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ADAM P. BALCERZAK

ILONA PIETRYKA

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**edited by
Adam P. Balcerzak, Ilona Pietryka**

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Public participation in rural municipalities

JEL Classification: *H72; O18; O30*

Keywords: *public participation; sustainable development; rural areas; village (solecki) fund*

Abstract

Research background: Sustainable development of rural areas is becoming an increasingly important challenge for local self-governments due to economic, intellectual, social or ethical barriers existing in the areas. Considering that sustainable development is to lead to improvement of the quality of life of residents with non-infringement rural resources such as the natural environment, landscape and cultural heritage we should take in consideration possibility of using public participation in shaping the expenditures of rural municipalities to improve the quality of inhabitants' life.

Purpose of the article: This article aims to analyze changes in the scale and directions of the use of "Sołecki Fund" in municipalities in 2014-2017 as a tool of participation of citizens in sustainable development of rural areas.

Methods: The research used the data of the Local Data Bank of the Central Statistical Office on the structure of expenditure of rural municipalities within the framework of "Sołecki Fund". The study covered all rural communes in Poland in the years 2014-2017. An analysis of the structure of communal expenditures was made in terms of the basic sections of the budget classification.

Findings & Value added: On the basis of the conducted research, it is possible to indicate an increase in the use of "Sołecki Fund" by rural municipalities in Poland. It should be pointed out that in relation to 2014, in 2017, there was an increase in the use of this public participation instrument from 49% to 64% of all rural munic-

ipalities The basic areas of expenditure were public transport, safety and fire protection, culture and protection of national heritage and sports.

Introduction

After 1989, one of the most significant manifestations of systemic and economical changes was the introduction of decentralisation of the state administration, in particular at the local level (Swianiewicz, 2003). This was the result of legislator's conviction that implementation of a large part of tasks concerning local matters can be more effectively conducted by public administration bodies, which are directly associated with the given local community (e.g. via the system of representatives elected to these bodies from the local community), and therefore they are able to recognize and satisfy the needs of such community to a greater extent. In Poland, the territorial local government is assigned with the performance of the part of public tasks, which are not reserved in the Constitution or other laws for the bodies of other authorities (article 163 of the Constitution of the Republic of Poland). They are implemented in their own name and on the responsibility of individual local governments, and they are determined by law as specific competences and tasks. At the communal level, among others, they are associated with the protection of widely understood technical and social infrastructure, as well as public safety and environmental protection (Local Government Act, 1990), art. 7), therefore also with the ensuring of appropriate quality of life for the residents of the given areas.

The local governments' strong pursuit to increase the residents' participation in the process of making decision on public spending directions can be noticed in Poland in the recent years. Increase in the interest in the formula of participatory budgeting in cities is the manifestation of this phenomenon (Bednarska-Olejniczak & Olejniczak, 2017, 2018; Bednarska-Olejniczak *et al.*, 2019). However, a relatively earlier formula of sołectki fund (SF) - because it has been legally sanctioned since 2009, and in a new form since 2014 – which is applicable in rural and urban-rural areas, is very often overlooked. The main intention that constituted the basis of SFs, on one hand, consisted of providing sołectwo, as auxiliary unit of the commune, with its own funds intended for the implementation of tasks associated with the development of the given community. While, on the other hand, it was supposed to provide the residents of sołectwo with a real impact on the activities undertaken in the above-mentioned scope – which until 2009 was not guaranteed due to the arbitrary regulations of the status of sołectwo in the legislation of individual communes. Consequently, the

effect of introduction of the SFs was supposed to strengthen civil society and to better adapt the scope of communal expenses to the needs of local communities (OECD, 2018).

The existence of sołectwo in communes is not obligatory. They constitute auxiliary units, which are appointed to implement tasks of the commune based on the statute assigned to them by the commune council. This means that the commune council, while fulfilling the will of the residents, creates sołectwo in order to implement part of the tasks, which due to the limited territorial scope (usually several villages within the commune) is specific for the given sołectwo. In practice, this is equal to the possibility of matching certain activities implemented with the use of communal funds (as own tasks) to the specificity (preferences of the residents) of the given sołectwo. However, this does not mean that sołectwo is independent and separate from the commune. The village meeting is the acting and controlling body, in which all residents of the sołectwo can participate, however the commune council has the control over the spending of funds under the SF, while the resources of SF constitute the expenses of the communal budget.

Establishment of the SF means the consent of the commune council to guarantee to individual sołectwo an appropriate minimum level of funding, resulting from the statutory regulations (Sołeczki Fund Act, 2014). However, this is not equal to the limiting of fund size, because depending on the actual demand, it is possible to increase the level of financing of individual sołectwo by communes.

From the perspective of benefits gained by the communes, apart from activation of local communities and the expected increase in the accuracy of spending of the funds (as a consequence of activities aimed at improving the quality of life of the residents), it is worth to mention that communes (which fulfil the statutory requirements) have the possibility to obtain refinancing of the part of eligible funds of SFs from the state budget. The general principle included in the Sołeczki Fund Act (art.3, item 7 and 8) states that the commune, in which the SF was created and the expenses were incurred within this fund, is entitled to reimbursement of the part of expenses incurred in the year preceding the budget year. The relation between the base amount for the commune and the base amount calculated for all communes in the country, is the factor deciding about the amount of reimbursement. The biggest, i.e. 40% refinancing can be obtained by communes, in which the base amount is lower than the national base amount. In turn, in the case of communes, in which the base amount equals from 100% to 120% of the average national base amount, the refinancing amounts to 30%, while in the case of communes, in which the base amount is greater

than 120%, but not greater than 200% of the average national base amount, the refinancing amounts to 20%. It should be noted that this Act also establishes limits of the funds envisaged for refinancing of expenses of SFs, which in practice forces the use of a mechanism to reduce the percentage thresholds.

Research methodology

The main purpose of this article is to indicate changes in the directions and scale of the use of SFs in rural communes in Poland, in the context of differences occurring between the regions. The years 2014-2017 were assumed as the research period, which is a consequence of the introduction of a new Sołectki Fund Act in 2014 that significantly changes the Act of 2009 and the availability of data. From the viewpoint of this article, an important issue is the answer to the question about existence of differences between individual regions in the scale of the use of SFs, as well as directions of spending the funds. Having in mind that, apart from economic factors, there may also occur other differences, among others: cultural, demographic or geographical differences, this article is only a starting point for the discussion on conditions of the directions and the scale of use of SFs by rural areas in Poland.

The basic research method consisted of statistical analysis of the data made available in the Local Data Bank (CSO) concerning the scale and directions of communal expenses within SFs, and communal income. The first stage of research included an analysis of quantitative and spatial changes in the use of SFs in rural communes in Poland. Within the last stage, the conducted analysis concerned the structure of main groups of expenses within the framework of SFs in the territorial system. Correlation measurement of the amount of expenses within SFs with the level of income was not undertaken, due to the statutory algorithm, which strongly links these two quantities with each other.

Results

Increase of the interest of auxiliary units in rural communes (sołectwo) in the possibility of using SFs, is visible in the analysed period. In 2014, the SFs were used by 754 rural communes (49% of all rural communes), while in subsequent years, this level reached approx. 980 (63%). During assessment of the significance of communal expenses in the national scale, it is

necessary to point out that the share of expenses of the SFs in current expenses fluctuates at the level of 1.25% (2014) to 1.08% (2017). Reference to the level of current expenses seems to be more justified here, firstly due to specific nature of fund expenses and, on the other hand, due to the relative stability (apart from the increase in communal expenses resulting from changes in the scale and structure of tasks after 2015) of current expenses of the communes. Having in mind that the purpose of creating the SFs is to finance own tasks of communes leading to the improvement of the quality of life of residents, it would be necessary to indicate the main areas of expenses occurring within the framework of activities of the SFs. The analysis of section classification of communal expenses within SFs demonstrates that these expenses can be assigned to five main sections (table 1).

Data obtained from BDL indicates an increase of local communities' interest in using the public participation tool that is the SF. Of course, there is also a question of actual degree of involvement of the residents of communes in the activities of sołectki councils and rural meetings, due to the lack of available data regarding the attendance of residents. It should be noted that within the expense directions of SFs, due to percentage of communes, in which the use of the SFs was noted, the section of transport and communication is undoubtedly in the first place (over 90% of communes demonstrated expenses in this section), and this state does not change despite an increase in the number of communes with the SF in subsequent years. Also in the case of expenses in the sections of municipal management and environmental protection, as well as culture and protection of national heritage, approx. 80% of communes implementing expenses within SFs note the involvement of funds. Two next sections that appear within the expenses of SFs in over 65% of communes consist of public safety and fire protection, and physical culture. Along with the increase in the number of communes approving the SFs, there is also visible an increase in the percentage of communes, in which all the above-mentioned sections occur.

Analysis of the scale of expenses within particular sections indicates a significant advantage of expenses in the scope of transport and communication over other expenses - they constitute between 34 and 38% of total expenses, while the expenses on culture and protection of national heritage constitute only approx. 22-23%, and expenses on municipal management and environmental protection 13-16% (table 2). In the case of other sections, the expenses oscillate from approx. 7-9% to the value below 1%.

Due to the observed diversification of the quality of life in rural areas in the regional cross-section (Michalska-Żyła & Marks-Krzyszowska, 2018; Olejniczak, 2015; Sompolska-Rzechula, 2017), the question arises regard-

ing the possible differences in the scale and directions of the use of SFs in individual regions.

Based on the data presented in the table 3, it can be noticed that there are significant discrepancies in the scale of the use of SFs between the regions. The analysis of data available in BDL GUS clearly indicates that while on the one hand, in the majority of provinces in the south-western Poland (Opole, Lower Silesia, Greater Poland, Lubusz, Kujawy-Pomerania), a high percentage of communes using the SFs (over 70%) can be noted, on the other hand, it is not possible to conclude that there is a territorially compact group of provinces, in which the percentage of rural communes using SFs is low (Podlasie, Łódź - below 40%). It is important to emphasize the fact that in the years 2014-2017, there was an increase in the percentage of communes using SFs, whereas from the viewpoint of changes in the regions, the least dynamic changes occurred in the second group of communes. Moreover, it is necessary to note that there is no relation between the quantity of rural communes in the given province and the number of communes using the SFs. In the context of the above-mentioned differences in the quality of life in rural areas between individual regions, it is necessary to point out that e.g. Podlasie and Łódź were included into the group of provinces with better quality of life compared to Lower Silesia, Kujawy-Pomerania and Lubusz, and at the same time lower quality of life compared to the other three that were mentioned (Sompolska-Rzechula, 2017; p.187).

