such activity of the companies may result in the stretched or reduced budgets for creating and implementing new technologies, what will ultimately lead to delays in developing new products and processes, limitation of their quality, and even stopping the part of the innovation projects.

The problem of the influence of the conjunctural cycle on the innovation activity of companies is not a new phenomenon, but it still remains in the area of interest of the science, what is confirmed by the publications constantly appearing in this field on both the national and foreign market (Dominiak, Churski, 2012, pp.54-77; Etkowitz, Leydesdorff, 2000, pp. 109-123; Archibugi et al., 2013, pp. 1247-1260; D'Este et al., 2012, pp. 482-488). At the company level, literature in economics shows the diverse influence of the economic slowdown on the dynamics of innovation expenditures. There is the dispute broadly described in this scope. Traditionally, investments into new technologies should be treated as the counter-cyclical measure for companies operating on the market, because limitations taking place in the downturn influence the level of their profitability, what generates the imperative to seek paths to obtain higher productivity. Thus, according to the concept of "creative destruction" of J. Schumpeter, the crisis creates new perspectives for economic entities (Schumpeter, 1939). As the result, many of them should aim to reorganise the structures and improve the quality of own innovation activity. A manifestation of this approach may be the R&D sphere personnel, which during the crisis is subject to the natural phenomenon of "work hoarding". That is, the most qualified employees are "stored" in the company thanks to the lower qualification personnel (Soete, 2009). This generates new potential possibilities to develop the organisation. In turn, the lost profits resulting from the limited labour demand of the directly manufacturing employees should be, during reces-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

sion, a contribution for the new companies for new investments in the area of technology (Stiglitz, 1993; Aghion, Saint-Paul, 1998, pp. 279-303; Canton, Uhlig, 1999, pp. 239-266). As it is known that the chances of bankruptcy of the companies, which do not implement the reorganisation programs, are higher in the recession phase (Aghion, Saint-Paul, 1998, pp. 279-303).

Despite many logical and common sense arguments that the innovation activity of companies should be counter-cyclical in nature, in literature there often in parallel exists a notion that managers of the companies do not treat the innovation activity differently than its remaining functions. This means that this activity should have the cyclic nature. In the modern economy, generation and implementation of new technologies, mostly the fundamental ones, is delayed during the recession, and companies are waiting for the next wave of recovery (Shleifer, 1986, pp. 1163-1190; Francois, Lloyd-Ellis, 2003, pp. 530-550). In this situation there is no scientific consensus in the area of veracity of the Gerhard Mensch's „acceleration of innovation” hypothesis of 1975, assuming that innovations, especially the radical ones, are more often implemented in the recession phase as an attempt to search new opportunities for companies willing to survive on the shrinking market (Clark et al., 1981, pp. 308-322).

The economic situation is an important factor, which can often influence the decisions about taking or abandoning the innovation activity by industrial companies, both in Poland and in the more developed countries. The Polish industrial system due to its underdeveloped, but improving, character more often depends on the changes taking place in its closer and further environment, and therefore in more developed countries. Studies conducted in the SME manufacturing sector in Spain in 2013 confirm and at the same time generate equivocal conclusions in the analysed sector, and they come down to the following theses (Madrid-Guijarro et al., 2013, pp. 578-601): (1) innovation of small and medium industrial companies decreases during the economic crisis, (2) types of the implemented innovations in the Spanish SME change in different economic conditions, and what is extremely interesting, (3) innovation has a beneficial influence on the results of companies both during the economic development and the recession. The obtained results of studies show that the innovation strategies in the SME sector, despite different phases of the economic cycle, have a significant impact on the efficiency of its functioning and these conditions should be included in the planned and implemented innovation policies. This provides

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

the rationale to conduct analyses in terms of the intensity of involvement in a variety of innovation activity due to changes of the business cycle phases.

Therefore, it can be concluded that the discussion in the studied area was not completed, and the economic impact on the technological changes in the companies seems to be a phenomenon more heterogeneous in nature than it has been previously thought. The analyses presented in the work aim to, even a little, enrich the current state of knowledge in this area, especially in an attempt to explain the conditions of functioning of the economic systems in the “catching up” type of countries.

The essence of the innovation systems are the relations taking place between the individual participants of the market forming the network of links. However, this does not mean that the innovation systems operate in a vacuum, because they are embedded in specific economic conditions. Research conducted by Joint Research Centre (JRC) in the area of assessing the influence of the market conditions on the innovation activity of the economy became the reason to undertake an attempt to assess these phenomena in Poland (JRC, 2010). The results of the analyses conducted there still confirm the ambiguity of this phenomenon and its impact on the innovation activity. Thus, the question remains unresolved: is the economic boom or recession the factor stimulating the companies to adept pro-innovation attitudes?

The primary objective of the study was, therefore, the attempt to search for directions, as well as the power of impact of the economic situation on the innovation activity of companies within the Polish industrial system. Consequently, this was to allow the determination of boundary conditions for the national network of innovation and its model structure, which would take into account the specificity of Poland. The effects of original research presented in this article are only a part of the conclusions, which were obtained as a result of the conducted multi-threaded analyses in the country over the last six years.

The exemplification layer of the paper was based on the study in detail exploring the Polish industry. The studies were conducted based on the questionnaire conducted on a group of 5209 industrial enterprises (the number of sent and correctly completed questionnaires), including 4615 enterprises with the exclusive national capital, 281 – with the foreign capital and 313 enterprises with the mixed ownership structure. Due to the lack of funding of the conducted studies they were spread in time and lasted six years (2007-2012). The simultaneously created database of companies is constantly updated, because the works on the attempt to repeat the studies

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

in next provinces are underway. The basic path of data collection was the procedure connecting the initial telephone conversation with the submission of the questionnaire form by mail. The complementary forms included the telephone interview or acquiring the filled in questionnaire by e-mail, or fax. The incorrectly filled questionnaire, depending on the character of the mistake, has essentially disqualified it from the opportunity to participate in subsequent stages of the study. The structure of the studied companies approximately corresponded the data presented by the Central Statistical Office. However, unlike the studies conducted in it, there was also taken into account the micro-enterprises sector, what is an incidental phenomenon in the scale of our country, trying to present holistically the way of functioning of the national industrial system in Poland.

All analyses were static and were conducted in the three-year arrangement, referring to the methodological standards over the R&D sphere and innovations conducted in the OECD countries. Because of this there was the possibility to conduct analysed for a longer period of time, without a significant impact on the final results of the study..

Methodology of the research

The methodological part of analyses was based on the theory of probability. The group of eighteen variables included:

a) the occurrence of expenditures on the innovation activity in the companies, but in connection to their structure, that is the R&D sphere, investments in new machines and technical equipment, as well as buildings, constructions, lands and investments in new computer programs,

$$Y_{1i} = \begin{cases} 1, & \text{if expenditures exist} \\ 0, & \text{if expenditures doesn't exist} \end{cases}$$

b) implementation of new processes and products, taking into account the specific solutions in this regard, and thus new products and new technological processes,

$$Y_{1i} = \begin{cases} 1, & \text{if implemantation exists} \\ 0, & \text{if implemantation doesn't exist} \end{cases}$$

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

c) cooperation in the area of the innovation activity in terms of the subject, that is with suppliers, competitors and recipients, as well as universities, JBR and foreign research institutes.

$$Y_{1i} = \begin{cases} 1, & \text{if cooperation exists} \\ 0, & \text{if cooperation doesn't exist} \end{cases}$$

Independent variables, which were used in the study, are the three economic phases: revival, stagnation and recession, which were identified by entrepreneurs based on information about the incomes earned in the last three years. If the incomes in the company increased in the studied period it was assumed that it is in the revival phase. If the incomes decreased – in the recession phase, and when they did not change: in the stagnation phase.

$$X_{1i} = \begin{cases} 1, & \text{if enterprise declares economic prosperity} \\ 0, & \text{if enterprise declares doesn't declare economic prosperity} \end{cases}$$

$$X_{2i} = \begin{cases} 1, & \text{if enterprise declares economic recession} \\ 0, & \text{if enterprise declares doesn't declare economic recession} \end{cases}$$

$$X_{3i} = \begin{cases} 1, & \text{if enterprise declares economic stagnation} \\ 0, & \text{if enterprise declares doesn't declare economic stagnation} \end{cases}$$

Based on this selection of independent and dependent variables there was an attempt to define the interactions occurring between the prosperity phase, in which the company can be found, and the actual innovation activity (financial, implementation and innovation cooperation). However, taking into account the fact that the subject of the study covered the industrial system in Poland and not the single company, then obtained conclusions with the induction method and thanks to the applied statistical tools apply to the whole group of entities. While the probability values approximated in the analytical part of the article are crucial to determine the poten-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

tial effectiveness of the instruments of the innovations policy – its directions and force of impact.

The adopted independent variables are a set of reference planes, which illustrate the innovation activity of industrial companies, adopted on the basis of the methodology commonly used for the OECD countries since the 80s of the last century (OECD, 2005). There was distinguished the set of features describing the innovation activity of industrial companies at the input (expenditures) and the output (implementation and cooperation). At the same time, to date, the synthetic measure describing the innovation activity on the industry level has not been developed, although the attempts of its system recognition can be found in the literature (KE, 2013). However, they often encounter greater or lesser criticism due to the heterogeneous nature of this activity, difficult to be brought to a common denominator, and the applied measures have specific and, at the same time, limited use.

The statistical verification of models was conducted based on the Wald's *Chi*-square statistics, while the verification of parameter relevance with the *t*-student test using the asymptotic standard errors of assessment. There were adopted the confidence limits at the level of +/-95% – for the model and its parameters. Due to the number of estimated models it was decided to present only those, which meet the condition of the statistical significance – both of the whole model, and its parameter (of the considered factor).

It is also worth noting that both the dependent and independent variables had the binary character. On one hand, this is connected with the fact of necessity to collect a significant number of the properly filled questionnaires – the system study, and on the other, the maximal simplification of questions included in it. This does not change the fact that the nature of the questions asked was consistent with the international methodological standards and practice adopted in this field. For this reason, it was only decided to form the univariate models – the lack of continuous variables on the input allowing for more precise conclusions, however, stressing the directions of the statistically significant connections found between the variables adopted for the study. This proved to be sufficient for the evaluation of the studied phenomena. Based on the theory of probability, there can be estimated the chances of occurring of particular areas of the innovation activity provided that there exist the selected boundary conditions and, this, plan and strengthen the effects of impact of the innovation policy instruments.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

In case when the dependent variable gets dichotomous values, there is no chance to use the multiple regression, commonly applied in the quantitative phenomena. An alternative for such a situation is the use of the probit regression. Its advantage, undoubtedly, is the fact that the analysis and interpretation of the results is similar to the classical regression method. Methods for variable selections, as well as testing the hypotheses, thus have a similar pattern. However, there are differences, which may include, among others: more intricate and time-consuming calculations, as well as calculating values and creating residue charts, which often do not provide anything new to the model (Stanisz, 2007).

In case of a model, in which the dependent variable takes the value of 0 or 1, then the expected value of the dependent value adopted for the model may be interpreted as the conditional probability of the execution of the given event, taking into account the determined values of the independent variables. The applied modelling of this probit type allowed to evaluate the chance of existence of diverse behaviours within the scope of the innovation activity depending on the previously adopted boundary conditions.

Conducting all calculations has been done with the use of the *Statistica* software. Due to the aesthetics of the presentation of the results of the conducted studies, it was decided to present only the basic properties of the econometric models, which met the assessment criteria of the significance of the parameters and models, at the same time resigning from the developed form of presentation, however, taking into account the calculated standard errors, assessment statistics of the model significance as a whole and the probability of occurrence of the phenomena.

All variables adopted for the study, therefore, both the dependent and independent variables, are binary in nature, that is they reach the values of 1 or 0, and therefore the interpretation of the study results has been conducted based on the structural form of the model and achieved probability values. The positive sign by the parameter means that the probability of the event of the innovative nature is significantly higher in the distinguished group of industrial companies in relation to the rest of the group. The probit type of modelling is a very effective research tool, however, mostly in case of large, but at the same time statistical research samples, where the dependent variable takes the qualitative form.

As it has been already mentioned in the introduction, the study was conducted based on the sample of 5209 industrial companies in Poland. The structure of the studied companies from the point of view of the size and technology is presented by the table below.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 19. The structure of industrial enterprises by firm size and technology level (in percent)

No	Firm size	Poland	Technology level	Poland
1	Micro (<10)	36,3	Low	52,2
2	Small (<50)	36,3	Medium low	29,6
3	Medium (<250)	21,5	Medium high	13,2
4	Large (>249)	5,9	High	5,0

Source: own study based on questionnaire research evidence.

The conducted analyses were statistical in nature, what is important from the viewpoint of maintaining the comparability of data and they were conducted in the three-year arrangement with methodological standards of research over the innovations conducted in the OECD countries (OECD, 2005).

The economic prosperity and the innovation activity of the industrial companies

Subjecting a group of companies declaring boom to the probit modelling there were obtained interesting and homonymous study results. For all analysed areas of innovation there were obtained statistically important parameters with the positive sign, without exception. This means that industrial companies are statistically more often prone to undertaking any of the considered innovation activities in the revival phase than in other phases of the economy cycle (cf. Archibugi et al., 2013, pp. 1247-1260). These positive dependencies can be observed both for the financial expenditures incurred for research and development, implementation of new technological processes, and the innovation cooperation, and this process is referred to in the literature as “creative accumulation” (Pavitt et al., 1999, Malerba, Orsenigo, 1995, pp. 47-65). Thus, the obtained results of studies confirm the meaning of supporting this group of entities with different instruments of the innovation policy, either on the national or regional level. Moreover, already at this stage of solutions, in the Polish industrial system, doubts are caused by the counter-cyclical hypothesis of Gerhard Mensch – “acceleration of innovation”.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 20. The parameter value for the independent variable „economic prosperity”, in the probit models describing the system of industrial innovation in Poland

Innovation feature	Coef	Std. error	t-test	Chi²	P> z 	p₁	p₂
R&D expenditure	+0,574	0,037	15,66	249,86	0,00	0,45	0,24
Investment in new fixed assets (including):	+0,509	0,039	13,18	175,97	0,00	0,83	0,67
a) buildings and grounds	+0,419	0,039	10,85	119,65	0,00	0,32	0,18
b) technical equipment and machinery	+0,442	0,036	12,12	148,04	0,00	0,75	0,59
Computer software	+0,209	0,044	4,72	35,70	0,00	0,59	0,51
Launching new products	+0,567	0,038	14,97	227,43	0,00	0,81	0,63
Implementation of new technology processes (including):	+0,380	0,035	10,83	118,01	0,00	0,55	0,40
a) New production methods	+0,383	0,037	10,43	109,75	0,00	0,39	0,25
b) Non production systems	+0,651	0,039	9,04	83,73	0,00	0,29	0,18
c) Support systems	+0,369	0,038	9,63	93,89	0,00	0,31	0,20
Cooperation with suppliers	+0,270	0,065	4,15	17,75	0,00	0,05	0,03
Cooperation with competitors	+0,233	0,092	2,53	6,59	0,01	0,02	0,01
Cooperation with Polish Academy of Sciences units	+0,340	0,065	5,22	28,45	0,00	0,06	0,03
Cooperation with universities	+0,361	0,053	6,83	48,32	0,00	0,11	0,05
Cooperation with domestic R&D units	+0,432	0,091	4,73	24,65	0,00	0,03	0,01
Cooperation with foreign R&D units	+0,248	0,040	6,25	39,48	0,00	0,25	0,18
Cooperation with customers	+0,389	0,035	10,99	121,65	0,00	0,50	0,35
Overall innovation cooperation	+0,574	0,037	15,66	249,86	0,00	0,45	0,24

p<0,05

Source: own study based on questionnaire research evidence.

Considering in detail the values of probabilities, however, we can observe several other interesting probabilities. Firstly, there is a wide diversity between the mathematical value of chances in the areas of financing and implementation, and the innovation cooperation. Companies in the boom period, although more often than other entities, finance and implement new solutions, still they are less often interested in entering into cooperation relations, mostly horizontal (Jasiński, 2014; CSO, 2012). High probability values are obtained for the investment into fixed assets (0,83), including the purchase of machines and devices (0,75) and computer software (0,59),

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

implementation of new products (0,59) and technological processes (0,81), with emphasis on the new methods of their production (0,55).

In the area of the innovation cooperation, entities are more often interested in the vertical connections – with suppliers (0,31) and recipients (0,25), when the horizontal ones are very rare, regardless of the considered cooperation entity (chances close to zero).

In summary, companies in the prosperity period are significantly more likely to implement different forms of innovation activity, mostly in the R&D work area, investment in new fixed assets, implementation of new products and technological processes in the production systems or the vertical innovation cooperation. However, not all indicated areas should be potentially supported by different mechanisms of the innovation policy. This mostly results from the fact of reaching the probability value much above the average (certainty of events). In this situation, there should be considered the meaning of the company support, which regardless of the occurrence of instruments of the innovation policy will implement different forms of the innovation activity (displacing efficiently operating market mechanisms). Thus, the directions of stimulation in the revival period should hover around the following activities: the R&D activity, investment in new buildings, implementation of new products and methods of their production, innovation cooperation along the supply chain. In terms of others, we will deal with 1) the situation of market displacing by the state policy (high probability values), and 2) with non-system attempts to stimulate the innovation activity – high costs and its low effectiveness (low probability values).

As a result of the conducted studies we can observe that the period of the economic acceleration favours the system of acceleration of the technological progress of the Polish industry and basically at this stage of its development it should be supported by instruments of the innovation policy, however not in every area. Such “intelligent” stimulation should accelerate technological changes in the industry, what in turn will contribute to the system, high and self-sustaining auto-dynamism of innovation in Poland.

Recession and the innovation activity of the industrial companies

In the analysed period, 916 industrial companies declared that they were in the recession period (18,6%). They constituted a relatively small percentage of the analysed group of entities, and in addition, taking into ac-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

count the occurrence of mostly positive trends in the economy during the analyses, the obtained information can be considered reliable.

Table 21. The parameter value for the independent variable „ economic recession”, in the probit models describing the system of industrial innovation in Poland

Innovation feature	Coef	Std. error	t-test	Chi²	P> z 	p₁	p₂
R&D expenditure	-0,503	0,049	-10,23	109,12	0,00	0,22	0,39
Investment in new fixed assets (including):	-0,472	0,047	-10,17	101,92	0,00	0,63	0,79
a) buildings and grounds	-0,370	0,052	-7,09	52,42	0,00	0,17	0,28
b) technical equipment and machinery	-0,386	0,045	-8,52	72,27	0,00	0,56	0,70
Computer software	-0,350	0,045	-7,79	60,74	0,00	0,50	0,63
Launching new products	-0,235	0,045	-5,26	27,69	0,00	0,47	0,57
Implementation of new technology processes (including):	-0,507	0,046	-11,06	121,19	0,00	0,58	0,76
a) New production methods	-0,283	0,042	-6,68	39,51	0,00	0,39	0,50
b) Non production systems	-0,428	0,050	-8,62	77,10	0,00	0,21	0,35
c) Support systems	-0,270	0,052	-5,22	28,07	0,00	0,18	0,26
Cooperation with suppliers	-0,324	0,051	-6,31	41,12	0,00	0,18	0,28
Cooperation with competitors	-0,314	0,095	-3,31	12,14	0,00	0,02	0,05
Cooperation with universities	-0,219	0,088	-2,49	6,60	0,01	0,03	0,05
Cooperation with domestic R&D units	-0,280	0,073	-3,86	15,87	0,00	0,05	0,09
Cooperation with customers	-0,156	0,052	-3,00	9,15	0,00	0,18	0,22
Overall innovation cooperation	-0,295	0,046	-6,43	41,87	0,00	0,34	0,45

p<0,05

Source: own study based on questionnaire research evidence.

As expected, since the period of prosperity had a positive and system influence on the innovation processes, time of recession is responsible for the opposite phenomenon (JRC, 2010). This time, in sixteen out of eighteen potential econometric models, the parameters and models as a whole, reached the statistical significance. The lack of important dependencies was observed only for the innovation cooperation with the PAS units and foreign scientific units, what means that the indicated activity does not decrease significantly during downturn. In other cases, all parameters reached the negative sign, and thus the recession period has a system and negative influence on the innovation behaviours of the studied companies.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Analysing the achieved probability values, we can observe their strong internal differentiation. However, there are lacking the ones, which take very high values, as it happened in the revival phase. Despite the economic slowdown period, companies are still intensely interested in financing (apart from ED works and investments in new buildings) and implementation of new products and technologies, as in the case of other, more developed countries, what may suggest the cyclic independence of these areas (OECD, 2009; Paunov, 2011, pp. 24-35). Chances for such phenomena are contained in the scope of 47%-63%. However, in case of the implementation of new technological processes, their internal structure is highly diversified. Only the implementation of new production methods is characterised by the relatively high probability (0,39), although, at the same time, twice larger than others, that is the new by-production and support systems.

The establishment of innovation cooperation less often takes place in the recession period. Its greatest chances can be observed again in case of vertical links in the supply chain – with suppliers and recipients (over 18%), what still significantly differs from the phenomena of financing and implementation of new solutions. In other cases, probability oscillates around zero.

Summing up, the potential support in the recession phase with the “visible hand” mechanisms (innovation policy) in Poland should apply to a small number of areas. Particularly susceptible to acceleration are the investments in new machines and technical equipment (0,56), purchase of the computer software (0,50), implementation of new products (0,47) and production methods (0,39). The others reach low, or very low probability values, and the attempts to support them will have the characteristics of non-system, isolated and secluded actions without the effect on the industry as a whole. In other words, the acceleration of innovation processes using the instruments of the innovation policy during recession should be performed with great caution and focus of efforts on the narrow group of areas prognosticating the system effect, according to the concept of “intelligent specialisations”.

**Economic stagnation and the innovation activity
of the industrial companies**

In 27,3% of the studied cases it was declared that the companies are in the stagnation phase with unchanged incomes in the analysed period. Since we have encountered the polarizing approach to the implementation of

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

innovation processes in the revival and recession, it was expected that the stagnation phase will become the bridge connecting the mentioned opposite phases of the economy cycle.

Table 22. The parameter value for the independent variable „economic stagnation”, in the probit models describing the system of industrial innovation in Poland

Innovation feature	Coef	Std. error	t-test	Chi²	P> z 	p₁	p₂
R&D expenditure	-0,364	0,041	-8,80	78,96	0,00	0,26	0,39
Investment in new fixed assets (including):	-0,226	0,042	-5,40	29,99	0,00	0,70	0,78
a) buildings and grounds	-0,261	0,044	-5,97	36,26	0,00	0,20	0,28
b) technical equipment and machinery	-0,235	0,040	-5,88	34,40	0,00	0,61	0,70
Computer software	-0,356	0,039	-9,05	82,09	0,00	0,51	0,64
Launching new products	-0,078	0,039	-2,02	4,03	0,04	0,53	0,56
Implementation of new technology processes (including):	-0,272	0,041	-6,65	44,00	0,00	0,66	0,75
a) New production methods	-0,262	0,040	-6,63	44,61	0,00	0,41	0,51
b) Non production systems	-0,173	0,041	-4,20	17,77	0,00	0,28	0,34
c) Support systems	-0,242	0,044	-5,46	30,41	0,00	0,19	0,26
Cooperation with suppliers	-0,237	0,043	-5,46	30,33	0,00	0,21	0,28
Cooperation with universities	-0,298	0,078	-3,82	15,77	0,00	0,03	0,05
Cooperation with domestic R&D units	-0,262	0,061	-4,27	19,13	0,00	0,06	0,09
Cooperation with foreign R&D units	-0,406	0,115	-3,54	14,72	0,00	0,01	0,02
Cooperation with customers	-0,204	0,045	-4,50	20,60	0,00	0,17	0,23
Overall innovation cooperation	-0,267	0,040	-6,70	45,28	0,00	0,35	0,46

p<0,05

Source: own study based on questionnaire research evidence.

However, it did not happen. It turned out that there were estimated, like in case of the “economic slowdown” variable, sixteen models with statistically significant parameters. The only change applied to the innovation cooperation and consisted of the lack of models for the cooperation with competitors, and the appearance of foreign scientific units. However, what is the most important is the fact that in all models the parameters reached the negative values. And thus, the phase of economic stagnation has a system effect on the inhibition of innovation processes in the Polish companies. Moreover, the power of this negative impact, taking into account the

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

achieved probability values, is similar to the one from the recession period, and sometimes it is even higher.

The potential directions of support of the innovation activity should apply to investments in new machines and technical equipment (0,61), purchase of computer software (0,51), implementation of new products (0,53) and methods of their production (0,41). Chances for the innovation cooperation reach very low values and are once again the domain of relationships along the supply chain. This does not change the fact that they do not have chances for a system innovation dynamism of the industry while undertaking the attempts to stimulate them.

In conclusion, the stagnation phase has a system and negative influence on the implementation of the innovation processes in the Polish industry, like in the recession period. Thus, companies are more often interested in the limitation of the risk connected with this activity than the attempt to anticipate the market events. Entrepreneurs themselves adopt the expectant and conservative position. This is all the more disturbing that the strongest fluctuations apply to areas, which by definition should be long-term in nature (independent on the business cycle), like the R&D activity or innovation cooperation. This reflects mainly the acute treatment of these functions and the lack of noticing of their strategic potential (Marceau, 2002, pp. 209-221). Taking into account the fact that the Polish economy is slowly coming out of the stagnation phase, in the near future we should not expect the high innovation dynamism. This does not change the fact that there exist areas of potential support directions of the discussed activity, despite the adverse market conditions.

Conclusions

After analysing the relationships taking place between the economic prosperity and activity in the sphere of innovation activity in the national industrial system, it can be observed that this phenomenon is mostly cyclical and is shaped like in other countries. During the period of revival, there can be observed the increase of interest in financing and implementing new technologies, while during recession and the economic stagnation, the entities resign from conducting the innovation activity. Therefore, at this stage the hypothesis of Gerhard Mensch about the innovation acceleration in the economic downturn cannot be positively verified. Such a phenomenon, of course, has both advantages and limitations, because from one perspective, the cycle changes influence the market verification of the risky ventures.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

While on the other, the innovation activity has a long-term significance and dimension, and thus, the high volatility may disrupt the natural rhythm of creating new solutions, or their transfer and implementation.

Based on the conducted studies, it can be stated that the business factor systemically illustrates the innovation behaviours of the industry in Poland, what is evidenced by the number of statistically significant estimated profit models. Although all areas of the discussed activity have been described, we can observe significant differences within the achieved probability values. High chances of phenomena are usually noted for the areas of financing (outside the R&D sphere) and implementation of new technological solutions, when the innovation cooperation in Poland is very rare, especially with the institutional R&D sphere. This demonstrates the low maturity of the national industrial system in the possibility of the broad entering into horizontal innovation interactions. Thus, this area in principle should not be temporarily supported by mechanisms of the innovation policy, both on the national and regional level, until it can independently systemically accelerate the innovation processes. Otherwise, the attempts to stimulate this type of relationships will be incidental, isolated and secluded in nature, without affecting the system as a whole. After analysing the existing main directions of the country's influence on the innovation activity in our country, it should be stated that unfortunately we are dealing with such mechanisms, and they constitute the core of the Polish innovation policies implemented on the national and regional levels. System changes according to the evolutionary time perspective, however, require time, so that it can be able to initiate the natural and adequate immanent systemic auto-dynamism, and consequently, obtain the base ability to accelerate innovation processes, which in turn will subject itself to the successful stimulation with mechanisms of the state policy.

The use of the probit type of modelling has in an interesting way illustrated the shape, as well as innovation mechanisms found in the national industrial system. According to the author, it can constitute an interesting alternative for the studies of the dynamics of phenomena. In terms of statistics, so far they have not reached satisfactory time series, and what goes with it, they do not allow the calculations and the appropriate inference. Therefore, it is an attempt of the systemic understanding of the discussed economic phenomena.

Taking into consideration the achieved study results, the support of innovation activity in Poland should be differentiated depending on the phase of the business cycle. Such a mechanism should contribute to a significant-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

ly more favourable influence of the state policy and its individual support instruments on the system and research and developmental innovation activity of industrial companies.

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18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
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**Income Inequality by Method
of Non-weighted Average Absolute Deviation:
case study of Central and Eastern European
Countries***

JEL Classification: *C13; D31; I32*

Keywords: *income inequality; index; comparison; method of non-weighted average absolute deviation*

Abstract: The presented article uses the method of non-weighted average absolute deviation for expressing income inequality in the 11 selected Central and Eastern European Countries. Specifically, the analysis of income inequality is done for Poland, Czech Republic, Slovak Republic, Austria, Slovenia, Hungary, Romania, Bulgaria, Latvia, Lithuania and Estonia. Based on the determination of income inequality in the article there is made an analysis of development of income inequality, including the subsequent inter-regional comparison in the context of the degree of income inequality in a given human society and economy. The text of this article is organized in 4 parts, after Introduction follows the analytic chapter where is primarily the method of non-weighted average absolute deviation explained. The third part contains the empirical analysis of income inequality and the

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Conclusion highlights some major conclusions of detailed analysis made in chapter 3. The analysis of income distribution of 11 European households between years 2005-2013 and its order is made in deciles based on empirical data from the Statistics on Living Conditions and Welfare published by Eurostat.

Introduction

Income inequality was and also is a natural part of every economy and its society. Income inequality in essence means that different people or different groups of people will reach different income and this income dispersion determines how much the great range of individual income in society at the economy is. (Turečková & Kotlánová, 2014a, pp. 240-247) Phenomenon of poverty and inequality accompanies human society, almost from the very beginning of its existence. (Lapáček, 2007) By Samuelson and Nordhaus (2010) is the invisible hand of the market very effective at allocation of resources and production of goods and services, but can produce simultaneously very unequal distribution of income. Stiglitz (2007) also admits that between efficiency and equality, there is a substitution relationship and therefore to achieve equality is usually required to give up parts of effectiveness. There are many possibilities how to look on or measure standards of living in selected countries. One of the best known is GDP per capita. Despite the fact that this indicator could reach relatively large value, it does not predicate differences of incomes in society. Another indicator we could hear about very often is average wage. Not even its amount is guarantee of economic well-being. It is usual that over 50% of working population of the country cannot reach this amount. One of the best known and used measures of income inequality is Gini coefficient and its graphical representation through Lorenz curve. It could be supplemented by Robin Hood Index and S80/S20 Ratio which are used as other methods of comparison of income inequality. (Turečková & Kotlánová, 2014b, pp. 1063-1057)

The ability to measure and define income inequality is essential for the subsequent analysis of the determinants of income inequality which is given to the context. For example imperfect financial institution causes income inequality as well as inefficient capital allocation (Daisaka et al., 2014, p. 4) or technological changes are often identified as one of the driving forces behind recent rises in inequality. (Lemieux, 2008, pp. 21-48) This can be given in context of Rosen (1981, pp. 757-775) who take the view that one reason that impact of technological changes on income distribution is the well-known “economics of superstars” because technologies

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

enable the top talents to capture increasingly large share of the market. For more information about relationship between income inequality and the knowledge economy see Peng (2014).

Income inequality also resides on spatial dimension where an increase in regional integration associated with the amelioration of inequality at one level usually corresponds to a reproduction of inequality at higher geographical levels (Novotný, 2007, p. 575). For example you can also see Paredes et al. (2012, pp. 1 – 33). Williamson (1965, pp. 3-47) proposes that unequal initial endowments imply a spatial income disparity, but market mechanisms, mainly through labor and firm mobility, lead to the decline of any regional disparity in the long run. Also interesting is the impact of income inequality between households on the housing market. This is partly due to the spatial dimensions, which according to Dewilde and Lancee (2013) there is a positive relation between inequality and crowding and also higher income inequality is associated with lower housing quality.

This article is characterized by introducing and using alternative method for measuring, expressing and analysing income inequality in case of Central and Eastern European inhabitants in the period of years 2005–2013. Among well-known methods how to measure income inequality belong traditionally Lorenz curve, Gini coefficient, Coefficient of income inequality S_{80}/S_{20} (or Quintile share ratio or S_{80}/S_{20} Ratio), Atkinson index, Theil index, Robin Hood index and Variation coefficient. For more information about these methods see for example Atkinson (1970, pp. 244-263), Dalton (1920), Lapáček (2007), Litchfield (1999), Schutz (1951, pp. 107-122) or Wolff (2009). Analysis of income inequality is focused on method of non-weighted average absolute deviation that is not normally used in context of income inequality. The great advantage of using this method is its mathematical-algebraic procedure for calculating the coefficient expressing the degree of inequality directly adapted to the data format in which are data of income distribution provided by statistical organizations. In previous researches was proven extremely positive and high correlation between the results and evaluation of income inequality by here used method and standard methods, such as the Gini coefficient, index S_{80}/S_{20} or Robin Hood index. (Turečková, 2015b, 2015b) Analysis of income inequality through this mentioned method will be based on empirical data of Eurostat in the chosen period of time for 11 selected European countries, namely for Poland, Czech Republic, Slovak Republic, Austria, Slovenia, Hungary, Romania, Bulgaria, Latvia, Lithuania and Estonia.

The rest of the article is structured as follows: the next section provides same theoretical introduces and propositions of method of non-weighted average absolute deviation and its decomposition. Also discusses the advantages and disadvantages of using this method in the context of measures of income inequality. Section 3 contains the analysis of the income inequality in selected European countries using the method of non-weighted average absolute deviation. There is also mention the development of income inequality during analyzed period of time with evaluation of countries and their ranking. Finally the Conclusion concludes with some general comments.

Methodology of the research

Method of average deviation reflects the degree of variability, defined as the arithmetic average of the absolute deviations of individual values of observed indicators from the selected value (given point) (for more information about method of absolute average deviation see for example Tuleja (2009) or Babu & Rao (1990). This method can be also named as Method of mean absolute deviation. Generally, the deviation is reckoned from the ideal value, recommended value, central value that is constructed as some type of average, median, mean of the data set and other. This value chosen here understands the value for the ideal distribution of income in society, ie. the value of expressing absolute equality in income for each inhabitants. In general absolute deviation is constructed on the basis of this formula 1:

$$d_i = |x_i - (x)| \quad (1)$$

where: d_i presents the absolute deviation from i-th indicator,
 x_i presents the i-th indicator (data element, variable),
 (x) is the chosen given point.

Indicator (x) is the ideal percentage value of income which get in concrete the percentage of households in society, for example, 10% of households get precisely 10 % of total income ($(x) = 10\%$). Variable x_i presents real household's money income cumulated into relevant deciles, quintiles, quartile and other. Here we can give an example, that 30% of households got 16.7% of total income in Czech Republic in 2010 ($x_i =$

16.7%). Own value of non-weighted average absolute deviation we obtained from the formula 2:

$$\bar{d}_i = \frac{\sum_{i=1}^p |x_i - (\bar{x})|}{n_i} \quad (2)$$

where: \bar{d}_i presents the average absolute deviation from i-th indicator,
 n_i presents the number of values of i-th indicator that we have available,
 (\bar{x}) is the arithmetic mean of i-th indicator.

Particular form for using this method is to set the time integrated value of the index (3) for relevant evaluation of selected indicators during analysed period of time. Based on this calculated index we can determine the intertemporal ranking of the chosen regions or countries or identify differences between them. The value of intertemporal integrated index we compile by following formula:

$$INI_p = \frac{\sum_{i=1}^p |\bar{d}_i|}{n_i} \quad or \quad D_{ii} = \frac{\sum_{i=1}^p |\bar{d}_i|}{n_i} \quad (3)$$

where: INI_p is an integrated index calculated using the average absolute deviation, where $INI_p \in \langle 0, 100 \rangle$,
 D_{ii} integral index for income inequality (special label).