Diversification analysis of the use of funds within the SFs demonstrates that in the case of transport and communication section, the largest share of expenses within the SFs is noted in the eastern and central part of Poland, and the share of these expenses in relation to the total amount of expenses usually does not fall below 40% (fig. 1). Whereas in the communes of western Poland, both in 2014 and in 2017, the share of this group of expenses was occasionally exceeded by over 20%. When comparing expenses within SFs in the section of municipal management and environmental protection, it should be noted that the largest share (approx. 40%) of this type of expenses within SFs is noted in over a dozen of communes from north-eastern Poland (fig. 2), however in each region there is at least one commune with such expenses. Moreover, the relative stability of the above-mentioned share in the communes with high level in all regions is also visible. In turn, the share analysis of resources of the SFs intended for culture and protection of national heritage (fig. 3) demonstrates that the highest share of this type of expenses is noted mainly in the Lower Silesia, Lubusz, Greater Poland and Kujawy-Pomierania provinces, whereas the share of these expenses in relation to the total amount of expenses very often ex-

ceeds 40%. It can be noticed (fig. 4) that expenses for physical culture do not take a significant place in the vast majority of communes. Moreover, it can be observed that only few communes, which are mainly located in the Pomerania and Lower Silesia provinces, engaged a pool of funds larger than 20% in the scope of expenses of the SFs.

Conclusions

It should be noted that after 2014, the scale of the use of sołecki funds in Poland is significantly increasing. Five main areas of spending can be distinguished. That reflects the main needs of residents reported to communes in the area of improving the quality of life within the individual communes. It can be noticed that there is a strong diversification of directions of the sołecki funds' expenses between the regions. It should be underlined that it is not possible to indicated the reasons for such differences between the regions without further in-depth research.

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Annex

Table 1. Percentage of communes that implemented expenses within the framework of SFs in the years 2014-2017 and percentage of communes that implemented expenses from the SF in the main sections of budgetary classification (%)

Year	In total	Transport and communication	Housing economy	Public safety and fire protection	Education and upbringing	Municipal management and environmental protection	Culture and protection of national heritage	Physical culture
2014	48.71	93.50	32.63	60.88	33.55	77.59	79.44	61.67
2015	59.24	93.02	34.79	63.90	34.68	78.41	78.41	62.27
2016	63.57	94.21	39.94	62.40	35.06	79.78	81.81	67.99
2017	63.31	93.47	37.45	66.02	32.65	80.00	82.86	68.16

Source: own calculations based on BDL data.

Table 2. Share of expenses by sections of budgetary classification in the total amount of expenses within the SFs. (%)

Year	Transport and communication	Housing economy	Public safety and fire protection	Education and upbringing	Municipal management and environmental protection	Culture and protection of national heritage	Physical culture
2014	39.0	4.0	6.3	2.5	13.2	23.3	7.4
2015	38.0	4.5	6.5	2.7	14.1	21.9	7.8
2016	34.9	4.8	5.6	2.5	16.6	22.5	8.8
2017	34.8	4.6	5.7	2.4	16.8	22.7	9.2

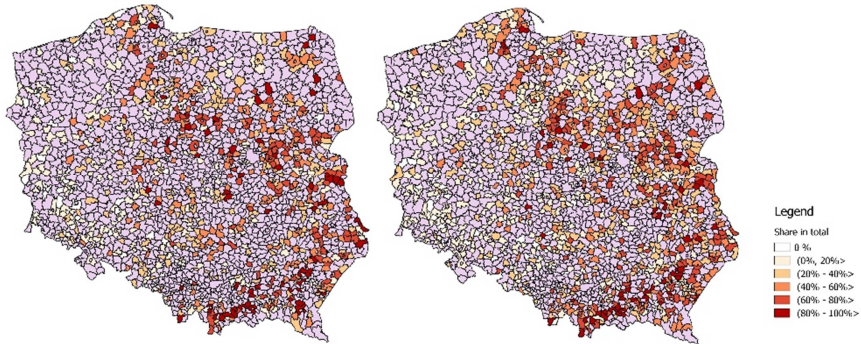
Source: own calculations based on BDL data.

Table 3. Percentage of rural communes in individual provinces, which implement expenses within SFs (%)

Year	Lower Silesia	Kujawy-Pomerania	Lublin	Lubusz	Łódź	Lesser Poland	Mazovia	Opole	Podkarpackie	Podlasie	Pomerania	Silesia	Świętokrzyskie	Warmia-Masuria	Greater Poland	West Pomerania
2014	68	50	55	62	32	45	46	66	60	27	49	57	44	43	54	38
2015	72	62	66	62	44	55	57	77	75	37	54	63	52	52	71	50
2016	79	70	72	74	47	64	59	80	79	35	63	63	53	57	74	56
2017	78	71	65	79	43	64	59	80	82	35	64	65	52	66	74	54

Source: own calculations based on BDL data.

Figure 1. Share of expenses in the section of transport and communication within the SFs in 2014 (left) and 2017 (right) in the researched communes



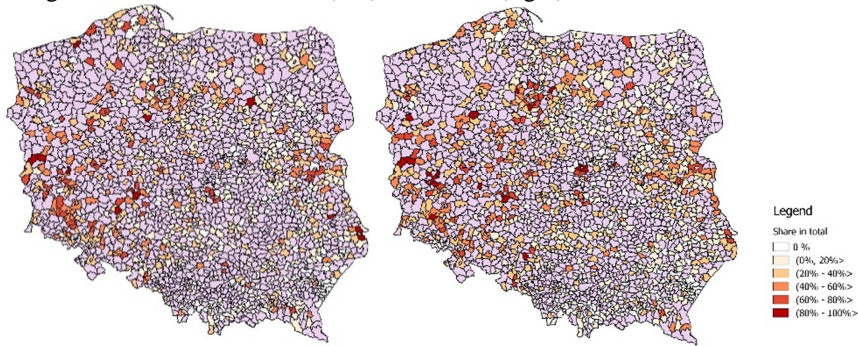
Source: own calculations based on BDL data.

Figure 2. Share of expenses in the section of municipal management and environmental protection within the SFs in 2014 (left) and 2017 (right) in the researched communes



Source: own calculations based on BDL data.

Figure 3. Share of expenses in the section of culture and protection of national heritage within the SFs in 2014 (left) and 2017 (right) in the researched communes



Source: own calculations based on BDL data.

Figure 4. Share of expenses in the section physical culture within the SFs in 2014 (left) and 2017(right) in the researched communes



Source: own calculations based on BDL data.

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Luxury goods in economics

JEL Classification: *D01; D90*,

Keywords: *luxury goods, necessities, conspicuous consumption*

Abstract

Research background: The luxury goods gain growing importance in economies of all countries but modern economics does not put special attention to this type of goods.

Purpose of the article: The main aims of the paper is to show the economics' background of luxury concept and to collect, compare and describe the main features of luxury goods presented in modern economic literature.

Methods: Paper's research methodology based on wide literature review and comparative analysis of views and opinions on luxury and luxury goods.

Findings & Value added: Luxury goods are unique type of goods in economy. The description of their main specific features indicates necessity to further studies. The existing theory is insufficient and the analysis based on the opposition to necessity goods does not explain the luxury goods specific character and importance.

Introduction

Nowadays, despite many theoretical and research problems and confusions, scholars and researchers across all social sciences share a similar overall understanding of luxury, which is mainly defined in opposition to necessity. However, there is still a lack of consensus regarding to the precise definition of luxury and the list of luxury features. Over time luxury changed its meaning and characteristics. Nowadays it has got more conceptual than

symbolic dimension but its modern understanding is the result of a historical evolution.

Research methodology

In the paper the beginnings of luxury justification in modern economics are indicated and then the microeconomic issues connected with luxury are briefly described. Then the different definitions of luxury are compared and main features of luxury are listed and described. Paper's research methodology is based on wide literature review and comparative analysis.

The concept of luxury in economics

The main change in understanding of luxury and its social justification took place between the 17th and the 19th centuries. It's important element was the discussion between David Hume and his contemporaries. This debate illustrated the level of disagreement in economic discourse during that time. The counterparts searched for sources of wealth and prosperity, discussed the issues connected with money and financial markets, and especially focused on consumption and luxury. David Hume in his essay *Of Luxury*, published in 1742, separated luxury and morality and provided philosophical legitimization of luxury. In general, he was an applauder of luxury and understood luxury goods as commodities that exceed the scope of basic needs. Hume claimed that availability and desire for luxury goods benefited both the individuals and the whole society. He also distinguished "good" and "bad" luxury and believed that moderate luxury consumption, restrained by means of good legal order and morals could be obtained. In the 18th century the disapproval of luxury among societies based mainly on the fear of moral decline (caused indolence and loss of national courage). Hume disagreed completely with this statements and alleged that luxury strengthened the societies morale (Pietila, 2011, p. 18).

Adam Smith, the father of economics and economic liberalism was favorable to trade and to luxury as the drivers of economic growth. He also provided the first economic rationale for luxury as the means used to create wealth for all. Smith claimed that the luxury consumption of the rich encouraged productivity and provided employment for many and that the great wealth of the few generally benefits the rest of society, at least in material terms and over the long run. The Smith attitude to luxury was changeable in time. In his early works he saw luxury, unlike Hume, as ra-

ther contemptible despite its desirable effects. In the *Wealth of Nations* saving was treated as the key element of growth and Smith suggested that spending on luxury could harm growth. On one hand Smith wanted to hang on to the arguments he had taken from Hume, on the other the acceptance of luxury did not fit his concept of economic system. This may explain a number of oddities and inconsistencies in the *Wealth of Nations* (Brewer, 2003, p.78). The Enlightenment Movement along with social transformations successively changed the meaning of the concept of luxury. Additionally the leading English philosophers such as Adam Smith or David Hume stipulated the dissociation of luxury and morals, hitherto considered as mutually irreconcilable, if not even hostile ideologies in Christian Europe.

Concurrently the increased prosperity and the ongoing democratization process made luxury both more accessible and acceptable to customers. Then Industrial Revolution, female emancipation created the moral justification of luxury. Before the 19th century the world of luxury was virtually totally isolated from the rest of economy and dedicated to the very small elite. The rest of population lived in subsistence economy. In next decades and centuries processes of industrialization, democratization, increase of spending power, globalization of markets, long-lasting periods of peace and the development of communication means influenced the spread of luxury among societies and its popularization and therefore social, economic justification. The women's emancipation efforts throughout the 19th and the 20th century further spurred the social legitimisation of luxury (Kapferer & Bastien, 2012, p. 9). Despite of many arguments, the uniform evaluation of the concept of luxury did not become universally accepted and opinions on luxury were polarized. Then the economic treatise *The Theory of the Leisure Class* by Thorstein Veblen became a standard reference work and enjoyed great popularity still today as one of the most comprehensive analyses of luxury in social sciences (Mortelmans, 2005, p. 497). Veblen argued that the ruling leisure class used conspicuous consumption to show its wealth, power and status in deliberate demarcation from lower social classes. This point of view is still present and even nowadays the legitimisation process of luxury acceptance still does not appear to be finally completed. Nowadays it is even more delicate as it interferes with three politically and economically sensible topics: the persistence of social stratification, the idea of prodigality in an era of global resource shortages and the controversial issue of wealth distribution (Kapferer & Bastien, 2012, p. 8).

Definition and characteristics of luxury

Etymologically, the word luxury derives from the Latin word 'lux' and can be translated as light, luminosity or luminance. There is a lack of consensus regarding the definition of luxury. Although there have been numerous attempts to define luxury goods (Dubois & Czellar 2002), these definitions remain rather vague and difficult to manage because the luxury concept is a constantly evolving and extremely subjective concept. Its meaning changes according to person, place or time (Michman & Mazze, 2006) and always changes its appearance (Mortelmans, 2005, p. 504), which means that this concept remains subject to a constant process of review and improvement.

Luxury is "anything unneeded", which gives us some idea of conspicuousness. In economics, luxury is still generally defined in comparison with necessity. It is described as something that is more than necessary (e.g. by Bearden and Etzel 1982, p. 184) or non-necessity and superfluity. The distinction between necessity and luxury is based on the availability or exclusivity of resources. While necessities can be possessed by virtually everyone, luxuries are available exclusively to only a few people or at least only on rare occasions. Bearden and Etzel (1982, p. 186) described the necessity-luxury dimension as a continuum ranging from absolute necessity to absolute luxury¹. They defined luxury (1982, p. 186) as not needed for ordinary, day-to-day living. The distinction between luxury and necessity can be described by using the concept of income elasticity of demand. If a household spends more in luxury goods, it means that its income is growing. Additionally, purchases of the more dispensable luxuries decline with price rises (along with the concept of income elasticity of demand).

Luxury is also defined as something that is desirable and more than necessary and ordinary. Luxury goods are perfections and refinements of ordinary (basic) human needs and partially determined by its natural desirability. Nevertheless, possessing luxuries satisfies people rather than simply trying to alleviate a state of discomfort, like in the case of necessities. However the decision of what is desirable and more than necessary and ordinary is relative and depends on the perspective (Büttner *et al.* 2006, p. 9) The relativity of luxury can be analyzed from regional, temporal, economic, cultural and situational perspective. The types of luxury relativity are precisely described by Heine (2012, p.43) who states that these types of

¹ They created the six-point Likert scale ranging from "a necessity for everyone" to "a luxury for everyone" in order to measure the luxuriousness of a number of product categories (see also Kemp 1998, p. 594).

relativity can be used to determine a general perspective from which luxury should be defined. It means that definition of luxury should:

- be defined from a global (not regional) perspective,
- refer to the present,
- be defined from the perspective of the entire society of developed regions (not just poor and rich),
- be determined by the upper class,
- generally should not consider any temporary or individual circumstances (it should be restricted to normal conditions).

Defining the luxury causes many additional problems. First of all, mentioned above existence of the necessity-luxury continuum indicates that all luxuries are not equally luxurious, which means that there is also a hierarchical relativity. Luxury level therefore is one of the major means of differentiation for luxury products and brands. Therefore it is possible to distinguish different levels of luxury and there is still a wide variety of resources such as musical talent or self-determination which are not relevant with existing definitions of luxury. Alleres (1990) have developed a hierarchy of luxury products linked with each socio-economic dimensions and divided luxury goods into three main groups: accessible luxury consumed by middle class, intermediate luxury created for professionals and inaccessible luxury for elite.

It is worth to notice that luxury can be analyzed in qualitative and quantitative dimensions. When it refers to single items, it is usually described as qualitative luxury. In contrast, quantitative luxury refers to the profusion of an excessive amount of resources, which are not necessarily luxurious.

Dubois and Czellar (2002, p. 8) empirically identified main characteristics that reflect the core of a luxury brand and are nowadays usually used to describe luxury goods:

- very high price
- scarcity and uniqueness
- excellent quality
- aesthetics and polysensuality
- superfluousness

Very high price is so-called expensiveness. It is measured by absolute value of the price or in comparison with non-luxury alternatives. Expensive product is not automatically a luxury product. But conversely, all luxury products are expensive. Expensiveness intensifies rarity and gives reason to believe that the product delivers on excellence.

Scarcity and uniqueness are usually co-called: rarity. Scarcity is caused by limited distribution channels and lack of mass-production. Luxury never

negotiates on quality. No concession is ever made on materials, craftsmanship or standards, which are unflinching. The rarity can also be induced by setting a very high price, because luxury products that are not highly priced will lose their luxury character.

Premium price and rarity are inherently connected with exclusivity (Mortelmans, 2005). In the past, rarity referred to the use of valuable materials that were naturally scarce and not yet widely available. However, nowadays luxuries are subjectively rare (Mortelmans 2005). It means that a consumer of luxury good believes that others cannot afford them. Luxury goods are also virtually rare. Luxury manufacturers offer an impression of rarity by limiting production in order to create temporary shortages or by offering limited editions to consumers. In addition, many luxury brand companies create this impression of rarity by selling their products.

Excellent quality is so-called: excellence. High quality of materials used, special diligence and high expertise within the manufacturing process are necessary. Luxury is not democratic. It means that it's exclusive, rare and limited or it becomes a mass affluent product. Luxury products aggressively restrict when, where and how they are made, sold and to whom. This excellent quality can be obtained in two ways: by using high-quality raw materials and by detailed workmanship. Luxury goods are thus perceived as fine pieces of craftsmanship, with an excellent quality, performance and durability. These goods often have a sophisticated design and offer great comfort to consumers. In the past, luxuries were often handmade, which required great precision and patience. To ensure the excellent quality, luxury manufacturers try to distinguish their products by offering unique craftsmanship, innovativeness and sophistication.

Aesthetics and polysensuality mean that luxury create profoundly hedonic shopping experience and multisensual consumption pleasure that is comparable to the study of a work of art. In line with this idea, consumers who never bought a luxury goods perceive it as more luxurious, compared to consumers who already bought the item. Moreover, luxury brands are often perceived as exclusive brands because they are unique.

Ancestral heritage and personal history represent the uniqueness of the luxury goods. Luxury good's history is anchored in the past and often it based on legend and the consumer's individual experience with that brand,

Superfluosness is a kind of uselessness. Luxury goods are not perceived as indispensable to physical survival, are not necessary for living.

Additionally luxury goods can be characterized by such attributes:

- symbolism, possessing an object elicits envy, shows status or power,
- timelessness, luxury is timeless. It has a past and it usually doesn't lost value over time,

- honesty, luxury is honest because it's not synthetic or reproduced and it can't be duplicated.
- they are tailored, created for customer, very often luxury goods are bespoke, specifically designed and therefore unique.
- luxury goods are irrational and emotional: possessing an object that elicits envy, status or power. The quest for personal satisfaction is intrinsic to any luxury product or service. Luxury is mainly irrational and engages strong and intense emotions, it is multisensory.

It is not necessary that all luxury goods need to have a maximum level covering all mentioned characteristics, particularly because consumer's purchase decision depend on the comparison between expectations of the product and their perception of the product attributes and benefits.

These major characteristics of luxury goods can be considered as dimensions ranging from a minimum level (that is also necessary for non-luxury goods) to a maximum level that corresponds to the highest form of luxury (from accessible luxury, through aspirational luxury to absolute luxury). Although luxury products require a relatively high rating for all of the major characteristics, there still exists a wide range of possible ratings within the luxury segment. However the luxuriousness of a product increases when the level of at least one of these characteristics increases.

The luxury goods are not independent of each other. This means that if one dimension is at a high level, it also induces high levels of other dimensions. For instance, relatively small production volumes (high rarity) influences the superior level of quality and therefore the relatively high effort made for aesthetics, extraordinariness. A good story behind the good inevitably leads to a relatively high price (Mortelmans 2005, p. 507). Goods that are scarce cannot be owned by everyone, because they are too expensive. Moreover, consumers use price as an indicator of product and they are willing to pay more for products which are different and exclusive.

Conclusions

Luxury goods are special and unique type of goods in economy. The theory of economy does not explain and describe their otherness. The manufacture and trade of luxury goods contribute to economic growth and to well-being of many nations worldwide. Process of luxury democratization facilitates wider access to luxury goods and influences the growing demand. Therefore luxury can't be perceived negatively, even in economic theory.

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Integrated territorial investments in Białystok functional area

JEL Classification: J24; O15

Keywords: *functional areas development, integrated territorial investments*

Abstract

Research background: Cities and their functional areas are an important element of development policy. In the financial perspective of the European Union for 2014-2020, a special instrument was dedicated to them - integrated territorial investments (ITI) to implement territorial strategies in a comprehensive way. ITI is used to solve economic, environmental, climate, demographic and social problems diagnosed in different functional areas. The development priorities and effects measured by appropriate indicators are defined by ITI strategies.

Purpose of the article: The aim of this paper is to indicate level of implementation of Białystok Functional Area (BFA) Strategy in frame of financing from ITI.

Methods: The analysis was based on the literature and on the own statistic research carried out in December 2018 in Białystok Functional Area Association (BFAA), including data received from the central teleinformation system SL 2014.

Findings & Value added: The majority of 76 million EUR in frame of ITI instrument were contracted. The achievement of the strategic indicators is unsatisfactory and in some areas due to the low interest in the participation of applicants in open calls for proposals is seriously endangered. The greatest difficulties occur in the implementation of social services (care and assistants services and support for foster care).

Introduction

Socio-economic development is an important research topic. Urbanization and development of urban centers is popular as a research topic. This is due

to the systematic growth of people living in cities, Where more than half of population live. In the literature, there are many papers concerning sustainable development of cities, including specific elements forming the urban system or defining its quality, i.e. transport system, air quality, social problems, etc. Cities, however, do not function in a vacuum. They are connected by socio-economic ties, in particular with neighboring areas.