Integrated index (INI_p) express the average value of variable \bar{d}_i during analysed period of time. Integrated index in context of measuring income inequality will be marked as D_{ii} (deviation of income inequality). Both value of non-weighted average absolute deviation and amount of integrate index can have values from 0 to 100 and if value of non-weighted average absolute deviation and amount of integrate index is lower (the more close to 0) than less income inequality is between the richest and poorest households in society. Perfect income equality in the society would occur in a situation where both values would come out zero.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The intertemporal integrated index based on methods of non-weighted average absolute deviation is useful for simple comparison of income inequality in large number of societies (communities) together during a long period of time. It is also much easier to use and apply the method of non-weighted average absolute deviation to express income inequality than count Gini coefficient because the results of both methods are essentially identical (Turečková, 2015a, 2015b). As it was mentioned in Introduction there were done another two studies. There were compared results of the level of income inequality measured through 3 methods, using new methods of non-weighted average absolute deviation and two standard methods: Gini coefficient and S80/S20 Ratio. The correlation between them was very high which means that there is a high significant dependence between selected variables. Since the correlation between the results obtained with the method of non-weighted average absolute deviation and Gini coefficient is significant, it is advisable to use the method of non-weight average absolute deviation to express the deviation in income inequality instead of Gini coefficient which calculation is considerably more difficult. The negative of using the intertemporal integrated index is that the value of this index does not tell us anything about the development (or the trend) of income inequality in the society during the time.

From a methodological perspective, the work is based on secondary data gained by Eurostat, concretely from the Population and social conditions, Living conditions and welfare, Income distribution and monetary poverty, Distribution of income by deciles as a share of national equivalised income for 11 European countries: Poland, Czech Republic, Slovak Republic (Slovakia), Austria, Slovenia, Hungary, Romania, Bulgaria, Latvia, Lithuania and Estonia. The covered period includes years 2005-2013 because of missing credible data which is not available for a longer period.

Income is understood as a total disposable income of a household that is calculated by counting personal income received by all members of the household plus income received at household level. Disposable household income includes all income from work (employee wages and self-employment earnings), private income from investment and property, transfers between households and all social transfers received in cash including old-age pensions. (Eurostat, 2015)

Calculations of value of non-weighted average absolute deviation and integrated index (D_{ii}) are based on calculations using formulas (1), (2) and (3). All these measures of income inequality were described in the text

above. The software used was MS Excel. All calculations and graphical analysis is author's own.

Empirical analysis and findings

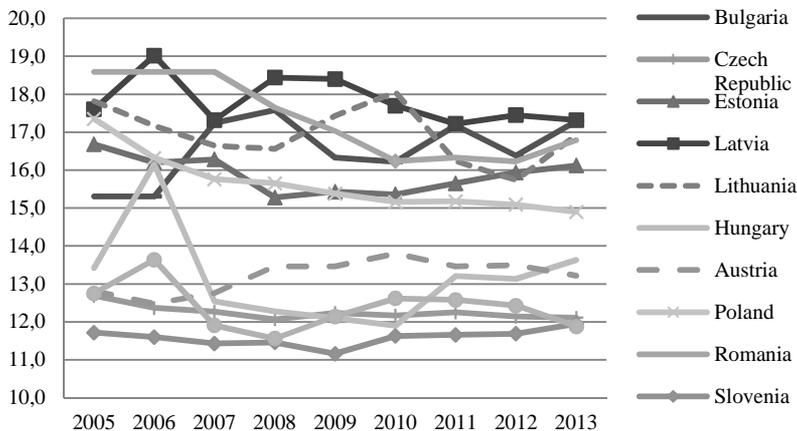
Empirical analyses were made on the basis of the share of national equivalised income of 11 Central and Eastern European countries household's data from Eurostat (2015). Subsequently on the basis of the data we compute through method of non-weighted average absolute deviation the values that by the set way characterize income inequality. We can also compare these values to determine the income inequality between countries or characterize development of income inequality in relevant country over the period of time.

Figure 1 is showing the development of values of average absolute deviation for selected eleven European countries for the years 2005-2013. It shows that the best income equality from analysed group of countries has Slovenia. Through the graphical interpretation of income inequality shown in Figure 1 clearly see the natural division of the countries analysed in two groups. Group of countries with higher income equality forms already mentioned Slovenia, followed by Slovakia, Austria, Czech Republic and Hungary, whose development in income inequality has a considerable dynamic, which is not desirable. Group of countries with higher income inequality, whose values of income inequality calculated by non-weighted average absolute deviation are higher than the first group, consists of all three Baltic States, Poland, Romania and Bulgaria.

The Figure 1 shows that only Poland achieved continuous decline in income inequality (by 2.5 point) during the period. How we can see also from this graph, there were not any significant changes in income inequality/income equality in other 9 selected countries (except Bulgaria, where its increased value indicating income inequality by 2 points) in the set period of time.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Figure 13. Development of values of income inequality calculated by non-weighted average absolute deviation (\bar{d}_i) in selected European countries (11), (2005-2013)



Source: own calculations based on Eurostat (2015).

Table 1 complements Figure 1 and presents a value of income inequality calculated by non-weighted average absolute deviation in analyzed European countries for years 2005-2013. Table 1 is supplemented with a multicolored range where the darker the tint value in the cell is given by the country for that year characterized by higher income inequality. Countries with a light tint are doing in the context of income equality better than those for which it is darker tint values.

Table 23. Values of income inequality calculated by non-weighted average absolute deviation (\bar{d}_i) in selected European countries (11) for each year supplemented with a multicolored range

Geo/Year	2005	2006	2007	2008	2009	2010	2011	2012	2013
Bulgaria	15.3	15.3	17.2	17.6	16.3	16.2	17.2	16.4	17.3
Czech Republic	12.7	12.4	12.3	12.1	12.2	12.2	12.3	12.1	12.1
Estonia	16.7	16.2	16.3	15.3	15.4	15.4	15.7	15.9	16.1
Latvia	17.6	19.0	17.3	18.4	18.4	17.7	17.2	17.5	17.3
Lithuania	17.8	17.2	16.6	16.6	17.4	18.1	16.2	15.7	16.9
Hungary	13.4	16.2	12.5	12.3	12.1	11.9	13.2	13.1	13.6
Austria	12.8	12.5	12.8	13.5	13.5	13.8	13.5	13.5	13.2
Poland	17.4	16.3	15.8	15.7	15.4	15.2	15.2	15.1	14.9

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Romania	18.6	18.6	18.6	17.7	17.0	16.2	16.3	16.2	16.8
Slovenia	11.7	11.6	11.4	11.5	11.2	11.6	11.7	11.7	12.0
Slovakia	12.8	13.6	11.9	11.6	12.1	12.6	12.6	12.4	11.9
Mean	15.2	15.4	14.8	14.7	14.6	14.6	14.6	14.5	14.7

Source: own calculations based on Eurostat (2015).

There is also data about a mean value for each year. Comparing these values, we find that in the course of 9 years, income inequality across groups of countries as a whole declined (from 15.2 point to 14.7 point). If you simply compare values between year 2005 and year 2013 then there is an improvement in income equality in the Czech Republic, Estonia, Latvia, Lithuania, Poland, Romania and Slovak Republic. Deepening income inequality occurred in Bulgaria, Hungary, Austria and Slovenia.

The value of (intertemporal) integrated index D_{ii} representing the level of income inequality in society in each country is shown in Table 2. This index averages the values obtained by the non-weighted average absolute deviation for the whole analysing time series. Based on the amount of this index we can compile the ranking of countries based on their uniform distribution of income in the society.

Table 2. Amount of intertemporal - integral index for income inequality and the ranking of countries in context of income inequality for selected European countries (11), lined up

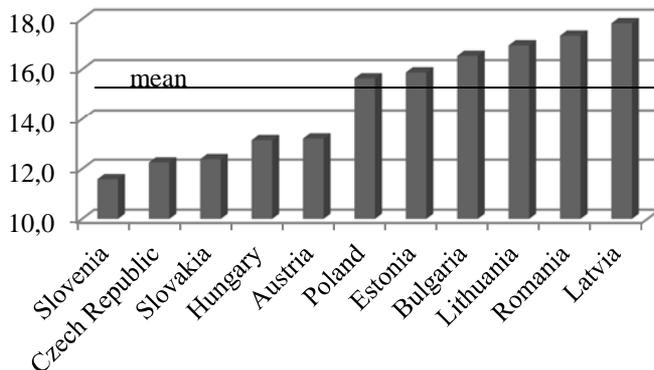
In- dex/Geo	Slovenia	Czech Repub- lic	Slovakia	Hungary	Austria	
D_{ii}	11.59	12.26	12.39	13.15	13.22	
Ranking	1	2	3	4	5	
In- dex/Geo	Poland	Estonia	Bulgaria	Lithuania	Romania	Latvia
D_{ii}	15.64	15.88	16.54	16.95	17.34	17.83
Ranking	6	7	8	9	10	11

Source: own calculations based on Eurostat (2015).

Graphs of the results (see Figure 2) of the index D_{ii} are more easily legible and complete Table 2. The income inequality was lowest in Slovenia during years 2005-2013, where the intertemporal integrated index was 11.59. About 0.67 points after Slovenia, in second place with the lowest income inequality, was Czech Republic and about 0.8 points, in third place was Slovakia (Slovak Republic) within the selected group of countries followed by other analysed European countries. Average value of the index,

mean, is 14.8 points. The worst situation in context of income inequality was in Latvia where the amount of integrated index was 17.83 points for time period 2005-2013.

Figure 2. Development of values of income inequality calculated by non-weighted average absolute deviation (\bar{d}_i) in selected European countries (11), (2005-2013)



Source: own calculations based on Eurostat (2015).

Figure 2 shows another interesting fact. From a geographic point of view, countries with higher income equality concentrated in the central European region while countries with higher income inequality make up the group Baltic countries, along with Poland, Romania and Bulgaria, it means the Eastern European countries acceding to the European Union at the end of the integration process and countries in transition problematic process. For further research, the question is whether that income inequality is not related to the geographic location, which in turn determines the other factors involved in the distribution of income in society.

Conclusions

There is a lot of methods, procedures and approaches to measurement and describing income inequality in our economy and our society. In this paper is paid attention to new (alternative) method of measuring and expressing income inequality through method of non-weighted average absolute deviation. It was used to map changes in income inequality of eleven Central and Eastern European countries, concretely of Poland, Czech Republic, Slovak Republic (Slovakia), Austria, Slovenia, Hungary, Romania,

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Bulgaria, Latvia, Lithuania and Estonia between years 2005-2013. There was also assembling the ranking of these countries in context of a more equal distribution of income in a given society. It was done on the basis of intertemporal integrated index. The highest income equality reached Slovenia from the analyzed group of countries; the worst income inequality was in Latvia.

The second conclusion presented in this paper is that non-weighted average absolute deviation method can expand the existing portfolio of methods for measuring and expressing income inequality between households in society because of its comparatively simple feasibility while the results are comparable to standard and traditional methods of measuring income inequality.

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**Proceedings of the 8th International Conference on Applied Economics
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18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
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**Dispersion of Inflation Expectations
in the European Union During the Global
Financial Crisis**

JEL Classification: *C33; C42; D84; E31*

Keywords: *inflation expectations; survey data; global financial crisis; European Union*

Abstract: Inflation expectations, both their median and dispersion, are of a great importance to the effectiveness of monetary policy. The goal of this paper is to examine the impact of the global financial crisis on dispersion of inflation expectations in the European Union. Using European Commission's survey data, we find that in the early phase of the crisis the dispersion dropped rapidly but then, after Lehman Brothers' collapse, the trend reversed and these fluctuations cannot be explained by movements of inflation rates and other commonly used factors. We also observe that, in the new European Union member states, the initial drop of the dispersion was weaker whereas the subsequent rise was stronger as compared to the old member states.

Introduction

The starting point of this paper is that inflation expectations underlie many consumption and investment decisions, price and wage setting, and thus determine inflation itself. Therefore, low, stable and well-anchored inflation expectations play a decisive role not only for maintaining price

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

stability over longer periods of time, but also for the effectiveness of monetary policy in case of such major shocks as the global financial crisis. Nevertheless, uncertainty brought about by the global financial crisis may have significantly modified the way economic agents formulate their inflation expectations. For instance, greater dispersion of inflation expectations might negatively affect the monetary policy environment and welfare in crisis-affected countries.

Dispersion (or heterogeneity) of inflation expectations seems to be an inherent feature of economic systems. There is a growing body of literature confirming the need to analyze this phenomenon. According to Mankiw et al. (2003), disagreement about future inflation is an interesting variable both for theoretical and practical considerations, because it may be vital for understanding macroeconomic dynamics. High dispersion of inflation expectations changes allocation of resources and implies significant adjustment costs for a large number of individuals if they realize that the actual inflation rate deviates from their initial expectations (Gerlach et al., 2011). Different opinions about future inflation can invite agents to speculate which in turn may delay or distort actions undertaken by the central bank. They may alter the term structure of interest rates and thus threaten fiscal discipline. They may also affect the distribution of income and wealth as persistence of forecasting errors implies making suboptimal decisions (Gnan et al., 2011). Besides, the dispersion of inflation expectations can be used as a measure success of inflation targeting countries (Capistrán & Ramos-Francia, 2010). Finally, dispersion of inflation expectations is of a great importance for monetary unions where persistent differences in inflation expectations among countries may create external imbalances, destabilizing trade and affecting the effectiveness of supranational monetary policy. Therefore, low dispersion of inflation expectations in a monetary union (such as the euro area) can be treated as one of indicators of convergence in terms of inflation rates (cf. Gnan et al., 2011).

There are several papers referring to the dispersion of inflation expectations in the euro area after the onset of the global financial crisis. For example, Badarinza & Buchmann (2009) observed that in the euro area the disagreement about inflation expectations started to rise in the second half of 2007 and rose further with the ongoing crisis. Galati et al. (2011) reported that in the euro area the cross-sectional dispersion of long-run inflation expectations increased in the beginning of 2009. Gerlach et al. (2011) found that the dispersion of professionals' forecasts of five-year inflation in the euro area reached its maximum in the beginning of 2009. Then it started

to decline, but it did not return to its pre-crisis level. Gnan et al. (2011) noticed that the dispersion of inflation expectations calculated for the euro area as a whole dropped sharply in 2007 and did not change significantly until the third quarter of 2008. Afterwards, disagreement increased again surpassing the level observed before the introduction of the euro.

However, none of these papers formally examine the impact of the crisis on the dispersion of inflation expectations controlling for factors that influence the expectations like the level of inflation and its variability. Here, we fill this gap and test empirically the hypothesis that uncertainty brought about by the global financial crisis increased the dispersion of inflation expectations in the European Union countries. Contrary to the previous papers, we focus not only on the euro area, but we also include the other members of the European Union. Therefore, we can highlight the important differences between the old and new European Union member states.

The remainder of the paper is structured as follows. In the subsequent sections, we present the data and the measures of ordinal variation that we use in our empirical analysis, and the methodology that we employ. Then, we estimate the impact of the global financial crisis on the dispersion of inflation expectations in the European Union and examine whether all countries observed similar developments. For comparative purposes we also conduct analysis of perceived inflation. We conclude in the final section.

Data on expected, perceived and actual inflation

Our choice of measures of dispersion of inflation expectations (discussed in the next section) is dictated by the character of available data. We use qualitative data on expected and perceived inflation taken from the European Commission's Business and Consumer Survey (European Commission, 2015). The survey is conducted monthly in the European Union member countries as well as candidate states. Each month about 300-2000 complete questionnaires are gathered in each country. We are interested in two questions for which respondents can give answers according to a five-option ordinal scale, i.e.:

Question 5: How do you think that consumer prices have developed over the past 12 months? They have: (a) risen a lot, (b) risen moderately, (c) risen slightly, (d) stayed about the same, (e) fallen, (f) don't know.

Question 6: By comparison with the past 12 months, how do you expect that consumer prices will develop in the next 12 months? They will:

(a) increase more rapidly, (b) increase at the same rate, (c) increase at a slower rate, (d) stay about the same, (e) fall, (f) don't know.

Our sample covers the period 2003-2014. We decided to start our analysis a year after the introduction of the euro because of significant disturbances associated with formation of inflation expectations in the newly established euro area. We consider the current members of the European Union, but because of data unavailability we have to exclude Luxembourg, Denmark, Ireland and Croatia from the sample. Besides, we do not analyze aggregate measures of inflation expectations, because they seem to mask heterogeneity observed across countries (cf. Gnan et al., 2011).

Furthermore, as the actual inflation rate is an explanatory variable in our models, we also extract monthly data on the HICP inflation (Eurostat, 2015) for the period 2002-2014 (with the first 12 observations being used to calculate the yearly changes of the inflation).

On the whole, we work on a balanced panel with 24 countries and 144 monthly observations.

Measurement of dispersion of inflation expectations

Empirical analyses of dispersion of inflation expectations are usually based on such measures as the standard deviation (e.g. Galati et al., 2011; Gerlach et al., 2011) or the interquartile range (e.g. Mankiw et al., 2003; Trehan & Zorilla, 2012). However, these both measures cannot be calculated directly for qualitative data as they require quantification. Therefore, following Badarinza & Buchmann (2009) and Gnan et al. (2011), we use the index of ordinal variation proposed by Lacy (2006) as the baseline measure of the dispersion of inflation expectations.

If f_1, f_2, \dots, f_k denote cumulative category shares, then the index is calculated as follows:

$$IOV_{Lacy} = \sum_{i=1}^{k-1} f_i (1 - f_i).$$

In our case, $k = 5$, because when calculating the dispersion measures, we always exclude the last answer (*f*) *don't know*, and adjust the remaining frequencies proportionally to keep the sums equal to 100%. For $k = 5$, the index coincides with the measure proposed by Berry & Mielke (1992).

Lacy's index is designed to measure an average difference between categories and has very intuitive properties: it takes values from the range

$[0, 1]$, where the value 0 is attained only when all respondents give exactly the same answer. On the other extreme, when $w_1 = w_5 = 0.5$, then the value of the index equals 1.

For the robustness check purposes, we also consider two other measures. The first is an alternative index of variation for ordinal variables introduced by Leik (1966). The index assesses an average deviation from the median and is given by the formula:

$$IOV_{Leik} = \frac{\sum_{i=1}^k w_i |i - m|}{0.5(k - 1)},$$

where by m we denote the median. It holds similar properties as the Lacy's index.

As for the second measure, we follow the standard practice from the literature and assume the normal distribution of inflation expectations. Then, we estimate the relative standard deviation σ/π^e of the distribution using the formula developed by Berk (1999):

$$\frac{\sigma}{\pi^e} = \frac{2}{z_1 + z_2 - z_3 - z_4},$$

where

$$z_1 = \Phi^{-1}(1 - w_a),$$

$$z_2 = \Phi^{-1}(1 - w_a - w_b),$$

$$z_3 = \Phi^{-1}(1 - w_a - w_b - w_c),$$

$$z_4 = \Phi^{-1}(w_e),$$

σ denotes the standard deviation, π^e is the expected inflation rate, $\Phi^{-1}(\cdot)$ stands for the inverse of the normal cumulative distribution and w_i is the frequency of answer i . In case of $w_e = 0$, we set $\Phi^{-1}(w_e) = -3$.

All three dispersion measures are conditional on the perceived inflation. Basically, this comes from the conditional nature of question 6 in which respondents are asked about their expectations relative to the perceived price change in the previous 12 months (question 5). (In fact, the answers (d) and (e) to question 6 are stated unconditionally, but, nonetheless, they

are rarely chosen by respondents.) Throughout the paper, we do not try to use unconditional dispersion measures, because it would inevitably involve estimating cross-section correlations between expected and perceived inflation which seems to be a demanding task without the survey microdata.

Methodology of the research

To assess the impact of the crisis on the dispersion of the inflation expectations we estimate following fixed-effects panel models:

$$y_{it} = \alpha_{0i} + \alpha_1 \pi_{it-1} + \alpha_2 (\Delta \pi_{it-1})^2 + \alpha_3 d_{ce,t} + \alpha_4 d_{cm,t} + \alpha_5 d_{cl,t} + \alpha_6 d_{euro,it}, \quad (1)$$

where y denotes the dispersion measure, π – the annual inflation rate, $\Delta \pi_t = \pi_t - \pi_{t-12}$ is the annual change of the inflation rate, d_{ce} , d_{cm} , d_{cl} – dummy variables representing phases of the financial crisis, d_{euro} – dummy variable for the euro adoption period.

We set the common dating of the crisis period for all countries, since we are unable to find any comparable criterion for setting the crisis time frames in all countries separately. As already suggested by equation (1), for the purpose of our study, we distinguish three phases of the crisis. The early phase (d_{ce}) that lasts from July 2007 to August 2008 is associated with a swift rise of inflation rates caused by the oil price rally. At the beginning of this period, the first worldwide shortages of liquidity occurred and stock market indices began to fall. The middle phase (d_{cm}) starts in September 2008 when Lehman Brothers collapsed and lasts 10 months, until June 2009. This phase is characterized by a severe recession and rapidly decreasing inflation rates. Finally, the late, or recovery, phase (d_{cl}) ends in June 2010, when GDP growth rates approximately returned to their pre-crisis levels and inflation started to accelerate again. That month, the European Central Bank also ended its first covered bond purchase programme, intended to support a specific financial market segment that had been particularly affected by the financial crisis.

Of course, the proposed phasing is somewhat arbitrary. However, establishing the exact time frames of the global financial crisis is a difficult task as far as expectations are concerned. The difficulties result from the interplay of two features of expectations: forward-lookingness and non-observability. Observed events as well as rich statistical data offer a sound guidance for the real-economy crisis dating, but are less useful if expectations are investigated. Unfortunately, there is no reasonable alternative to

them. Nonetheless, our phasing allows us to highlight the evolution of the expectations' dispersion during the whole crisis.

In our analysis we also include control variables to capture the correlations between the dispersion measures and the inflation rate as well as the trend in the inflation rate $(\Delta\pi_t)^2$. The dummy variable for the euro adoption period is equal one for six months before the euro adoption date and for another six months after the date and zero otherwise. It accounts for the changes of the inflation expectations caused by the euro adoption in some new European Union countries.

Results

In table 1, we present the main results of our analysis. The table contains the parameter estimates of the model (1) for the Lacy's measure of the dispersion of inflation expectations. We report the results for the panel of all studied countries, denoted by full sample, as well as the separate estimates for the panels of old and new EU members.

Table 19. Estimates of panel models for the dispersion of inflation expectations

Var.	<i>const.</i>	π_{t-1}	$(\Delta\pi_{t-1})^2$	d_{ce}	d_{cm}	d_{cl}	d_{euro}	R^2
Full sample	0.565 (0.004)	-0.010 (0.001)	0.0005 (0.0001)	-0.031 (0.008)	0.051 (0.011)	0.028 (0.012)	0.039 (0.012)	0.62
Old EU	0.609 (0.005)	-0.014 (0.003)	0 (0.0013)	-0.043 (0.013)	0.044 (0.014)	0.020 (0.013)		0.59
New EU	0.529 (0.006)	-0.010 (0.002)	0.0005 (0.0001)	-0.016 (0.008)	0.062 (0.018)	0.036 (0.019)	0.035 (0.011)	0.55

Note: In parentheses, Arellano (1987) robust standard errors are reported. Last column contains the within R^2 , from LSDV regression.

“Old EU” panel includes 12 countries: Belgium, Germany, Greece, Spain, France, Italy, Netherlands, Austria, Portugal, Finland, Sweden, United Kingdom.

“New EU” panel includes 12 countries: Bulgaria, Czech Republic, Estonia, Cyprus, Latvia, Lithuania, Hungary, Malta, Poland, Romania, Slovenia, Slovakia.

Source: Authors' calculations based on European Commission (2015) and Eurostat (2015) data.

As far as the full sample is concerned, in the first phase of the crisis, the dispersion was (on average) lower by 0.031 than the theoretical values predicted by other explanatory variables. Then, in the middle phase, the dispersion bounced back and on average was higher by 0.051 than the theoretical levels. Finally, in the late phase of the crisis, the dispersion also re-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

mained high, although the difference was considerably smaller. Nonetheless, all effects are statistically significant at 0.01 significance level. To put the estimates into the right perspective, they can be compared with the unweighted average unconditional standard deviation of the dispersion measure for all panel countries that is equal to 0.065. From this point of view, the “pure” effects of the crisis do not seem impressive, but one has to keep in mind that they are accompanied by the nonnegligible effects of rapid changes in the other explanatory variables, especially the inflation rates.

Generally, a similar pattern is observed in the old European Union member states. Interestingly, the decline in the dispersion in the early phase of the crisis is almost exactly compensated in the middle phase. This, however, is not the case in the new member states. There, the initial drop is weak, just 0.018, but the subsequent rise is significantly stronger. Likewise, in the late phase, the “pure” effect of the crisis remains stronger than in the old members of the European Union. Finally, our results also confirm that the euro adoption by some new European Union countries was associated with the significant increase in the dispersion of inflation expectations.

To put more light on the differences between the old and new member states, we run country level ordinary least squares regressions of model (1). The results are reported in table 2.

Regarding the early phase of the crisis, the drop in the dispersion is observed almost in all old member states (with the only exception of the United Kingdom), whereas the new member states exhibit more heterogeneous outcomes. Particularly, the weak drop in that group reported in table 1 results mainly from the considerable increases in the dispersion observed in Latvia, Malta and Bulgaria.

On the other hand, there are fewer differences as far as the middle phase is concerned. The significant rise of the dispersion is observed in all countries, except from Spain, Italy, Hungary and Poland. Finally, the heterogeneity of the results becomes stronger again in the last phase. In particular, contrary to the general trend, the dispersion declined in almost all Southern Europe countries.

Finally, we also note that the general conclusions from table 1 do not apply to Poland. Interestingly, the dispersion in Poland was constantly lower throughout the crisis. This might reflect the relatively weak impact of the crisis on the Polish economy, although one has to bear in mind that similar drop was observed in the Southern Europe, where the crisis was by no means mild.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

For the robustness check purposes, we conduct a similar analysis with other measures of dispersion. The results are reported in table 3. As far as the Leik's index is concerned, we do not find any significant differences as compared with the findings already obtained with the Lacy's measure. The two indices differ mainly with respect to their average levels, but the results are correlated strongly.

Table 20. Results of the country level OLS regressions

Cou.	<i>const.</i>	π_{t-1}	$(\Delta\pi_{t-1})^2$	d_{ce}	d_{cm}	d_{cl}	d_{euro}	R^2
BE	0.594***	-0.003*	-0.0002	-0.023**	0.008**	0.024***		0.20
BG	0.509***	-0.011***	0	0.037**	0.06***	0.043***		0.62
CZ	0.567***	-0.011**	0.0012***	-0.013	0.114***	0.07***		0.50
DE	0.556***	-0.003	0.0004	-0.068***	0.015	0.039***		0.53
EE	0.470***	0	0.0001	-0.037	0.132***	0.118***	0.06***	0.38
EL	0.630***	-0.016***	0.0077***	-0.12***	0.006	-0.001		0.52
ES	0.621***	-0.026***	-0.0021**	-0.005	-0.037*	-0.099***		0.24
FR	0.532***	-0.006*	-0.0007*	-0.005	0.046***	0.042***		0.25
IT	0.574***	0.002	0.0034	-0.036**	-0.005	-0.062**		0.06
CY	0.545***	0.008*	0.0003	-0.022	0.096***	0.107***	-0.009	0.16
LV	0.531***	-0.019***	0.0003	0.11**	0.223***	-0.005	0.056***	0.66
LT	0.523***	-0.021***	0.0022***	0.018	0.157***	0.007	-0.017	0.61
HU	0.395***	-0.005***	0.0003*	-0.023***	-0.02***	0.013**		0.23
MT	0.697***	-0.044***	-0.0013*	0.112**	0.102**	-0.112***	-0.042	0.19
NL	0.725***	-0.028***	-0.0064***	-0.114***	0.075***	0.052***		0.62
AT	0.577***	-0.018***	0.0012*	-0.024**	0.095***	0.047***		0.65
PL	0.492***	-0.021***	0.0006	-0.017**	-0.012*	-0.007		0.36
PT	0.587***	-0.028***	-0.0014**	-0.006	0.063***	0.04***		0.62
RO	0.513***	-0.008***	0.0004***	-0.047***	0.022*	0.049***		0.47
SI	0.611***	-0.008*	0.0007*	-0.038**	0.024*	0.001	0.007	0.20
SK	0.590***	-0.021***	-0.0005**	-0.074***	0.026	0.07***	0.044***	0.76
FI	0.562***	-0.031***	0.0006	-0.018**	0.136***	0.079***		0.66
SE	0.728***	-0.006	-0.0021**	-0.097***	0.031**	0.014		0.30
UK	0.630***	-0.006***	-0.0017	0.001	0.071***	0.015**		0.26

Note: Stars represent significance level: 0.1*, 0.05**, 0.01*** based on the Newey-West standard errors. Shaded are the new EU countries. Abbreviations: BE – Belgium, BG – Bulgaria, CZ – Czech Republic, DE – Germany, EE – Estonia, EL – Greece, ES – Spain, FR – France, IT – Italy, CY – Cyprus, LV – Latvia, LT – Lithuania, HU – Hungary, MT – Malta, NL – Netherlands, AT – Austria, PL – Poland, PT – Portugal, RO – Romania, SI – Slovenia, SK – Slovakia, FI – Finland, SE – Sweden, UK – United Kingdom
Source: Authors' calculations based on European Commission (2015) and Eurostat (2015) data.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

On the other hand, we find more differences for the standard deviation of the normally distributed expectations. In particular, the “pure” effects of the crisis on the dispersion seem to be weaker in the early and late phase of the crisis. In fact, in the latter case, the effect is statistically insignificant, and simply absent in the new members of the European Union. Moreover, the size of the middle-phase effect is similar for the old and new member states. Nonetheless, the observed differences are generally mild and do not contradict explicitly the general findings reported above.

Table 21. Results for the alternative measures of the inflation expectations dispersion

Var.	<i>const.</i>	π_{t-1}	$(\Delta\pi_{t-1})^2$	d_{ce}	d_{cm}	d_{cl}	d_{euro}	R^2
Dependent variable: Leik's ordinal variation								
Full sample	0.417 (0.005)	-0.009 (0.002)	0.0004 (0.0001)	-0.030 (0.009)	0.045 (0.011)	0.031 (0.013)	0.037 (0.011)	0.59
Old EU	0.474 (0.006)	-0.019 (0.003)	-0.0004 (0.0012)	-0.049 (0.012)	0.039 (0.015)	0.019 (0.015)		0.55
New EU	0.378 (0.006)	-0.009 (0.002)	0.0004 (0.0001)	-0.002 (0.009)	0.056 (0.016)	0.042 (0.018)	0.030 (0.010)	0.51
Dependent variable: relative standard deviation of the normal distribution								
Full sample	0.592 (0.003)	-0.007 (0.001)	0.0004 (0.0001)	-0.018 (0.009)	0.059 (0.013)	0.013 (0.012)	-0.005 (0.015)	0.58
Old EU	0.602 (0.010)	-0.011 (0.003)	0.0021 (0.0025)	-0.024 (0.012)	0.057 (0.023)	0.013 (0.020)		0.61
New EU	0.586 (0.005)	-0.006 (0.002)	0.0004 (0.0001)	-0.010 (0.015)	0.055 (0.015)	-0.001 (0.014)	-0.008 (0.017)	0.56

In parentheses, Arellano (1987) robust standard errors are reported. Last column contains the within R^2 , from LSDV regression. See also the note below table 1.

Source: Authors' calculations based on European Commission (2015) and Eurostat (2015) data.

Finally, in a similar way, we examine the behavior of the dispersion of perceived inflation measured by question 5 of the survey (see table 4). As far as the full sample and the old EU panel are concerned, the results are virtually the same as for the inflation expectations. Surprisingly, we do not find the middle-phase impact of the crisis on perceived inflation in the new member states.

Table 22. Estimates of panel models for the dispersion of perceived inflation

Var.	<i>const.</i>	π_{t-1}	$(\Delta\pi_{t-1})^2$	d_{ce}	d_{cm}	d_{cl}	d_{euro}	R^2
Full sample	0.533 (0.006)	-0.014 (0.002)	0.0009 (0.0002)	-0.051 (0.013)	0.038 (0.013)	0.029 (0.012)	0.016 (0.010)	0.59
Old EU	0.576 (0.015)	-0.032 (0.006)	0.0018 (0.0009)	-0.051 (0.016)	0.052 (0.015)	0.026 (0.013)		0.71
New EU	0.516 (0.006)	-0.011 (0.002)	0.0009 (0.0002)	-0.045 (0.019)	0.019 (0.021)	0.013 (0.023)	0.016 (0.011)	0.46

Note: In parentheses, Arellano (1987) robust standard errors are reported. Last column contains the within R^2 , from LSDV regression. See also the note below table 1.

Source: Authors' calculations based on European Commission (2015) and Eurostat (2015) data.

Conclusions

The results of the study document a clear pattern regarding the behavior of inflation expectations in European Union member countries during the global financial crisis. In the early phase of the crisis, the dispersion significantly dropped. However, after Lehman Brothers' collapse, the trend reversed and the dispersion exceeded the typical levels. Therefore, we confirm the findings of Gnan et al. (2011), but contrary to that study we show that the movements cannot be attributed to the behavior of inflation rates and some other commonly used factors. We also estimate the "pure" effects of the crisis on the dispersion in its three phases and show that they are not very impressive compared to the unconditional standard deviation of the dispersion values. Moreover, we highlight that the initial drop of the dispersion in the new European Union member states was weaker whereas the subsequent rise was stronger than in the old member states.

The country-level analysis reveals some interesting deviations from this pattern. In particular, the dispersion was constantly below the typical levels in the Southern Europe countries as well as in Poland and Hungary. The opposite results are obtained for Bulgaria, Lithuania and the United Kingdom.

Naturally, further research could focus on building more comprehensive models including a wider choice of economic and demographic variables. They could analyze not only the overall effect of the global financial crisis on dispersion of inflation expectations, but also more detailed issues such as possible changes in inflation expectations formation (including their unanchoring).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Another possibly important avenue is related to measurement of the dispersion of inflation expectations. In the study, we use the dispersion measures conditioned on perceived inflation that do not take into account the dispersion related to the inflation perception. Employing unconditional measures would definitely put more light on the discussed topic.

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
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**The Review of Theories of Mainstream
Economics on the Example of Economic
Models**

JEL Classification: *E10*

Keywords: *economic model; economics; economic theories; economy*

Abstract: Regardless of the fact that economics distinguishes itself from other social sciences by a high level of formal deductive modelling, it is a social science due to the essence of the economic process where a human is subject and object at the same time. In the recent years this issue has been more frequently emphasized by economists in ongoing discussions. In the discussions a good deal of time is devoted to economic models and, mainly, their relations with the socioeconomic reality and coherence of empirical evidence. The article presents a thesis that some mainstream economic theories have not always constituted the background to their practical applications, which led - and still can - to the dogmatic and inflexible use of model solutions for economic phenomena which are difficult to forecast in a non-variant rigid model. The aim is to critically analyse beliefs about usefulness of universal economic models in the economic reality advocated by mainstream economists and to prove that not all economic models have constituted the background to their practical applications.

Introduction

The necessity of reviewing or even redefining some previous economic theories arose earlier. Nevertheless, these processes have accelerated by the last global crisis. Then, practice visibly showed that some assumptions of theories of economics, including the mainstream theory, become invalid under the influence of the dynamically changing reality.

Mainstream economics (also called neoclassical synthesis) is an attempt to combine different economic theories, mainly the elements of Keynesian theory and monetarism. It is still the most common economic mindset in the world. However, the achievements of mainstream economics are being heavily criticized. The criticism comes down to objections to the methodological sphere and not noticing and omitting close relations between economy and other areas of social life, assumptions about extreme rationality of economic entities, simplifying model analyses, as well as accepting by its followers the axiom of a perfect information flow and unlimited possibility of using it. Meanwhile, market reactions of economic entities appeared to be different from what in the theory of mainstream economics concerns standard models of a competitive market. Thus, basic dogmas of mainstream economics were criticised severely because they diverged significantly from the economic reality. The negation of the doctrines of mainstream economics caused that, in the 1970s and 1980s, some of its assumptions were liberalized. As part of moderating the assumptions of mainstream economics, above all new theoretical tools were applied which made it possible to analyse imperfectly competitive market structures and, especially, to use in the analysis issues concerning the exchange of intermediate products, monopolistic competition, the meaning of economies of scales and activities of international companies.

L. Calmfors created a list of objections to economists, mainly followers of mainstream economics, among which there was a statement saying that these economists are not able to assess risks, their analyses are in general false, theories are not coherent and models break under their own weight or are incompatible with the reality (Walter, 2011, pp. 40-41). K. Juselius also treats economists, especially those being followers of neoclassical and mainstream economics, with a lot of reserve. In her view, econometrics is certainly a part of economics due to using tools of mathematics, statistics and informatics for studying relations between phenomena in economy, but it is also used to conduct analyses and prepare economic forecasts. However, according to K. Juselius, authors of econometric models attach more

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

significance to their mathematical and statistical precision (they are very often awarded the Nobel Prize for that) than to the reality in which they should be useful. What was mastered to perfection was creating a price index used to indicate an inflation index omitting such elements as a dramatic rise of stock and real estate prices or increasing exchange rates of Swiss franc and other currencies. In economic models, however, many other factors are not considered, e.g. the widening gap between rich and poor or the focus on results and maximum intensification of work, what causes stress and makes a circle of the excluded broaden. In consequence, they do not give answers to our questions which we need (Walter, 2011, pp. 40-41). The issue was emphatically raised by L.Calmfors mentioned before who claims that economists were the cause of the crisis and that: "(...) it is their extensive financial instruments, their policy of low interest rates and deregulation of the financial market that led to the collapse of the Lehman Brothers investment bank and, then, to the financial crisis of global economy in autumn 2008" (Walter, 2011, pp. 40-41).

D. Orrell treats economics, especially the assumptions of mainstream economics, very disapprovingly. D. Orrell identifies mainstream economics with the following ten assumptions (which, incidentally, are accepted by the majority of economists): economy can be described using economic laws, it consists of independent entities, it is stable, rational and effective, it does not favour any sex, the economic risk can be managed thanks to statistics, economic growth can last forever and it is always good and gives us happiness (Orrell, 2010). In should be added that these assumptions serve as the basis for neoclassical economics and other currently dominating theories, among others the efficient-market hypothesis. According to D. Orrell, economics is in such a bad state because mainstream economists are Pythagoreans¹ - from "an initiation" to an approach to forecasting. One becomes an economist through long and expensive (in the Anglo-Saxon countries) studies. There are strong mechanisms for extorting orthodoxy (in the main economic magazines, it is practically impossible to publish studies which challenge the aforementioned assumptions). Mainstream economists (as well as neoclassical ones) seek elegant numerical rationality. Just as

¹ To put it simply: the Pythagoreans thought that the whole world can be described by numbers. Some, no mean - there were to be smooth, perfect numbers. They believed that there is some profound order which special people - those like them - are able to encapsulate in refined theories. Initiation meant that the Pythagoreans were a very elite circle. To join them, one had to meet high requirements: dispose of all possessions, lead an ascetic life and study for five years having taken a vow of silence.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Pythagoreans, they are willing to ignore inconvenient facts in order to sustain the belief that economy looks as they would like it to look like. The author claims also that mainstream economists try to imitate Newton (the fathers of modern macroeconomics - William Jevons Leon Walras or Vilfredo Pareto - were saying that straight), even though they deal with a completely different sphere of reality. Meanwhile, Newton understood that it is impossible to describe human behaviours in a way that physics does. He wrote: "I can calculate the motion of heavenly bodies, but not the madness of people." D. Orrell explains in an appropriate and accessible way why he criticizes the basic model of neoclassical economics, also accepted by mainstream economics. In his view, it does not correspond to human economy, but the god's, and he gives the following example: "If an economist knocked on your doors and asked you to create the plan of consumption for the rest of life, you could have quite a problem. (...) It would require unlimited computational capabilities" - he writes. Then, he points out that "Mainstream economics assumes that people are highly rational - superrational, and are not subject to emotions. They never overeat or get drunk, they save towards their retirement, the exact amount that is needed - first, they count how much they will need and then, they save money with a meticulous precision. Real people are not like that" (Orrell, 2010).

Many economists being followers of modern mainstream economics have presented the achievements of economics in such a way as if it was a part of applied sciences. Such an approach, however, involves different research methods since a greater precision and ability to forecast are expected from applied sciences than from social sciences. It provokes some reflection that if a degree of methodology of some economic articles is comparable to studies from applied sciences, then one should be prepared that it increases expectations concerning insight and accuracy of answers to many questions related to, among others the last crisis.

Summing up, it can be acknowledged that a big mistake of economic policy in the mainstream theory was universalism established a priori. As a result, mainstream economics has become excessively formalized. It limited economics to rigid and measurable dimensions which were very often included in economic models. Together with complex economic phenomena, such formalism led to mistakes involving a significant simplification of mechanisms functioning in economy. It is impossible to present essential qualitative features using algebraic formulas in economics. The next drawback of modern mainstream economics is assuming that in economy there are "optimal" solutions which can be easily found as a result of the analysis

of an adopted model. It is not possible because assuming that, from the real world one should exclude consumers' irrational behaviours, risk, speculations, enterprise and uncertainty connected with it, which take place in every real socioeconomic life.

The imperfections of mainstream economics presented above show awareness of the necessity for transformation in the theory of economics and socioeconomic practice, and, what is most important, support more extensive research and discussions on possible directions of changes.

Methodology of the research

The scientific aim of the article requires an adequate methodology of research, which will allow to define efficacy and research value of the presented analysis.

The modern economics in its main trends (including main-stream economics) employs a perspective basing on statistical or mathematical methods. In order to obtain data necessary for such a methodology the supporters of the main-stream economics introduce statistical methods in their modified form, i.e. econometrics. This formal approach to economics has lead to a divide between economists focused on direct, practical aspects and the ones who stressed the importance of models created by means of new analytical tools. One has to point out that more often than not many authors have underlined the danger of “mathematization” of economics due to the formal approach or the scientism, i.e. the simplified attempts to uncritically adapt certain methods from so-called “natural sciences” to human or social sciences.

Taking all the above mentioned errors of the main-stream economics into account the author based her methodological assumptions on the following axioms: the methodology employed in the research ought to include not only the research methods themselves (i.e. the choice and creation of the research acts) but also the conditions (psychological, sociological, technical) in order to obtain and formulate the knowledge and foremost the features expected from the knowledge worthy to be considered scientific. Therefore the methodology nowadays should be seen in a wider scope, as a field encompassing not only the methods but their results as well.

The methodology of economics, just as any other disciplinary methodology, has generated its specific methodological terms and criteria employed in the presented article. These criteria are mostly the following:

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

- Theoretical context/paradigm including the hitherto obtained research results (bibliography, social factors and individual motivations).
- The scope of the reality taken under observation, convergence with socio-economic reality.
- The perspective of the research.
- Methodology (such as critical analysis of the bibliography, confrontation of the existing hypothesis and economic laws with the reality, monographic method, inductive method).
- The form of assertions (the terminological apparatus, language).
- Social needs triggered by the research.

Controversies over economic models

Varied approaches towards issues concerning modelling in economics contributed to the development of numerous models, reasons for their divisions and types. In the Polish bibliography of economics, these issues were dealt with in a great deal of studies, parallel to papers in economics, econometrics, statistics and other fields close to economics.

"A model" from the perspective of economics is frequently defined as:

- "A simplified image, model of a part or a set of economic life" (Chodorowski, 1974, p. 81)².
- "A set of assumptions of the economic theory that is a set of conditions where abstract laws are true" (Lange, 1959, pp.123-124).
- "A theory describing a copy of the original which retains the original's properties" (Nowak, 1972, p. 136).
- "A simplified image of economy. With the use of, e.g. a drawing, mathematical equations, a mechanical device, a model shows relations of studied variables" (Czarny, 2011, p. 66).

Obviously, there are many other interpretations of the term "economic model" in Polish and also foreign literature on the subject, however, it seems that few quoted ones make it possible to state that an economic model is an ambiguously defined and relative concept. Since an economic model is explained as a simplified portray of a part of the economic reality, in such a case, in the structure of economics everything can be a model. Then, according to J. Semkow (1977, p. 152), a model is any economic concept because in its simplified form it shows key features of some elements of

² Many definitions concerning this point of view differ from each other because many of them equate the concept of a model with a theory.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

economic life. From this perspective, every economic theory is a model as well; this way some definitions of a model equate it with an economic theory. Despite this correct remark made by J. Semkow, a model in economics is frequently treated as a synonym of an economic theory, however, a model is more often a simplified schema of functioning of national economy or, in general, an economic phenomenon (Marciniak, 2007, p. 31).

Regardless of semantic disputes, an economic model always presents a narrowed image of the economic reality. It is impossible, however, to fully convey the economic reality through applying even extensive, complex and multidimensional models, since real economy undergoes constant evolution caused by social, cultural, political, technical and technological changes, and also by natural disasters. Therefore, a lot of economic models are of a static nature. However, economic laws and theories in static relations cannot be equivalents for reality, since they involve specific context which does not appear in reality. They only copy objective regularities. Thus, models - mainly macroeconomic ones - are based on knowledge from the past. Meanwhile, economy undergoes a constant transformation.

Nevertheless, an economic model helps to create a synthetic image of regularities appearing in economy. Adopting essential assumptions which simplify the economic reality, one can create a model of economy and analyse undergoing in it relations between economic entities. Then, from a nature of these relations and regularities between them, the behaviour of entities in the economic reality can be deduced (Rekowski, 2005, p. 32). The issue was similarly presented by E. Stiglitz who claimed that "in every analysis there are used models which have a form of simple hypotheses concerning reactions of particular units and companies to different changes in a country's policy and a total influence of these reactions on economy. In order to illustrate consequences of various country's activities, everyone use models - politicians as well as economists. However, as opposed to politicians, in their models, economists try to form hypotheses very clearly, in such a way that they are not contradictory to each other and they are in accordance with reality" (Stiglitz, 2004, pp. 22-23). Reality showed that J. E. Stiglitz overestimated prudence and pragmatism of many economists. Moreover, he altered the aforementioned statement. At the economic conference in Lindau in Switzerland in 2012, in which seventeen economic Noble prize winners took part, he stated that macroeconomists have been

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

ignoring undergoing changes for so long that they have lost contact with reality creating unreal economic models (Żakowski, 2011, p. 21)³.

According to J. E. Stiglitz (2004, pp. 22-23), economics, especially macroeconomics, for a few last decades has become a refined academic field, however not very useful in practice. Accuracy of this statement is proved by irregularities and even errors in the assessment of socioeconomic achievements (as the last global crisis revealed), both at the microeconomic (mainly in the evaluation of companies' assets prices and capitals value) and macroeconomic level (e.g. in the evaluation of the value of gross domestic product, GDP). The issue is described at length among others by R. Skidelsky who claims that the global crisis was a result of a wide range of irregularities and errors in the evaluation of assets by private banks and rating agencies. The consequence of these irregularities was largely illusory models (Skidelsky, 2011). This situation has one more alarming side, that is, it provides impetus to marginalizing ethical and moral values. Thus, it is worth emphasizing that it is mainly the lack of obeying ethical rules that led not only to irregularities connected with the system of assessment of socioeconomic achievements, but also to the outbreak of the last crisis.

The economic crisis, situation on financial markets, bankruptcy of many banks and changes in consumer behaviour have given rise to a fierce discussion among economists which focused on the problems related to the socioeconomic theory and practice. The criticism mainly concerned the utilitarianism of models constructed by economists. There were many negative opinions, especially among macroeconomists, on the belief that there is a possibility of devising universal economic models that completely reflect the economic reality. One of the sceptics is P. Diamond⁴ who claims that each individual situation requires a different model, while some economists erroneously believe that once a mechanism or a truth are discovered they should be treated as indisputable. G. Akerlof aptly encapsulated this problem stating that the letter "e" which symbolizes real human behaviour in macroeconomic models has been replaced by "e*" that symbolizes how people should behave according to the author. It is G. Akerlof's opinion that the asterisk should be deleted and replaced by knowledge that stems from research on real human behaviour. In most cases such research has not been conducted yet (Żakowski, 2011).

³ In the article, the author described a debate on modern economics which took place in Lindau and 17 economic Nobel prize winners took part in it.

⁴ Peter Diamond is considered one of the most eminent modern economists together with Stiglitz, Krugman or Roubini.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

T. Lawson (2009, pp. 757, 765) has also heavily criticised the relations between economic models and the socioeconomic reality and their coherence with empirical evidence. He completely negated the application of modelling as a useful method for assessment and recognition of the essence of the socioeconomic reality by claiming that such a reality has "depth or structure; the social relations, rules, positions, power structures and so forth that are typically immeasurable [...]. Social reality, in other words, is of a nature that is significantly at variance with the closed systems of isolated atoms that would guarantee the conditions of mathematical deductivist modelling".

In its nature, the construction of models that reflect the economic reality as accurately as possible is a difficult and complicated task. Many economists state that creating an economic model often verges not only on science but also on art. It is difficult not to agree with such a statement. Building a model that includes all indispensable features of the real world from the perspective of researched problems is not so easy, especially when at the same time it cannot include too many or too little details. An impressive number of variables and their interdependencies in the former case make the essence of the problems disappear in the swath of data. While, in the latter case the simplification will result in a general outline of the analysed aspect and, in consequence, it will not allow to accurately and comprehensibly present the researched problem. Incidentally, the term "art of economics" dates back to J.N. Keynes who divided economics into positive and normative and was later cited by M. Friedman. J. N. Keynes did not create such a division because in reality he divided economics into positive, normative and the art of economics. He emphasised that the art of economics is of a great importance as it is the branch of economics that also concerns economic policy. Therefore, the art of economics requires a judgement regarding reality as it introduces sociological and political variables. According to D. C. Colander, it is inevitable when we talk about economic policy. He elaborates on the topic saying: "the main objection I have to the majority of people in our profession is that they try to combine positive economics with economic policy and draw conclusions about it from models which are not realistic enough from the institutional perspective to be used for such aims" (Snowdon, Vane, 2003, pp. 284-285).

M. Friedman argued that the realism of assumptions is irrelevant and that, what is really important, is the prognostic value of a theory (Snowdon, Vane, 2003, p. 284). D. C. Colander absolutely rejects this notion and claims that everything is dependent on the level of deliberation. According

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

to D. C. Colander, there is no method in macroeconomics to unquestionably test all devised concepts at an empirical level. The author emphasizes that "[...] where you cannot test empirical theorems, the method based on "prognostic value" becomes problematic. There is no proven theory in macroeconomics. We only perceive reality in a general way. The realism of assumptions in such a general understanding of reality plays the main part as assumptions constitute a part of this understanding. The assumptions determine what is perceived. Thus, I believe that Friedman is completely wrong in his view of macroeconomics, however, in a wider sense, if we assume that economics was a science in which one can unambiguously test theorem, I would be more willing to approve of Friedman's views" (Snowdon, Vane, 2003, p. 284).

Considering the above deliberations, it appears there is a considerable group of modern economists that firmly emphasize the significance of qualitative factors in their final conclusions on economic models. Meanwhile, the neoclassical theory, and later mainstream economics, radically divided the quantitative and qualitative manifestations of phenomena, which in practice disregarded the role of qualitative aspects. Thus, the constructed econometric models omitted qualitative elements which could not be included as variables in a model because they were considered immeasurable. As a result, discerning cause and effect relations between individual elements of economy became more complicated as the qualitative manifestations of phenomena and economic processes were disregarded. Economics thereby moved away from real social problems while attempting to gain an image close to the one possessed by applied sciences. In consequence, quantitative analysis methods became of a great importance in mainstream economics as they allowed the balance of each particular element of the economic system to be accurately described. Economists started to be solely interested in aspects that were measurable, countable and could be mathematically expressed.

Naturally, neither theoretical concept nor economic model can ideally recreate the complexities of socioeconomic life. It is necessary to apply a simplified image that concentrates on recurring, representative manifestations of phenomena and processes. Thus, the purpose of a model is not to reproduce reality accurately but to retain the realism of its assumptions.

Conclusions

The conducted analysis of the theory of mainstream economics from the perspective of economic models allows a following conclusion to be formulated: the most often framed reproof of economic models concerned their inaccuracy with the reality of economy. The criticism was also aimed at too much theory in economic models, as well as at an excess of empirical knowledge. According to A. Wojtyna (2009, pp. 36-37), as well as other participants of this discussion, a major part of objections to mainstream economics would lose its strength [...] "if new findings of research conducted on human behaviour by other disciplines (mainly by psychology and neurophysiology) were taken into account to a larger extent." In other words, mainstream economics would be more receptive to behavioural economics⁵, which in recent years without doubt has become one of the most dynamically developing research areas in economics". It is a very accurate insight as behavioural economics is currently perceived as a mature research programme and a separate sub-discipline of economics. D. Fudenberg (2006) points out that the outcome of such research was not only attracting the mainstream economic followers' attention to the irregularity of human behaviour that deviates from a standard model, but mainly building formalized models which generate and explain these irregularities and may be incorporated into larger models. Nevertheless, behavioural economists realize that, on the one hand, their accomplishments cannot be questioned, but, on the other hand, they are aware that an unquestioned

⁵Inception or rather origins of behavioural economics can be dated back to the 1930s. John Broadus Watson and Burrhus Frederic Skinner are considered the founders of behavioural economics. In 1979, however, texts by Daniel Kahneman and Amos Tversky in *Prospect Theory: An Analysis of Decisions under Risk* were published. It was followed by Richard Thaler's *Toward a Positive Theory of Consumer Choice* a year later (Kahneman, D., Tversky, A. (1979). *Prospect Theory: An Analysis of Decisions under Risk*, „Econometrica” 1979, no. 47, p. 313–327; Thaler, R. (1980). *Toward A Positive Theory of Consumer Choice*, „Journal of Economic Behavior and Organization”, no. 1, p. 39–60.). Both of these publications triggered a rapid development of a new field known as behavioural economics. In their works, the authors explained economic theories in the context of psychological basis for human behaviour. Behavioural economics is not a homogenous school, quite the contrary, it consists of a set of different theories including the Michigan School (George Katona), psychological economics (Colin Camerer, Richard Thaler, Ernst Fehr), behavioural macroeconomics (George Akerlof), evolutionary economics (Richard Nelson, Sidney Winter), behavioural finances (Robert Schiller) or experimental economics (Vernon Smith). What all these concepts have in common is the negation of neoclassical convictions that equate a human with *homo oeconomicus* whose characteristics are absolute rationality, drive to satisfy only their own narrowly defined interest and complete self-control.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

introduction of their own research programme may lead to them being excluded from the discourse. This happened to heterodox economics which also presented different research methods and subject of analysis in comparison with mainstream economics, though in a more forceful manner. Mainly, but not only, due to those reasons, relations between mainstream economics and behavioural economics are still weak. In a long-term perspective, according to C. F. Camerer and G. Loewenstein, simplified models based on the assumption of strict rationality will be successively replaced by behavioural models. The assumption of strict rationality, which currently is perceived as an inherent part of economics, in the future will be treated as a useful, special case that stems from more general, behaviourally-substantiated theory (similarly to how the Cobb-Douglas production function or the expected value maximization principle are treated now). At the same time, they emphasize that their approach is not based on an idea of a complete rejection of neoclassical economics, which in general is very useful, but "on modification of one or two assumptions of the standard theory in order to achieve a higher psychological realism" (Camerer, Loewenstein, 2004; Wojtyna, 2009, p. 41). Table 1 shows the main characteristics of mainstream economics and behavioural economics.

Table 1. The main characteristics of mainstream economics and behavioural economics

MAINSTREAM ECONOMICS	BEHAVIOURAL ECONOMICS
Mainstream economics, also referred to as neoclassical synthesis, is an attempt to combine various economics theories, mainly the elements of Keynesian economics and monetarism.	Behavioural economics is a discipline that combines the accomplishments of classical economics and psychology. It is a field of an economic analysis that verifies the assumptions of neoclassical economics on the basis of sociological and psychological research findings.
Main research methods: econometric modelling, deductive and abstract methods, the analysis of economic phenomena from the static and dynamic perspectives, taking into account innovation in built models, devising microeconomic base for a macroeconomic analysis that guarantees internal coherence.	Main research methods: the theory of planned behaviour, experiments that employ more realistic psychological foundations.

Source: own work.

Thus, agreement, consensus or shared beliefs so much needed by modern economies are a procedural content of conditions on which the success of mainstream economics being receptive to behavioural economics depends. However, the success depends on whether the assumptions used in mainstream economic models will be supplemented with qualitative fac-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

tors. This means that they will also include the ideas of behavioural economics mainly including assumptions that are based on sociological and psychological research findings, as well as the findings of research that apply a similar methodology. As A. Wojtyna (2009, p. 47) noted, this will support making “economic human” resemble “ordinary humans”. The future will show whether and to what extent these changes will be useful in practice. However, due to increasing criticism of models that are often defined as the standard models of mainstream economics, certainly there is a natural need to search for new solutions focused on the usability of economic models in real economy, especially in terms of their forecasting capabilities. This thesis is proved by the fact that none of the intricately built economic models forecasted the crisis. Although, more worrying is the fact that there have not been built any models that would show how to get out of it.

This article has presented the position which claims that for mainstream economics to assertively open up to behavioural economics there is a need for the advocates of the former to be always reflective, think critically and search, as well as to overcome their persistence of adhering to one right ideology, because it blocks the way to complementary changes in economics.

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18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
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Institutional Determinants of Regional Diversity of Labor Market in Poland*

JEL Classification: *B15; B25; B52; J08*

Keywords: *institutional economics; labor market; institutional unemployment; labor market's institutions*

Abstract: The article will focus on regional diversity of the Polish Labor Market from institutional perspective. The Polish Labor Market is geographically diverse in terms of unemployment and employment rates, and also in terms of economic development. At the end of 2013 the difference between the lowest and the highest unemployment rate in the Polish regions was 12.1% (Wielkopolska located in the West Poland has unemployment rate of 9.6% and Warmia - Mazury in the East has unemployment of 21.7%). The question arises whether this difference comes from the structural or institutional sources? The paper will describe the character of Polish Labor Market whereas in the second part, it will trace the impact of institutional variables such as real wage, Kaitz index and Gender gap on the regional unemployment rate in 2002-2012 in Poland.

* This text was presented during the 26th Annual EAEPE (European Association for Evolutionary Political Economy) Conference 2014, Nicosia, Cyprus, which was held between the 6th-8th Nov 2014.

Introduction

The economic crisis that first broke out in 2008 has taken a tremendous toll on labor markets across the EU. Unemployment figures have increased, while employment rates continue to fall. It has been observed that the crisis has served to accelerate previously existing structural trends, generating increasing inequality, polarisation and atypical employment (Crisis takes its toll: disentangling five years of labor market developments, 2014, p. 27).

In this context, the Polish Labor Market is an interesting example of changing situation. On the one hand in terms of economic growth, Poland remained “green island”, but on the other hand Polish Labor Market remains highly diversified with some structural and institutional problems.

The aim of this paper is to present this regional diversity of Polish Labor Market from the institutional perspective. The intellectual background of this text is based on institutional economics. As North (1990, p. 3) put it: “Institutions are the rules of the game in a society or, more formally, are the humanly devised constraints that shape human interaction”. For labor market the most important are: benefits, participation-friendly schemes, labor taxation, wage setting, employment protection legislation, union density and active labor market policies (skills developments, youth employment and job creation). Such institutions affect the efficiency of an economy. An economy with good institutions is more efficient in the sense that it takes less inputs to produce the same amount of output. Moreover, bad institutions lower incentives to invest, to work and to produce (Sala-i-Martin 2002).

An important part of labor market are also informal institutions such human capital, social capital, religion, customs, norms and type of society. This institutions are especially important for the big labor market with diverse regional field, where cultural factors play a major role.

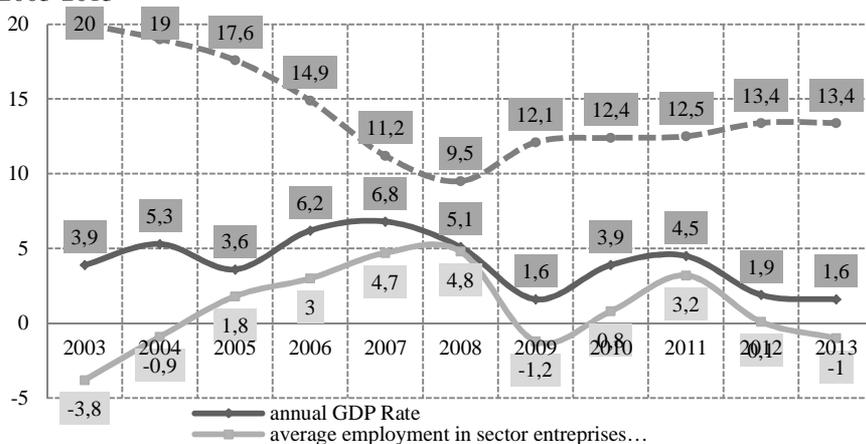
Nowadays problems of Polish Labor Market are geographically diverse - low activities of labor force, especially women and high unemployment. Most of the analysis of this problem is focused on the structural sources, but the interesting question is: how the institutions affect the unemployment and if this impact is the same in all regions of Poland?

In the first part of this paper, I describe the character of Polish Labor Market whereas in the second part, I trace the impact of selected institutional variables such as real wage, Kaitz index and Gender gap on the regional unemployment rate in Poland in 2002-2012.

Institutional characteristics of Polish Labor Market

Not a long time ago, in 2004, Poland was fighting very serious unemployment (20% in 2002-2003). The transformation process imposed a radical change regarding rationalization and restructurization of employment, which was carried out in Poland in two waves. The first wave of restructurization (companies before 1989) was overlapped by the second wave, based on the development of the new IT based economy. Moreover, new restructurization of social services appeared, for example in education or health care. These two processes led, especially after 2001 to employment rationalization, forcing rapid economic growth, generated mainly by increasing productivity and use of new technologies. The situation on Polish Labor Market also has changed after Poland joined the EU system. Common European Labor Market has helped to solve the problem of Polish unemployment. Unfortunately, after 2008 the latest global economic crisis has affected the Polish Labor Market as well and nowadays the rate of unemployment is still 13.4% (see Figure 1).

Figure 1. Annual GDP rate, employment and unemployment rate in the years 2003-2013



Source: own elaboration based on Statistical Yearbooks of GUS (GUS).

While analyzing the data presenting by Eurostat, we do not see a serious problem of unemployment and employment in Poland, but the problem with the overall level of economic activity for the age group 15-64 years (see Table 1). In the years 2003-2013, we observe even a significant de-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

crease of difference between Poland and EU28 in terms of employment and unemployment. However, European statistics do not show the real situation in Poland, because are based on different definition of working force age (in Poland – 18/59-64 years¹, than in the EU – 15/64 years).

Table 1. Activity, employment and unemployment in Poland vs. EU28

Year	Activity rate (15-64 years)			Employment rate (15-64 years)			Unemployment rate (15-64 years)		
	Poland	EU(28)	difference	Poland	EU(28)	difference	Poland	EU (28)	difference
2003	64	68,9	-4,9	51,4	62,6	-11,2	19,7	9,2	10,5
2004	63,7	69,2	-5,5	51,4	62,7	-11,3	19,4	9,3	10,1
2005	64,4	69,7	-5,3	52,8	63,4	-10,6	18	9,1	8,9
2006	63,4	70,1	-6,7	54,5	64,3	-9,8	14	8,3	5,7
2007	63,2	70,3	-7,1	57	65,3	-8,3	9,7	7,2	2,5
2008	63,8	70,7	-6,9	59,2	65,7	-6,5	7,2	7,1	0,1
2009	64,7	70,9	-6,2	59,3	64,5	-5,2	8,3	9	-0,7
2010	65,3	70,9	-5,6	58,9	64	-5,1	9,7	9,7	0
2011	65,7	71,1	-5,4	59,3	64,1	-4,8	9,8	9,8	0
2012	66,5	71,7	-5,2	59,7	64,1	-4,4	10,2	10,6	-0,4
2013	67	72	-5	60	64,1	-4,1	10,5	10,9	-0,4

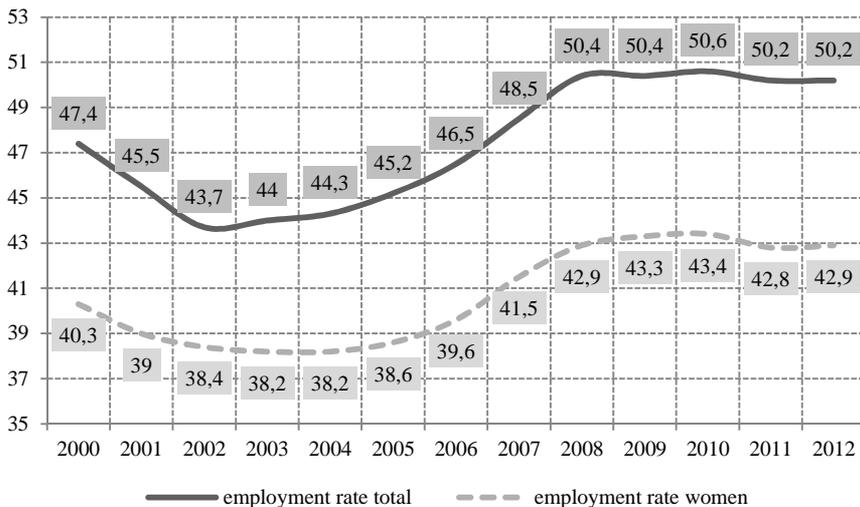
Source: (Rynek pracy w Polsce w 2013 roku, p. 16).

Thus, in Poland we have a lower activity and lower employment than in the EU - particularly of women (see Fig. 2). For example, in 2011 Poland was inhabited by 38.5 million people including 23.6 million people at the working age. Among people of working age – only 16.5 million people were economically active (including women - 7.4 million). In the fourth quarter of 2013, the most important reasons for inactivity were: a pension

¹ In 2013, the retirement age was raised in Poland to 67 years.

(indicated by nearly half of the economically inactive population), learning and raising qualifications, disease and disability (indicated by 13.9% of the economically inactive) and family responsibilities (11.1% of passive population) (Rynek pracy w Polsce w 2013 roku, p. 3).

Figure 2. Employment rate total and women (18-59/64 years) in Poland in the years 2000-2012 (%)



Source: own elaboration based on Statistical Yearbooks of GUS (GUS 2000-2014).

Low economic activity and low employment rates provoke questions about the institutional conditions of the labor market in Poland. Among the most important informal and formal institutions which affect the behavior of the labor market participants we can point out the following:

- a) In the employer's environment:
 - perception of the hierarchy and the distance worker-employer,
 - acceptance of change - the need of regulation,
 - tax system (labor costs, tax wedge),
 - employment protection system (rules for employing, dismissing, and wage setting, eg. the scope and level of wage negotiation and coordination, minimum wage system),

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

- social dialogue (including social goals and ways to achieve them by trade unions and employers' organizations, the level of unionization and wage bargaining system),
 - bureaucratic and financial obstacles for the development of entrepreneurship,
 - existence and size of the shadow economy.
- b) In the employee's environment:
- feminization vs. masculinization of social roles,
 - perception of leisure time and family (*work life balance*),
 - quality of social capital,
 - unemployment income protection (passive labor market policy) and assistance in finding and obtaining work (active policy),
 - social assistance, infrastructure of family support, educational policy, pension system,
 - professional and spatial mobility.

Institutional determinants of unemployment can be divided into those that affect the demand for labor and the supply of labor. The former ones include: employment protection legislation, labor taxation, the system of unemployment benefits, union density, system of wage bargaining. The latter ones - the factors affecting the changes in labor supply: demographic and family policy, earlier deactivation and migrations.

In institutional analysis, the most important problem is the choice of one indicator, which allowed a total assessment of institutional change. In most cases, existing indicators describe reality at the macroeconomic level for the whole country. Therefore they are useful to conduct regional analyzes. However, in order to illustrate national trends in institutional change we can use the following indices:

- Index of Economic Freedom in the labor market developed by the Heritage Foundation (published since 2005);
- Labor Market Efficiency Index published by the World Economic Forum (since 2006);
- Employment Protection Legislation Index (EPL) developed by the OECD.

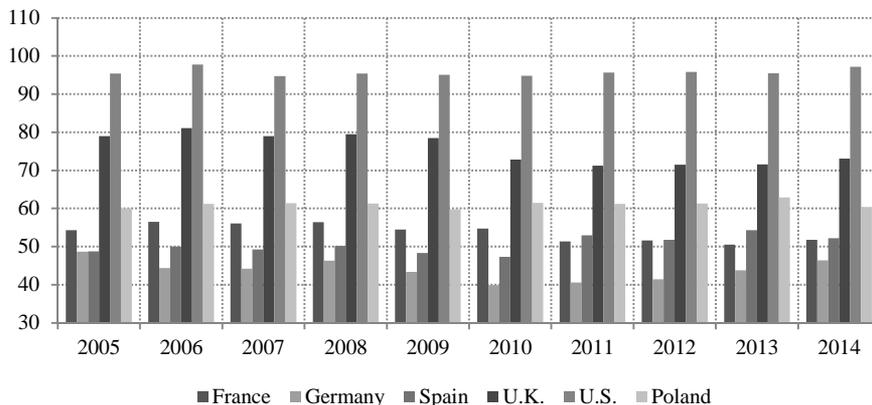
Referring to these indicators, it can be summarized that in terms of freedom in the labor market, Poland is classified among the countries with the average economic freedom (with a score of 60 points).

The best results are achieved by the United States (in 2014 - 97.2 points) and the U.K. (73.1 points). The vast improvement is observed in the Czech Republic (an increase from 57.7 points in 2005 to 84 points in 2014), and

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

the reverse trend - in the case of Slovakia (a decrease from 77.1 in 2008 to 53.6 points in 2014).

Figure 3. Index of Economic Freedom in the labor market in Poland and in selected countries of Western Europe and the U.S. in the years 2005-2014



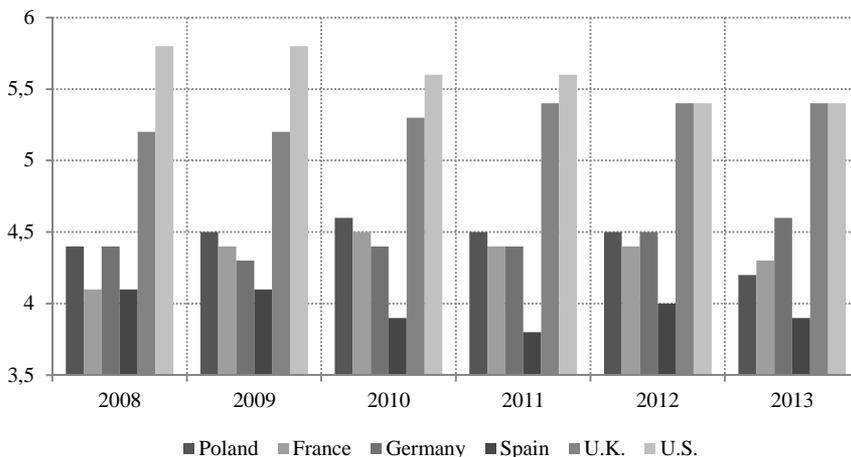
Source: own elaboration based on (Heritage Foundation).

Another institutional indicator is the Index of Labor Market Efficiency which is the component of Competitiveness Index published by the World Economic Forum. Competitiveness is understood here as “*the set of institutions, policies, and factors that determine the level of productivity of a country*”. The level of productivity, in turn, sets the level of prosperity that can be reached by an economy. The productivity level also determines the rates of return obtained by investments in an economy, which in turn are the fundamental drivers of its growth rates. In other words, a more competitive economy is one that is likely to grow faster over time (The Global Competitiveness Report 2013-2014, p. 4).