In the programming perspective 2014-2020 of the European Union (EU) in frame of territorial development policy approach, the role of the cities and their functional areas in process of development is emphasized. Therefore, a special instrument - integrated territorial investments (ITI), was created to support such areas. *The Partnership agreement* emphasizes that functional areas of voivodship capitals generated approximately 51% of the national GDP), they also have important metropolitan functions: administrative, social, scientific, cultural and other and they are centers attracting financial and human capital.” (Ministry of Infrastructure and Development, 2017, p.47). Therefore, this article focuses on the territorial dimension of cohesion policy, presenting hitherto achieved effects of the development of the functional area within the financing of ITIs on the example of Podlaskie Voivodship in Poland. These considerations were preceded by an analysis of the literature on functional areas and integrated territorial investments.

Literature review

The concept of functional area in Polish legislation is among others characterized *Concept of spatial development of the country 2030* (2011, s. 187-194). This document defines it as a settlement system, spatially continuous and composed of separate administrative units. Referring to the theory of regional development, functional areas are connected to the polarization theories (sectoral, regional and sectoral-regional). They assume that development is initiated in specific industries or places. The diffusion processes then cause it to spread to the rest of the territory. Usually these processes are initiated in the agglomeration center, and then spread to regional centers and peripheries. Therefore, there are several approaches in this area developed independently. The basic ones include the theories of F. Perroux, A.O. Hirschman and G. Myrdal. (Dyjach, 2013, pp.48-59)

The first of above mentioned theories shows in particular that development processes are characterized by varying intensity in time and space. In some places, areas develop much faster (the so-called growth poles), and economic development assumes a polarized nature. The result of this is the concentration of economic activity, as well as the occurrence of imbalances

between geographical areas and economic branches located in that areas. According to Perroux, such growth pole was, for example, a plant or a set of industrial plants or even a city. (Benedek, 2016, p.286)

The nearest to the idea of functional areas in perspective 2014-2020 is G. Myrdal's regional polarization theory. He assumed that one change in the elements of the socio-economic system in space causes changes in other elements, and the feedback that occurs with them increases the intensity of mutual interactions. Changes can be positive, associated with the expansion of development, or negative causing the effect of leaching development. The effect of spreading development occurs when the positive effects of economic activity in the center are transferred to the peripheries. The second effect will occur, when changes in the growth pole attract workforce and material resources to the center, and cause accumulation of development in this centers. The diversification of economic development is the effect of the long-term impact of economic, social, political and cultural factors. An important factor in the development of areas, especially less developed ones, is the activity of public authorities. Therefore, the level of differences in development between regions is determined by positive or negative effects occurring in the centers. (Berger, 2008, pp.357-365)

The third researcher - A. O. Hirschman, emphasized that development is concentrated in geographical centers of growth. He noticed that sustainable development in space is impossible to achieve, despite the fact that it can spread from centers to neighboring areas. Therefore, Hirschman was an advocate of supporting the development of central regions, and then strengthening the processes and instruments for diffusion of this development to less developed areas, for example by building infrastructure, mainly communication one.

New approach to cities and their functional areas in the EU's development policy should be considered in two aspects: the formation of an urban policy and the territorialisation of cohesion policy intervention. (Kaczmarek, Kociuba, 2017, p. 50) At the level of functional areas, integrated territorial investments (ITI) are a special instrument for financing development. ITI could be implemented as part of EU funds through separate actions under at least two priority axes of a regional operational program financed from two structural funds. To implement ITI municipalities forming functional area had to establish ITI relationship, e.g. association or a signing an agreement between local government units. The next step was to develop the ITI strategy and conclude an agreement or contract for the implementation of ITI between a specific ITI organization and the competent managing authority, containing in particular the scope of entrusted tasks. (Kociuba, Szafranek, 2018, pp. 65-67) The ITI instrument supports functional urban

areas not only in Poland, but also in the Czech Republic, Slovakia, Great Britain, Belgium, Germany (only in selected regions) and some regions of Finland. (Kociuba, 2018, p.84)

In Poland, in the financial perspective 2014-2020, 17 functional areas for voivodship cities were created obligatorily. In addition, there are also some areas for subregional centers. One of the seventeen functional areas of voivodships cities is Białystok Functional Area (BFA). It consists of 10 municipalities: Białystok, Choroszcz, Czarna Białostocka, Dobrzyniewo Duże, Juchnowiec Kościelny, Łapy, Supraśl, Turośń Kościelna, Wasilków and Zabłudów. It is located in north - east Poland, in Podlaskie Voivodship. It occupies an area of approx. 9% of the region. At the end of 2016 it has more than 416,000 inhabitants (35.1% of the population of Podlaskie Voivodship), which places this area on the 11th place among 17 urban functional areas of voivodship centers in Poland. (Białystok Functional Area Association, 2016, p.12-17). The development of BFA focuses on 7 basic goals: investment attractiveness, competence to work, accessibility to culture, active social inclusion, low-carbon economy and environment, communicative accessibility and integration of BFA strategic development management. The largest share of financial resources was allocated to the development of vocational education and low carbon economy. The ITI is not implemented in all 7 purposes. The support has been allocated to few areas, i.e. investment attractiveness, pre-school and vocational education, low-emission economy and the development of social services in the total amount of 76 million euro. (Białystok Functional Area Association, 2016, p.159).

Methods

Ongoing monitoring of strategy is extremely important for the assessment of implemented projects and the impact on the development of functional areas. In particular, it is important to follow the level of achieving a strategic indicators contributing to the socio-economic development of functional areas. The results of the above studies were preceded by a review of the literature relating to functional areas and integrated territorial investments. The aim of this paper is to indicate level of implementation of the BFA Strategy in frame of financing from ITI in the Białystok Functional Area. Bearing in mind that the research was carried out in the middle of the expenditure eligibility period, the following hypothesis were made: the level of contracting ITI projects in BFA area is high and the implementation of projects in frame of ITI instrument is characterized by a high degree of

achieving indicators. The analysis was based on data obtained during research conducted in the Białystok Functional Association in December 2018. The data was obtained from the central IT system SL 2014 and in frame of interview conducted with the Association's employee responsible for monitoring BFA Strategy.

Results - development in Białystok functional area

In the Regional Operational Program of Podlaskie Voivodship 2014-2020 (ROPPV), 76.0 million EUR (6.26% of ROPPV allocation) were allocated within the framework of selected investment priorities for the implementation of ITI (the allocation of the European Regional Development Fund (ERDF) is 67.2 million EUR (7.7% of ROPPV allocations from the ERDF) and the allocation of the European Social Fund (ESF) is 8.8 million EUR (2.58% of ROPPV allocation from the ESF)). The largest amount of ITI - 28 million EUR, was earmarked for a low-carbon economy, mainly related to renewable energy sources, low-carbon public transport and the expansion of the cycle path network. A large support group is also represented by investments in educational infrastructure (kindergartens, vocational schools and a science laboratory) - almost 23 million EUR. Quite large share in ITI funds is also provided by investments implemented in objective 1 BFA ITI Strategy, which is modernization of investment areas - over 12 million EUR.

As part of the ITI allocation of the Białystok Functional Area, by 31 December 2018, in total 37 subsidy contracts were signed for the amount of EU funding 249 million PLN, which is 77.98% of the total ITI allocation. In 2018, further 4 open call for proposals were announced (concerning social services (2 calls), pre-school and professional education) for a total amount of 24 million PLN. Their results are expected in the first half of 2019 year. In addition, in 2019, one more open call for proposals regarding the development of social services in BFA and one project (in a non-competitive procedure) related to the modernization of investment areas in the municipality of Supraśl with a total amount of approx. 8 million PLN are planned. Bearing in mind the above, the distribution of ITI resources to beneficiaries can be positively assessed. The entire ITI allocation should be contracted in the first half of 2020, which will leave the beneficiaries a maximum of two and a half years for implementation of projects. (Białystok Functional Area Association, 2018)

When considering issues related to the disbursement of ITI funds for which contracts have been signed, it can be noted that the EU contribution

at the end of 2018 in approved applications for payment amounted to 83.7 million PLN, which is 26.17% of the total ITI allocation. (Bialystok Functional Area Association, 2018). By the end of 2018, 14 subsidy contracts had been completed. Analyzing the above mentioned, some problems in the implementation of projects can be noticed. However, they do not result from the specificity of projects in the ITI formula¹, but are general in nature and appear in other projects implemented in the regional operational program. Among these reasons the following can be distinguished: problems in the selection of contractors of tasks, delays in the implementation of planned work by contractors, increase in prices of materials and personnel costs in construction companies, etc. (Bialystok Functional Area Association, 2018) The above mentioned problems are also reflected in the implementation of certain tasks. Looking at the more detailed implementation stage of the ITI ventures, it can be noted that there is a differentiation in the level of achievement of indicators in individual strategic objectives. (Bialystok Functional Area Association, 2018)

Implementation of projects supporting investment areas (objective 1) can be assessed satisfactorily. One out of four (including three integrated) projects have been completed. However, the achieving target indicators depends on the completion of the investment implemented by the City of Białystok, which prepares c.a. 45 ha of investment areas. The implementation of the next objective of the ITI Strategy is less advanced and achieved indicators are still quite low. Until the end of 2018, any integrated projects hadn't been completed. Despite the fact that in the 5 educational institutions the investment part has been completed, the ESF part of the project is still being implemented. The planned completion date for the projects is 2020-2021. When assessing the indicators fairly good implementation of pre-school educational activities can be emphasized. Two kindergartens were opened, but there are still non-investment projects being implemented, 4 more are ongoing, and in the assessment of applications there are two more projects. The realization of the project in activity 3.3.2 of the ROPPV is going quite slowly, which is being implemented from 2017, and the deadline for completion ends in 2020. The progress of other projects related to vocational education is low. In total, 5 integrated projects are implemented, but only in one of them the investment part is completed. (Bialystok Functional Area Association, 2018) Another goal financed from the

¹ In frame of ITI, in addition to projects financed only from the ESF and ERDF, mostly are implemented integrated projects, i.e. combining the activities financed by the ESF with the ERDF with a common project objective. The contracts for each fund are signed separately, but the achievement of the project's goals is related to the completion of the projects of the funds' commitment.

ITI instrument is the objective 4 regarding support for social services: families and children in foster care and dependent people (including people with disabilities, old age, socially excluded). The implementation of this objective is the most threatened, mainly in the case of foster care. In spite of 5 calls for proposals, only 4 projects were selected for co-financing (including 1 for foster care). At present, there are still three projects remaining in the assessment. Quite low effects of project implementation can also be observed in the last goal supported by ITI - objective 5. Projects implemented here concern modernization of individual heat and energy sources, replacement of street lighting, supporting low-emission public transport, construction of bicycle paths. Most of the indicators aren't achieved, but the co-financing provided in this goal was in a non-competitive procedure. For all planned projects co-financing agreement was signed, which allows to assess that planned indicators will be realized. (Bialystok Functional Area Association, 2018)

Conclusions

Support for the development of the functional area of the voivodship city is a minimum of 5% of the regional operational program. In the context of the entire operational program, this is not a large amount dedicated to the functional area, but a fairly significant support instrument for smaller municipalities, which previously lost the competition for EU money with bigger ones. In the context of the functional area itself, the impact of ITI on development is difficult to assess due to the low comparability of project indicators and available in public statistics. However, based on the research conducted at BFA, it could be noticed that this impact exists not only in the material sphere, but also in the development of institutional capacity, especially the cooperation of local governments at a level that has not been implemented so far. In addition, to summarize the results of the conducted research, it can be assessed that the implementation status of the ITI instrument is, in terms of contracted allocation, at a high level of c.a. 76%. Thus, one of the hypotheses set forth in the previous part of the article can be positively verified. However, the achievement of indicators is slower. One-third of the indicators are still at level 0. In the majority of other indicators, the execution rate is less than half of the target value. Therefore, the second hypothesis should be verified at this stage negatively. The low execution level can be read as a warning signal for an institution involved in the implementation of projects from the ITI instrument. However, it should be remembered that the deadline for most projects is 2020 - 2021. It can be

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therefore assessed that during this period the values will significantly increase. Moreover, the call for proposals and the announcement of the recruitment results in three competitions are also planned. Bearing in mind the above mentioned, the implementation of the strategy in the middle of the expenditure eligibility period can be assessed satisfactorily.

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Trend model of integration of monetary and fiscal politics

JEL Classification: C58; E44; G17

Keywords: *monetary policy; fiscal policy; decision tree; debt; shares; decision tree*

Abstract

Research background: Monetary and fiscal policy tasks can be unique, complex and multidisciplinary – economics, sociology, politics, etc. These are the main reasons why such tasks are solved under information shortages. Trends, i.e. increasing, decreasing, constant values, are the least information intensive quantifiers. Trend heuristics quantified by trends; „a growth rate of money supply (M1) is increasing” is a heuristic trend. A set of heuristic trends is studied as a generator of a complete list of all possible trend scenarios.

Methods: The solution of a trend model $M(X)$ is a set S of scenarios where X is the set of n variables. A set T of transitions among the set of scenarios S is used to generate unsteady state behaviours formalised by an oriented graph H . Any future and past time behaviour of a system under study is characterised by a path within the transitional graph H . A tree, which is a sub graph of the graph H can be used as a trend decision tree. The data set required by the standard evaluation of a decision tree is usually available just partially. This paper presents a very simple evaluation algorithm, which is based on easy to understand evaluation heuristics, e.g. “a longer decision tree sub-path is less probable. The case study presents six trend models $M(X)$ and their solutions.

Findings & Value added: The largest model has 28 heuristic trends and 13 scenarios. The relevant transitional graph is presented in the details.

Introduction

This study is based on research on the impact of monetary and fiscal policy on bond mutual funds and stock markets, which examined the relationship between bonds, stocks, their responses to market shocks by some macroeconomic variables that are characteristic of central bank monetary interventions or government fiscal interventions. At present, it is discussed how the use of non-standard monetary policy instruments, which is unprecedented in the past, will affect the future development of the economy and whether the expected recession will be a deep drop in global economic performance. The use of the quantitative easing method (QE) in major world economies (the United States, European Union, Japan) has resulted in a significant increase in money in the economy, a rise in debt, and has also contributed to an increase in stock and property prices. Lowering the interest rate to zero (zero low bond, ZLB) results in a reduction in the serviceability of public debt and thus in sustainability at an elevated level, but negatively affects the value of bonds. The close interdependence of the entire financial market sector means that changing one part of it, such as the stock market, has an impact on the rest of its parts. At the same time, the stability of the financial sector is very fragile due to its worldwide interconnection. The misalignment of individual market segments, such as shares, can also occur on the basis of unpredictable variables, such as the collective sentiment of investors and their subsequent behaviour based on information, for example, in the press or on the investor's website, or as a consequence of a decrease in their credit rating. The interdisciplinary nature of economics involves many aspects. Many soft aspects, such as political situation, investor sentiment, etc., must be included. The only knowledge that is invariable under all circumstances, such as gravity law, can be called a profound knowledge. Soft sciences, which also include economics, are very rarely based on deep knowledge and their variables are heuristics. Often these items can only be described by verbal descriptions indicating their trend - decreasing, constant, increasing (Dohnal, Kocmanova, 2016). This study deals with general heuristic trends, where X is a set of n variables such as bond flows, market returns, money supply growth, treasury bill, budget deficit, and GDP. The solution to this model trend is set S of scenarios where any future or past behaviour of the studied system of variables is characterized by the path in transition graph H . In this paper, an evaluation algorithm that works with the above mentioned financial market variables and the macroeconomic variables from the monetary area and fiscal policy is presented. The data source used is from a statistical evaluation of quarterly

data from 2001-2015 from the United States, France, Ireland, Luxembourg, Australia, China, Thailand, Malaysia, Taiwan, and South Korea. Since 2008, the Federal Reserve (Fed) has started using the non-standard monetary policy quantitative easing tool, and since January 22, 2015, the European Central Bank (ECB) has also begun to use it. The paper aims to define whether the general rules of the business cycle still apply, even with the massive use of these non-standard means in developed countries.

The post is organized as follows. The related literature is included in Section 2; the used data and variables are contained in Section 3. In Section 4, the heuristic evaluation is performed by the evaluation algorithm, and the results are discussed in Section 5. The following is a conclusion in section 6.

Literature review

Alfonso, Jalles (2018) noted that, before the economic and financial crisis of 2008-2009, the overall risk was underestimated, while overestimated during the subsequent crisis. The program of nonstandard monetary measures in the form of quantitative easing applied to the EMU of the European Central Bank (ECB) had a significant impact on government bond yields. According to Alfonso, Jalles, 2018, the ECB's intervention has contributed to reducing government bond yields. There was also a view that further implementation of quantitative easing could be considered a risk to Euro area economies, which are more financially vulnerable. Brana, Prat (2016) states that massive money creation is effective in combating liquidity shortages but also insufficient to prevent asset market collapses, especially in global risk aversion. Belke, A., Beckmann, J. (2015) examined the impact of short-term interest rates on stock prices. The impact of the unconventional monetary economy by the Federal Reserve System (FED) was examined by Neely, C.J. (2015).

Methodology

The starting point for this work is the correlation matrix elaborated in the article by Fiza Qureshi, Habib Hussain Khan, Ijaz ur Rehman, Saba Qureshi & Abdul Ghafoor (2019): An International Comparison, Emerging Markets Finance and Trade. This study used quarterly data from five emerging and five developed countries in 2001-20015. According to Fama (1981), the use of quarterly data can effectively detect macroeconomic

behaviour over the longer term. A sample of developed countries included the United States, France, Ireland, Luxembourg and Australia. A sample from developing countries was composed of China, Thailand, Malaysia, Taiwan, and South Korea.

Trend models

This paper is based on qualitative / trend reasoning which is described in detail e.g. in (Dohnal and Kocmanova, 2016). Direct and indirect trend proportionalities are used in this paper, for details see (1) in (Dohnal and Kocmanova, 2016):

- SUP if X is going up (down) then Y is going up (down) as well;
generalized supporting effects (1)
- RED if X is going down (up) then Y is going up (down) as well;
generalized reducing effects

The relations (1) are heuristics trend specified by experts or extracted from NL based knowledge. The relevant computer instructions used to develop a formal model are

- | | | | |
|---------------|---|---|-----|
| SUPPORT (SUP) | X | Y | |
| | | | (2) |
| REDUCE (RED) | X | Y | |

The trend relations (1) are the least information intensive and are based on the first derivative quantified by trends. If trend of trend is known then the following trend relations/heuristics trend can be used:

For example, the shape 21, Fig. 1, is not based on any quantifiers, e.g. numerical. It indicates just trend information items:

- The first derivative dY/dX is positive
- The second derivative d^2Y/dX^2 is positive (3)
- If $X = 0$ then Y is positive

A computer instruction, based on a shape from Fig. 1, is
Shape No.

$$23 \quad X \quad Y \quad (4)$$

For example, if it is known that

Y is increasing if X is increasing and vice versa

There is an upper limit for Y

then the trend relation $Y = f(X)$ is described by the following computer instruction

$$23 \quad X \quad Y \quad (5)$$

A computer n dimensional trend model M is a set of computer instructions (2)–(4)

$$M(X_1, X_2, \dots, X_n) \quad (6)$$

A new type of information non-intensive quantifier requires new algorithms for relevant model analysis and interpretation of results. The basic relevant definitions follow.

Trend analysis

The trend analysis is based on four values only, see e.g. (Vicha and Dohnal, 2008):

Trend Values:	Positive	Zero	Negative	Anything	
	+	0	–	*	(7)
Trend Derivations:	Increasing	Constant	Decreasing	Any trend	

The model (6) is solved and the set of n-dimensional scenarios is obtained $S(n, m)$. There are m scenarios:
 $S(n, m) = \{(X_1, DX_1, DDX_1), (X_2, DX_2, DDX_2), \dots, (X_n, DX_n, DDX_n)\}_j$,
 $j = 1, 2, \dots, m$ (8)

where, DX is the first and DDX is the second time trend derivatives. For example, the following three-dimensional scenario,

$$n = 3 \quad (9)$$

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$$\begin{array}{ccc} X_1 & X_2 & X_3 \\ (+ + +) & (+ - 0) & (+ - -) \end{array} \quad (10)$$

indicates that X_1 is increasing more and more rapidly, X_2 decreases linearly, X_3 is decreasing more and more rapidly.

It is possible to introduce higher trend derivatives, e.g. the third derivative DDDX. However, the third derivatives are not known and therefore they are not used.

Description of unsteady state behaviours - transitional graph

The triplets given in Fig. 3 describe a qualitative oscillation. A simple common sense analysis of the harmonic oscillator in classical mechanics indicates that a spring which is currently moving downwards must stop first and then it can move upwards.