In comparison to selected countries of West Europe, Poland obtained results similar to the French market (France with a score of 4.31 in 2013 ranks 71 out of 148 countries, and Poland with a score of 4.20 ranks 80), and far better than Spain (ranks 115 with a score of 3.93). In contrast, in Eastern Europe, the Czech Republic and Slovakia reached a better result in 2008 (4.7), but currently indexes for Poland, Hungary, the Czech Republic and Slovakia remain at a similar level (in 2013, the Slovaks have achieved the result 4.24 and ranks 76, Poles and Czechs - 4.20 and rank 80 and 81, and the Hungarians - 4.18 and ranks 85).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Figure 4. Labor Market Efficiency Index in Poland and in selected countries of Western Europe and the U.S. in the years 2008-2013



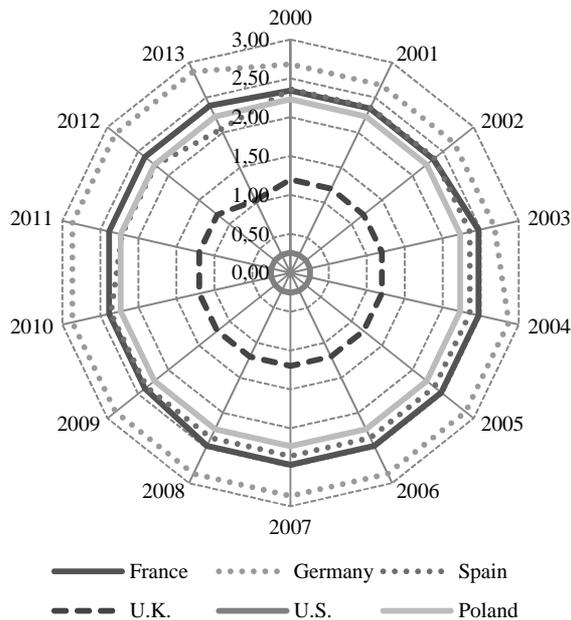
Source: own elaboration based on (The Global Competitiveness Report 2008-2009; 2009-2010; 2010-2011; 2012-2013; 2013-2014).

To evaluate the flexibility of the labor market we can refer to employment protection legislation (EPL) index applied by OECD. This indicator measures the procedures and costs involved in dismissing individuals or groups of workers and the procedures involved in employing workers on fixed-term or temporary work agency contracts. EPL index takes value from 0 to 6 (the higher the number, the bigger protection of the labor market) and concerns three areas: individual dismissal of workers with regular contracts, additional costs for collective dismissals and regulation of temporary contracts.

In general, Poland in the years 2000-2013 was characterized by a relatively liberal labor laws in comparison with other transition countries, both in terms of regular contracts, as well for collective dismissals. Meanwhile, in the case of regular contracts we don't observe changes in index of employment protection legislation for Poland (in contrast to the Czech Republic and Slovakia, where the EPL indicators are falling). The exception is the protection of employment for collective dismissals, where the rate fell from 3.38 in 2003 to 2.88 in 2004. We can therefore conclude that the labor market in Poland has been largely liberalized but the decline of employment protection mainly reflected in the development of atypical forms of employment. At the turn of the 20th and 21st centuries the workers with tem-

porary contracts counted 5-6% of total employment, while at the end of the decade, their share exceeded 25%. As a result, Poland has become the country with the highest ratio of fixed-term workers within the EU. In 2011, the percentage of fixed-term workers in Poland was 26.9, which was almost twice as much as the EU27 average - 14.1 (Bartosik, 2012, p. 35).

Figure 5. Employment Protection Legislation for workers with regular contracts in Poland and in selected countries of Western Europe and the U.S. in the years 2008-2013



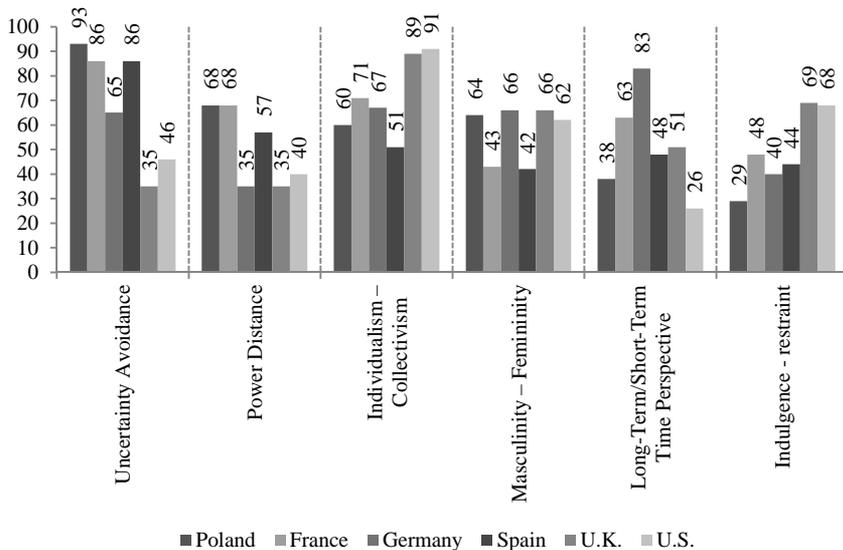
Source: own elaboration based on EPL OECD data (OECD 2014).

Finally to analyze the institutional fundamentals of labor market, we should refer also to informal institutions. Without going into detail of sociological research, we can quote only the research of Geert Hofstede, Gert Jan Hofstede and Michael Minkov, which shows the type of society and helps to understand the Polish character of labor market. G.Hofstede analyzed five dimension of culture which characterize each population (Hofstede 1991). The first was the distance to authority (distance of employees or citizens from superiors or leaders). In other words, this dimension assesses attitudes toward hierarchy. The second dimension is the level of

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

individualism - whether it is important to achieve the objectives of the individual, or of the whole group. It also draws attention to masculinity or femininity of society. A community which is more male define clearly social roles of gender and in the case of interests' differences seek confrontation. In contrast, more feminized society sets both sexes the same requirements and pays attention to the quality of interpersonal relations. In this society the conflicts are solved by negotiation. Societies which are more male are characterized by less professional activity of women. An important dimension is also avoidance of uncertainty - if we accept the changes. Society expecting predictability (avoiding uncertainty) protects itself by creating numerous laws and regulations. Therefore in the case of labor market they will not be willing to deregulation.

Figure 6. Dimensions of national cultures in Poland and in selected countries of Western Europe and the U.S.



Source: own elaboration based on (Hofstede G., Hofseted G.J., Minkov, 2011, pp. 70-72; 105-106; 150-151; 201-202; 260-262; 289-291).

The research of Hofstedes and Minkov based on *European Social Survey* and *World Values Survey* indicates that Polish society is still male with a medium level of individualism and a large distance to the authorities, pending predictability and avoiding uncertainty, with short-term oriented

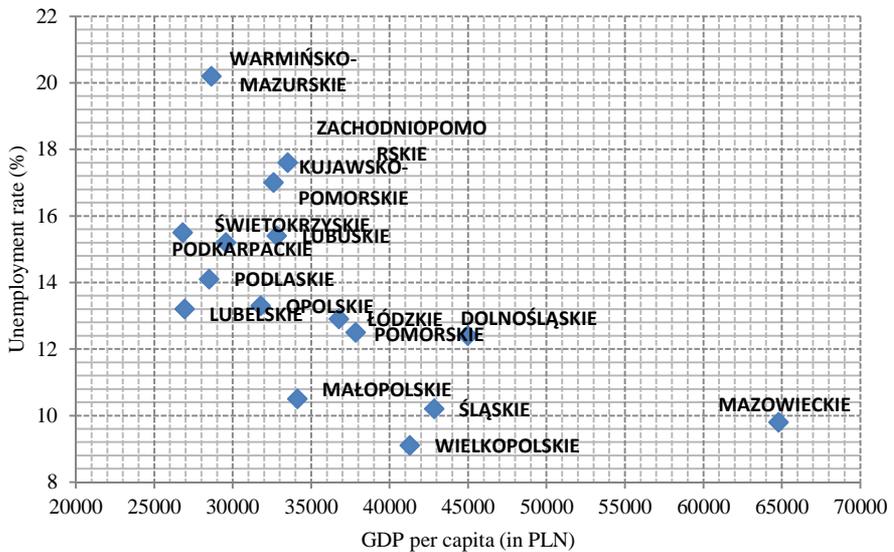
strategies and rather restrictive (Hofstede G., Hofseted G.J., Minkov, 2011, pp. 70-72; 105-106; 150-151; 201-202; 260-262; 289-291).

Regional diversity of Polish Labor Market

Having presented trends on the Polish Labor Market, I would like to answer the question whether this market is homogeneous? The question is: how the institutions affect the unemployment and if this impact is the same in all regions of Poland?

First, using the index of GDP per capita, which shows indirectly scale of household income and comparing it to the unemployment rate (data for 2011) we can show the placement of the Polish regions in terms of the regional markets development.

Figure 7. GDP per capita and unemployment rate in 2011 by region



Source: own elaboration based on regional BDL data (GUS 2014).

Figure 7 confirms the existence of the underdeveloped regions, such as Warmia-Mazury, Podkarpackie, Swietokrzyskie and Lubuskie (regions close to the eastern border – so called the Eastern Wall), but also Zachodniopomorskie (region at the western border) and Kujawsko-

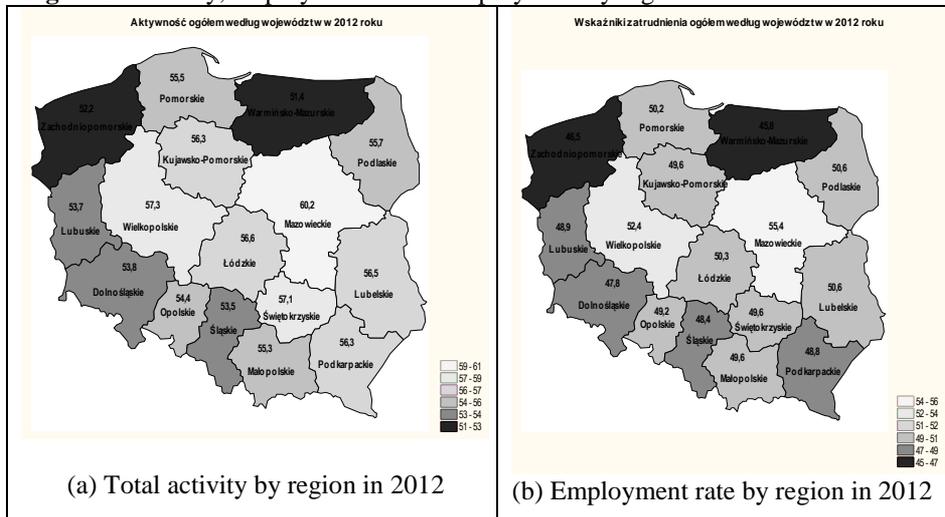
Pomorskie (central Poland). At the opposite extreme we have Mazowieckie with the capital Warsaw – standing out from the other regions, and further Wielkopolska, Silesia and Malopolska.

Such important developmental difference between regions in Poland is due to many factors, including long-term underdevelopment and civilization gap which lead to the threat of permanent marginalization of certain areas. This marginalization is supported by the structural and institutional conditions of local markets.

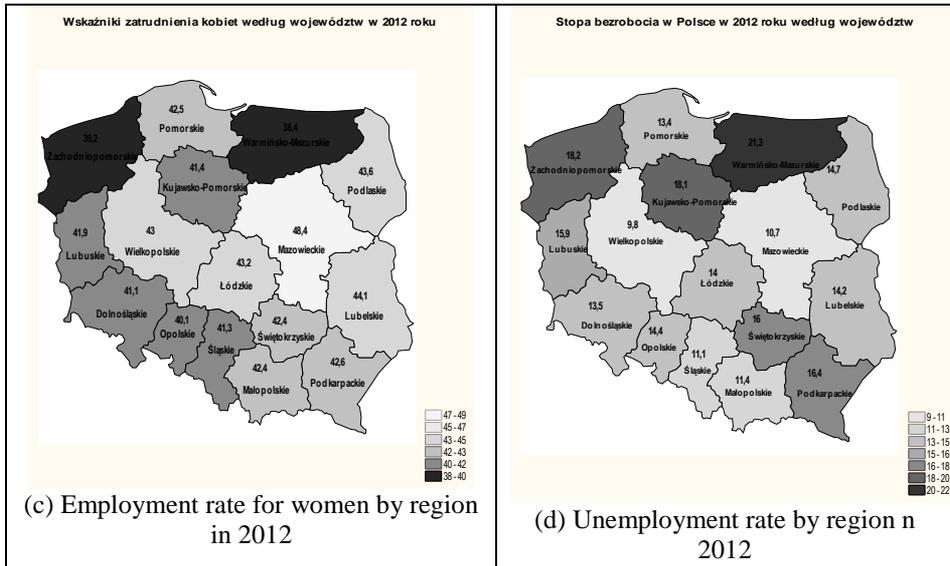
It should be noted that Poland is still a country with predominantly rural areas (93.1% of the country). In 2012, these areas had more than 15 million inhabitants (39.3% of the total population). That causes – contrary to trends in developed countries - still a high share of employment in agriculture (in 2013 in the Eastern Wall - Lubelskie - 26.5%, Podlaskie - 24.3%, Swietokrzyskie - 21.8%, Podkarpackie - 17.9%). In the eastern regions it is almost twice the national average (13.2%). Moreover, in Eastern Poland there is a large number of protected areas (almost 40% of the surface, in the case of Podkarpackie - even more than 60% of the Małopolska - more than 50%) (Boni 2007).

Thus, more than one third of the Polish population permanently living and working in rural areas and what is the problem for the Eastern Wall is the lack of large cities that constitute the metropolitan facilities for development (especially in Podkarpackie, Swietokrzyskie and Lubelskie).

Figure 8. Activity, employment and unemployment by region in Poland in 2012



**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**



Source: own elaboration based on regional data (BDL).

The scale of structural changes can be seen clearly on level of regional unemployment. As emphasized at the beginning - at the end of 2013 difference between the lowest (Wielkopolska with 9.6%) and the highest (Warmia-Mazury with 21.7%) unemployment rate in the Polish regions was 12.1%. Without the doubt such difference is the result of geographic location, socio-economic development, but also impact of institutions (formal and informal).

Methodology of the research

To confirm the significance of institutions' impact, I assumed that the selected quantitative indicators influence the changes in unemployment in regional labor markets. The indicators are the following:

- average real wage in the corporate sector,
- Gender gap defined as the difference in activity between men and women,
- Kaitz index calculated as the ratio of the minimum wage to the average wage.

I treat wages and Gender gap as manifestations of institutional changes in the labor market.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

In my empirical investigations I use separate panels for regions with good labor market and another for the regions with less developed labor market. The first group consists of Małopolskie, Mazowieckie, Pomorskie, Silesia and Wielkopolskie. The second group consists of Kujawsko-Pomorskie, Podkarpackie, Swietokrzyskie, Warminsko-Mazurskie and Zachodniopomorskie. I selected the regions on the base of unemployment rate in 2012.

In this section first I summarize the statistical properties of the labor market variables. To ensure stationarity the series is expressed in first differences. I present the descriptive statistics in Table 2. The mean value, median, standard deviation, skewness and kurtosis in the case of unemployment, highlights the heterogeneity of regional labor markets in Poland. The differences between regions can be seen also in the case of skewness for Gender gap.

Table 2. Descriptive Statistics of Variables Expressed in First Differences

	Unemployment		Real wage		Gender gap		Kaitz index	
	RD	RLD	RD	RLD	RD	RLD	RD	RLD
Mean	-0,055	-0,020	0,050	0,048	0,014	0,017	0,017	0,018
Median	-0,079	-0,011	0,051	0,049	0,014	0,007	0,002	0,004
Std. dev.	0,184	0,128	0,020	0,020	0,072	0,077	0,044	0,041
Skewness	0,372	0,110	-0,336	-0,573	0,616	-0,137	0,542	0,552
Kurtosis	-0,287	-0,535	-0,790	0,612	0,389	-0,324	-0,989	-0,799

RD – regions developed, RLD – regions less developed

Source: own elaboration based on BDL data.

In order to verify the research hypothesis that the institutions impact the unemployment rate I adopted two studies - Granger causality tests (Granger 1969, pp. 424-438) and impulse-response analysis . Justifying the choice of this method I should stress that both tests are well known. Moreover, the feasibility of regional research from institutional perspective is limited because of data availability. In the case of regional analysis I have to deal with a small number of observations with a large number of regions. Thus, the selection of panel methods. Furthermore, the analysis of the significance of the response function in the impulse-response method can be interpreted in a similar way to Granger causality test.

First, in the analysis of Granger causality tests I was used procedure Sargent (Sargent, 1979, pp. 8-15). In the procedure of Sargent in the first step:

$$y_t = \sum_{i=1}^k a_i y_{t-i} + \varepsilon_t. \quad (1a)$$

In the second run the regression residuals from (1a) with respect to the variable x:

$$\varepsilon_t = \sum_{i=1}^k \beta_i y_{t-i} + \sum_{i=1}^k \gamma_i x_{t-i} + \eta_t. \quad (1b)$$

Tested the hypothesis that the lack of Granger causality from x to y is:

$$H_0: \beta_1 = \beta_2 = \dots = \beta_k = 0. \quad (1c)$$

To test the hypothesis (1c) I was used likelihood ratio test.

Then I estimate a VAR model to perform the impulse-response analysis. The general form of the Vector Autoregression Model (VAR) can be written as (Kusidel 2000, pp. 15-17; Lütkepohl 2004, p. 88):

$$y_t = A_1 y_{t-1} + \dots + A_p y_{t-p} + \mu_t \quad (2)$$

where:

y_t – vector containing each of n variables of model: $y_t = (y_{1t}, \dots, y_{kt})$

A_i ($i = 1, \dots, p$) - matrices of parameters of lagged variables of vector y_t , without zero elements,

μ_t – vectors of stationary random disturbances having an independent Gaussian distribution with zero average and variance \sum_{μ} .

Results of empirical investigation

Table 3 summarizes the Granger causality tests and the signs of the response values.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 3. Summary of Granger causality tests and the Impulse-Response Analysis

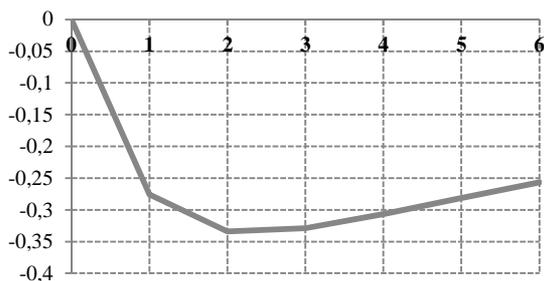
Variables	Regions with good developed labor market (RD)		Regions with less developed labor market (RLD)	
	Granger causality tests	Response	Granger causality tests	Response
Unemployment	Hypothesis rejected	negative	Hypothesis non-rejected	negative
Real wage	Hypothesis non-rejected	negative	Hypothesis rejected	positive
Gender gap	Hypothesis non-rejected	positive	Hypothesis non-rejected	positive
Kaitz index	Hypothesis non-rejected		Hypothesis non-rejected	

RD – regions developed, RLD – regions less developed

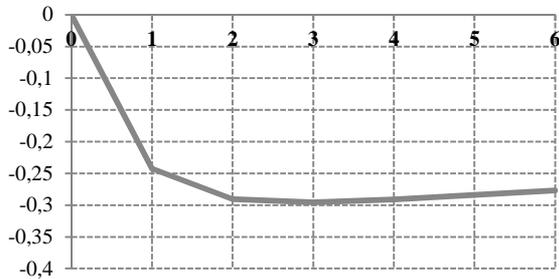
Source: own elaboration.

Summing up the results presented in Fig. 9-11, shock in real wages leads to a higher reaction of unemployment in developed regions than in less developed regions, although the results of Granger causality test indicate the significance of real wage for regions with less developed labor markets. On the other hand, the response of unemployment to shock in Gender gap is negative in developed regions and positive – in underdeveloped regions. In turn, the response of unemployment to shock in Kaitz index is positive in all analyzed panels, but reaction in developed regions is two times higher than in less developed areas. Therefore, in all tested panels we observed the positives responses of unemployment to shocks in Kaitz index, but in case of more developed regions Gender gap plays significant role, whereas, in case of less developed markets, it is real wages.

Figure 9. Impulse Response Analysis Results: Responses of Unemployment to Shocks in Real Wage (RD – regions developed, RLD – regions less developed)



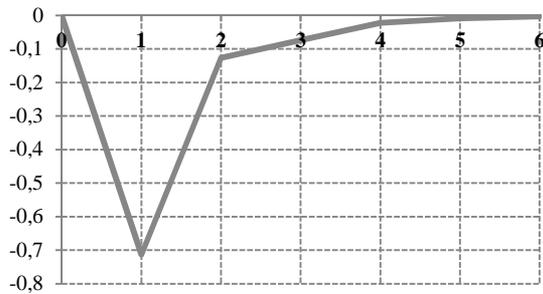
(a) response to shock in real wage, RD



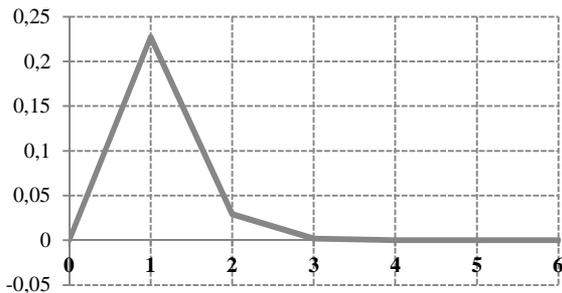
(b) response to shock in real wage, RLD

Source: own elaboration.

Figure 10. Impulse Response Analysis Results: Responses of Unemployment to Shocks in Gender gap (RD – regions developed, RLD – regions less developed)



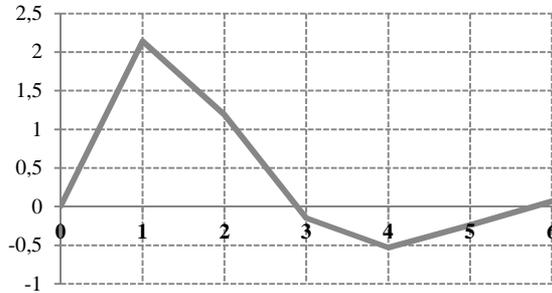
(a) response to shock in Gender gap, RD



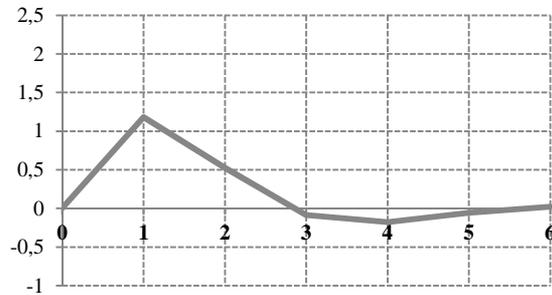
(b) response to shock in Gender gap, RLD

Source: own elaboration.

Figure 11. Impulse Response Analysis Results: Responses of Unemployment to Shocks in Kaitz index (RD – regions developed, RLD – regions less developed)



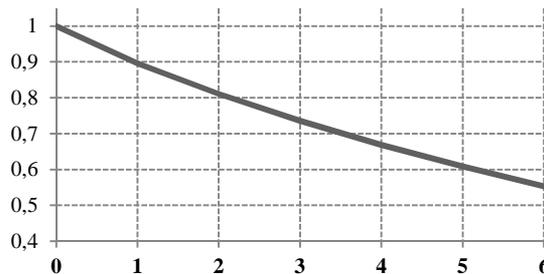
(a) response to shock in Kaitz index, RD



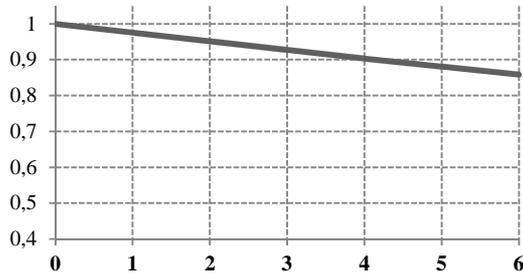
(b) response to shock in Kaitz index, RLD

Source: own elaboration.

Figure 12. Impulse Response Analysis Results: Responses of Real Wage to own Shocks (RD – regions developed, RLD – regions less developed)



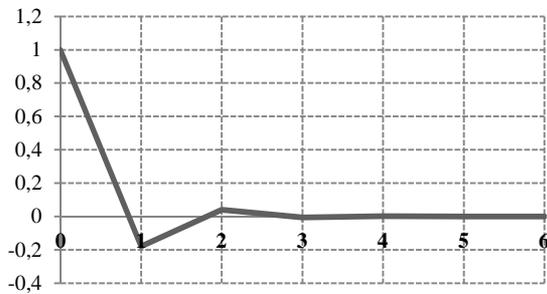
(a) response of Real wage to own shock, RD



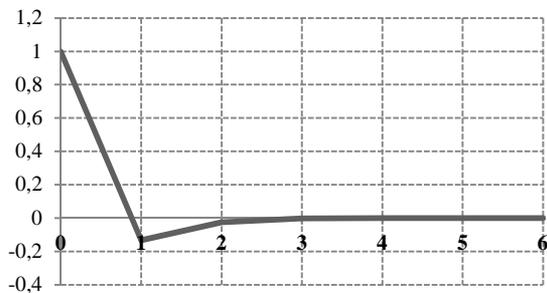
(b) response of Real wage to own shock, RLD

Source: own elaboration.

Figure 13. Impulse Response Analysis Results: Responses of Gender gap to own Shocks (RD – regions developed, RLD – regions less developed)



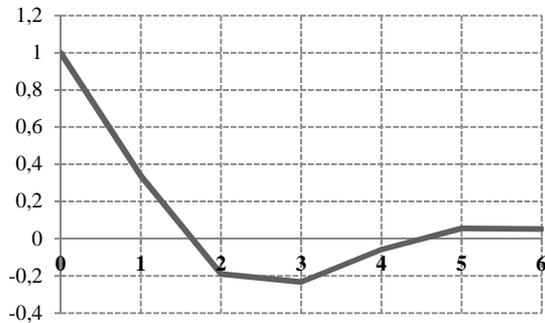
(a) response of Gender gap to own shock, RD



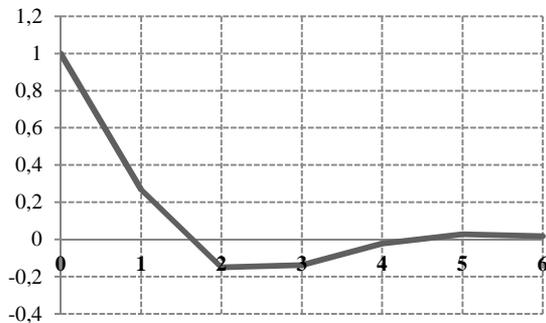
(b) response of Gender gap to own shock, RLD

Source: own elaboration.

Figure 14. Impulse Response Analysis Results: Responses of Kaitz index to own Shocks (RD – regions developed, RLD – regions less developed)



(a) response of Kaitz index to own shock, RD



(b) response of Kaitz index to own shock, RLD

Source: own elaboration.

Conclusions

The efficiency and flexibility of the labor market are critical for ensuring that workers are allocated to their most effective use in the economy and provided with incentives to give their best effort in their jobs. Labor markets must therefore have the flexibility to shift workers from one economic activity to another rapidly and at low cost, and to allow for wage fluctuations without much social disruption. Efficient labor markets must also ensure clear strong incentives for employees and efforts to promote meritocracy at the workplace, and they must provide equity in the business environment between women and men (The Global Competitiveness Report 2013-2014, pp. 6-7).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The main goal of this paper was the description of the Polish Labor Market character and answer to the question if this market is efficient and flexible? For this answer I try to analyze how some institutions as real wage, Kaitz index and Gender gap affect the unemployment and if this impact is the same in all regions of Poland?

My estimations show that both magnitude and the direction of unemployment rate responses differ in developed and less developed regions of Poland. Changes in minimum wages are the most important factor affecting the regional labor market in Poland, but in case of more developed regions Gender gap plays significant role, whereas, in case of less developed markets, it is real wages. These conclusions seem to be particularly important from the perspective of creating recommendations for Polish Labor Market Policy.

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**Proceedings of the 8th International Conference on Applied Economics
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18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
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**Welfare and Higher Education in EU Member
States – Comparative Analysis**

JEL Classification: *A11; H52; I25; I32*

Keywords: *welfare; higher education; social policy*

Abstract: This paper addresses issues related to higher education in selected EU Member States and its contribution to the creation of wealth. Special emphasis was placed on the shape of education policy in selected countries through an analysis of the main indicators characterizing the same. The paper raises a number of questions which are important from the point of view of social policy: these questions relate to the policy of higher education funding and attempts to isolate and identify the relationships between higher education funding and the situation of people with higher education on the labour market. In the first part of this paper, the author presents the phenomenon of welfare by taking into account its measurement, especially those measures that relate to education related elements. Then the author indicates the relationship between education, especially its availability, and the process of wealth creation in the economy. In the empirical part of the paper an analysis is carried out on the basis of available and comparable indicators for selected EU Member States and conclusions are drawn based on the indicators.

Introduction

Issues related to economic development and the creation of national wealth have long been the subject of scientific discourse (Smith, 2007). Wealth, which was primarily associated with material prosperity, is of in-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

terest to researchers, especially in so far as it captures the essence of the phenomenon through its definition and appropriate measurement. Wealth creation is affected by numerous factors of a mixed character. One can look at wealth from the point of view of meeting an individual's different needs (Machaczka, 2001). In this approach, education occupies a major place because it meets the needs of the individual in the field of self-development and self-actualisation, talent development, desire to gain new skills, knowledge and understanding of the surrounding world and its underlying causes. In addition, higher education is seen as an important bargaining asset in the labour market, helping one find a well-paid and rewarding job. The massification of higher education has over the years contributed in EU countries to an increase in the number of university graduates. The market has experienced an over-representation of people boasting higher education, especially pedagogical, philological and economic (Drozdowicz-Bieć, 2014, pp.3-9). The consequences of this phenomenon can be felt in the labour market, where increasingly members of this group are faced with a lack of job offers consistent with their skills and abilities (Kocór, Strzebońska, 2014). The EU sees a steady increase in the number of unemployed people boasting higher education¹ (Dzierżek, 2014).

The paper highlights the impact of higher education in selected EU countries on the creation and multiplication of wealth. Its aim is to answer the questions posed in the paper about educational and social policies and attempt to isolate and identify the links between higher education funding and the situation of people with higher education on the labour market. The paper is structured as follows: the first part presents the phenomenon of welfare, taking into account its very measurement, especially those measures that include education related elements, and then the author presents the relationship between education, especially its availability, and the process of wealth creation in the economy. The methodological part describes hitherto research, including it describes the indicators used in the analysis of this phenomenon, methods and ways of their use. The final part presents conclusions from the analysis and indicates directions for future research.

¹ Mean value of the indicator for UE countries: 2008 -3.9%, 2009- 5.0%, 2010 -5.5%, 2011- 5.6%, 2012 - 6.2%, 2013 – 6.5%.

Welfare in economic theory

Welfare is a complex and multidimensional concept. Pertinent literature features the following alternative terms related to wealth: level of wealth, standard of living, quality of life (Kot, et al., 2004, p. 109). Level of wealth refers only to material values e.g. size of a person's property. Quality of life, in turn, is a category mostly considered from the point of view of happiness, resources and satisfaction of an individual's needs. Quality of life is a broad term spanning many complex issues. It can accommodate categories such as consumption, otherwise immeasurable individual states of a person's satisfaction, happiness deriving from consumption, use of natural resources, good health, an individual's education, prosperity in life, job satisfaction (Bywalec, 1991). According to Scanlon quality of life is the quality of the conditions in which life goes on, including protection from disease and danger, the possibility of good nutrition and education (Kot, et al., 2004, p. 111). The term "welfare" most often collocates with the "social" and "economic". "Socio-economic welfare" is another frequently used collocation. In economics, economic welfare is the utility of income and it underlies social welfare which means the state of meeting mainly health, education, leisure, place of residence and work related needs of the population. In the national economy, capital resources required for its generation, including physical, social and human capital constitute the basis for wealth creation. Economic welfare can be more broadly defined as a state consisting in the satisfaction of material and spiritual needs of the individual and society and as a trigger for a sense of self-actualisation enabling the attainment of happiness and shaping of individuals' ethical attitudes to the surrounding reality (Markiewicz, 2014, p. 7).

Social welfare has a broad meaning. This may be indicated by the broad array of its constituents, which according to E. Aksman (2010, p. 140), include: per capita GDP or GNP, level of total consumption, economic growth rate, productivity, technological progress, the level of public education, social security, population's health indicators, the degree of efficiency of administration and public safety, condition of the natural environment and the degree of development of the information society. All of the above descriptions of welfare feature education as an element leading to latter's improvement. Pertinent literature regards education as an important element of the welfare state.

The importance of education in creating prosperity is also corroborated by the fact that many of aggregate indicators measuring welfare contain

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

education related indicators. The aggregates include the HDI (Human Development Index)² which ranks countries on three levels: "long and healthy life", "knowledge" and "prosperous standard of living." HDI relies on the following indices: life expectancy, the average number of years of education received by the population aged 25 years and older, the expected number of years of education for children starting the education process, national expenditure per students in equivalent USD converted using PPPs for GDP (PPP \$)³. Another indicator used to measure economic welfare is called the Index of the Economic Aspects of Welfare EAW (Borys, 1999). It basically relies on the calculation of the level of individual consumption, additionally taking into account expenditure on education. In the Index of Sustainable Economic Welfare, among its many components is also education, including spending on education and education-related consumption. Quality of Life⁴ is a welfare measure proposed by Eurostat, which publishes separate reports on each of the following aspects of quality of life: material conditions, health, education, leisure, safety, work, family and friends. These give a comparable picture of prosperity across countries. Current welfare measurement methodology favours aggregated indicators used in ranking building. An interesting compilation of several rankings that describe welfare in most countries around the world is offered by the Legatum Institute. Its indicator of prosperity is dubbed the Legatum Prosperity Index (Legatum, 2012). This ranking was developed on the basis of the following eight aggregated indicators: economic development, opportunities for companies, quality of public administration, education, health, safety and security, personal freedom and social capital.

In all of the above indicators education features as one of their components. The level of a country's education depends on numerous factors, including the educational policy. Educational policy is regarded as one of the elements of social policy. In particular, the emphasis is on development of and access to higher education, even if only because of dependencies which are derived from the existence of people with higher education and the dynamics of economic growth (Turski, 2000, p.19). Wide access to the

² Published by the United Nations Program for Development. The indicator was designed by A. Sen and Mahbub ul Haq.

³Details of the methodology the available in: World Development Indicators 2011, The World Bank.

⁴For more information see: Quality of Life: A Systems Model, The University of Oklahoma School of Social Work, <http://www.gdrc.org/uem/qol-define.html>

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

general education smoothens up social inequalities, which is very important from the point of view of creating and multiplying wealth in society. Education forms a significant part of a person's life, indelibly shapes their personality, attitudes, skills and qualifications (Wronowska, 2012, p. 32.) Thus formed human capital is every person's unique resource which gives them a bargaining power in the labour market that distinguishes the person from other job applicants. Education plays a key role in shaping welfare, particularly in the area of meeting the needs of a higher order. Based on P. Spicker's theory of the welfare state (2005), one can point out two approaches to the creation of the theory the welfare state. The first one originates in the state's activities and programmes in the social sphere, and in the other, the welfare state is treated as an extension of mutual assistance and solidarity in the country. The author points out three basic assumptions on which the theory is based. They are as follows:

- People live within a society and have obligations and responsibilities to one another,
- Welfare is attainable and safeguarded through social activities,
- The welfare state is a means of increasing and safeguarding society' welfare.

In a narrow sense, the welfare state may refer to the state's tools to provide social services confined to health, education, housing and income maintenance (Pierson, 1998, p. 7). According to T. Marshall (1975) social policy is a government policy on the action that directly affects the well-being of citizens by providing them with services or income.