It means that the following transition between two one-dimensional triplets is not possible:

$$(+ + +) \rightarrow (+ - -) \quad (11)$$

A complete set of all possible one-dimensional transitions is given in Tab. 1.

Case study

Used variables are following:

- BON bond flows
- MRS market returns
- MSG money supply growth (Growth rate of money supply M1) (12)
- TBA Treasury bill ratio (3-month T-Bill rate)
- DGA deficit to GDP ratio
- PGA public debt to GDP ratio

The correlation matrix , see Tab. 2, Fiza Qureshi, Habib Hussain Khan, Ijaz ur Rehman, Saba Qureshi & Abdul Ghafoor (2019): The Effect of Monetary and Fiscal Policy on Bond Mutual Funds and Stock Market: An International Comparison, Emerging Markets Finance and Trade. Can be easily transfered into the following set as computer instructions.

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1	SUP	PGA	BON	
2	RED	PGA	MRS	
3	RED	PGA	MSG	
4	SUP	PGA	DGA	
5	SUP	PGA	TBA	
6	SUP	TBA	BON	
7	SUP	TBA	MRS	
8	SUP	TBA	MSG	(13)
9	SUP	TBA	DGA	
10	SUP	DGA	BON	
11	RED	DGA	MRS	
12	RED	DGA	MSG	
13	RED	MSG	BON	
14	SUP	MSG	MRS	
15	RED	MRS	BON	

The model (13) gives the following solution.

	BON	MRS	MSG	DGA	TBA	PGA	
1	+00	+00	+00	+00	+00	+00	(14)

It is a well known fact that there are more solutions. Therefore some instructions of the model have been eliminated.

	2	RED	PGA	MRS	
	3	RED	PGA	MSG	
	4	SUP	PGA	DGA	
	5	SUP	PGA	TBA	(15)
	9	SUP	TBA	DGA	
	11	RED	DGA	MRS	
	12	RED	DGA	MSG	
	14	SUP	MSG	MRS	

The solution of the modified model (15) gives three scenarios.

	BON	MRS	MSG	DGA	TBA	PGA	
1	++*	+-*	+-*	++*	++*	++*	
2	+0*	+0*	+0*	+0*	+0*	+0*	(16)
3	+-*	++*	++*	+*	+-*	+*	

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The second scenario is the steady state scenario, see (14).

There is one instruction, see instruction No. 3 which indicates that the trend of trend is known for relation of the variables PGA, MSG. The relation has the shape No. 24, see Fig. 1. The modified model.

3	24	PGA	MSG	
4	SUP	PGA	DGA	
5	SUP	PGA	TBA	
14	SUP	MSG	MRS	
15	RED	MRS	BON	(17)

Is solved and the following set of 13 scenarios is the result.

	BON	MRS	MSG	DGA	TBA	PGA	
1	+++	+-	+-	+++	+++	+++	
2	++0	+0	+0	+++	+++	+++	
3	++-	++	++	+++	+++	+++	
4	++-	++	++	++0	++0	++0	
5	++-	++	++	++-	++-	++-	
6	+0+	+0-	+0-	+0+	+0+	+0+	
7	+00	+00	+00	+00	+00	+00	Equilibrium
8	+0-	+0+	+0+	+0-	+0-	+0-	(18)
9	++	++	++	++	++	++	
10	++0	++0	++0	++	++	++	
11	++	++	++	++	++	++	
12	++	++	++	+0	+0	+0	
13	++	++	++	+-	+-	+-	

When evaluating the entered heuristic algorithms, 13 scenarios that may occur can be generated. Scenario 7 is the equilibrium state of the economy. In the graph, see Fig. 3 shows 23 different motion options (T) between scenarios. The ideal scenario is a fixed state, i.e., scenario No. 7. It is a goal scenario. The worst-case scenarios are numbers 1 and 13, which can result from shocks or unpredictable events.

1 → 2 → 4 → 5 → 7

or

13 → 12 → 10 → 9 → 7

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From

1	+++	+--	+--	+++	+++	+++
2	++0	+0	+0	+++	+++	+++
4	++-	+++	+++	++0	++0	++0
5	++-	+++	+++	++-	++-	++-
7	+00	+00	+00	+00	+00	+00

Or

13	+--	+++	+++	+--	+--	+--
12	+--	+++	+++	+0	+0	+0
10	+0	++0	++0	+++	+++	+++
9	+++	++-	++-	+++	+++	+++
7	+00	+00	+00	+00	+00	+00

Discussion

Scenario 1 includes an overheated economy where the attractiveness of bonds is low, money is invested in stocks, and there is enough liquidity in the market. Short-term and long-term bond yields are low, public debt to GDP and the budget deficit to GDP increase. On point 2, long-term bond yields and 3-month bill increases, while return on equity begins to decline (declining economic performance). M1 begins to decline, with the general deficit and public debt rising at a fast pace. In point 4, long-term bond yields continue to rise rapidly, while stock prices fall rapidly, M1 declines rapidly, and the VAT and public debt budgets are slowing down to GDP. In point 5, this trend continues and then goes to point 1 when the economy is in a steady state, and all monetary and fiscal variables are settling. The second alternative, the procedure from scenario 13 is analogous but with the opposite evolution of the individual variables. At point 13, long-term bond yields are high, 3-month bill high yields and low currency (low liquidity). The stock price is meager, and there is a very high budget deficit to GDP and public debt to GDP. The economy is at its lowest level during the recession. Point 9, point 12, rapidly decreases long-term bond yields, the slower 3-month bill as well as public debt to GDP and the budget deficit to GDP. In point 10, the budget deficit and public debt reduction are accelerating, decelerating the decline in long-term bond yields, increasing share prices and increasing M1. At point 9, the trend begins to stabilize and goes to equilibrium at point 7. Thus, the economy shows the same trend oscillation as described in Samuelson, Nordhaus, 1995, p. Furthermore, the

results are the same as stated in Mankiw, 1999 p. 658 as a characteristic and that most macroeconomic variables move together.

Conclusions

According to the evaluation, the economic variables, which are the budget deficit to GDP and the level of public debt to GDP, as well as the long-term bond yield and 3-month bill, have the same trend development. For long-term bonds, it differs only in scenario 12, when it is faster than above, and in scenario 2 it is slower. In the following scenarios, the speed changes analogously in the opposite way. The return on shares and the amount of money are quite the same, but the opposite is true. The rate of return on long-term bonds and the return on shares is always the opposite if bond yields decline, the return on shares increases and vice versa. Biasing the economy from a balanced state can cause central bank intervention or an external factor, such as a political one. Another trigger may be the bursting of the speculative bubble on the stock or bond market. Intervention in one variable will trigger a cascade of changes across the financial market as well as in the state's economic condition. The results of the analysis coincide with one of the partial conclusions of the work of the authors from which the correlation matrix was adopted, namely that there is a two-way (negative) relationship between bonds held in bond funds and returns on equity markets in the presence of monetary and fiscal policies.

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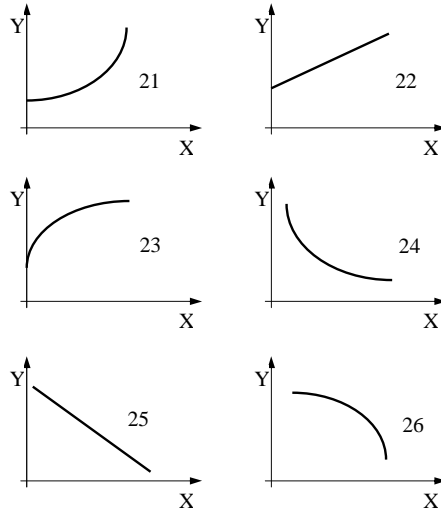
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Annex

Table 1. A complete set of one dimensional transitions. Source: Dohnal, Kocmanová (2016)

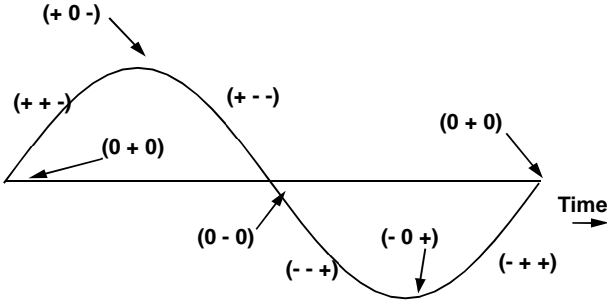
	From		To	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i>	<i>f</i>
		→		Or	Or	Or	Or	Or	Or
1	+++	→	++0						
2	++0	→	+++	++-					
3	++-	→	++0	+0-	+00				
4	+0+	→	+++						
5	+00	→	+++	++-					
6	+0-	→	++-						
7	+++	→	+0+	+0+	+00	0+-	00+	000	0-0
8	+0+	→	+++	++-	0-0				
9	++-	→	+0+	0--	0-0				

Figure 1. Trend relations



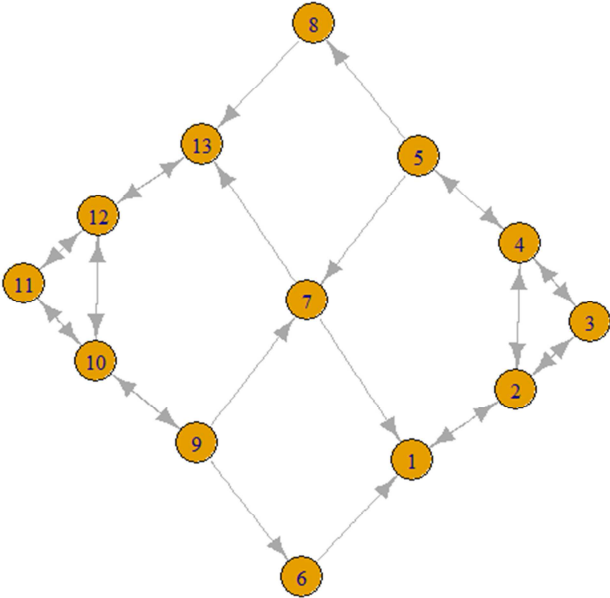
Source: Dohnal, Kocmanová (2016).

Figure 2. Qualitative description of a harmonic oscillation



Source: Dohnal, Kocmanová, 2016.

Figure 3. Transitional graph



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Brexit and the Theories of European Disintegration. Is There a Match?