Given these above characteristics of the role of social policy in shaping welfare, one can reflect on the effects of educational policies on welfare, which is its element. The funding of higher education with public money fits in with the provision of education related social services by the state. Funding of this area with public money offers broad access for the public to such services, which demonstrates that education implements equality of opportunity. Higher education is a service craved for numerous reasons, including because of the prestige attributed to this level of education and the role it plays in the job search process. It is believed that education is an argument giving bargaining power in the labour market, in many ways allowing one to find a satisfactory job. Now, when higher education is more accessible to a wider audience than a dozen years ago, the massification of the process of acquiring knowledge at this level has its consequences, both positive and negative. The benefits include the fact that a larger percentage of the population taps into the opportunity to acquire

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

knowledge, skills and qualifications at this level of education. This is reflected in the growth of welfare in the society. Adverse effects of the massification of higher education relate primarily to developments on the labour market. The supply side predominates and the market cannot cope with it because it does not offer enough jobs consistent with acquired education and aptitude. There is stiff competition, which prolongs the process of entering the labour market and, consequently, increases demand for social policy programmes, in particular for unemployment benefits. Given the above interdependencies, i.e. on the one hand, broad access to higher education and, on the other, the impossibility of finding employment consistent with education, the paper poses the following questions: Are there any relationship, and if so, what is their nature, between higher education funding with public money and the level of unemployment among people with higher education? Can similar relationships be ascertained in all the EU countries under analysis or only in some of them? Can higher education spending be treated as a substitute for the demand for programmes implemented within the framework of social policy? Will higher education in the countries surveyed match the classical classification of welfare states as liberal, conservative and social democratic regimes⁵? (Esping-Andersen, 1990, p.44-45, Esping -Andersen, 2001).

Methodology of the research

The study covers 20 selected EU countries. The choice of countries was dictated by the availability and comparability of statistical data. Higher education in the selected group was analysed based on quantitative indicators including:

- Gross enrolment ratio in tertiary education⁶,
- Public tertiary educational expenditures as a percentage of GDP⁷
- Share of public expenditure on tertiary educational institutions (%)⁸
- Annual expenditure per students in equivalent USD converted using PPPs for GDP⁹.

⁵ Research into this area was conducted e.g. by: N. Willemse and P. de Beer, K. Czarnecki K.

⁶<http://data.worldbank.org/indicator/SE.TER.ENRR/countries?>

⁷http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=educ_figdp&lang=en

⁸ http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=educ_figdp&lang=en

⁹ Education at a Glance 2014: OECD Indicators, p. 249, http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=educ_fitotin&lang=en

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The author also used a quantitative variable capturing the situation of people with higher education in the labour market i.e. youth unemployment by age¹⁰.

The author relies mainly on the following sources and databases: Eurostat, World Development Indicators 2014, Education at Glance 2013, Education at Glance 2014: OECD Indicators. The data is for 2011, with supplementary information from 2010 being used in just one case.

The analysis was performed relying on rankings developed on the basis of a mean value and standard deviation. This allowed for the creation of three sets ordering the examined countries into relevant groups. This in turn facilitated the inference of conclusions. In the case of indicators relating to higher education, ranks 1, 2 and 3 emerged, 1 being the lowest rank, and 3 – the highest. The higher the indicator value, the higher the rank. In the case of the labour market indicator, ranks 1, 2, 3 were also established, but here the lower the ratio, the higher the rank.

The summary table below presents the indicators and author's own calculations used in the paper.

By analysing the enrolment rate in higher education for the selected group of countries one can see that it is diverse and ranges from 55 for Slovakia to 95 for Finland, the latter being the maximum value in the sample. This indicator reveals the percentage of students at a given level of education in relation to the number of people of an age corresponding to that level of education. It shows the utilisation of the access to higher education. With regard to this indicator, the countries are arranged into three groups. Group 1, with the lowest level of the indicator, features: Slovakia, France, Germany, Hungary, Great Britain, Italy, Czech Republic, Portugal, and Latvia. Group 2 features countries with an average level of the indicator: Austria, Belgium, Denmark, Estonia, the Netherlands, Ireland, Sweden, and Poland. Group 3 consists on just three countries where the indicator is the highest – Finland, Slovenia and Spain.

¹⁰ http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=une_rt_a&lang=en

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table1. Indicators in tertiary education and labour market in select EU countries

Country name	Gross enrolment ratio in tertiary education	Rank	Public tertiary educational expenditures as percentage of GDP	Rank	Share of public expenditure on tertiary educational institutions (%)	Rank	Annual expenditure per students in equivalent USD converted using PPPs f or GDP	rank	TOTAL rang	Unemployment rate among people with higher education in the 25-29 age group	Rank
Austria	70	2	1.5	2	86.9	3	12 942	2	9	3.9	3
Belgium	69	2	1.4	2	90.1	3	13 468	2	9	5.5	3
Czech Republic	65	1	1.4	2	81.1	2	7 507	1	6	5.5	3
Denmark	77	2	1.9	3	94.5	3	19 509	3	11	9.2	2
Estonia	75	2	1.7	3	80.4	2	5 405	1	8	7.9	2
Finland	95	3	1.9	3	95.9	3	17 260	3	12	6.0	3
France	57	1	1.5	2	80.8	2	12 360	2	7	7.1	2
Spain	83	3	1.3	2	77.5	2	N.A.	N.A.	7	19.7	1
Netherlands	76	2	1.8	3	70.8	1	12 590	2	8	3.1	3
Ireland	73	2	1.5	2	90.6	3	N.A.	N.A.	7	10.5	2
Latvia	67	1	1.5	2	62.6	1	4 384	1	5	9.5	2
Germany	57	1	1.3	2	84.7	2	13 927	2	7	2.8	3
Poland	74	2	1.3	2	75.5	2	5 056	1	7	9.3	2
Portugal	67	1	1.4	2	68.6	1	6 043	1	5	14.3	1
Slovak Republic	55	1	1.0	1	78.9	2	6 170	1	5	12.5	1
Slovenia	85	3	1.1	1	85.2	3	7 858	1	8	13.4	1
Sweden	74	2	1.7	3	89.5	3	18 163	3	10	6.3	3
Hungary	60	1	1.0	1	78.5*	2	6 786	1	5	7.0	2
United Kingdom	61	1	1.2	1	30.2	1	4 049	1	4	5.2	3
Italy	64	1	1.0	1	66.5	1	6 795	1	4	16.0	1

Sources: author's own calculations based on Eurostat data, OECD (2014), Education at a Glance 2014, Education at a Glance 2013.

* 2010 data.

The second of the indicators sheds light on the amount of higher education funding with public money in relation to GDP. This is one of the determinants of the social policy pursued in the field of the public funding of

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

education. The indicator reveals the existence of the following three groups: group 1, involving countries with the lowest level of the indicator, features: Hungary, Great Britain, Italy, Slovakia, and Slovenia. Group 2 consists of: Austria, Belgium, Czech Republic, France, Spain, Ireland, Latvia, Germany, Poland, and Portugal. Group 3 features Sweden, the Netherlands, Finland, Estonia and Denmark. As far as the level of this ratio is concerned, since 2000 it has been on a steady increase in all of the surveyed countries (Education at the Glance 2014, s. 231).

The third indicator is related to the percentage share of public funds in the financing of higher education in the overall sum of public and private funds allocated for this purpose. It seems to be the most important indicator in the set. The higher the share of state financing of higher education, the wider the audience availing itself of the service provided by the state in pursuit of social policy. This contributes to the creation of welfare, by creating an opportunity to satisfy higher order needs in the community and at the same time to enhance the quality of human capital in the economy. The legitimacy of public funding of education is related to the concept of the social investment state (Busemeyer, Marius (2013), which emphasises that activation through education of human capital and potential, which should be treated as an investment in the future constitutes the main purpose of public spending.

On the basis of this ratio the countries can be grouped as indicated below. Group 1 comprises countries with a low indicator level: Italy, Portugal, Latvia, the Netherlands, and the United Kingdom, which reveals the lowest level of the index at just 30.2%. Group 2 features Hungary, Slovakia, Poland, Germany, Spain, France, Estonia and the Czech Republic. Countries where higher education draws mainly on public funds are Austria, Belgium, Ireland, Slovenia, Sweden, Denmark and Finland, where the indicator reaches 95.9%. These countries constitute group 3.

The last of the indicators in this group shows the level of expenditure on higher education expressed as an amount per student. Countries that belong to group 1 are the Czech Republic, Estonia, Latvia, Poland, Portugal, Slovakia, Slovenia, Hungary, Great Britain, and Italy. Group 2 consists of Germany, the Netherlands, France, Belgium, and Austria. Group 3 countries are Denmark, Finland and Sweden. Statistics on Spain and Ireland were not available. In order to determine the status of implementation of education policies in these selected countries, the author created a collective ranking based on the four sub-rankings. The results are presented below.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 2. Composite ranking

Rang	12	11	10	9	8	7	6	5	4
Countries	FI	DK	SE	AT, BE	SI, NL, EE	FR, IE, DE, PL	CZ	LV, PT, SK, HU	IT, UK

Source: author's own calculations based on table 1.

Based on the above, the countries can be ranked as follows. The highest possible rank is 12 and it is a rank that constitutes a benchmark of educational policy for the surveyed countries. Finland proved itself to be the benchmark and it is followed by Denmark at 11 and Sweden at 10. All three represent the social democratic regime. Countries with a ranking ranging between 9 and 5 represent the conservative regime, while countries with a ranking of 4 represent the liberal regime. This division is not final, and refers to a division proposed by Sam Yu (2012, p. 263) for other areas related to the welfare state and social policy.

Comparing the rankings in table 1 in the area of education with a ranking for the labour market (table 1) it can be said that there is no clear relationship between the phenomena discussed. However, one can see some relationships in the case of smaller groupings, notwithstanding the fact that caution should be exercised when drawing conclusions. In a few cases including Austria, Belgium, Finland, Sweden (ranked 3 and 3 respectively) a high share of public expenditure on higher education means the level of unemployment among people with higher education in the 25-29 age group is low. These cases may confirm the validity of the claim that educational policies can be substitutive in relation to social policy in these countries because a low unemployment rate is also indicative of low demand for social policy programmes. This dependence is not ascertained in Slovenia though, where high public expenditure on higher education (rank 3) is also accompanied by a high unemployment rate in the surveyed group of people (rank 1). In this case, universal access to higher education contributes to the massification of the phenomenon, whereby the number of university graduates increases and this, in turn, entails greater competition in the labour market. This phenomenon undermines the argumentation in favour of educational policy being a substitute for social policy. In the case of the Netherlands and the UK, a low share of public expenditure on higher education (rank 1) is coupled with a high unemployment rate in the age group studied. This dependence can confirm the claim that in those countries there may be

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

complementarities within social policy, between educational policy and social policy. The other surveyed countries do not permit one to draw firm conclusions. It would seem reasonable to extend the set of indicators to incorporate further indicators from the area of higher education and the labour market which would deepen the analysis.

Conclusions

The paper presents the phenomenon of welfare and ways of defining and measuring it, and underlines the importance of education in shaping it. As a result of analysis based on quantitative indicators, one can indicate the possibility of grouping countries implementing educational policy within the concept of the welfare state according to the type of their regime. One cannot clearly indicate a trend in the relationship between the level of higher education funding with public money and the size of the unemployment rate in the age group studied. The case of some countries may confirm the possibility of both substitutability and complementarities between educational and social policies in these countries. On the basis of the set of indicators used, one cannot draw clear-cut conclusions for all the countries surveyed. The research problem is more complex and the study should continue by expanding the analysis to other aspects, including aspects of the quality of social policy.

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18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
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Prospects for the Development of Prosumer Energy in Poland

JEL Classification: *A11; E61; F50; H89*

Keywords: *prosumer; energy sources; renewable sources of energy; climate and energy policies*

Abstract: Renewable energy will play a key role in the transition towards a competitive, secure and sustainable energy system. In 2014 the Commission proposed an objective to increase the share of renewable energy to at least 27% of the EU's energy consumption by 2030. The European Council endorsed this target which is binding at EU level.

The Renewable Energy Directive (Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC) was implemented in Poland on 20 February 2015 by the new renewable energy sources act.

The objective of this article is to analyse the current state of the Polish energy sector related to the prosumer energy industry. It also describes the future potential for the development of prosumer energy in Poland. The analysis was conducted in the light of the new EU climate and energy initiatives.

At the beginning, the article presents the current general state in EU's energy sector. European Union Climate and Energy Package targets up to 2050 and the state of renewable energy use gives the background to conduct an analysis of prospects for the development of prosumer energy in Poland. That is why the last part is devoted to the prosumer energy sector in Poland in the context of European Union regulations. The critical analysis of the current situation in that sector has

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

made it possible to evaluate prospects for the development of prosumer energy in Poland in the context of the recently introduced legal regulations.

Introduction

Energy is a vital factor in socio-economic development, seen by many countries as strategic to their future. It is a source of growth for competitiveness and the development of modern economies. The important role of energy stems from the fact that primary energy includes sources used by man in the process of the industrial production of electricity, heat and chemical products. The sources of energy include solid fuels, liquid fuels, nuclear fuels, and so-called renewable fuels (Niedziółka, 2010, p. 7).

Renewable energy will play a key role in the coming years in the transition towards a competitive, secure and sustainable energy system for EU as an international organization as well for the Member States. In 2014 the European Commission proposed an objective of increasing the share of renewable energy to at least 27% of the EU's energy consumption by 2030. The European Council endorsed this target which is binding at EU level.

The Renewable Energy Directive (Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC) is one of the Climate and Energy Package document. The Directive established a common framework for the use of energy from renewable sources in order to limit greenhouse gas emissions and to promote cleaner transport. Each Member State has a target calculated according to the share of energy from renewable sources in its gross final consumption for 2020. That Directive was implemented in Poland on the 20th of February, 2015, by the new renewable energy sources act.

The objective of this article is to analyse the current state of the Polish energy sector related to the prosumer energy industry. It also describes the future potential for the development of prosumer energy in Poland. The analysis was conducted in the light of the new EU climate and energy initiatives.

Methodology of the research

This article is an attempt to find answers to the following question: - what the prospects for prosumer energy to be included in the recently intro-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

duced legal regulations in Poland are, - whether the European Union regulations concerned Climate and Energy package will help the development of prosumer energy sector in Poland?

It seems that the development of prosumer energy in Poland is an opportunity for the Poland energy sector; however, it will depend primarily on attitude of prosumers, their energy needs and the state support for the microinstallations.

To realize the objectives of the article, the analysis is divided into four parts. At the beginning, the article presents the current general state in EU's energy sector. European Union Climate and Energy Package targets up to 2050 and the state of renewable energy use gives the background to conduct an analysis of prospects for the development of prosumer energy in Poland. That is why the last part is devoted to the prosumer energy sector in Poland.

Literature concerning European climate and energy policy is unusually extensive (see Wojtkowska-Łodej, 2003, 2014; Ważniewski, 2014; Michalski, 2013), however until now, there is a gap in the information available about the Polish energy sector related to prosumer energy (compare Nowicka-Skowron & Pachura, 2013).

The results of analysis are available for different countries and they concerned different issues. J. Rodriguez-Molina, M. Martinez-Nunez, JF. Martinez and W. Perez-Aguilar deal with emerging business models for smart grid prosumers, their strengths and weaknesses and puts forward new prosumer-oriented business models, along with their value propositions (Rodriguez-Molina & Martinez-Nunez & Martinez & Perez-Aguilar, 2014, pp. 6142-6171). GKH. Larsen, ND. van Foreest and JMA. Scherpen analysed a balance of power in a group of prosumers, based on a price mechanism (Larsen & van Foreest & Scherpen, 2013, pp. 828-836). A. Filipowska, K. Fabisz, TM. Hossa, M. Mucha and R. Hofman present a solution for managing the energy consumption and production in microgrids. They present challenges of managing such networks as well as functionalities of a system, that enables for e. g. preparation of forecasts, tracing the energy consumption or creation of recommendations for the microgrid prosumers, in order to deal with these challenges (Filipowska & Fabisz & Hossa & Mucha & Hofman, 2013, pp. 298-314).

The analysis in this article is based on the study of literature, the legal regulations and Eurostat's statistics.

Situation in the EU energy sector

As part of the regional economic integration in Europe, Member States took steps towards increasing integration of energy markets and creating common energy policy. These were accompanied by EC efforts aimed at protecting the environment, especially working against its degradation. Depending on the state of the world economy at the time, actions taken in the 70s, 80s and 90s of the previous century were varied in character. In the first decade of the 21st century a new factor in the discussions and strategies, were the attempts to link the issues of energy and climate change. This also finds expression in the policies of the Treaty on the Functioning of the European Union (Wojtkowska-Łodej, 2014, pp. 44-45). According to article 194 of the TFEU introduced in the Lisbon Treaty, „1. In the context of the establishment and functioning of the internal market and with regard for the need to preserve and improve the environment, Union policy on energy shall aim, in a spirit of solidarity between Member States, to:

- ensure the functioning of the energy market;
- ensure security of energy supply in the Union;
- promote energy efficiency and energy saving and the development of new and renewable forms of energy; and
- promote the interconnection of energy networks.” (see Zajączkowska, 2014).

These energy targets are an important factor in the EU’s Europe 2020 growth strategy (European Commission, 2010) based on the increase in competitiveness of the EU, as well as a roadmap for moving to a competitive low carbon economy in 2050 (European Commission, 2011).

In 2011 the European Union (EU-28) was the fourth biggest energy producer (6.1%), behind China (18.4%), USA (13.5%) and Russia (10%) (European Commission, 2014b, p. 10). In 2012, primary energy production in the EU stood at 794 million tons of oil equivalent and was 15% lower than in 2004. In the first decade of the 21st century the drop in energy production was gradual. An exception was the year 2009, when energy production dropped around 5% in relation to 2008 (Eurostat, 2013). This was partly the effect of the global crisis, and a drop in the demand for energy in certain Member States. An additional reason for the gradual drop in energy production could be ascribed to the industry, namely the problems faced by suppliers in the oil and gas sector.

The structure of the world’s energy sources has remained unchanged for decades. It is mainly based on the location of energy resources as well as

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

strategic political decisions, which have the biggest influence on the development of the nuclear and renewable energy sectors. In 2011, the part played by oil and oil derivatives worldwide stood at 31.3%, solid fuels 29.2%, gas 21.2%, renewable energy 12.9%, and nuclear energy 5.1%. Also noticeable is the steady increase in the consumption of oil, fossil fuels, gas and renewable sources since 1995. An exception to this is the part played by nuclear energy, which in 2011 dropped by 6% in relation to 2010 (European Commission, 2014b, p. 11).

In the European Union, the situation is slightly different. In 2012, the percentage of oil and oil derivative products used in the production of energy was 11.1%, solid fuels 20.7%, gas 16.5%, renewable sources 21.9% and nuclear energy 28.1%. Renewable energy sources and nuclear energy, therefore, constitute half of the energy production in the EU. It must be noted that 48% of the EU energy sector is dependent on fossil fuels, which produce the most CO₂ emissions, which is responsible for climate change. A major difference between the European Union and the rest of the world is the place of oil and oil derivatives (-20 p.p.), as well as nuclear energy (+23 p.p.) (European Commission, 2014b, p. 35).

Climate and Energy Package targets up to 2050

One of the key objectives of the current Climate and Energy Package is the reduction of greenhouse gas emissions by 20% compared with base year 1990. In light of the Kyoto Protocol, participating countries were responsible for the reduction of emissions of seven greenhouse gases: carbon dioxide, methane, nitrous oxide, fluorinated gases, including hydrofluorocarbons, perfluorocarbons, sulphur hexafluoride and ozone trifluoride (European Commission, 2014a, p. 3).

In January 2014, the European Commission has published the terms of the next Climate and Energy Package valid until the year 2030. Two main aims were introduced: the reduction in the emission of greenhouse gases by 40% and increasing the use of renewable energy sources to 27%, without precisely setting specific levels for each country. The debate on future EU strategy, which began in March 2014 (Green Paper to establish a 2030 framework for climate and energy policies), turned out to be difficult. Union aims for climate and energy policy until 2020 are set out clearly (known as the “20-20-20” targets or 3x20% targets). They are based on three main criteria: competitive economy, sustainable growth, and security of supply. At the start of the debate, a controversy arose on whether the European

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Union should accept only one binding target – the reduction of greenhouse gas emissions, or whether all currently binding targets should be kept (Gawlikowska-Fyk, 2014, p. 1).

In October 2104 Union leaders gathered for the Brussels summit agreed that by 2030 the EU will reduce CO₂ emissions by at least 40 per cent compared with 1990. Additionally, under a new Climate and Energy Package it was established that free allowances for emissions will be applicable after 2020 and not only until 2019 as was established previously. Efforts will be made in Brussels concerning legislative solutions which will ensure this goal is achieved. The European Union will therefore introduce its obligations in the first quarter of 2015.

For 2050, EU has endorsed the objective of reducing Europe's greenhouse gas emissions by 80-95% compared to 1990 levels as part of efforts by developed countries as a group to reduce their emissions by a similar degree set for 2020 year.

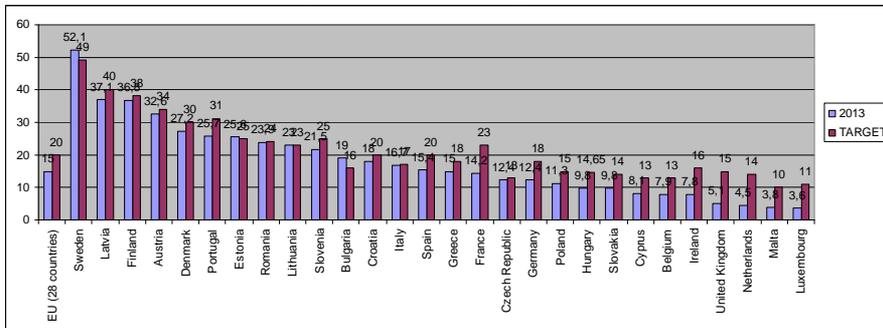
Renewable Energy Use

In the currently applicable 3x20% targets, the increased use of renewable energy sources has been set to at least 20% of overall energy production (in the electricity, heating and transport sectors), with 10% of biofuels to be used in transport, relative to 2006. The real capabilities of Member States were, however, taken into account, hence the application of the category of national plans, in which Member States set their own indication levels towards which they are striving. The ranges vary substantially across the Union.

Figure 1 shows the share of renewable energy sources in the final total energy consumption of EU Member States in 2012 against national plans for the year 2020.

Analysis of the data presented in the figure above, leads to the conclusion that quite early on, the plan to increase the usage of renewable energy has been successfully implemented in Sweden, Estonia, Lithuania and Bulgaria, with Sweden exceeding the 50% mark. The furthest from meeting their national criteria were Great Britain (9.9 p.p.), Netherlands (9.5 p.p.), France (8.8 p.p.) and Ireland (8.2 p.p.). Poland has a chance of meeting its target of 15%, because it achieved a level of 11,3% as early as 2013 (Eurostat, 2013).

Figure 1. Share of renewable energy in gross final energy consumption of EU Member States in 2013 compared with national plans for the year 2020 (in %)



Source: own calculations based on Eurostat (2013). Retrived from : http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=t2020_31&plugin=1 (26.01.2015).

From the above figure 1 it can be seen that the highest target in the usage of renewable energy as an overall part of country energy mix was set by Sweden at 49%, with the lowest being Malta at 10%.

Situation in Poland's energy sector

The energy situation in Poland seems challenging. Most electrical power and heating stations have old power units that should be taken off the grid in the next few years due to wear and age. Even if a decision is made to build a nuclear power station, it will only meet a small portion of the country's energy needs. Also, shale gas extraction will not be ready in the nearest future. Therefore every decision concerning the country's energy policy will play a vital role in securing Poland's energy as well as diversifying energy sources (Grzegorzczuk, 2014, p. 208). Creating small microgrids systems might become the solution that will help solve Poland's two basic energy problems: the necessity to modernize coal power stations; and support for building nuclear power stations. The simultaneous passing of legislation concerning renewable energy sources will meet European Union climate and energy policy targets while also fulfilling Poland's international responsibilities.

After a few years of work on the project, on 20 February 2015 the Sejm passed legislation concerning renewable energy sources (Ustawa o odnawialnych źródłach energii, 2015). The renewable energy resources act will come into force after 30 days and regulations concern an auction sys-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

tem and feed-in tariffs on 1 January 2016. The new laws introduced new principles that support energy production from renewable energy sources. It is the sign of the Renewable Energy Directive implementation.

One of the fundamental changes to the currently applicable laws supporting renewable energy sources is the replacement of the guarantee green certificates with an auction system. The government is to decide how much renewable energy is needed, taking into account EU climate policy. Auctions are then prepared in which the lowest bidder wins. In exchange they are issued a guarantee of support for 15 years. Auctions will be separate for different technologies, as well as large and small installations. The support of renewable sources will be passed onto consumers, who will incur an additional renewable energy fee. In its first year this cost will amount to PLN 2.27 per megawatt-hour of electricity.

The legislation also foresees the requirement to buy energy and feed-in tariffs for the resale of electrical energy by prosumers. A constant price of PLN 0.75 per kilowatt-hour has been set for 15 years from sources up to 3 kW and for energy originating from hydroelectric, wind and solar sources. A constant price will also be applicable for sources between 3 kW and 10 kW – PLN 0.70 for one kilowatt-hour of energy from agricultural biogas, PLN 0.55 for biogas from storage, and PLN 0.45 from sewage works. A constant price of PLN 0.65 will apply for a kilowatt-hour of energy for hydroelectric, wind and solar energy. For these sources there is also an obligation to purchase for 15 years from when the installation goes into use.

Feed-in tariffs for home micro-installations of renewable energy sources is a chance for many people to lower their energy bills. This solution could in time improve the situation for all citizens, because it provides access to the energy production market even for the smallest home renewable energy source and lowers the cost of investment in distribution networks, which would be spread amongst all energy users. The government's earlier proposal would have meant that only wealthy people would be able to afford investing in renewable energy sources. Feed-in tariffs have leveled the opportunity of buying micro-installations, as well as limiting costs and distributing them in a fairer way. This change is important, but minor from the overall perspective of the whole renewable energy sector, as it only amounts to 1% of the whole electrical energy market. It is therefore not enough to solve the problems of renewable energy in Poland.

A valuation of the effects of regulation estimates the cost of the future legislation at ca. PLN 4 bn per annum. For prosumer installations, i.e. those up to 40 kW, no concession or formation of a business will be required. It

will also be possible to sell surplus energy back to the grid (compare Cyglicki, 2014).

Conclusions

Two of three treaties calling the European Communities into existence dealt with the energy sector. Over the last few decades the EU has accepted legislation amounting to numerous Energy, and later Climate and Energy Packages. However, specific regulations regarding energy were not written into primary law of the EU. The situation changed with the acceptance of the Lisbon Treaty. By the authority of this treaty, articles concerning Energy were introduced into the Treaty and the functioning of the European Union, whereby energy policy gained treaty backing. Next, these resolutions were included in the Strategy for smart, sustainable and inclusive growth, and in the Roadmap for moving to a competitive low carbon economy in 2050. These documents show the direction the EU will take in the next 30 years, which can be described as green growth and stable development. It should also be highlighted that the acceptance at the Brussels summit in October 2014 of goals regarding the reduction of CO₂ emissions by at least 40 percent by 2030 relative to 1990 requires further detailed legislative work, which will ensure reaching the target. Work on these will take place in parallel with the international agreement which will be reached at the COP20 summit in Paris in 2015 and will replace the currently used Kyoto protocol of 1997.

The dynamics of reform and real change in the energy sector in Poland differ from those found in the energy sectors of other EU countries and are mainly the result of historical factors. While preparing the framework for the next Climate and Energy Package, the European Commission should consider the specifics of the energy sector in each East-Central Europe country, including Poland. Failing that, the meeting of the interests of individual countries will become more important than the implementation of the common Climate and Energy Policy. The European Union should therefore increase the size of the European funds assigned to infrastructure investments in the energy sector of countries in East-Central Europe.

The energy-mix options available in each Member State are varied. Member States can focus on developing their own choice of energy sources, but it is also necessary to include European targets, especially renewable energy sources.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

It seems that, in light of the experiments conducted in different countries, prosumer energy presents an opportunity for the Polish energy market, because it could lower the cost of electrical energy and create new sector jobs. There are analysis that in 2020 aggregate heat and electricity power from microinstalations based on renewable energy sources will achieve 38,5 TWh (for electrical energy 2,9 TWh) and the number of prosumers will exceed 2,5 million in Poland (Instytut Energetyki Odnawialnej, 2013).

Moreover, the growth of prosumer energy supplies could have a positive impact on meeting the criteria of the Climate and Energy Package, specifically the 20% reduction of CO₂ emissions by 2020.

However, the final word on growth will belong to the prosumers, their local conditions, as well as individual preference and choice.

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Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
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A Paradox of Reforming Pensions in Poland

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Abstract: Recent years see intense reforming of funded pensions sub-system in Poland. Actually, what are policy objectives like at which change in design introduced in 2013 (mandatory funding) and projected in 2014 (voluntary funding) is oriented? The article briefly reports what was contemporary re-designing of the pension system at different stages about and reconstructs objectives of reforming at each stage. It finds that interlocking streams of change aimed at two goals in fact which are i) relief to public finance ii) expanding pension funding by financial intermediaries. It argues that the two are in contradiction to each other, and this makes a paradox of pension reforming. The review of 2013- and 2014- design, unexpectedly enough, results in conclusion that at present reforming is focused on pension funding revitalization which may cause a recurring distress to public finance. Thus, the article identifies one of dilemmas of institutional-order development in Poland which can be probably also experienced in other countries where pension funding has been introduced.

Introduction

Funded pensions introduced in Poland in 1999 appear to be an issue which is intensively debated from time to time. In January 2015 the theme returned with the project of reforming pension funds created on voluntary basis. December 2013 saw relevant change in rules that govern mandatory funding. Mandatory funding was scaled down while voluntary funding can

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

see „pumping-in” both of public money and members. Understanding of the process at stake is in no proportion to the temperature of publicity provided. Are the privately managed tiers of pension system in Poland in demise or on rise? This is an attempt to understand reforming at recent stage thanks to taking broader perspective of Polish pension reforms.

The paper arrives at conclusion that subsequent waves of reforms demonstrated immanent flaw which are contradictory goals of the publicly- and privately managed tiers of the system. This paradox of the pension reforms has persisted since 1999 up to present, and seems to explain the policy inconsistency identified above.

Methodology of the research

The analysis of pension engineering and economic reasons for change is organized in historical order. The next section reports in brief what was contemporary re-designing of pension systems at different stages about. The major differences in shape divide the history of pension systems into three periods: pre-reform, the 1990s and beyond as well as 2008 and beyond. This calendar organizes contents of the major section that follows. Objectives of reforming at each stage are derived from announcements of officials who are either politicians or policy-makers or experts. The discussion differentiates between explicit and implicit goals, pointing apart of official announcements also to actual outcomes.

Changing design: the stages¹

The most widespread scheme for financing pensions is insurance where a benefit is conditioned on contribution. Apparently, universal old-age insurance is a very special branch of finance as far as its original social mission concerned. The traditional core idea of designing old-age insurance has been safety which is provided by an income (pension) to be paid to a person when in the retirement age; income high enough to protect from living in poverty has been at heart of the mission. The first wave of pension

¹ This section and the next section to some extent draw from my article: Institutional interests and institutional change. Poland on the second wave of pension reforms, *Equilibrium* 2014 No 4. However, their contents have been considerably extended by developments in Poland of the last quarter of 2014 with the scope broadened by funding on voluntary basis. Reforms in full-fledged market economies are left beyond the scope of this paper. For details and variety in design see the article mentioned.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

reforms in the 1990s and early 2000s eroded this founding principle in most countries, Poland included.

Originally, the initiative of old-age insurance developed in the private sector, and appeared in form of local mutual insurance (so called social insurance companies in Poland; Bratkowski, 2014). Then it was captured by the state. Under welfare capitalism universal mandatory pension systems became common; pension-system design in Poland after WWII got the same character. Governments mandated individual employees to participate in the pension systems which were normally publicly managed. Compulsion was considered to generate an implicit government guarantee of decent retirement benefits (minimum pension guarantee). "Decent" refers to levels meeting needs which are believed to be basic for living in the society (so called social minimum). This was a broad meaning of Defined Benefit (DB) formula relating benefit and contribution. Basically, public insurers were believed to afford benefits adequate to social minimum at least due to another founding pillar of pre-reform pension system which was financing on PAYG basis since this system of financing allowed for income redistribution.

At turn of the millenium as observed in Poland's country category the paradigm of pension systems was changed (Sarfati & Ghellab, 2012). By saying this we mean such basic features like ownership characteristics of major fund-managing agents, way of making records², and most of all contribution-to-benefit formula and system of financing.

Firstly, the basic relation between contribution and benefit was changed, namely Defined Benefit (DB) formula was replaced with a Defined Contribution (DC) formula in the system as a whole. Thus guarantees of social minimum were withdrawn from the pension industry and the risk of old-age poverty was shifted from managing agent to contributor with extremely low retirement benefit eventually being supplied up to minimal level from social aid resources. According to DB formula benefit may be based on the worker's final wage and length of service, however, it does not depend on the amount of assets accumulated in the person's name; instead, funds are adjusted to meet obligations; thus the risk of varying rates of return to pension assets falls on the sponsor. In traditional system the fund-managing public agency was backed by the state budget who was the sponsor. Under DC formula, on contrary, the benefit is determined by the amount of capital paid in toward a person's pension. A pure DC plan adjusts obligations to

² In Poland individual accounting of contributions was introduced in place of a central trust fund.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

match available funds; thus this is individual contributor who faces the portfolio risk (Barr & Diamond, 2008a).

Secondly, with respect to financing the PAYG system was supplemented with capital funded pension schemes. Pay-as-you-go (PAYG) pensions are paid out of current revenue that comes, basically, from contributions to the system made by the actually employed (the prospective pensioners) and/or their employers. Funded pensions use an accumulated fund built from contributions by or on behalf of its members which is invested in securities. In this tier of the system pension benefits are paid basically from paid in capital and investment outcomes, and no redistribution between current contributors and current beneficiaries takes place. Thus a multi-tier system was created. The law of 1997 allowed for pension savings to be channeled to the licensed agents for both voluntary and mandatory funded schemes to be created. The outcome of the reform in the shape of three "pillars" is presented in table1.

Around 1999 the reform engineering split the traditional pension system into publicly- and privately managed pillars, run by ZUS as well as by the PTEs and TFIs respectively. The the TFIs and the PTEs are private companies founded mainly by banks and some insurers. Thus the state has invited private firms into the area which traditionally was a domain of state compulsion and was managed by a public agency. Mandatory contributions raised by ZUS have since then been divided into funds run by ZUS and run by PTEs while funds run by TFIs enjoyed fiscal support in the shape of tax relief.

Years 2008 and beyond have seen intense reforming of privately managed sub-system of funded pensions. These developments can be regarded a new stage in contrast to reforming and splitting traditional PAYG system before. After 2008 numerous regulations referring to OFEs (II pillar) and new propositions referring to voluntary pension funds (III pillar) appeared³.

³ Historical report requires mentioning a relevant change introduced in the system as a whole in 2012 that is the shift of statutory retirement age on to 67 to be gradually completed in 2020 with regard to males and in 2040 with regard to females.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 1. Old-age insurance in Poland as outcome of the reform of 1999

Pillar/tier	I	II	III
contribution (as percentage of wage)	12,22 mandatory	7,30 *	as contracted voluntary
funds	FUS (reformed) individual accounts, official valorization	OFE individual accounts, financial investment yield	PPE, IKE, IKZE individual accounts, financial investment yield
	Defined Contribution (DC)		
management	Public agency - ZUS	Private companies PTE	Private companies TFI
financing	Pay-as-you-go (PAYG)	Funded	Fully funded**
Retirement benefits	ZUS	ZUS***	
	basic		premium

* The share was reduced to 3,5 per cent in 2011 r. and to 2,92% in 2013.