JEL Classification: *F02; E61; P17*

Keywords: *European disintegration; Brexit; future of the EU*

Abstract

Research background: Numerous internal crises within the EU combined with the spectre of Brexit triggered a serious discussion on European disintegration. A new element of this debate is an attempt at theoretical presentation of the mechanism of the process to determine whether the disintegration is possible and what the potential consequences might be. For this very reason a new strand of research on disintegration theories began lately to appear. It was supposed to fill in a serious gap in the body of literature, which had so far optimistically focused on integration processes.

Purpose of the article: Given that the United Kingdom now appears on course to leave European Union, there is a necessity of analyzing probable scenarios of disintegration and evolution of the Union. The aim of our work is to identify how the theories of European disintegration could be useful in analysing Brexit.

Methods: This paper attempts to test the disintegration theories on Brexit's case to elaborate on the future of European Union.

Findings & Value added: We are of the opinion that Brexit is based on irrational premises therefore only post-functionalism is able to satisfactorily explain it by turning to mass politics and questions of identity instead of economic rationality.

Introduction

Literature on the theories attempting to explain the process of the European integration is vast. The impulse for its blossoming came from the need to understand the path breaking phenomenon of close cooperation between the countries of great diversity and difficult past relations. The main issue was how was it possible for this integration to last for such a long time and come that far. Recently, however, this trend came to a halt. Numerous internal crises within the EU combined with Brexit dynamics witnessed a rapid rise in studies on disintegration. Many phenomena – from euro and sovereign debt crisis to the emergence of right-wing, populist and anti-liberal movements – have brought into question the actual foundations of European integration.

In this paper we are trying to reflect on Brexit by means of the recent body of disintegration literature. In the past scholars claimed that the EU is a political system and as such can hardly serve as a basis for a general theory of integration. Drawing on this argument we claim that Brexit is such an unprecedented event that it can hardly serve as an exemplification of a rationally motivated act of quitting the EU.

The paper is organized as follows. In the second section we briefly characterize three influential theories of European integration, i.e. neofunctionalism, intergovernmentalism and postfunctionalism. In the third section we discuss the recent advances in the disintegration discourse. In the fourth section we attempt to juxtapose Brexit with the disintegration debate trying to test how well these two match each other. The paper ends with conclusions.

Theories of European integration

Within the vast literature theorizing on European integration three approaches seem to have earned a particular significance. These are the theories of neo-functionalism, intergovernmentalism and postfunctionalism.

According to the neo-functionalist theory the European integration proceeds due to positive spillovers it creates. This can be understood in two dimensions. First, progress in integration in one area stimulates deeper integration in other areas. Second, some issues are tackled more effectively by a coalition of states instead of introducing solutions by each state separately. Such economies of scale mean more efficacy in dealing with common challenges and bring down the costs of designing and introducing the necessary policies. Once the integration process has entered a specific path,

the costs of leaving it are high and so it leads to a creation of a supranational entity with a political arena of its own. Also, various pressure groups find it easier to deal with one central political actor, which in turn gains more legitimacy and recognition. In sum, neo-functionalism is a rather deterministic view, which assumes that the spillovers and search for political efficiency will eventually lead to a new political entity, being it Brussels in the case of the EU.

In contrast to the neo-functionalism, intergovernmentalism concentrates on the leading role of nation states in the process of integration. The integration is a product of cooperation between the governments, which perceived it as beneficial for national interests. Thus the progress in integration is shaped by states' goals and benefits being often a response to changing exogenous conditions, economic advantages and current constellations of power. Supranationalism is not going to make nation states obsolete, as it is formed and steered by negotiations between governments. According to this theory nation states are there to stay and the future of the EU lies in their hands.

More recently, the shortcomings of the above approaches led to the theory of postfunctionalism (Hooghe & Marks 2019). The new theory claimed that neo-functionalism and intergovernmentalism became increasingly less useful in explaining the progress of European integration due to the politicization of the previously rather technocratic process. Postfunctionalism puts emphasis on the influence of national politics based on identities and territorial communities, which interests have entered the scene. The debate about the role and shape of the European Union has moved to national politics and therefore to masses, public opinions, internal political struggles and home sentiments. In domestic politics voters are more concerned about losses (or gains) in welfare, identity, competitiveness or migrations, which is exploited by national parties. Thus the main actors of the European drama are no longer only governments and big business, but also citizens and political parties. As a result, the 'permissive consensus' enjoyed previously by political elites has turned into 'constraining dissensus' which produces heavy political restraints on further integration.

Postfunctionalism does not imply implicitly integration or disintegration, various scenarios are viable. It is rather the supranational and national reaction to crises and the dynamics it produces that is decisive here. The integration, if it proceeds, will be an effect of political conflicts and struggles, not technocratic consensus. Neo-functionalism and intergovernmentalism view thus the European integration as a cooperative process led by interest groups and governments, whereas postfunctionalism underlines

conflict emanating from the incompatible national preferences and systems of values.

The disintegration debate

For many years the European integration seemed irreversible and the theories of integration tended to confirm this confidence. However, recent developments within the EU and in its surroundings triggered a scholarly debate on the possibility of disintegration. Number of crises, which have developed in the last two decades e.g. relatively poor economic performance of the EU countries, banking crisis, sovereign debt and euro crisis, the migration crisis, EU leadership deficit, Brexit, rising euroscepticism, weakened EU legitimacy among European citizens and a declining position of the EU on the global scene. Facing all these crises at once is a real political challenge.

So in general terms a disintegration of supranational political entity can be a result of accumulation of a series of negative events and processes, which make further integration difficult by its delegitimation or political deadlock. In such case societies, politicians and various interest groups do not perceive it any more as sensible and beneficial due to political contradictions and economic hardships. However, it seems too early to judge if the EU has already reached this position. As Schmitter and Lefkofridi (2016, p. 3) argue, 'the EU is not likely to break as long as it successfully fulfills key functions for the Union's economy and society as a whole; but it *can* and *will* break if it does not'. They identify areas in which we can still observe gains from cooperation and where we can reap mutual benefits, that is a convergence in technocratic policies and expert advice leading to advances in public policies, more economic security and stability, and increased social welfare. Yet some societies seem to have been left with their problems including sluggish growth, stagnating wages, unemployment and migrations. These issues may fuel disintegration tendencies in the future if not addressed properly by the EU authorities. Integration leading to growing divergence is not sustainable by all means.

In an effort to combine various theories of integration as well as in the face of many of them not matching the reality, Jones (2018) proposed a model of integration/disintegration based on cumulative sequence. He placed the emphasis on the equality of opportunity, which in political terms means that some, usually less endowed, players are offered a voice to be heard and a chance to build equal welfare and reap economic benefits like more successful states. If that kind of equality leads to better resource allo-

cation and efficacy of political processes, then the rules of the game are accepted and the support for integration grows. Interests of wealthy and less developed, strong and weak societies become convergent, their chances are perceived as equal. In contrast, when hardships of various nature lead to political and economic divergences contributing to an increase in the inequalities of opportunity, tendencies to disintegrate begin to appear. Parties feel discriminated and have the impression of playing on a tilted table, so in consequence they start to believe they would be better off on their own. The directions of causation depend thus on the accumulation of positive and negative experiences. It is crucial to search for winners and losers of integration processes, because there the discontents and tendencies to separate emerge.

How does Brexit fit into this theoretical framework?

At the first sight Brexit is a manifestation of European disintegration. Behind this step lies faith that the British can do better without the EU rules, regulations and structures. National government is expected to tackle the accumulated and future challenges with more efficacy than supranational Brussels authorities. However, we think that we should rather ask whether the theories we have at hand are helpful in explaining the somewhat chaotic process of Great Britain leaving the EU or is it actually the Brexit that shows us gaps and imperfections in the body of theoretical approach. It seems that both can be the case.

All theoretical constructions need to be internally coherent and should refer implicitly or explicitly to some kind of intrinsic logic. Otherwise they would be a set of generalizations with little connection to the real processes and phenomena. In the case of integration theories this logic seems to refer to rational political claims and actions which would lead to achieving better results in comparison to the previous state of affairs.

It is thus no wonder that a part of the Brexit debate concentrated on the attempts to explain and justify it in a rational manner. Even though the hardships and threats stemming from Brexit were acknowledged, there must have been some rationale justifying the whole process. This attitude was especially evident for Eurosceptic politicians and commentators. The negative attitude of the British conservative party to the European integration and a substantial Eurosceptic electorate have always suggested that the UK was reluctant and hesitant of delegating parts of its sovereignty to the continent. However, due to the geopolitical position it was more beneficial to join the EU than to stay outside the integration process. British accession

to the EU have always bred a dissatisfaction among voters, same as migration into the UK. Thus London has adopted a position of an outsider opting for a European confederation instead of further integration. Britain joined the EU to protect its interests, not because it was eager to integrate with the continental values and structures. It was a marriage of convenience, not of love and devotion. Brexit therefore is just a response to the changing circumstances and consequences of being an EU member. It should not come as a surprise that it was the UK that was first to react to the undesirable changes within and around the EU as it was always the most sceptic member. The disintegration processes have already started years ago, but Brexit is just a solid manifestation of it. For Richardson (2018) this is a clear failure of the idea of supranationalism. Top-down coercion in the process of governing the EU has displaced the politics based on consensus-seeking and respect of national diversity. The divergence between European elites and citizens has never been so huge. Richardson thus rejects the idea that it were the internal factors of British politics that have led to Brexit. It was rather the unwanted and arbitrary expansion of EU authorities into national public policies and regulations far exceeding the expectations of European people that triggered the animosity of many citizens against the EU. The processes of integration and unification have a pace of their own and too much pressure on hastening them brings negative consequences.

Even though the above argumentation has something to it and provides some explanation of Brexit rationale, we believe that it is an attempt to provide ex-post justification to a sudden and unexpected move. The true reason for Brexit was a lost referendum, which was a political gamble by David Cameron. The referendum itself was a triumph of civic ignorance, post-truth and disinformation embodied in a negative campaign. The standard set of arguments of Leave option included immigration control, rejection of Brussels bureaucracy, opposition to the establishment and the wish to 'make Britain great again'. Alas, no detailed plan of how to achieve these goals was presented. It was a game of emotions targeted at the discontented masses, not a discussion based on rational, geopolitical and economic calculations. During the Brexit campaign there were no simulations offered predicting how much British economy would lose (or gain) on leaving the EU. However, according to economists' calculations (Sampson 2017) British GDP per capita may shrink by 10% in 10 years if UK leaves the Single Market.