** Fully-funded pensions pay all of benefits from accumulated funds. Funded pensions use an accumulated fund built from contributions by or on behalf of its members (Barr, Diamond 2009).

***According to the law of 2013 ZUS is in charge of paying out the annuities from both pillars.

Source : developed by the author.

As far as mandatory pension funds concerned, the government scaled them down gradually since 2009⁴ with the law of December 2013 as a breakthrough. Since 1999 the mandatory contribution used to be automatically divided between I pillar and II pillar (see table 1) and thus in effect of state compulsion open pension funds (the OFEs) were created. Since 2013 the PTEs that is profit-making companies specialized in managing OFEs are sure of steady inflow of contributions no more. The new law opened opportunity for members to express their will in multi-years intervals. In defined periods they are allowed to declare whether they are going to stay in the OFE tier vel II pillar. In the event no declaration of insured person has been made his or her contribution remains under management of ZUS, undivided. The same procedure refers to persons who are just about to enter the labour market. In the event they have not explicitly chosen otherwise their contribution will be administered by ZUS since the random selection which used to distribute such cases among the OFEs was cancelled (Ustawa, 2013). The first such opportunity with the deadline for decision-making

⁴ There were reductions in fees in 2009 as well as in portions contributed to the OFEs in 2011.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

at end of July 2014 resulted in number of OFEs' members having shrunk from ca. 16 million to 2.5 million.

In result of the 2013 reform OFEs found themselves scaled down not in terms of number of contributors alone but also in terms of their share in the mandatory pension saving. Those members who still wish to contribute to an open pension fund can declare only 2,92 of their wage to be transferred to the fund. Thus, both number of contributors and value of transfers of individual contributions shrunk. Consequently, this means dramatic down-scaling of PTEs' incomes for which the value of funds accumulated is critical. According to OFE-tier regulations PTEs benefit from "transaction cost-covering" fees charged as percentage of contribution to OFE and from provisions charged as percentage of funds accumulated. The former was cut by half and reduced to 1,75 p.p., and revenues due to the latter fall automatically following the funds.

Independently, that is before the dramatic change in number of contributors could be included into calculus, in early February 2014 the OFEs found assets on their members' accounts reduced by 51.5 per cent due to obligatory transfer of treasury bonds and publicly guaranteed securities from their portfolios to a special account under ZUS management. The rest of accumulated assets, that is mainly shares remained with OFEs no matter whether pension savers declared "stay" either "exit", and is bound to new investment limits. This and a couple of other changes brought into mandatory pension funding by 2013 law will appear in commentary later on. What should be mentioned here is that these assets are going to leak out from the OFEs gradually due to special rule concerning those members who are close to the retirement age. Once a fund-managing company is informed by ZUS that a given OFE-member is aged 10 years below due retirement age it is obliged to default systematically each month a due part of accounting units on his or her individual account while these liabilities appear on his or her individual account in ZUS (Ustawa, 2013).

Year 2014 witnessed a new offensive with regard to voluntary pension funds. At that time at request of President's Bureau a project was prepared by the Association of Polish Economists and was officially presented in January 2015. Its general idea seems to be accommodating voluntary schemes by transfers of public money, as well as providing new members due to introducing by the state a peculiar automatism beside individual choice. The expertise suggests three options which are tax relief for the IKZE- and IKE-members, a quota of public money for prospective contributors, and universal automatic participation in PPE with opportunity to opt-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

out. The first and second option are so designed as to expand TFI customers group including persons earning wages below the average in particular. This is to be achieved thanks to giving-up a part of budget revenues due to personal income tax (PIT) and/or via public donations to individual accounts run by the TFIs. The costs for state budget are estimated in the report at milliards of zlotys, varying from 2.2 milliard to 6.2 milliard per year for a single case (Dodatkowy...2014).

The third option of pension saving with the TFIs are employers pension schemes (PPEs) already in operation, however, with the reversed act of will of the insured persons as a novelty. Presently, a declaration of an employee is necessary to participate in the scheme. According to the new design, a declaration of an employee would be necessary in aim to opt out since under regulations proposed each employee and each newly-employed person would automatically become a member of a PPE chosen by the company. The project is a promise of rapid increase in number of contributors for TFIs and of an almost costless arrangement for employers. The latter is based on the idea that employer's part of contribution could be paid from company's social funds (ZFSS). The experts estimate these funds at ca 2 milliard zloty per year (Dodatkowy...2014). Thus, this option instead of public money makes company's social funds engaged and transferred in part to pension funds.

In sum year 2014 saw dramatic cuts in funds transferred to II pillar by public agency (ZUS) on the one hand and projects to transfer considerable amounts of public and/or social money to III pillar on the other hand. This policy inconsistency needs deliberation. For better understanding of the processes observed we must take perspective which is broader than pension engineering, and we have to trace objectives of reforming pensions which definitely can not be reduced to the traditional social mission.

Doing so, we will draw from/take advantage of this piece of analysis. This section has shown that dynamics of reforms in Poland can be measured by stages as reported above.

The starting point is the pre-reform shape of the pension system. Mandatory pension saving was managed exclusively by public agency then with implicit state guarantees of retirement benefits adequate to social minimum.

Years 1999 and beyond saw the architecture of pension system profoundly transformed due to shifting the risk of old-age poverty from managing agency to contributors in the system as a whole, with privately managed pension funding having been introduced.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The 2008 aftermath, and 2103 law in particular, brought relevant reforms of privately managed pension funding with mandatory pension saving getting scaled down and with voluntary pension saving becoming eventually accommodated by transfers of public money and/or provided by new members to extraordinary extent.

The search for explicit and implicit objectives of change will be organized in accordance to these stages.

Changing design: objectives and outcomes

Contemporary rhetoric concerning goals of pension reform says about improved social safety, fiscal balance and solvency of the pension system, individualism and privatisation. Such rationalization is still present in political and economic debates. Actually, historical approach to dynamics of reforms reveals a departure from functions of mostly social and political nature to accounting and other issues related with private and/or public finance.

Pre-reform

Pension system as designed in Poland at pre-1999 stage can be said to have had counter-poverty and counter-social-exclusion functions. According to Barr and Diamond (2014, p.31) there are two basic functions of pension system. Pension funds are designed to "smooth down" the income along lifetime of an individual that is while employed and while retired. In social dimension pension-system function is also to redistribute income and wealth in aim to contain poverty of contributors after retirement. Obviously enough these functions declared by Barr and Diamond as their focus aim at economic safety and material-needs satisfaction of the pensioners. However, they are by no means entirely economic objectives but rather social and/or political ones. National pension systems had been designed with regard to improving social equity and, thus, preserving social peace.

The latter statements are supported by Polish pre-reform evidence. The heritage of the previous social and economic order was the pension system where one of the construction pillars was PAYG financing and income redistribution, and another was DB formula with state implicit guarantees regarding social minimum. The opening years of systemic transformation in Poland saw social peace broken and pension system used as a device of cooling down social riots. Those appeared mostly as going on strikes in

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

great state-owned enterprises where both real wages and jobs seemed to be affected by macroeconomic austerity and the set-off of privatisation. As a matter of fact, unemployment rate was on dramatic rise, and in aim to reduce social and political costs of mass unemployment early retirement was allowed as well as invalid rents became relatively easy to acquire. Thus, increased outlays from the pension system replaced to much extent social aid, and a number of people acquired status of early pensioners and official invalids instead of being unemployed. In the 1990s the publicly managed system of old-age insurance was used more apparently than ever to serve social and political goals⁵.

This early re-forming of the system, however, increased implicit pension debt to unprecedented extent⁶. One decade later at the turn of millennium pensions and rents were paid out to nearly 25 per cent of inhabitants, while people in retirement age constituted only 13 per cent (Zieliński 2003). Increased outlays contributed to public finance instability, current illiquidity and implicit insolvency of the pension system. At the turn of 1999 and 2000 statistics for Poland revealed significant pension spending and record implicit pension debt (Impavido, Tower, 2009, p.41, table 8). The latter is meant by the IMF as a rough indicator of the accrued value of the pension system liabilities where the government needs to bail out the pension system. According to the IMF among thirty five low and middle income countries Poland had 3-rd largest pension spending as share of GDP and 5-th largest implicit pension debt as share of GDP with public debt at that time being though relatively moderate (the 16-th position).

1999 and beyond

Improving the deficit of the public pension (and implicit pension debt) became an urgent objective of the 1999 reform. The related issue was constraining increase in public debt. Although public debt was rather moderate when 1999 reform gained shape it could be easily predicted to be on rise once the public pension was in deficit. As already said, DB means funds are adjusted to meet obligations, and when public pension system is unable to

⁵ Moreover, some professions of political relevance like police, army, judges, clergymen have enjoyed noncontributory universal pension financed from the governmental budget.

⁶ Other reason of implicit pension debt more widely publicized than that one was demographic change. While considering this argument to be rather controversial when applied to Poland we deliberately skip the discussion for the sake of maintaining line of reasoned discussion.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

make this adjustment then implicit benefit guarantees make the state to become the sponsor. Thus outlays from the state budget on behalf of public pension appear and, eventually, budget deficits increase. Under such circumstances, shifting from DB to DC means a relief to the budget. With the portfolio risk shifted to individual contributor there was a relief to the sponsor. Therefore, the change in the formula in 1999 should be seen as aimed indirectly at prospective problem of public debt.

Improving implicit pension debt can be regarded to be a goal while constraining rates of replacement to be an immediate objective. According to Nicolas Barr and Peter Diamond if a public pension is running deficit that is regarded as unsustainable, the only solution is to make it sustainable by increasing contributions, reducing benefits, or both (Barr & Diamond, 2008b). In Poland the relative benefit was radically reduced which means plummeting predicted pension benefit as related to average or last wage (Wiktorow 2008, p.36, table 3). In pension-engineering slang this index is called a rate of replacement. Diminishing values of the index meant roughly that planned outflows from the system were to be lower in relation to inflows to the system, and this was the way of constraining rise in the implicit pension debt⁷. One of the authors of the reform claimed in 2002: "The reform apparently was just aimed at diminishing this index. In the aging society this is requirement of systemic solvency." (Hausner 2002).

Thus the fundamental change in the contribution-to-benefit formula appears to serve a relief in public finance or, to be more precise, in general-government finance⁸. This means that accounting and financial goals won priority before social ones. The same observation can be applied as far as another fundamental change in design concerned which was emergence of pension funding. Investing part of savings accumulated in pension funds instead of paying them out immediately for pensions and current consumption as under PAYG actually means introducing financial logic into the system. Pension funding, however, was never chosen to be presented to the public in that direct way.

Foreseen constraint in rates of replacement needed to be somehow cushioned with regard to the public. The official concept of "security due to diversity" which was originally elaborated by UNFE (2000) said that a multi-tier system is to create more security for prospective pensioners. In-

⁷ Another way of reducing outflows from the system and postponing them as well was shifting a retirement age. It became politically feasible, however, only in 2012.

⁸ General government contains, beside the governmental budget also local budgets and other (extra-budgetary) public funds.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

cluding pension funding into the reform seemed to be of help along with the following rationale attached. Funded pension schemes will possibly increase their part of pension income, improve the sum of benefits originating from different pillars and effectively constrain a further risk of old-age poverty. This reasoning makes a multi-pillar approach for the pension system attractive thanks to suggestion of improving rather than deteriorating outcome of the system as a whole. Another argument extensively used said that funding in the pension system made pensions free from political abuse ("political risk"), to some extent at least.

Rhetoric pointing to social function of institutional design with pension funds constituting additional pillars provided a smokescreen. The point is that pension funding, and OFE in particular, was introduced not to secure future pensions but to invest pension savings (Szumlicz, 2002). As far as mandatory pension funding concerned expertise for decision-makers exposed saving-and-investment issues. It said about "profit-oriented investment regarding acceptable risk" being rather enigmatic on possible increase in retirement benefits (Grabczan, 1998). The supporters of introducing the OFEs added "fairness" of the deal (Góra, 2002) which is, however, a double-edged sword with respect to benefits since capital pension funding is subject evenly to losses and gains under *bessa* and *hossa*, and no insurance for mandated contributors against the loss of assets was introduced.

As a matter of fact, new pension system architecture introduced financial-market logic to where principle of social insurance had ruled. Financial markets development can be said another genuine goal of the 1999 reform. Pension funds channel domestic savings to financial operations being a vehicle of exchange of their contributors' savings into securities, so their rise meant increase in turnover of bonds and shares by definition. More, new opportunities of making profits on financial-assets turnover attracted foreign capital. We find expansion of pension funding by financial intermediaries and, consequently, financial markets development as another major goal beside relief to public finance.

To sum up, of the two major changes which the reform brought, the shift from DB to DC formula was a rather direct device of alleviating pressure on the pension and budget deficits. The shift from DB to DC means as already said that funds which can be found at the core of contemporary pension systems are to be adjusted to meet obligations no more. Thus public pension deficit can be constrained and subsidies from the state budget can be diminished. This is the non-questioned financial aspect associated with the Polish reform that is ultimately beneficial for public finance

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

(Łaski, 2010). The move to mandatory funding, however, had immediate adverse effect on both public pension and budget deficits. The price to be paid was the explicit budget gap due to transferring to OFEs "their" portion of contribution which increased deficits of the publicly managed pension fund (FUS) and enforced donations from the government budget thus contributing to fiscal deficits. Three concepts at least served to cut controversy about the move to mandatory funding from fiscal point of view. They were privatization fund as a cushion; supposition that the OFEs would be included into general government, with the EU approval; the premise that developed financial markets are good for economic growth. From retrospect all of them turned out to be weakly-founded. Fiscal cost of voluntary funding, mostly due to tax relief, can be neglected as far as now because of marginal size of this tier, however, it is potentially detrimental along with increasing both the size of the pillar and the scope of privileges of this tier.

Introducing funding into Polish pension system, however detrimental from fiscal perspective, was relevant for financial markets development. A part of mandatory pension savings is transferred out beyond the PAYG system and is bound to market rules. Transferring a portion of pension savings, voluntary savings included, to financial markets results in increases in securities turnover and means development of earning opportunities there. As a matter of fact the OFE project and introducing voluntary pension funding as well were an invitation for foreign capital groups to bring equity and go into business in Poland in the shape of the PTEs or TFIs. In 1999 foreign investors held directly or indirectly 75 per cent of the PTEs assets (Rymsza, 2002, p.265). The biggest open pension funds got under management of international banks and insurers or their subsidiaries, with ING Nationale-Nederlanden Polska, Unicredit and AIG among them. Under transition to full-fledged market economy development of financial markets as well as rules inviting for foreign capital inflows apparently gained in prominence. At turn of the millenium particularly OFEs could have been perceived as a helpful institutional device with these respects. However, such speculations if in place turned out to be exaggerated, and explicit public debt issue became a first-hand reason for 2013 policy turnabout.

2013 aftermath

Transfers of percentage of mandatory contributions to OFEs mentioned before which had added to fiscal deficits and, consequently, to public debt appear as the main reason of the reversal. According to the stance, con-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

firmed definitely by Eurostat in 2004, OFEs can not be regarded as an institution of general government sector. If so, transfers made by ZUS to OFEs count as liabilities of the sector and add to public debt as related to GDP a couple of percentage points. "After having broken the EU budget deficit bench-mark, with the burden of public debt approaching another EU limit the government represented by minister of finance John Vincent Rostowski said the cost of maintaining OFEs in terms of public debt was too high". Thus, even more obviously than in the late 1990s the reform was induced by General Government accounting. The law of 2013 explicitly aimed at constraint of costs which the pension system had induced to the governmental budget and predicted numerous economic benefits due to that action (Uzasadnienie... , 2013, p.61-62).

However, one can argue that in spite of determination in following the fiscal line even after 2013 some other regulations were oriented on expansion of private pension funding. There are two arguments at least that seem to support such implicit goal. First, OFEs have never been eradicated and we are going to show now that they can still prosper fairly well after 2013. Second, we are just observing changing attitude on behalf of voluntary funded pillar. The ideas which founded the PTEs' business seem to find continuation in projects concerning the TFIs.

The reform of 2013 keeps mandatory pension funding still active. As already said, it has opened opportunity to shift membership out of the OFE tier and reduced significantly assets at OFEs' disposal. Thus, logics of doing business by the PTEs (and probably, their involvement as well) must have been changed. They are to rely less on amount of capital and due fees and they will probably strive for rewards based on the velocity of capital turnover. This supposition seems to be in accord with some other regulations introduced by the law of 2013. Fees charged as percentage of contribution were radically constrained and thus the due revenues were reduced⁹. However, since 2014, structural limits concerning OFEs' assets have been abolished and the maximum share of assets denominated in foreign currencies was impressingly increased from 1.27 per cent to 30 per cent (Uzasadnienie ..., 2013). This opens space for relatively risky operations on shares and in foreign stock exchanges in search of higher yields. The more so, since each PTE is free to point reference indices of their own to be used as a bench-mark to the rates of return of "their" OFE (Rutecka, 2014). With

⁹ As far as other factors of calculus concerned the maximum management commission charged by the PTEs on assets remained unchanged and fees paid due to transfers made by ZUS were cut down to 0,4%.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

equities share in assets increased up to 85 per cent mandatory pension funds are likely to turn into aggressive investment funds. The OFEs saw their assets, both those accumulated and those predicted, significantly reduced and the PTEs probably have to accept their record rates of return plummeting (Capital Strategy 2013). Nevertheless, simultaneously new opportunities of doing business in the mandatory funding tier appeared. Therefore the reform must be seen as a struggle to constrain public deficits and debts rather than a battle against privileges in the mandatory privately managed tier. The OFEs have been not eradicated, and fund-managing companies have still a chance to be handsomely rewarded, becoming far more aggressive investors in capital markets.

As far as pension schemes managed by the TFIs concerned an idea of universality is on top as expressed explicitly in the motto of the 2014 project and repeated in the declared objectives of three proposals discussed above in section 2 of this article. Pension funding in III pillar is meant to acquire a universal dimension in the sense of mass membership, the pre-2013 II pillar alike. Respectively, thanks to tax relief "as many persons as possible" from low-income groups are to be included into the IKE and IKZE schemes which are to be attractive for both full-time workers and self-employed persons as well (Dodatkowy....2014, p. 57). This is also the target group of the second proposal referring to public donation for individuals as a "carrot" which would result in "universal individual extra old-age insurance" (Dodatkowy....2014, p.65). Similarly, the last proposal aims at "universal participation in employers' schemes" (Dodatkowy....2014, p.70). This option is most likely to result in mass membership due to automatic inclusion of persons employed in the public and private sectors. This "automatism" would be achieved thanks to respective change in law. Therefore it can be regarded as a "stick" or a discreet introduction of state compulsion into III pillar (Oreziak, 2015). Opting-out which would be allowed in strictly defined periods of time seems to be far not enough to call this form of insurance a voluntary one. The explicit goal of the projected reform is to make membership to pension funding run by the TFIs as large as once the one to pension funding run by the OFEs was; the implicit intermediate objective with regard to this option is to change its voluntary nature into mandatory saving in fact thus following the OFE pattern again.

To sum up, however the claim regarding expansion of privately managed pension funding may appear paradoxical in the face of down-scaling the OFEs under law of 2013 the PTEs may become more aggressive investors in capital markets, and thus they are given new opportunities of doing

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

business and money. More, the first year under new law concerning OFEs saw change in thinking in favor of funds managed by TFIs. The project of 2014 just discussed may be regarded as an attempt to compensate the dramatic down-scaling of mandatory pension funds with channeling savings to voluntary pension funds even if it was to be made with use of "stick".

Putting findings in this section together:

- The pre-reform pension system had been oriented at functions of mostly social and political nature.
- The 1999 reform initiated a departure to accounting issues related with private and/or public finance. The socially-sensitive pre-1999 system was split into three parts, with pension funding in II and III pillar governed by principles definitely different than counter-poverty and counter-exclusion functions. Improving the deficit of the public pension (and implicit pension debt) and developing capital market with help of pension funds more accurately describe objectives of this reform.
- The explicit objective of 2013-turnabout was of accounting and financial nature as well. Reformers' endeavours have been aimed at cutting systemic costs in the sake of reduction in the budget deficits and public debt on the one hand and at revitalization of privately managed pension funding on the other hand.

Conclusions

Historical approach reveals a departure in Polish pension-system designing from functions of mostly social and political nature to goals related with private and/or public finance. Since 1999 the reforms seem to constitute two interlocking streams of change aimed at i) relief to public finance ii) expansion of pension funding and financial market development.

After several decades under new circumstances publicly managed system of mandatory pension saving was said to be implicitly insolvent. Political consciousness of this development induced reforms in the 1990s that were believed to constrain the financial consequences of state implicit guarantees and, thus, public pension debt. This was achieved by shifting from DB to DC which did not, however, improve situation in general government sector. Introducing pension funding and privatisation of the pension industry was of help in the sense of dispersing responsibility for diminishing rate of replacement. However, mandatory funding is controversial from perspective of the general government finance due to transfers of a percentage of contribution raised by public agency ZUS away to OFEs. In

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

spite of this structural flaw which actually compelled the state budget to provide donations to ZUS mandatory pension funding was introduced and maintained.

Although pension funds are neither solution to the implicit insolvency problem nor source of fiscal relief (Chełchowski, 2001) this institutional arrangement has found support at every stage of contemporary pension reforms in Poland. Taking this under consideration, introducing and expansion of pension funding can be seen as an end in itself which is tightly related to financial market development. As a matter of fact, the OFE project as well as pension funding on voluntary basis meant inviting foreign capital to emerging market economy of Poland. Last paragraphs of the previous section provide arguments that this finding remains valid however impressed we could be by recent radical change concerning OFEs.

The two goals, however, are in contradiction to each other, and this makes a paradox of pension reforming in Poland. On the one hand, there is a strain to improve public finance. On the other hand, expansion of pension funding by private agents requires allowing real tax money and contributions to outflow from general government sector to the privately managed tiers.

The analysis that has helped us to identify the two contradictory policy objectives makes the picture of recent reforming more clear. There is some logic in recent thinking on and reforming of the pension funding in II pillar and III pillar. The OFEs became a victim of reforming along fiscal lines in the sake of relief to public finance. The Rostowski's reforms were a blow against expansion of pension funding and financial markets due to down-scaling of the OFEs. However, the review of 2013- and 2014- design, unexpectedly enough, resulted in conclusion that at present reforming is focused on revitalization of pension funds. It was argued that both some 2013 regulations and the 2014 project as a whole constitute to some extent the compensation and act in favour of financial market development, with new opportunities of doing business given to OFEs and mass membership in funded voluntary pension plans projected.

The recent focus on pension funding may make distress in public finance recurrent. Are the contemporary pension reforms more about expansion of the financial sector than anything else then?

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
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18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
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**The Role of the Level of Development,
Geographical Factors, and Culture for
the Efficacy of Economic Freedom**

JEL Classification: *H10; O10; P50; P51*

Keywords: *economic freedom; institutions; economic development; geopolitics; culture*

Abstract: There are many studies focused on the role of economic freedom in creating conditions supportive for economic growth. Most of the recommendations in this area are based on the observations of the highly developed countries. But is it reasonable to generalize these findings to the other countries, independently from their conditions? Contemporary the number of the research conducted for the countries outside the world's forefront rises. Results are varied – some elements of economic freedom seem to be effective unconditionally, some of them bring different results. The aim of the paper is to examine the role of such factors as a stage of economic development, geographical location, and culture in the context of the efficacy of economic freedom. The study was conducted with usage of regression models for panel data and based on the indicators connected with economic freedom and economic growth.

Introduction

A discussion on the optimal level of public regulation has a long history among the economists. Many researchers indicate economic freedom as important determinant of achieving a high level of welfare. But, not all research bring the same results – it is still questionable which elements of economic freedom are important and whether economic freedom is required in all spheres of economy and works for each country. Most of the research are usually based on the highly developed countries. Western world however has its specific, as a result of the history, culture, geographical conditions etc. The question that can be raised is if the results true for western developed countries are also true for the rest of the world. The aim of the paper isn't set that widely. The research is focused on the diversification of the results of analysing the impact of economic freedom on GDP pc when the level of domestic product, geographical location and culture are taken into account. The purpose of the research is to examine the role of such factors as a stage of economic development, geographical location, and culture in the context of the efficacy of economic freedom. The study was conducted with usage of regression models with fixed effect for 178 countries in period 1995-2015. The indicators used in the analysis are the Index of Economic Freedom elaborated by Heritage Foundation and GDP pc (data form International Monetary Fund). Countries were analysed in three cross sections: economic (the level of GDP pc), geographical location (continent), and cultural (on the basis of Huntington's classification known as "the clash of the civilization theory").

Literature review

Economic freedom is one of the aspects considered as a resource of the socio-economic welfare. Studies on the capability of provision of the most effective solutions by market mechanism have accompanied economics from the beginnings, but also advocates of the public intervention have important place in the history of economic thought. It is possible to speak about market mechanism, when there are settled rules of exchange, communication, transferring of property rights, establishing the means of payment. Otherwise making rational decisions wouldn't be possible. From the other side the state is considered as the one responsible for delivering an institutional order (Stankiewicz, 2005). Both regulators – market mecha-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

nism and state – are burdened with imperfections, and optimal level of public regulation is still under consideration of the economists.

Provision of empirical evidences for theories needs concrete measures of the phenomenon – in case of economic freedom such attempts began in 80s. Earlier efforts in measuring freedom were concentrated on political and human rights rather than on economic liberty. Economic aspects in measuring of freedom appeared in studies published in 1982 and provided by L. M. Wright in collaboration with Freedom House in form of indicator of property rights (Wright, 1982, pp. 51-90; Leblang, 1996, pp. 5-26). The possibilities of measurement of economic freedom were also the subject of the public debate since 1984, when the meeting of Mont Pelerin Society (the society founded by F. A. von Hayek) took place in Cambridge (Konratowicz, 2013, p. 29). Contemporary the most popular and complex indicators for measuring economic freedom are: Economic Freedom of the World – EFW (by Fraser Institute), and Index of Economic Freedom – IEF (by Heritage Foundation). First one is based on 5 main components (Size of Government: Expenditures, Taxes, and Enterprises, Legal Structure and Security of Property Rights, Access to Sound Money, Freedom to Trade Internationally, Regulation of Credit, Labor, and Business), and is published since 1996, currently for almost 150 countries (Gwartney, Lawson, & Hall, 2014). The second one covers 4 main areas (Rule of Law, Limited Government, Regulatory Efficiency, Open Markets), and is available for over 180 countries since 1995 (Miller & Kim, 2015). Except of EFW and IEF there are also such measures as Doing Business (published by World Bank), Product Market Regulation Index (included in OECD statistics), some elements of economic freedom (mainly connected with property rights, and barriers for entrepreneurship) are also present in other measures of institutions, quality of governance, in so called coordination indices developed under theories of varieties of capitalism (Hall & Gingerich, 2009, pp. 449-482; Zielenkiewicz, 2014, pp. 21-37), in measures connected with competitiveness, innovations (e.g. Global Competitiveness Index, Global Innovation Index) or knowledge based economy (Balcerzak, 2009, pp. 713-742).

Simultaneously with works on developing the measures of economic freedom publications with empirical evidences appeared. J. C. Hall and R. A. Larson (2014, pp. 1-19) made wide meta-analysis of over 400 research based on EFW. As authors conclude, from 198 articles, where EFW was an independent variable, “over two-thirds of these studies found economic freedom to correspond to a “good” outcome such as faster growth, better

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

living standards, more happiness, etc. Less than 4% of the sample found economic freedom to be associated with a “bad” outcome such as increased income inequality”. In 28% of cases results were mixed (Hall & Larson, 2014, pp. 1-19).

In the research, where Granger causality test was used, results show that elements of economic freedom are usually causal for economic outcomes (e.g. Far, Lord, & Wolfenbarger, 1998, pp. 247-262; Vega-Gordillo & Alvarez-Arce, 2003, pp. 199-215, Piątek et al., 2013, pp. 267-288). However, results are often diverse for different areas of economic freedom in terms of significance and even direction of relationship (Sturm & De Haan, 2000, pp. 215-241; Carlsson & Lundström 2002, pp. 335-344; Dawson, 2003, pp. 479-495; Berggren, 2003, pp. 193-212).

An important issue connected with research on impact of economic freedom on economies' prosperity is that earlier studies are usually focused on western, developed countries, so results may be biased and not necessary true for the countries in other conditions. D. Rodrik, A. Subramanian, and F. Trebbi (2002, pp. 131-165) claim that the impact of institutions has primacy to geopolitical factors for economic growth. While the level of economic freedom is an element of institutional framework, the question about independency of effects of economic freedom from factors connected with geography and political conditions can arise. Historically, geographical issues played an important role: such factors like costal location, climate, natural resources had an impact on development of cities and countries. Contemporary transport system and agricultural technologies are developed, sources of comparative advantages have changed, but does it mean that geographical factors don't matter anymore? There still are the issues connected with costs, availability of technologies, and proximity of developed countries (Sachs, 1995).

Another important factor is the culture. A wide research on the determinants of government performance was published by team from Harvard University and The University of Chicago. Authors conclude: “These results present clear evidence of systematic influence of historical circumstances, as captured by ethnolinguistic heterogeneity, legal origins, and religion, on government performance. Governmental performance is surely in part determined by economic development, but it is also shaped by systematic variation in the histories of individual countries.” (La Porta et al, 1999, pp. 222-279)

As measures of economic freedom became available for more and more countries, it is possible to verify results with taking into account different

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

circumstances. Last years brought an increase of the research based on data from countries other than the “world’s forefront”. Some results suggest the great impact of the other factors than institutional framework. E. g. studies conducted for economies in transition show that initial conditions matter and are more important than regulation changes (Heybey & Murrell, 1999, pp. 121-137). Regression analysis conducted by M. Brycz (2013, pp. 211-232) for European Union shows some diversity of results between old and new member states as regards to property rights – in second group relation was negative, what can be a result of mistakes in privatization as well as of some benefits that less innovative countries can get from not respecting the intellectual property. Similar benefits can be observed also in case of so called Asian Tigers. From static point of view such countries might not have reasons for applying property rights. But in long term the problem of “average-income trap” may appear. The research conducted for developing and transition countries with usage of Bertelsmann Stiftung Transformation Index shows that property rights change statistical importance and direction of relationship with economic growth dependently on the level of development (Zielenkiewicz, 2015). Summing up, the results of previous studies justify analysing economic freedom with taking into account factors such as the level of development, culture or geographical aspects.

Methodology of the research

The research was conducted for 178 countries on the basis of the Index of Economic Freedom (IEF) developed by Heritage Foundation, and data published by International Monetary Fund and World Bank. The analysis covers years 1995-2015 (the period where data were available). The evaluation of economic performance (to measure the effects of economic freedom) was based on GDP per capita. The aim of the research was to verify whether the relationship between different areas of economic freedom and the level of income depends (in terms of its direction and importance) on factors connected with the level of GDP pc, geographical location, and culture. For this purpose firstly the countries were analysed together (in order to check general relationships), then were divided into groups on the basis of the following criteria:

- the level of GDP pc;
- continent where the country is located;
- culture (with usage of Huntington’s classification).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The analysis conducted for groups of countries was focused on the goodness of fit of the models (in order to test whether the variability of characteristics do explain variability of GDP's level, when factors listed above are taken into account), statistical importance of the variables, and the direction of the relationship. Data were analysed with usage of linear models of regression with fixed effect:

$$Y_{it} = \beta X_{it} + \alpha_i + \varepsilon_{it}, \quad i = 1, \dots, n,$$

where:

Y_{it} – explained variables (GDP per capita),

β – vector parameter,

X_{it} – matrix of explanatory variables (ten components of IEF),

α_i – time-invariant component,

ε_{it} – idiosyncratic error,

n – number of countries.

Fixed effect allows to remove the effect of assumed time-invariant characteristics from the predictor variables and to assess the predictors' net effect, when each entity (in this case – a country) has its own individual characteristics that may have impact on the predictor variables (Cameron, Trivedi, 2010, pp. 237-238). The choice between models with random and fixed effects was based on the Hausman test.

GDP used in the research is GDP based on purchasing-power-parity per capita in current international dollar published by IMF. It is important to mention that in case of poorer countries the quality of the data is always a questionable issue (often GDP isn't calculated precisely but only estimated by the government or statistical institutions), therefore a risk of some bias in the results exists.

Index of Economic Freedom used in the research was elaborated by Heritage Foundation and published for first time in 1995. The index covers ten components divided into four groups presented in the table 1. For each category countries are evaluated in range from 0 to 100, where 0 means lack of freedom, and 100 full freedom. The original version of IEF didn't include Labor Freedom – it appeared as a component of IEF in 2005.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 24. Construction of Index of Economic Freedom

Index of Economic Freedom	Rule of Law	Property Rights (PR) Freedom from Corruption (FC)
	Limited Government	Fiscal Freedom (FisF) Government Spending (GS)
	Regulatory Efficiency	Business Freedom (BF) Monetary Freedom (MF) Labour Freedom (LF)
	Open Markets	Trade Freedom (TF) Investment Freedom (IF) Financial Freedom (FinF)

Source: Heritage Foundation (access form March 2015).

Additional explanation is needed in case of Government Spending. This component is based on the level of government expenditures (including consumption and transfers) as a percentage of GDP, and inverted, so the higher level of government expenditures results as the lower level of the index. However, zero does not mean that there is no private consumption in the economy, because expenditures (GE) are corrected with accordance to the formula: $GE_i = 100 - \alpha (\text{Expenditures}_i)^2$, where α is a coefficient to control for variation among scores (set by Heritage Foundation at 0,03). Therefore $GS = 0$ means that government expenditures exceeded the level of about 57 percentage of GDP (Heritage Foundation, 2015).

IEF was chosen due to its complexity (it contains 10 areas of economic freedom), relatively long period of calculations (index is available since 1995), and availability for many countries (nowadays it is published for 186 countries; not for all of them GDP was available, so number of countries in the research is 178).

Regression analysis of the relationship between components of IEF and GDP

Table 2 shows results of estimation for models (coefficients, standard errors, and statistical importance of the variables) without dividing countries into any groups.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 2. Regression models for IEF and GDP

Independent var.	Model 1: Coef. (Std. Err.)	Model 2: Coef. (Std. Err.)
PR	2.681578 (12.46837)	-
FC	23.74547 (12.34623) **	25.78491 (12.04522) **
FisF	61.93711 (13.47664) ***	59.76883 (13.3283) ***
GS	-9.813207 (5.751014) *	-
BF	44.43339 (8.815595) ***	43.79326 (8.76593) ***
LF	-18.43322 (8.899011) **	-18.53914 (8.686303) **
MF	-49.28179 (10.56115) ***	-50.44567 (10.4597) ***
TF	54.53139 (8.799615) ***	53.88342 (8.749685) ***
IF	46.89536 (6.706558) ***	48.35401 (6.63164) ***
FinF	5.61115 (8.700471)	-
Const.	4599.384 (1601.471) ***	4545.579 (1505.092) ***
Number of observ.	1842	1845
Number of countries	177	178
R²	42.55%	39.72%
Test-F	26.22***	37.01***
F test that all u_i=0	189.31***	191.20***
Effect	Fixed	Fixed

*** p < 0,01; ** p < 0,05; * p < 0,1

Source: Own study.

First model includes all variables, the second one only these which are statistically important. In both cases coefficients of determination (R²) are similar and suggest that approximately 40% of variability of GDP pc can be explained by variability of the level of economic freedom. The factors that occurred as statistically unimportant are: Property Rights, Government Spending, and Financial Freedom. With the exception of Monetary and Labor Freedom, components of IEF are positively related with GDP pc. The highest coefficient among positively related variables can be noticed in case of Fiscal Freedom, and – at the second place – Trade Freedom. These two factors, as well as Business Freedom and Freedom from Corruption are usually positively correlated with economic growth, independently from the diversity of the countries.

Tables 3-5 contain results (direction of relationship, statistical importance of variables, measures of goodness of fit) of the analysis for countries divided into groups by income (table 3), continent (table 4), and culture (table 5). Models are again with fixed effects.

In order to test, whether the results are going to change, when the level of domestic income is taken into account, countries were divided into

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

groups dependently on the level of GDP pc. Most popular classifications of countries in terms of development come from World Bank, International Monetary Fund, and United Nations (Nielsen, pp. 7-18). World Bank recognizes four main groups: Low income (\$1,035 or less); Lower middle income (\$1,036 to \$4,085); Upper middle income (\$4,086 to \$12,615); High income (\$12,616 or more). UN's classification is based on Human Development Index and divides countries also into four groups: low-, medium-, high-, and very high-human development. IMF uses main division on Advanced economies (Euro area, Major advanced economies (G7), Other advanced economies (Advanced economies excluding G7 and euro area), European Union) and Emerging market and developing economies (Commonwealth of Independent States, Emerging and developing Asia, Emerging and developing Europe, Latin America and the Caribbean, Middle East, North Africa, Afghanistan, and Pakistan, Sub-Saharan Africa). Because the analysis is based on other unit than classifications mentioned above, and due to the comparison of results for different versions of division, countries were divided into six groups by GDP pc. In case of countries in the range from \$1000 to \$2000 there are two models presented – the first one with all variables which occurred as statistically important, and the second one without these variables where probability was under 0,1 and with higher R².

Table 3. Results of regression analysis in groups by income

GDP pc ¹ (1995)	+	-	Obs.	N	R ²	F-stat./ F for all u _i =0
<1000	FC*** MF* TF* FinF***		565	32	0.02%	14.05*** 123.76***
1000-2000	FC*** FisF*** LF* TF*** FinF*	PR***	306	29	15,77%	18.79*** 46.41***
	FC*** FisF *** TF***	PR***	540	29	23,69%	86.44*** 24.91***
2000-4000	FC* FisF *** BF*** LF** TF*** IF***	PR*** GS*** FinF**	314	31	23,05%	28.15*** 83.98***
4000-7000	FC**	GS***	458	27	33,11%	86.27***

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

	FisF *** MF*** TF***					16.34***
7000-15000	FC*** FisF *** BF*** TF*** IF***	PR*** GS**	455	24	6,87%	66.37*** 42.06***
15000-30000	FisF *** BF*** TF*** IF*** FinF ***		614	30	27,92%	127.18*** 31.69***

*** p < 0,01; ** p < 0,05; * p < 0,1

¹ PPP, in current international dollar (IMF)

Source: Own study.

As can be seen in table 3, coefficients of determinations are relatively low, but also diverse. In case of countries with GDP pc below \$1000 the variability of GDP cannot be explained by variability of IEF's components. In this group such results were predictable: these often are countries in conflicts, located in hard climate, with large mortality rate, diseases, and hunger burden, without access to the basic sanitation and clean water. A bias due to the quality of data in case of the poorest countries also cannot be ruled. The highest level of R² (33,11%) can be observed in the \$4000-\$7000 group, which isn't a robust result. Thus, what can be seen, is that direction of the relationship of some variables and their statistical importance change across groups. Property Rights, and Government Spending in three groups appear as negatively related, Financial Freedom – in one case (\$2000-\$4000). In all groups a statistically important and positively related element of economic freedom is Trade Freedom. As relatively independent from the level of income can be also considered Freedom from Corruption and Fiscal Freedom (positive relation in five groups).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 4. Results of regression analysis in groups by continent

Continent	+	-	Obs.	N	R ²	F-stat./ F for all u _i =0
Africa	FisF*** TF*** FinF**	PR***	935	52	0,00%	44.13*** 187.05***
Latin+South America	FC*** TF***	PR*** GS*** FinF ***	554	29	5,54%	91.72*** 102.47***
Asia	FisF *** IF* FinF ***	PR *** MF**	864	46	3,73%	25.37*** 111.96***
Europe	FisF *** GS*** BF*** TF*** IF***	FC***	762	39	0,45%	128.87*** 74.67***
Oceania	FisF *** BF*** IF**	LF**	82	10	38,85%	8.16*** 125.08***

*** p < 0,01; ** p < 0,05; * p < 0,1

Source: Own study.

For the analysis of geographical location simple continental classification was used. It is more common to divide Africa onto at least two parts: northern and southern, but in groups based on culture such division was made, hence groups would be duplicated. North America was omitted because of too low number of countries to perform the analysis.

According to the results (table 4), only in case of Oceania R² was nearly 40%, in other cases models based on IEF do not explain the variability of GDP. That means that other factors must play role, and IEF is not a good descriptor of changes of income, when countries are analysed in respect of location.

The analysis based on culture (table 5) refers to Huntington's classification of civilizations (Huntington, 1993, pp. 22-49), related to cultural identity (mainly religion). Countries are not internally homogeneous in this respect, but were classified due to the majority present in the countries and historical background. African culture covers Southern, Middle, and Eastern Africa. Islamic culture include countries of Northern Africa, Middle East, Southwestern continental Asia, and Asian islands at the South. Latin civilization refers to Central and South America. Orthodox group includes mainly the former Soviet Union, the former Yugoslavia (without Croatia and Slovenia), and also Bulgaria, Romania, Greece, and Cyprus. Eastern

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

culture in Huntington's classification is differentiated: Japan is considered separately; Sinic civilization describes mainly China, but also Singapore, Taiwan, both Koreas, and Vietnam; Hindu group besides India also contains Nepal, and partly Bhutan; Buddhist countries are: partly Bhutan, Cambodia, Laos, Mongolia, Myanmar (Burma), Sri Lanka, Thailand (also Tibet which is not included in public statistics due to Chinese occupation). In the analysis these groups were taken as one. Western world includes mainly North America, Australia and Oceania, and most of Europe.

Table 5. Results of regression analysis in groups by culture

Culture	+	-	Obs.	N	R ²	F-stat./ F for all u _i =0
African	FC*** FisF *** GS** LF* TF* IF*	PR** BF*	433	41	1,25%	7.80*** 476.61***
Islamic	PR *** FC** FisF ** BF*** IF***	LF** MF**	347	34	36,50%	10.37*** 154.79***
Latin	FC*** TF***	PR*** GS***	493	26	3,56%	103.29*** 101.60***
Orthodox	FC* BF*** MF*** TF***	PR*** GS** IF** FinF**	255	14	17,08%	37.47*** 73.01***
Sinic/ Hindu/ Buddhist	FisF *** TF***	PR*** MF**	332	17	31,58%	15.59*** 36.82***
Western	FisF *** BF*** TF*** IF***		642	32	15,81%	265.43*** 127.52***

*** p < 0,01; ** p < 0,05; * p < 0,1

Source: Own study.

Coefficients of determination are highest in case of Islamic (36,5%) and Sinic/Hindu/Buddhist group (31,58%), what means that in these groups impact of economic freedom on income's variability is noticeable. In other cases again other factors than IEF must be more important. Trade Freedom seems to be the most independent from cultural circumstances factor – it is

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

positively related with GDP pc and statistically important in five groups. Similarly – Freedom of Corruption and Fiscal Freedom in four groups. Business Freedom and Investment Freedom are rather positively related, with an exception of one group in case of each of the indicators, where relation was negative, but with low statistical importance. Property Rights appear as negatively related in four group, and positively related in one case (Islamic culture). Mixed results can be observed in case of Government Spending (positive relationship in one group, negative in two groups), Labor Freedom (positive – one, negative – one), Monetary Freedom (positive – one, negative – two). Financial Freedom was statistically important only in one group.

Conclusions

The research conducted in the paper does not allow for rejecting the hypothesis that the analysis of the influence of economic freedom on countries' economic performance requires to consider also factors such as the geographical, cultural and related to the level of development circumstances. When countries are analysed in sections related to these factors, models based solely on components of the Index of Economic Freedom most often poorly explain the variability of the countries' economic outcome. Some of the elements of economic freedom seem to work regardless of the circumstances of the countries – that is freedom connected with trade, fiscal policy and control of corruption. But results for other areas of economic freedom are mixed. Such results are in line also with the observations of other researchers who indicate the importance of a number of components in the selecting of the model of public regulation. The study presented in the paper is preliminary. Institutional changes often bring effects many years after the implementation, which requires an analysis of the lag effect. This is going to be examined in the future research. Future research also are going to be expanded to include other aspects associated with affecting the effects of changing the level of economic freedom.

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18-19 June 2015, Economics and Finance**

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18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
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**Unemployment and Labor Market Policy
in Visegrad Group Countries***

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Keywords: *unemployment; labor market policy; discrimination; Visegrad Group countries*

Abstract: In the recent years, an economic crisis has appeared in most economies. It affected the labor market situation. This article refers to changes in the labor markets of the Visegrad Group countries. The analysis concerns the relations between the economic crisis, the level and structure of unemployment (taking into account the situation of women and young people as the groups strongly exposed to unemployment), and the level and structure of expenditures within the labor market policy. The article is based on data published by Eurostat, using the tools of descriptive statistics, and statistical indexes, in particular. The research period covers the years 2007-2012, which is dictated by the availability of comparable statistical data. An analysis of the data indicates that the economic crisis increased the economic activity of the population, which contributed to an increase in unemployment. There is no discrimination against women in the labor market, but there has been a serious increase in unemployment among young people. With the increase in unemployment, the expenditures on the total labor market policy have increased, as have those on passive labor market policies and labor market service. Expenditures on active labor market policies (ALMPs) grow relatively more slowly, which may be especially evident in the case of expenditure on training.

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Introduction

The level of unemployment and its structure mainly depend on the economic situation. A period of an economic crisis is characterized by a reduction of labor demand and a rising level of unemployment, whereas a period of economic recovery entails the opposite phenomenon. With higher levels of unemployment, one may access the additional resources for labor market policy activated by the state in order to avoid turning this situation into a phenomenon of long-term unemployment. In the context of labor market policy, the state has a range of instruments at its disposal, which, in various ways, support the unemployed in the job search process.

Instruments of the labor market policy should be tailored to the current situation and trends in the structure of unemployment. The labor markets of individual countries do not always respond to changes in the economic conditions in a way presented in theoretical studies. Labor market reactions are dependent on many factors, the most important of which seem to be the level of economic development and structure of the economy (the structure of employment by the sectors). To avoid these sources of differentiated labor market situations, the subject of the analysis in this article is the countries of the so-called Visegrad Group. These countries may be treated as operating at a similar level of economic development and are characterized by a similar structure of employment.

The evidence-based theoretical model hypothesis in this article states that the economic crisis has caused an increase in unemployment, a rise of discrimination in the labor market (e.g., on women and youth) and a change in the level and structure of expenditures in the labor market policy (LMP) adapted to the changes in the labor market.

To verify the hypothesis above, an analysis of the data related to the situation in the labor market, published by Eurostat for the Czech Republic, Hungary, Poland, and Slovakia in the years 2007-2012, has been carried out.

Methodology of the research

An objective of this work is to verify how the labor markets of the Visegrad Group countries respond to changes in the economic conditions in accordance with the literature model and, therefore, to what extent they may use the resulting recommendations to reduce unemployment. The selection of countries is dictated by their similarity in reference to the level of

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

economic development. It allows for a reduction of the factors other than the economic situation that have an impact on unemployment and the methods of its prevention. The research problem determines the methodology that has been applied. First, the analysis of the literature describing the model of the labor market response to the changes in economic conditions has been carried out, which enabled us to state the hypothesis of this article. This model has been updated with the results published in other publications, which are related to the particular problem (on the changes of activities and the presence of discrimination in the labor market).

The analysis of unemployment and prevention methods in the Visegrad Group countries was based on the data published by Eurostat. The year 2007 was chosen as the beginning of the analyzed period when positive economic trends were still visible. The end of the research period is the year 2012 because until this year, the data on the labor market policy were available. The article analyzes the changes in the level of economic growth and the accompanying changes in the level and structure of unemployment, as well as changes in the level and structure of expenditures on labor market policy. The method of statistical analysis has been applied in relation to the particular changes in the various quantities characterizing the labor market, mainly using the index method.

Unemployment and labor market policy in theory

Economic fluctuations, which usually appear first in the financial market, cause changes in the goods market and the labor market (in the form of changes in the level and structure of employment and unemployment). The economic crisis causes a decrease in the demand for work reported by employers (Neumeyer & Perri, 2005, pp. 545-580; Andolfatto, 1996, pp. 112-132; Zieliński & Jonek-Kowalska, 2011, p.46). This situation may be partly balanced by the response to the supply side of the labor market, which may go two way. On the one hand, the supply of work falls because of the appearance of the so-called “discouraged unemployed” (people who have lost their jobs and do not register in labor offices or the ones who resign from the status of the unemployed), who will return to the labor market when the employment prospects have substantially improved (Blundell et al., 2008, pp. 421–453; Pissarides, 2000, p. 172; Góra, 2005, p. 29). On the other hand, the supply of labor increases, thanks to the effect of the so-called “additional employee”, that is, the emergence of workers who thus far, have been professionally inactive in the labor market, as they have come

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

from families whose incomes have decreased due to the loss of employment by the “main breadwinner” (Cahuc & Le Barbanchon, 2010, pp. 196-205). In the literature, it is assumed that the effect of the “discouraged unemployed” is usually greater than the effect of the “additional employee” thus, the economic downturn entails the reduction of professional activity (and vice versa) (Pissarides, 2000, pp. 170-174; Kwiatkowski, 2002, p. 32; Coile & Levine, 2007, pp. 1902-1919).

An analysis of the statistical data on the labor markets in six largest EU countries during the recent economic crisis, contradicts the theoretical assumptions, unfortunately. In most of the countries the years 2008-2010 brought an increase in the professional activity of the population, and in half of them (France, the UK, and Spain), the increase in unemployment outmatched the decline in employment. Thus, the effect of “additional employees” was higher than the effect of “discouraged unemployed” persons (Zieliński et al., 2014, pp. 765-766).

The period of economic crisis is characterized by deterioration in the structure of unemployment in the form of increased participation of the so-called “problem groups” in total unemployment. The “problem groups” are classified as those with unfavorable socio-demographic characteristics, which result in a worse situation in the labor market. Among these problem groups, we may distinguish the following: women, young people, low-skilled persons, older workers, workers in declining industries, those working part-time, the disabled, etc. (Maksim, 2001, pp. 5-7). The increase of participation of these groups in total unemployment contributes to the growth of long-term unemployment and decreased professional activity (groups of discouraged unemployed) (Góra, 1994, p. 212). An economic downturn reduces the liquidity of the labor market because employers often protect their employees from dismissals, and one of the first measures to reduce the scale of the necessary reduction in employment is to suspend the inflow of a new workforce. Such a strategy adopted by employers particularly affects young people, including school graduates, who are also perceived by employers as being low-skilled, because they do not have any professional experience. Staying outside the group of employed leads to the depreciation of human capital concerning graduates and causes perturbations in their careers (Wincenciak, 2010, pp. 859-860). The situation of young people in the period of accelerating economic growth usually improves, when new businesses are created and the existing ones usually want to increase and supplement their staff.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Empirical studies confirm the discrimination of problem groups on the labor market, which is reflected in higher unemployment and lower wage levels. This occurs in relation to women (Kraal et al., 2010; Shortland, 2009; Bardasi, Monfardini, 2006; Rutkowski, 2006), the youth (Verick, 2011; Rutkowski, 2006; Golsch, 2004), low-skilled workers and low levels of education (Belan et al., 2010; Tomé, 2007; Charlot & Malherbet, 2013), immigrants, and ethnic minorities (Sa, 2011; Pereira, 2012).

The basic instrument of the state intervention aimed at reducing the level of unemployment is the labor market policy. Through it, a given country tries to adjust the structure of labor supply to the demand and to counter the imbalance in the specific segments of the labor market. Among the objectives of the labor market policy, different purposes may be listed, such as the purpose of employment (increase in employment and decrease in unemployment), structural purpose (reducing a mismatch of supply and demand for labor), production purpose (increasing workforce productivity), and social purpose (ensuring social security and leading to professional integration of the unemployed) (Wiśniewski, 1999, p. 20; Jarmołowicz & Knapińska, 2005, p. 95).

The instruments of labor market policy are usually divided into the passive and active ones. The passive instruments are of a protective nature, and their goal is to reduce the risk of a sudden drop in incomes and the associated threats (e.g., extending the scope of poverty, social exclusion). The passive labor market policy instruments including benefits for the unemployed, early retirement, and severance pay for the dismissed. The active labor market policy instruments are designed to increase the chances of permanent employment of the unemployed (Jarmołowicz & Knapińska, 2005, p. 97). In addition to the prevention of deactivation of the unemployed, they are aimed at activating the inactive people. Among the activities in the field of an active labor market policy, the following are most often mentioned (Kluve et al., 2007, pp. 27-28):

- labor market services (job search assistance) – job agency and counseling conducted by the public employment services (labor offices), which decrease the exploration costs on the labor market (both for employers and employees),
- training programs – improving the qualifications of the unemployed through courses in training institutions, as well as apprenticeship and professional training at the headquarters of employers,
- supported employment and job creation – financial support for the employers of people who were previously unemployed, activation allow-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

ances for the unemployed who are about to take jobs, subsidy and advisory assistance provided to the unemployed setting up their own businesses (start-up incentives),

- supported employment and rehabilitation – initiating special programs designed to promote employment of people with disabilities (supported employment, financing of trainings, additional job search assistance for the disabled),
- direct job creation – creation of temporary jobs in the public sector entities and non-governmental organizations, and
- special programs for young people – trainings, supported employment, job search assistance.

Job centers and career guidance counselors encourage the increase in the transparency of the labor market and the mobility of workers in reference to their qualifications and territory. The system of trainings and development of employees contribute to growth of their skills, mobility, and professional activity (Kukulak-Dolata, 2003, p. 185; Kryńska 2001, p. 57). The state, through employment services, may also decide to intervene in the labor market by subsidizing some of the costs connected with employment of the unemployed. Supported employment may take a form of organizing public works, intervention works, and preferential loans to employers who create new jobs or to the unemployed who are setting up their own businesses (Kukulak-Dolata, 2003, p. 185; Wiśniewski, 1999, pp. 27-30).

The effectiveness of activation of the unemployed depends on the economic situation. It decreases along with the increasing levels of unemployment, a decline in the labor market liquidity, and prolongation of the period of labor market imbalance (Wiśniewski, 1999, pp. 20-21; Kryńska 2001, p. 42). In addition, in the conditions of an economic crisis, the state operates at a strong reduction of the budget, and the transformation of supported employment into stable jobs is much less likely than in the conditions of prosperity.

The labor market policy is an essential tool for reducing the level of unemployment among the problem groups. Without the help from the state, these groups are exposed to long-term unemployment, resulting in professional consequences (reduction in qualifications), as well as psychological and health ones (Maksim, 2001, pp. 6-7; Góra, 1994, p. 212). Reducing long-term unemployment fosters the launch of special programs, which, in weak economic conditions, are often effective only temporarily. After they have finished a return of people taking part in these programs to the pool of the unemployed may be observed.

Unemployment and labor market policy in the Visegrad Group countries in the years 2007-2012

To illustrate the factors influencing the level and structure of unemployment, besides the changes in economic conditions, other factors have been taken into account; these factors include the population of people aged 15 to 65 years, the level of employment, and the professional activity rate, which are considered the quotient of the sum of the employed and unemployed and the total population aged 15 to 65 years (Table 1).

Table 1. The basic factors characterizing the situation of the labor market in the Visegrad Group countries in the years 2007-2012

Count-ry	Year	Real GDP growth rate	Population aged 15 to 65 years (1,000 persons)	Employment (1,000 persons)	Unemployment (1,000 persons)	Professional activity ratio
Czech Republic	2007	5.7	7346.7	4922.0	276	70.8
	2008	3.1	7410.4	5002.5	230	70.6
	2009	-4.5	7431.0	4934.3	352	71.1
	2010	2.5	7399.5	4885.2	384	71.2
	2011	1.8	7295.8	4872.7	351	71.6
	2012	-1.0	7229.1	4890.0	367	72.7
Hungary	2007	0.1	6799.7	3926.2	312	62.3
	2008	0.9	6794.2	3879.4	329	61.9
	2009	-6.8	6770.9	3781.8	421	62.1
	2010	1.1	6769.3	3781.2	475	62.9
	2011	1.6	6770.2	3811.9	468	63.2
	2012	-1.7	6715.7	3877.9	476	64.8
Poland	2007	6.8	26298.7	15240.5	1579	64.0
	2008	5.1	26265.7	15799.8	1165	64.6
	2009	1.6	26338.3	15868.0	1359	65.4
	2010	3.9	25842.0	15473.1	1650	66.3
	2011	4.5	25813.8	15562.1	1659	66.7
	2012	2.0	25697.4	15590.7	1749	67.5
Slovakia	2007	10.5	3873.0	2357.2	293	68.4
	2008	5.8	3891.8	2433.7	254	69.1
	2009	-4.9	3916.6	2366.3	321	68.6
	2010	4.4	3926.2	2317.5	386	68.9
	2011	3.0	3882.3	2315.3	363	69.0
	2012	1.8	3881.0	2329.0	378	69.8

Source: Eurostat, economy and finance/annual national accounts/real GDP; population and social conditions/labor market/employment and unemployment (1.12.2014)

In the first year of the research, the analyzed countries were characterized by a very good economic situation, apart from Hungary, which reported economic stagnation in 2007. In the following year, there was a deterioration of economic growth, which, in 2009, took the form of a recession in

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

three of the analyzed countries. The recession did not occur in Poland, but the year 2009, in this case, was characterized by the lowest level of growth. It may be noticed that the two consecutive years brought an upturn, but in 2012, there was a “second downturn” of the economic situation in the Czech Republic and Hungary, where a recession appeared again.

When analyzing the changes in the level of employment and unemployment in response to changes in the economic conditions, it appears that their direction is consistent with the literature model. An economic slowdown was usually accompanied by a decline in employment and a rise in unemployment, but each of the analyzed countries shows some specificity. In the Czech Republic in 2011, there was a simultaneous decrease in employment and unemployment along with economic growth at the level of 1.8. The next year brought both employment and unemployment increases in the conditions of the recession. Hungary was characterized by an increase in employment in 2011-2012 when economic growth was at the level of 1.6 and recession at 1.7. The level of employment in Poland grew steadily (except for the year 2010), but there was a certain shift in the time of employment response to the economic situation (in 2010, the decline in employment at the economic growth of 3.9 occurred more as a reaction to the economic growth of 1.6 from the previous year). Since 2008, employment growth in Poland has been accompanied by an increase in the level of unemployment. The Slovak economy has been steadily losing jobs since 2008, and only a slight improvement was recorded in 2012, but it was actually a result of the economic recovery in the previous years (economic growth in 2012 was only 1.8). This phenomenon was accompanied by a gradual increase in unemployment, and in 2011, a decline was reported.

By analyzing changes in the population of people aged 15 to 65 years, its drop may be noticed in the first three of the analyzed countries, respectively, by 1.6% in the Czech Republic, 1.2% in Hungary, and 2.3% in Poland. Only Slovakia recorded an increase in the number of the working-age population by 0.2%. Despite this, the pressure on the labor market was growing as a result of an increase in the professional activity of the population, which was treated as a quotient of the sum of the employed and unemployed and the total population aged 15 to 65 years. Most strongly, in the years 2007-2012, the professional activity ratio rose in Poland (3.5%), and it may have been caused by a relatively low input level, and the best economic situation of the analyzed countries. In other analyzed countries, the professional activity ratio rose by 2.5% (Hungary), 1.9% (Czech Republic), and 1.4% (Slovakia). Similarly to the large EU countries men-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

tioned in the introduction, in the period of 2008-2012 in the Visegrad Group countries, the effect of additional employees was higher than the effect of the discouraged unemployed. This may cause serious problems when it comes to the effectiveness of the labor market policy, as the previously unemployed people looking for work in a situation when the employers reduce the demand for labor, and, if necessary, they may complement their staff with the unemployed who have relatively high qualifications.

To investigate whether, in the labor markets of the Visegrad Group countries, one may notice deterioration in the situation of problem groups (women and youth) in response to the economic downturn, a compilation of change indexes in the number of the unemployed in the analyzed sections who were characterized by unemployment rates was prepared (Table 2).

When analyzing the unemployment rate, the rate for women differs little from the unemployment rates for the entire population. In the Czech Republic, the unemployment rate of women in the analyzed period was higher than the average by 1.0% to 1.4%, in Poland from 0.3% to 0.8%, and in Slovakia from 0% to 1.6%. In the case of Hungary since 2009, the unemployment rate of women was lower than or equal to the unemployment rate for the entire population. Between the years 2007 and 2012, the relative situation of women in the labor market, as measured by the proportion of unemployment rates in the Visegrad Group countries, improved, and the only exception was Poland where the difference in the disadvantages between the women's unemployment rate and the total unemployment rate grew by 0.1%.

Similar conclusions may be drawn based on the change indexes in the number of the unemployed. In the years of the worst economic situation (2009 and 2012), in only three cases out of eight, increasing indexes in the number of unemployed women were higher than the index for the entire population. For the whole period of 2007-2012, the index of increase in the number of unemployed women was significantly lower than the index for the population in the Czech Republic (by 9.5 points), Hungary (by 8.7 points), and Slovakia (by 12.2 points). This index grew more quickly only in Poland, but its growth was minimal (0.6 points). The above data allow us to conclude that the period of economic crisis (slowdown) did not contribute to the increase in discrimination against women in the labor market; in fact, in most of the countries, their situation in the labor market has relatively improved.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 2. Change indexes in the number of the unemployed and the unemployment rate among women and youth in the Visegrad Group countries in the years 2007-2012

Count-ry	Year	Change indexes in the number of the unemployed			Rate of unemployment		
		Entire population	Wo-men	People aged up to 25 years	Entire population	Wo-men	People aged up to 25 years
Czech Republic	2007	-	-	-	5.3	6.7	10.7
	2008	83.3	83.0	89.1	4.4	5.6	9.9
	2009	153.0	139.4	173.2	6.7	7.7	16.6
	2010	109.1	109.0	102.8	7.3	8.5	18.3
	2011	91.4	93.3	91.8	6.7	7.9	18.1
	2012	104.6	105.0	109.0	7.0	8.2	19.5
	12/07	133.0	123.5	158.7			
Hungary	2007	-	-	-	7.4	7.7	18.1
	2008	105.4	104.7	105.2	7.8	8.1	19.9
	2009	128.0	120.6	129.5	10.0	9.7	26.5
	2010	112.8	112.3	100.0	11.2	10.7	26.6
	2011	98.5	102.4	97.5	10.9	10.9	26.1
	2012	101.7	99.1	110.4	10.9	10.6	28.1
	12/07	152.6	143.9	146.6			
Poland	2007	-	-	-	9.6	10.3	21.6
	2008	73.8	76.3	76.6	7.1	7.9	17.2
	2009	116.7	110.7	117.4	8.1	8.6	20.6
	2010	121.4	119.4	115.1	9.7	10.0	23.7
	2011	100.5	104.3	101.5	9.7	10.4	25.8
	2012	105.4	106.0	99.0	10.1	10.9	26.5
	12/07	110.8	111.4	104.0			
Slovakia	2007	-	-	-	11.2	12.8	20.6
	2008	86.7	87.2	85.0	9.6	11.0	19.3
	2009	126.4	116.9	137.3	12.1	12.9	27.6
	2010	120.2	115.1	118.6	14.5	14.7	33.9
	2011	94.0	91.4	90.4	13.7	13.7	33.7
	2012	104.1	108.8	101.3	14.0	14.5	34.0
	12/07	129.0	116.8	126.7			

Source: Eurostat, population and social conditions/labor market/employment and unemployment (1.12.2014)

This situation is different in the case of young people. The observed unemployment rates of people aged up to 25 years in all countries strongly deviate upward from the average. In absolute terms, the worst situation of youth present in Slovakia (where the unemployment rate since 2010 has exceeded 30%), whereas the lowest unemployment rate of young people is reported in the Czech Republic (the unemployment rate throughout the whole period did not exceed 20%). Comparing the increase in the youth unemployment rate between the years 2007 and 2012, the highest increase occurred in Slovakia (13.4%), whereas the lowest occurred in Poland

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

(4.9%). Analyzing the changing relationship between the youth unemployment rate and the total unemployment rate in the years 2007-2012, it may be noticed that it deteriorated in all countries, respectively, in the Czech Republic, it increased from 2.0 to 2.8, in Hungary from 2.4 to 2.6, in Poland from 2.3 to 2.6, and in Slovakia from 1.8 to 2.4.

The deterioration of the situation of young people in the labor market is not as clear in the case of the analysis of change indexes in the number of the unemployed. On the one hand, in the worst economic years (2009 and 2012), in six cases out of eight, the index of increase in the number of the unemployed in the age group up to 25 years old was higher than the index for the entire population. On the other hand, for the entire 2007-2012 period, the increase in the index of the number of the unemployed in the group up to 25 years old was significantly higher than the index for the entire population only in the Czech Republic (by 25.7 points). In the other countries, the index of increase in the number of the unemployed in the group up to 25 years old was lower than the index for the population. The above data allow us to conclude that the period of economic crisis (slowdown) contributed to an increase in discrimination against people under the age of 25 years old in the labor market (as indicated by changes in the unemployment rate). Furthermore, the absolute level of unemployment in this group is growing relatively more slowly than in the total population in three of the analyzed countries, probably due to a delay of introduction into the labor market and / or a reduction in the size of this group because of demographic reasons (as indicated by the increase index in the number of the unemployed).

The most recent data on the expenditure on the labor market policy (LMP) are available for the year 2012 (in the case of Poland for 2011). To facilitate the analysis, the expenditures on LMP may be divided into three groups: labor market service (column 4 of Table 3), passive labor market policies (in Table 3, column 9), and active labor market policies (in Table 3, columns 5 to 8).

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Table 3. Level and structure of expenditure on LMP in the Visegard Group countries in the years 2007-2012

Country	Year	Level and structure of expenditure on LMP						
		Total (mln €)	Structure of expenditure (in %)*					
			1	2	3	4	5	6
Czech Repu-blic	2007	588.92	28.8	1.7	5.8	14.8	4.8	44.1
	2008	645.50	27.7	1.7	3.3	15.7	6.5	45.1
	2009	1007.66	17.6	3.8	3.5	9.7	5.6	59.8
	2010	1045.02	16.1	6.0	7.3	11.5	6.7	52.4
	2011	863.87	17.5	2.2	7.9	16.6	5.3	50.5
	2012	758.60	22.2	2.5	4.2	18.8	4.0	48.3
Hunga-ry	2007	709.60	11.9	8.3	14.1	-	15.0	50.7
	2008	761.40	12.2	9.0	14.3	-	13.3	51.2
	2009	1069.14	7.6	4.2	7.9	-	21.3	59.0
	2010	1319.34	6.6	3.7	7.5	-	29.3	52.9
	2011	1026.40	1.6	2.5	9.6	-	21.9	64.4
	2012	1116.49	10.5	0.3	11.4	-	41.3	36.5
Poland	2007	3151.50	9.4	10.0	5.2	18.3	6.4	50.7
	2008	3285.75	9.7	13.6	6.3	22.9	8.9	38.6
	2009	2985.23	10.2	4.1	16.9	22.1	11.6	35.1
	2010	3673.86	8.9	3.5	20.7	20.7	13.2	33.0
	2011	2675.69	11.7	1.6	12.0	26.6	5.9	42.2
Slova-kia	2007	321.80	18.1	0.8	2.8	2.3	14.0	62.0
	2008	446.91	16.0	1.5	2.2	2.4	15.5	62.4
	2009	581.47	11.1	1.3	3.3	2.9	8.8	72.6
	2010	617.26	10.7	0.6	10.4	3.7	10.1	64.5
	2011	546.79	9.1	0	12.6	5.3	10.3	64.5
	2012	492.10	9.6	0.2	11.7	7.1	8.3	63.1

*1- labor market service; 2- training; 3- employment incentives; 4- supported employment and rehabilitation; 5- direct job creation and start-up incentives; 6- out-of-work income maintenance and support and early retirement

Source: Eurostat, population and social conditions/labor market/employment and unemployment/labor market policy/public expenditure on labor market policy (1.12.2014).

When analyzing the total LMP, it may be noticed that their highest levels of expenditure on LMP occurred in all analyzed countries in the year 2010, two years after the first downturn of the economic situation. It was also the year with the highest level of unemployment in the Czech Republic and Slovakia, as well as almost the highest in Hungary (about 1,000 more people were unemployed in 2012). Having high expenditures on LMP in 2010 was probably one of the reasons for reduction in the level of unemployment in the following year (in three of the analyzed countries) and the slowdown in unemployment growth in Poland.

The structure of expenditures on the LMP varied in the particular countries in different ways. In the Czech Republic, the amount of spending on passive labor market policies ranged from 44.1% in 2007 to 59.8% in 2009,

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

and then in subsequent years, it gradually fell. Therefore, the relation of this group of expenditures with the unemployment rate can be noticed. Expenditures on the labor market service were relatively stable, and the fluctuations of their share were mainly due to changes in the level of total LMP. As part of active labor market policies (ALMPs), an increase in total expenditures in 2010 can be observed, as well as a further increase in spending in 2011 in the group of supported employment and rehabilitation. The Czech Republic stands out among the examined countries in respect to an increase in spending on training during the growth of unemployment. This is probably because the unemployment rate in the Czech Republic is clearly the lowest among the examined countries (the highest level reached 7.3%). Further, at a low level of unemployment, the effectiveness of training as a way of reducing unemployment may prove to be successful.

Hungary shows very serious fluctuations in expenditures in passive labor market policies, which reached 59% in 2009 and 64.4% in 2011 and fell to 36.5% in 2012. Very serious fluctuations also occur in the context of labor market service, the shares of which fell sharply in 2011 (to 1.6%) to grow even more rapidly in the following year (to 10.5%). As a part of ALMPs, Hungary has not listed a group of expenditures for supported employment and rehabilitation. Throughout the whole period, the expenditures on training decreased to achieve a share of 0.3% in 2012. The Hungarian labor market policy focused on the expenditures in the group of direct job creation and start-up incentives, whose participation was by far the highest among the analyzed economies, and in 2012 even surpassed spending on passive labor market policies. The expenditures on employment incentives were relatively stable, and fluctuations in their share were mainly due to changes in the level of total LMP.

In Poland, the amount of expenditures on passive labor market policies in total LMP was the lowest among the examined countries during the first downturn, which is strongly linked to the fact that Poland managed to avoid the period of recession and associated mass dismissals of workers who were entitled to unemployment benefits. Just as in the Czech Republic, expenditures on labor market service were relatively stable, and their fluctuations were mainly due to changes in the level of total LMP. Since 2009, the share of expenditures on training gradually declined. Other groups of expenditures on ALMPs grew in the years 2009-2010. The growth in supported employment and rehabilitation was recorded in 2011, whereas shares of the other expenditure within ALMPs in 2011 significantly decreased.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Slovakia was hit by the highest level of unemployment among the countries analyzed, even though it has spent by far the largest amount of resources on passive labor market policies, the share of which in 2009 reached 72.4%. In absolute terms, as well as relative ones, after the downturn in 2008, the expenditures on labor market service in Slovakia dropped. In terms of expenditures on ALMPs, the least was spent on trainings, approaching zero in 2011-2012 (the reasons for this may be low effectiveness of this instrument at the time of a high rate of unemployment). Among the most important ALMPs in Slovakia since 2010 are those for employment incentives. Significant resources are also spent on direct job creation and start-up incentives.

Conclusions

The statistical data analysis conducted in this paper allows us to draw the following conclusions:

1. In the Visegrad Group countries, there was a trend to increase the professional activity of the population, which were treated as the sum of the number of the employed and unemployed during the time of the last economic crisis. This results in a deepening of the labor market imbalance, and it reduces the effectiveness of the labor market policy (due to the fact that it activates people who, so far, have stayed away from the labor market, most of whom are low-skilled).
2. In the labor markets of Visegrad Group countries, the economic crisis did not lead to an increase in discrimination against women (in Hungary, since 2009, the unemployment rate of women was even lower than that of men), while the situation of young people deteriorated significantly. For young people the unemployment rate in all countries was more than twice as high as for the total population.
3. Expenditures on LMP are positively associated with the level of unemployment, and in most countries, there is also a positive relation of unemployment and spending on passive labor market policies.
4. The relation between spending on training and the level of unemployment was identified. These expenses are rising in the period of economic downturn with a relatively low unemployment rate, and they are falling with high rate of unemployment.
5. Priorities within ALMPs are varied. The Czech Republic and Poland, in recent years, have spent the most resources on supported employment and rehabilitation, while Hungary has spent the most resources on direct

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

job creation and start-up incentives, and Slovakia has spent the most on employment incentives.

6. The least stable labor market policy, from the perspective of changes in the share of expenditures within LMP, is supported by Hungary, whereas the most stable one is that of the Czech Republic.

These conclusions allow us to partially confirm the hypothesis stated in the introduction. The economic crisis increased the level of unemployment, and it also led to an increase in discrimination in the youth labor market and the rise in the level of LMP expenditures, which was caused by changes in the labor market. However, the part of the hypothesis about discrimination against women on the labor market was not confirmed. The variability of the changes in the structure of expenditures on ALMPs in the individual countries cannot provide any reliable reason to believe that they are responsive to the changes in the labor market.

The results of the analysis of the statistical data presented in this article may be treated as a prelude to further extended research. First of all, it would be advisable to study, for a longer period of time, to what extent the observed relations are statistically significant, especially to what extent the structure of LMP expenditures translates into the reduction of the level of unemployment. This would allow us to propose some adjustments of the labor market policies in an attempt to increase its effectiveness.

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18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
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18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
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**Accession to the Eurozone as Lithuania's
Exit Strategy From the Currency Board
System**

JEL Classification: *E31; F31; F36*

Keywords: *Currency Board; Inflation; Euro Adoption; Lithuania*

Abstract: In the years 2004-2014 the Lithuania's exchange rate policy was based on a rigid currency board system. After a period of uncontested success in the fight against inflation in the first decade of the transition and economic growth, entering the ERM II in 2004 and efforts to adopt the euro were treated as an optimal exit strategy from the currency board system. However, the consequences of this exchange rate system in the following years (until 2014) prevented Lithuania from meeting the economic convergence criteria.

The starting point for the research is based on the theoretical analysis of literature studying benefits and risks associated with the use of the currency board system by the monetary authorities. The empirical analysis refers to the case of Lithuania and covers the years 2004-2014. The purpose of this analysis is to look at the effects of the use of the currency board system from the perspective of the convergence criteria of monetary nature and the extent of their implementation in the absence of opportunities for autonomous monetary policy.

Introduction

One of the modern varieties of the rigid exchange rate systems is the currency board system. It was used during the systemic transformation in the Baltic States - Lithuania and Estonia. While the use of the currency board system largely contributed to the stabilisation of the economy and the effective suppression of inflation in the first decade, after the accession to the European Union in 2004 it also began to show the negative consequences of this exchange rate system. In the Baltic States - in contrast to other economies in Central and Eastern Europe - after reaching the macroeconomic stabilisation no changes in the exchange rate system into a more flexible system were introduced. Both in Estonia and Lithuania rapid adoption of the euro was treated as an exit strategy from the currency board system (see Gulde et al., 2000; Brixiova et al., 2010, p. 222). However, despite the accession of these economies as early as June 2004 to the ERM II, in the subsequent years there were serious problems with meeting the convergence criteria, especially the inflation criterion. In addition, under the impossibility of carrying out an autonomous monetary policy as a result of the global financial crisis, these countries experienced a very deep economic downturn. Finally, Estonia was incorporated into the Eurozone on 1 January 2011, while Lithuania only on 1 January 2015. A particularly interesting case is the Lithuanian economy, which in 2006 ran less than 0.1 percentage point to meet the inflation criterion, and because of the limitations associated with the currency board system this criterion was possible only in 2014.

The purpose of this article is to confront the theoretical risks of a currency board with the experience of Lithuania. The conclusions from the analysis are universal as they permit to describe the consequences of the situation when it is not possible to run an autonomous monetary policy, both in good economic times and in the face of the global financial crisis.

Methodology of the research

The starting point for the research is - based on the studies of the specialist literature - the theoretical analysis of the benefits and risks associated with the use of a currency board system in the economy, particularly the consequences of renunciation by the monetary authorities of conducting autonomous monetary policy.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

The empirical analysis refers to the case of Lithuania and covers the years 2004-2014, i.e. the period within the ERM II. The purpose of this analysis is to look at the effects of the use of the currency board system in good economic times and in the crisis conditions through the prism of the extent to which the convergence criteria of the monetary nature were realised. What will also be taken into account is the experience of other economies that used the currency board system in modern times and moved away from the pursuit of such an exchange rate policy. This will enable answering the question whether the risks associated with the use of a currency board system are due to the specific conditions of a given economy or whether they stem from the essence of a rigid exchange rate system.

Benefits and risks of a currency board - theoretical analysis

Currency board (CB) is defined as a monetary institution that provides the exchange of the monetary base only in exchange for foreign currency representing foreign exchange reserves (Enoch & Gulde, 1998; Williamson, 1995, p. 2). The theoretical basis of the currency board system dates back to the year 1800; it was first introduced in 1849 in the British colony of Mauritius, and then widely used, mainly in the British colonies. It was most common in the 1940s and 1950s but then there was a shift from this exchange rate solution in favour of the independent national currency. Renewed interest in this system appeared in the early 1990s, when the currency board was introduced by the governments of Argentina, Estonia and Lithuania (see more Williamson, 1995, pp. 5-11; Wolf et al, 2008, pp. 7-18).

Theoretically, the institution of the currency board can replace the central bank or it may function besides the existing central bank. Foreign exchange reserves held by the CB correspond to 100-110% of the monetary base and are maintained in the currency which the national currency is linked to in the form of deposits of high liquidity and safety in reputable institutions. Only the currency of a country of high stability and low inflation, which is also the most important trading partner (see Gulde et al., 2000, pp. 5-6), can be selected as a currency anchor. In the currency board system there is a full convertibility of the national currency into the reserve currency, which means that at each request the central bank allows an exchange of the national banknotes and coins into foreign currency at a fixed rate. It does not exercise control over commercial banks and it does not function as the lender of last resort. The central bank cannot finance the

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

budget deficit and the monetary authorities are independent of political decisions. A commitment to the long-term use of the CB by appropriate legislation helps to enhance the credibility of the system (compare Hanke, 2002, pp. 204-206). Stronger commitment to maintain the currency board would entail greater benefits from the introduction of this exchange rate solution.

The main advantages of the introduction of the currency board include (see Imam, 2010, p. 20; Gulde et al., 2000, pp. 2-6; Wolf et al., 2008, pp. 27-30):

- increased macroeconomic policy discipline and its credibility (i.e. the disciplining effect);
- eliminated exchange rate risk in trade;
- lost ability of the central bank to conduct monetary policy aimed at achieving short-term goals, which is a message to the outside world of the strict observance of the rules;
- imported credible monetary policy from the outside (i.e. credibility effect);
- ‘anchored’ inflation at the level of the inflation occurring in the country which the currency exchange rate is tied with.

However, alongside the benefits of using a currency board system, related to the possibility of limiting inflation, the use of the exchange rate regime also involves certain risks for inflation trends from the outside. This is because the supply of money in the monetary system is dependent on the money issued by the reserve country (see Antas, 2001; Jakubiak, 2000). The reason for the creation of inflation in the currency board system can also be an increase in the money supply as a result of the influx of foreign capital and development of a positive balance of payments. Sławinski (2007, p. 289) sees renunciation by the monetary authorities of the ability to influence the level of real interest rates as the main source of threats to the currency board system. This is because it means the inability to conduct monetary policy, which cannot counteract the pro-cyclical changes in real interest rates, and could lead to a rapid accumulation of imbalances in the economy. In the event of any adverse external shocks the high rigidity of prices and wages may be associated with a decline in the competitiveness of the economy and hinder economic growth. In the currency board system automatic control of the money supply by matching at the level of the interest rate simultaneously causes significant fluctuations in interest rates. It is particularly fierce in a situation of declining confidence of foreign investors and capital flight. A developed and strong banking sector, which is well

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

able to cope with significant fluctuations in interest rates (Enoch & Gulde, 1998) is mentioned as a condition for the effective application of the currency board, and thus achieving the goal of curbing inflation.

**Currency board system in Lithuania before entering
the ERM II - historical overview**

In Lithuania the currency board (CB) system was introduced on 1 April 1994, after almost two years of the floating exchange rate regime. The Lithuanian litas (LTL) was pegged to the US dollar in the relation of 4 LTL = 1 USD (Alonso-Gamo et al., 2002, p. 5). The dollar served as the reserve currency since January 1994. Initially, Lithuania based its currency board model on the Estonian system. Two departments were part of the central bank: Foreign Department and Monetary Policy Department. The primary objective of the Bank of Lithuania, determined in the legislature, was to achieve monetary stability. The central bank was responsible for the monetary policy of the country, managed the foreign currency reserves, as well as monitored the use of the currency board system. In addition, it was responsible for the banking supervision. It could make loans to commercial banks and other financial institutions at risk of losing liquidity (the credit value, however, could not exceed 60% of the commitments of the assisted institution) (Bank of Lithuania, 1994). The change in the nominal exchange rate in Lithuania by the central bank could take place after the consultation with the government, and only in the case of extraordinary circumstances threatening the stability of the economy (Jakubiak, 2000, p. 10). This meant less restrictive protection of the currency board system in comparison with the countries in which the change is subject to the consent of the Parliament. The level of foreign currency reserves provided 100% coverage of the monetary base and liquid liabilities of the central bank. The scope of the obligations of the central bank, however, did not include loans, mainly from the International Monetary Fund.

The prerequisite for the decision to introduce the CB system in Lithuania was to quickly build full confidence of its own citizens and foreign investors in the domestic currency. The litas, pegged against the US dollar, also acted as an anti-inflationary anchor. The use of the CB system was designed to communicate the financial markets the lack of experience in the conduct of monetary policy will be compensated for by the observance of strict rules to ensure price stability. In 1997, after the crisis of the banking system in Lithuania, there was an attempt to change the currency board

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

system into a more flexible exchange rate system before joining the ERM II. In 1998, the Bank of Lithuania became a lender of last resort, but finally in 2000 the Bank officially resigned from conducting open market operations. The remaining strategic objective of the bank was to take care of price stability. In October of 1999, in connection with the growing ties between the Lithuanian economy and the European Union as well as the future Lithuania's accession to the Eurozone, the decision was taken to change the reserve currency from the dollar to the euro starting from February 2002 (see more Alonso-Gamo et al., 2002, pp. 4-11). The effect of this action was the phenomenon of 'dedollaring' of the economy in 2001-2002. After applying these changes, the dollar weakened significantly in relation to the national currency, although it was officially announced that the litas would not be devalued or revalued against the new currency anchor. Finally, the course was set at 1 euro = 3.4528 litas.

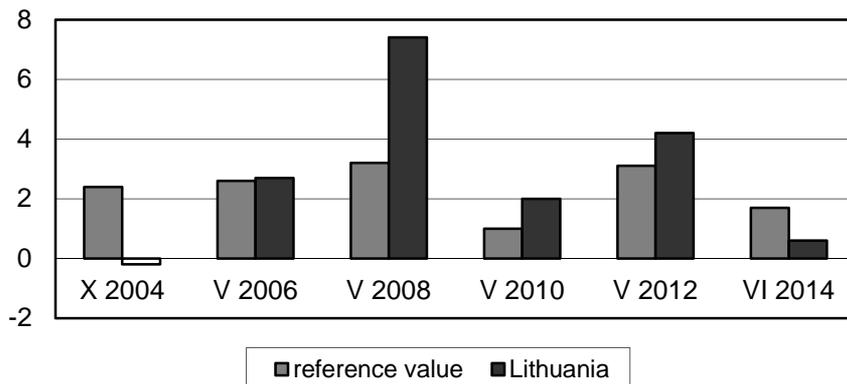
Along with the use of the CB system Lithuania enjoyed a lot of success in reducing inflation. Average annual inflation rate gradually declined: from 39.66% in 1994 to 24.62% in 1995 to 8.88% in 1996 and 5.07% in 1997. Even during the turmoil in global financial markets in the late 1990s (effects of the Czech, Asian and Russian crises), despite small fluctuations in individual months, the inflation rate persisted at a very low level - the average inflation rate was 0.75% in 1998 and 0.99% in 1999. In 2000-2003, the average annual inflation rate did not exceed 1.36%, and the country even experienced a temporary deflation (-1.13% in 2002). The fixed exchange rate and rapid liberalisation of capital flows contributed to the development of foreign trade and economic growth. Since 2000, Lithuania entered the path of rapid economic growth, recording the annual changes in the GDP volume from 4.23% in 2000 to as much as 10.25% in 2003. At the same time the exchange rate policy forced the authorities to conduct prudent fiscal policy (Sławiński, 2007, p. 280). In the first decade of using the currency board system, thus, many benefits revealed, especially in terms of suppressing inflation. In 1999-2004, the average annual inflation rate was the lowest among the economies of Central and Eastern Europe. However, the string of economic success of Lithuania - referred to as one of the "Baltic Tigers" - after joining the European Union in 2004, and later to the ERM II, symptoms began to appear indicating the existence of significant limitations associated with the use of such a restrictive exchange rate.

Monetary convergence in Lithuania in the conditions of the currency board

In connection with the strategy adopted by the monetary authorities of Lithuania - from the currency board to the euro (see Gulde et al., 2000, pp. 16-18), on 28 June 2004 the litas was included in the ERM II. Lithuania maintained its commitment to the use of the currency board and unchanged litas pegged to the euro. So restrictive exchange rate policy thus guaranteed meeting the first of the monetary criteria - exchange rate stability after two years in the ERM II, which was in June 2006. At the same time, however, it had a significant impact on the implementation of the other two monetary criteria – of price stability and of convergence of interest rates. It should be noted that the experience of other economies of Central and Eastern Europe showed a clear imperfection of the convergence criteria for the countries aspiring to join the euro zone, especially the inconsistency of the exchange rate and inflation criteria (see more Źuchowska, 2011, pp. 8-25).

The price stability criterion means that the rate of inflation, observed over a period of one year before the examination, does not exceed the inflation of the three EU member states with the most stable prices by more than 1.5 percentage points. Figure 1 shows the degree of meeting this criterion by Lithuania in the periods preceding the publication of the consecutive convergence reports. It is clear that this criterion was met in October 2004, that is, in the initial period in the ERM II, and then only in June 2014. In other reference periods the differences ranged from 1% to as much as 4.2%.

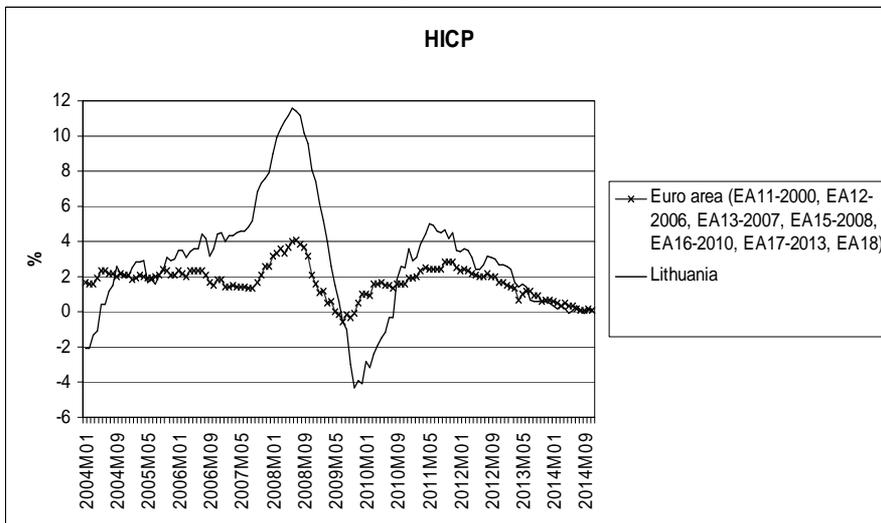
Figure 1. Meeting price stability criterion by Lithuania



Source: own calculations based on: ECB, 2004, 2006, 2008, 2010, 2012, 2014.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Figure 2. HICP in Lithuania against the Euro area average between January 2004 and November 2014 (monthly data y/y)



Source: Eurostat (27.12.2014).

The analysis of the historical data shows that the inflation in consumer prices in Lithuania remained at a relatively low level until mid-2006 (see Fig. 2). However, the problems of the rising inflation started already in May 2004 and were associated with the accession shock. In 2006 Lithuania minimally did not meet the criterion of the price stability and did not enter the euro area (12-month average rate of HICP inflation was 2.7%, which was just above the reference value stipulated in the Treaty, which was 2.6%). What should be noted while assessing the level of inflation in Lithuania during this period are the restrictions on the formation of the money supply by the central bank resulting from the application of the CB. The interest rates in the country were in fact related to the interest rates of the euro area, and the rigid link of the litas to the euro entailed a limited ability to respond to the short-term fluctuations in the inflation rate (Baran 2007, p. 42). Threats of rising inflation in Lithuania, which were then pointed out, include: harmonisation of excise duty to the EU level, dynamic output growth fueled by strong credit growth and low interest rates, as well as emerging bottlenecks in the labour market, which carry a risk of increasing unit labour costs and - consequently - domestic prices (ECB 2006, p. 20). The HICP inflation continued to rise sharply in 2007, reaching a record level of 11.6% in June 2008. At the same time the Lithuanian economy

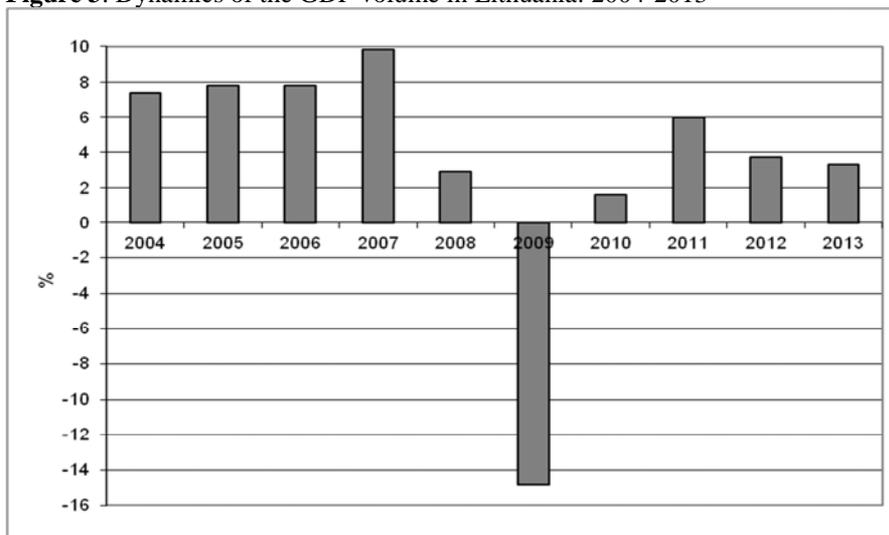
**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

showed growing signs of overheating and emerging significant imbalances. In 2004-2006 the real GDP growth remained at a level above 7% and reached 9.8% in 2007 (see Fig. 3). It was mainly stimulated by the high domestic demand. While the economy rapidly hastened, after joining the EU there was an outflow of human resources, so unemployment fell to the historically low levels; as a result, unit labour costs increased significantly. The domestic demand boom ended abruptly in 2008, which was due to the weakening external demand as a result of the outbreak of the global financial crisis. Just as in other CEE countries, due to the crisis of confidence there was a rapid outflow of foreign capital from Lithuania. In view of the fact that the currency board system does not allow to run an autonomous monetary policy, the monetary authorities could not actively resist the deteriorating economic situation of the country (see more Purfield, 2010). For most of 2008 Lithuania - as the only Baltic economy - stood firm against a strong economic slowdown, but in the fourth quarter the GDP decreased by 2.2% y/y. In 2009, the GDP declined at a record high level of 14.8% y/y (see Fig. 3). The economic downturn during the global crisis caused a rapid disinflation process in the Lithuanian economy, which turned up into a periodic deflation. In the second half of 2008 there was a downward trend in inflation (see Fig. 2). In 2009, the HICP inflation fell sharply, with the June level of only 0.6% (y/y), while the period from July 2009 to August 2010 was characterised by a negative growth rate of consumer prices (deflation ranged from -0.3% to -4.3% (y/y)). This allowed Lithuania to regain price competitiveness of its economy. As noted in the Convergence Report of May 2010, such a situation in the field of inflation should be analysed against the background of a strong reduction in domestic spending and reduction of the price dynamics shaped on the global markets (ECB 2010, p. 46). The return of the GDP growth was associated with an increase in the inflation process in September 2010. The monthly inflation (y/y) increased steadily, in May 2011 reaching the level of 5% and then keeping up at a level above 4% until November 2011 (see Fig. 2). This was also associated with the increases in the global food and energy prices (ECB 2012, p. 83). In 2012, the inflation rate fluctuated around 2.4-3.6%. As a result of the favourable changes in the global commodity prices as well as a decline in food and administered prices, the downward trend in inflation continued in 2013: it fell from 2.6% in January to just 0.5% in December. By 2014, the ratio of consumer prices fluctuated around zero (see Fig. 2). The dynamics of inflation remained at a very low level; temporary deflation was also reported. In contrast, during the reference period - from May 2013 till April

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

2014 - the 12-month average rate of the HICP inflation in Lithuania was 0.6%, which was significantly lower than the 1.7% reference value for the criterion on price stability (ECB 2014, pp. 83-84). After 10 years in the exchange rate mechanism of ERM II Lithuania met the inflation criterion.

Figure 3. Dynamics of the GDP volume in Lithuania: 2004-2013



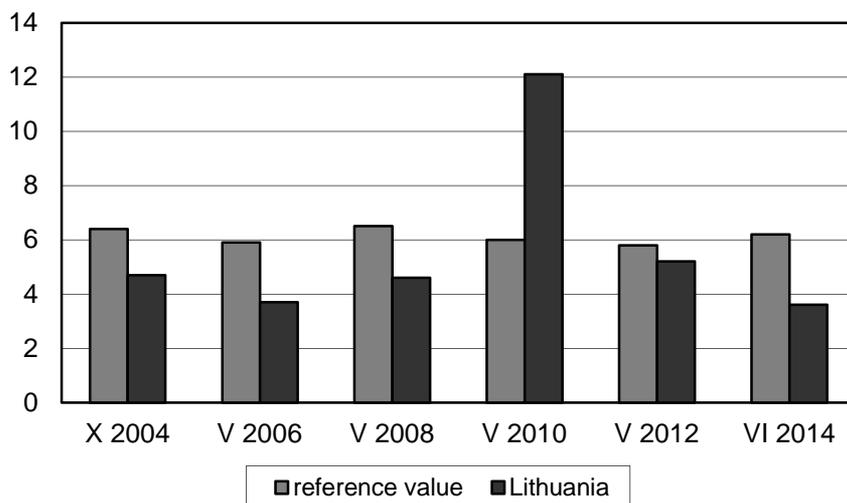
Source: Eurostat (25.12.2014).

The criterion for the convergence of interest rates means that within one year before the examination the Member State had an average nominal long-term interest rate that does not exceed by more than 2 percentage points that of the three EU member states with the most stable prices. As shown in Figure 4, Lithuania met this criterion, with the exception of the reference period after the global financial crisis from April 2009 to March 2010, when the long-term interest rate was above the reference value by 6.1%. This was due to the turmoil in the global financial markets, a downgrade of the country and a decrease in liquidity resources (ECB 2010, p. 47). Also in the field of meeting this monetary criterion there revealed negative consequences of the currency board. When economic growth fell below the potential rate, the monetary authorities of Lithuania could not lower the short-term interest rates to counteract their pro-cyclical changes and reduce the risk of recession. What is more, the more the pace of economic growth got reduced, the more the risk of default of domestic enterprises grew. There was an increase in the long-term interest rates and the likeli-

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

hood of a recession was growing. These consequences were especially pronounced during the global financial crisis (see Fig. 5). While between January 2004 and August 2008 the differences in the long-term interest rates did not exceed 1 percentage point, in the following months they increased to more than 5 percentage points in December 2008, and then exceeded 10 percentage points until November 2009 (long-term nominal interest rates in Lithuania were then as high as 14.5%). At the end of 2010, the nominal interest rate stood at 5.15%, which was slightly lower than before the onset of the turmoil in the global financial markets. In contrast, the differences between the Lithuanian long-term interest rate and the average for the euro area ranged only from 0.41 to 1.31 percentage points from January 2011 to the end of 2014 (see Fig. 5).

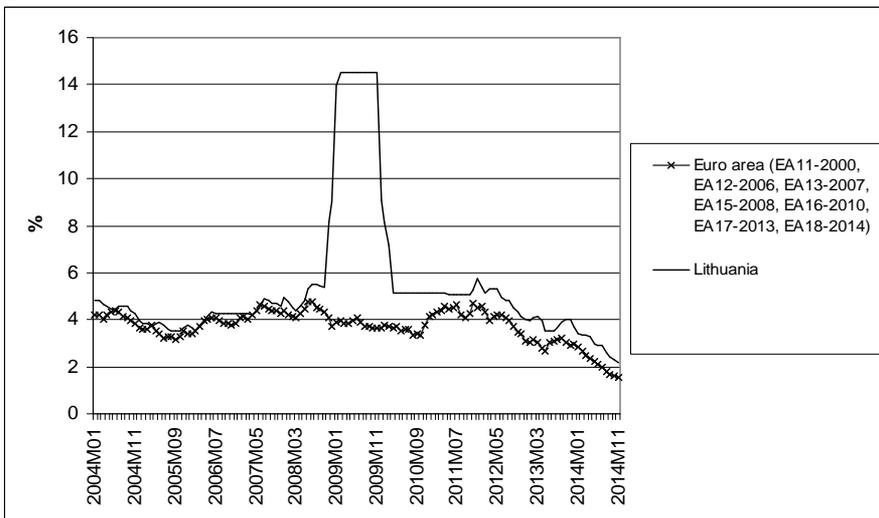
Figure 4. Meeting the criterion of the interest rates convergence by Lithuania



Source: own calculations based on: ECB, 2004, 2006, 2008, 2010, 2012, 2014.

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Figure 5. Nominal long-term interest rates in Lithuania against the euro area average



Source: Eurostat (25.12.2014)

After the period of success in the fight against inflation through a currency board system, serious problems arose in the Lithuanian economy from the excessive use of this exchange rate solution. The case of Lithuania showed that the country took the risk unnecessarily, just after the defeat of inflation. Such a restrictive policy led to a significant deterioration in the trade balance and current account balance in this country. The severity of the inflation process in the first years of the participation in the ERM II prevented the Lithuanian economy from a quick meeting of the inflation criterion and by the adoption of the euro - benefitting from a safe exit strategy. At the same time it deprived Lithuania of tools for a flexible response to the economic situation, which was particularly acute during the global financial crisis. The slowdown in inflation was recorded only during a deep economic recession. The inflation criterion and all the other convergence criteria were met only in the conditions of favourable changes in the world commodity prices and a decline in the food and administered prices between May 2013 and April 2014 (see Table in Appendix). On 1 January 2015 Lithuania was the last of the Baltic economies incorporated into the euro zone. However, in a monetary union, similarly to the terms of the currency board system, the monetary authorities will not be able to pursue independent monetary policy and thus the permanent maintenance of low

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

inflation in Lithuania can be difficult due to the continuation of the process of economic convergence (convergence of incomes and prices).

Lessons from the experience of Argentina and Estonia

The focus of this section is the experience of the economies which applied the currency board system since the early 1990, and then moved away from this restrictive foreign exchange solutions, i.e. Argentina (currency board in 1991-2001) and Estonia (currency board in 1992-2010).

The use of the currency board in Argentina and establishment of a fixed exchange rate against the US dollar, after unsuccessful attempts of introducing consecutive stabilisation programs in the 1980s and the loss of credibility of the monetary policy, brought success in the form of a permanent elimination of high inflation, which had been oppressing the country for decades. Additionally, the banking and public sectors were reformed. In a short time, Argentina transformed from a country with a high degree of regulation and protectionism into a liberal market economy (Sotomska-Krzystofik, 2003, p.48-49). However, the cost of this solution proved to be very high - the economy became vulnerable to external shocks. In the 1990s the economic growth was twice halted as a result of external factors. In 1995, the currency crisis in Mexico led Argentina to a currency crisis (due to the outflow of foreign capital), and the recession – the GDP fell by 2.8%. The country managed to survive the crisis with the help of the International Monetary Fund and in 1997 an economic growth of 8.1% was recorded. However, the effects of the strong devaluation of the Brazilian real in 1999 (a decrease by 40% in relation to the US dollar) were much more severe for the Argentine economy and led to a long-term economic recession. The fall in the GDP began in 1999; it was 3.3% and lasted until 2002, when the Argentine economy contracted by 10.9% (IMF, WEO 2014). In the context of the currency board system the monetary authorities did not have the opportunity to carry out the devaluation of the peso or lowering interest rates in order to stimulate economic growth. There was a loss of price competitiveness of the economy, the deterioration of the balance of trade and growth of external imbalance. In 1999-2001 Argentina also recorded deflation. After the initial successes, the currency board system itself became a cause of the erosion of the creditworthiness of Argentina. The investors showed rising concerns about how the monetary authorities - unable to conduct an autonomous monetary policy - would cope with the rising external debt (Sławiński, 2001, pp. 57-67). At the beginning of

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

December 2001, there was an escalation of the crisis – the deposits were completely frozen, foreign exchange reserves fell to 14.5 billion UDS (from 32.2 billion in 1999), and the government suspended the foreign debt service. As an exit strategy from the currency board system Argentina adopted a gradual transition to a floating exchange rate system. Initially a dual exchange rate system was introduced - in the settlements of foreign trade and capital flows the official parity was adopted by performing 29% devaluation, and in the remaining transactions the market rate was in force. The government was forced to intervene in order to prevent the deep depreciation of the peso against the US dollar. It was not able, however, to prevent it, even after the official introduction of the floating exchange rate system (Torre et al., 2003, pp. 20-21). As a result, the Argentine economy suffered the high cost of the application of the currency board.

Estonia's experience with the currency board system was very similar to that of Lithuania. In assessing the effectiveness of the currency board in Estonia in the 1990s we are definitely entitled to the conclusion that during this period the system performed its function well and - by a significant reduction of the inflation rate - contributed to control hyperinflation and achieve financial stability in the economy. In annual terms, in 1999 the inflation rate reached the lowest level (3.29%) since the introduction of the currency board system. Serious problems with inflation emerged in May 2004, after joining the European Union, and then the ERM II (see more Brixiova et al., 2010, pp. 204-205). In the coming years this prevented Estonia from meeting the inflation criterion in a time when all the other convergence criteria were met. One reason for the creation of inflation in the currency board system is an increase in the money supply as a result of the inflow of foreign capital. It was also influenced by increased lending in foreign currencies observed in Estonia after the accession to the European Union. This was due to the lack of exchange rate risk in the conditions of the currency board and constant persistence of lower interest rates in the euro area. In 2004 credits for the private sector accounted for 63.1% of GDP, and in 2006 for 86% of the GDP. This resulted in an increase in the foreign debt of Estonian banks. With a disturbingly low level of reserve assets (at the end of 2006, the state of the Estonian official reserves amounted only to 45% of the short-term foreign debt, which is the level of security), and a high level of deficit in the current account, it constituted serious threat symptoms to the economic balance of the country. In the period when the economic growth rate exceeded the potential rate, the monetary authorities of Estonia were unable to raise interest rates in order

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

to reduce the risk of inflation. Furthermore, the increase in inflation caused a decrease in real interest rates, which further intensified the economic expansion. However, in the situation of the recent financial crisis and economic downturn, which Estonia had to deal with, the monetary authorities of the country were deprived of the possibility of lowering interest rates to reduce the risk of recession. Therefore, the economic collapse occurring in Estonia from the third quarter of 2008 to the first quarter of 2010 was largely compounded by limitations of the monetary policy related to the use of the currency board system. The Estonian economy experienced the deepest economic crisis since the early 1990s. The decrease in the GDP volume reached more than 15% in the first, second and third quarters of 2009.

One of the most important consequences of the crisis - as it turned out, paradoxically positive for Estonia - was the decline in inflation rates. In Estonia, which had a two-digit rate of inflation before the crisis, i.e. one of the highest in the region, as a result of the global economic downturn observed a rapid disinflation process, sometimes turning into deflation. The drop in the general price level in Estonia continued from May 2009 to February 2010, which enabled the country to meet the criterion of price stability. Meeting this convergence criteria, which could not have been achieved in a period of high economic growth, was only possible due to the deep economic slump (Żuchowska, 2011, pp. 23-25). The situation of the public finances in Estonia was highly stable and despite a significant decline in the economic activity during the global crisis, the country had the lowest level of domestic debt of the agencies of the central and local governments throughout the EU. The public finance discipline enabled Estonia to meet the remaining economic convergence criteria in 2010.

Conclusions

The conducted analysis enabled to draw the following conclusions:

Firstly, the experience of the analysed economies show that the currency board system is effective in the early years of its use, helping to control hyperinflation and stabilising the economy. In the longer run, however, it turns out to be inefficient. This is related to the problem of time inconsistency, i.e. the solutions which are optimal in a given time, at a certain moment become a source of serious problems themselves in the economy.

Secondly, all the analysed economies suffered the risks associated with the use of a currency board system, as indicated in the theory. Thus, these

**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

concerns do not arise from the specific conditions of the economy, but the essence of the solution of the rigid exchange rate.

Thirdly, as shown in the analysis of the case studies, the biggest cost of the implementation of the currency board system is losing the ability to run an autonomous monetary policy, which allows the central bank to act counter-cyclically. This is a disadvantage in both good times and in the times of the GDP drop. In the case of external shocks it prevents the recovery of the competitiveness of the economy through its impact on the level of real interest rates. It is because in the conditions of a rigid exchange rate regime, it is not possible to adjust the side of the exchange rate, so costly adjustment on the side of the labour market and GDP follow.

Fourthly, the experience of Argentina and the Baltic states have shown that the adopted exit strategies from a currency board system were very expensive. Argentina suffered a very high cost of floating exchange rate. Lithuania and Estonia took the risk of the transition from the currency board to the monetary union, without the introduction of more flexible intermediate exchange rate solutions. These economies had serious problems with meeting the convergence criteria, especially the inflation criterion, the source of which was the currency board system.

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

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**Proceedings of the 8th International Conference on Applied Economics
Contemporary Issues in Economy under the title Market or Government?
18-19 June 2015, Economics and Finance**

Appendix

Table 1. Meeting the convergence criteria by Lithuania

Criterion	Date of the convergence report	Reference value	Lithuania
Inflation rate (HICP) (%)	X 2004	2.4	-0.2
	V 2006	2.6*	2.7*
	V 2008	3.2*	7.4*
	V 2010	1.0*	2.0*
	V 2012	3.1*	4.2*
	VI 2014	1.7	0.6
Long-term interest rates (%)	X 2004	6.4	4.7
	V 2006	5.9	3.7
	V 2008	6.5	4.6
	V 2010	6.0*	12.1*
	V 2012	5.8	5.2
	VI 2014	6.2	3.6
Budgetary situation (% of GDP): deficit (-), surplus (+)	X 2004	-3.0	-2.6
	V 2006	-3.0	-0.6
	V 2008	-3.0	-1.7
	V 2010	-3.0*	-8.6*
	V 2012	-3.0	-3.2
	VI 2014	-3.0	-2.1
Public debt (% GDP)	X 2004	60.0	21.4
	V 2006	60.0	18.9
	V 2008	60.0	17.0
	V 2010	60.0	38.6
	V 2012	60.0	40.4
	VI 2014	60.0	41.8
Stability of the rate		At least two years of the ERM II; No devaluation to the euro	ERM II since 28.06.2004

* unmet criterion

Source: own calculations based on: ECB, 2004, 2006, 2008, 2010, 2012, 2014.

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