Many studies have confirmed that the British voting to leave the EU were usually motivated by anti-immigration and anti-establishment feelings. They were thus trying to express their lack of confidence in the changes that modern societies have been going through lately and found a

suitable scapegoat for their decreasing welfare and growing uncertainty of life in the European Union. The Leavers were often the less educated and less well-off people feeling left behind by the processes of globalization, which actually reflects the situation in many countries across Europe. Paradoxically, these groups are also the most vulnerable to Brexit consequences taking into consideration a possible economic downturn and weakened geopolitical position of UK. To our best knowledge none of the alternatively considered relations between UK and the EU presents itself as more advantageous compared to the full membership.

From the theoretical perspective Brexit can be interpreted through the postfunctionalist theory of integration that puts the pressure of explanation on masses and politics. Schimmelfennig (2018) argued that the Leave campaign and the motivations to quit the EU were in line with postfunctionalist expectations. He also predicted that due to weak institutional bargaining power states seeking disintegration need to moderate their demands and make concessions to the EU when negotiating leave conditions. Also Hooghe and Marks (2019) emphasize that Brexit referendum portrays tensions between functional integration and nationalist resistance, which have never connected. The set of arguments of both sides was completely disjunctive so there was no common denominator between them to find a ground for a plausible discussion. For this reason it was the immigration issue that finally proved to be decisive.

The Brexit situation seems to prove something more though, namely that the benefits of EU integration are not acknowledged and appreciated enough until a society faces the possibility to lose them. The public opinion is also volatile. According to post-referendum polls the Leave decision was hasty and a petition to repeat the vote was swiftly signed by 6 million Brits. Do postfunctionalist assumptions need to yield to neofunctional theories? Such conclusions would be too rapid at the moment, but they provide a ground for a renewed discussion. The prevalence of neofunctionalism is for example clearly seen in the issue of regaining national sovereignty after leaving the EU. The complexity of the whole situation has induced the UK government to make a desperate plea for transition period after March 2019 to allow the country to set up its own regulatory machinery. The attempts to postpone or even cancel Brexit, which were made after that date, suggest existence of similar concerns.

Conclusions

Brexit is a truly unprecedented process. It is for the first time that a country attempts to leave a supranational entity with such political complexity and power. However, the most recent developments seem to confirm that the process of leaving the EU is highly improvised. Today, three years after the referendum, we still do not know whether Brexit will indeed take place or what kind of institutional form will it take. What we know though is that Brexit caused a major political crisis in the UK and impaired reputation of the country.

In contrast, supranational EU turned out effective in fierce struggle for Union's best interest. This highly bureaucratic organization was well-prepared to Brexit negotiations and presented a united front. UK entered the negotiations without thorough preparation and detailed plan on how to leave the EU. European negotiators quickly gained advantage over UK's representatives and controlled the whole process of negotiations. Rational justifications for Brexit remain therefore bleak, but it is easy to notice its political costs and point to economic threats deriving from the British divorce from the EU. Both neofunctionalist and intergovernmental theory of integration predicted the high costs, but none of them assumed that a nation would leave intentionally.

The case of Brexit seems to confirm the basic assumptions of post-functional approach to European integration. Beside economic rationality adopted by governments and interest groups exist other rationalities linked with identity, social issues and legitimization of power. When the latter prevail, the economic calculus becomes secondary issue, often to the surprise of many.

It is hard to predict today whether Brexit will foster further integration or encourage other countries to become more critical of the EU. Many point to the former considering the political atmosphere around Brexit and possible, yet unrevealed, consequences of the leave. What seems, however, easier to project is that it will open a new chapter in the research on European integration.

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Entrepreneurial propensity index of Czech university students

JEL Classification: *M13; D83*

Keywords: *entrepreneurship; university student; entrepreneurial propensity*

Abstract

Research background: Promotion of the entrepreneurship have an important role in the society, and the direct relationship between entrepreneurship and economic growth of the country is proven. Universities education should be one of the pillars to build a business environment and entrepreneurial propensity of the students in the entrepreneurship.

Purpose of the article: The paper aimed to define and quantify significant factors that shape the entrepreneurial propensity of university students and create the entrepreneurial propensity index. A part of this aim was a comparison of defined factors in the Czech Republic. The survey-based research was conducted with students in the last year of their economic studies on the universities. 409 students from 14 universities in the Czech Republic were approached during research.

Methods: The custom Entrepreneurial Propensity Index was created to verify the defined scientific hypotheses. Also, the descriptive statistics (pivot table, absolute frequency and relative frequency) were used to evaluate partial results.

Findings & Value added: According to Czech students, the most important factors with the impact on the entrepreneurial propensity to the entrepreneurship is that doing business enables using own abilities and it is easier to do business if close relatives are also in business. Otherwise, the most important barriers of entrepreneurial propensity to the entrepreneurship is media which provide information regarding status and activities of businesspersons, and the amount of administrative work of businesspersons in the country which has decreased in the last five years.

Introduction

With the retirement age rising of European countries, young people will soon work for 50 years or more. I realise that choosing the profession I want to follow – and the A-levels and university courses that will get me there – is a decision of paramount importance. However, I cannot help thinking that it is too much for an inexperienced 18-22 years old to make. However, young university graduates sometimes find it difficult to enter the labour market due to their overqualification (Crecente-Romero *et al.*, 2018, pp. 223-228).

The higher education system does not help much university students (Birdthistle, 2008, pp. 552-567; Plotnikova *et al.*, 2016, pp. 939-954). Universities often demand top grades and experience for certain courses (Morris *et al.*, 2017, pp. 65-85). In the crush to get all this sorted, it is hard to find the time to consider your options.

The majority of students do not know what they want to do when they finish education – let alone when they are halfway through (Solomon *et al.*, 2008, pp. 239-258). Moreover, the few who do know what they want often rethink their choice as they develop and grow. Who I am now isn't who I might be in the future, and the education and recruitment system needs to give us space and time to make the right career choices (Pruett *et al.*, 2009, pp. 571-574). In this context, it is important to identify and quantify the keys factors of the entrepreneurial propensity of university students to the entrepreneurship.

This paper analyses important factors of the entrepreneurial propensity and quantifies their significance in the Czech Republic. The originality of this research lies in the definition and quantification of the factors shaping the entrepreneurial propensity of university students to entrepreneurship, as well as the comparison of business indicators in the Czech Republic.

The structure of the paper is the following: The first part defines the aim of the research, the methodology, and the data collection. The second part presents the research results and discussion about the issue. The conclusion offers subsequent research of authors, limitation and also the final summary of the research.

Research methodology

The aim of the paper was to define and quantify significant factors that shape the entrepreneurial propensity of university students and create the entrepreneurial propensity index. A part of this aim was a comparison of defined factors in the Czech Republic.

In regards to the defined aim, survey-based research was conducted with students in the last year of their economic studies on the universities. Data collection took place in the year 2017. The method of random choice using the “Randbetween“ mathematical function was used to select universities (and their study field) from all universities (study field - economic area) in the Czech Republic. The questionnaire was constructed from demographic characteristics of the student (country of his study, gender and name of the university which his study), selected factors of entrepreneurial propensity and their indicators, statements on the entrepreneurial propensity. The research team used the data from all (43) statements. Students could reply with one of the following answers: I agree completely, I agree, No attitude, I disagree, or I disagree completely.

The students were approached via email asking them to fill out the online questionnaire. We have managed to collect the total of 409 fulfilled questionnaires. Czech students were from 14 universities. Structure of students by gender studying at universities: 156 males (38.14%), 253 females (61.86%). Students from the Czech Republic are studying at universities in the following cities: Liberec, Brno, Praha, Olomouc, Pardubice, Ostrava, Zlín.

Following the approach by Dvorsky *et al.* (2017, pp. 89-100), individual factors and their indicators were defined using the following statements:

Social environment (SE)

SE1: There is a businessperson in my family, and I highly respect him/her.

SE2: Society in general appreciates businesspersons.

SE3: Politicians, as well as the public, consider businesspersons to be beneficial for society.

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SE4: Media provide true information regarding status and activities of businesspersons.

Business support from the state (BSS)

BSS1: The state supports entrepreneurship by using its tools.

BSS2: The state creates high-quality conditions for starting a business.

BSS3: The state financially supports business.

BSS4: Legal conditions for doing business are of high quality.

Macroeconomic environment (ME)

ME1: I consider the macroeconomic environment of my country to be positive for doing business.

ME2: The state of the macroeconomic environment of my country supports starting a business.

ME3: Presents macroeconomic environment does not prevent me from starting a business.

ME4: Present level of basic macroeconomic factors (GDP, employment, inflation) supports business and creates interesting business opportunities.

Quality of business environment (QBE)

QBE1: The business environment of my country is of good quality and convenient for starting a business.

QBE2: The business environment of my country is relatively risk-resistant and enables to start a business.

QBE3: Conditions for doing business have improved in my country in the last five years.

QBE4: The amount of administrative work of businesspersons in my country has decreased in the last five years.

Access to financial resources (AFR)

AFR1: There is no intensive financial risk in the business environment, i.e. having limited access to external financial sources, bad payment habits, etc.

AFR2: Business entities have easy access to bank credits.

AFR3: I consider the credit conditions of commercial banks in my country to be appropriate.

AFR4: The interest rates of commercial banks support business activities.

Quality of university education (QUE)

QUE1: I consider university education of my country to be of good quality.

QUE2: O consider the educational structures at my faculty (university) to be of high quality.

QUE3: The knowledge acquired at my faculty (university) will help me when doing business.

QUE4: The knowledge acquired by students in my country will help them to start a business.

Personality traits (PT)

PT1: A businessperson does not have to have any special innate abilities.

PT2: The most important characteristics of a businessperson are specialisation, persistence, responsibility, and risk-resistance.

PT3: It is easier to do business if close relatives are in business.

PT4: Every person has certain prerequisites for doing business.

Business advantages (BA)

BA1: The advantages of entrepreneurship outnumber the disadvantages.

BA2: A businessperson is wealthier and having higher social status.

BA3: Doing business enables to have career growth and interesting job opportunities.

BA4: Doing business enables to make use of own abilities.

Entrepreneurial propensity (EP)

EP1: I am very interested in business.

EP2: I am convinced that I will start a business after I graduate from university.

EP3: In case nothing unexpected happens, I will start a business within three years latest.

EP4: At present, I have business activities.

Individual factors were incorporated into the questionnaire by a random selection in order to achieve the highest possible objectivity level. In order to quantify and compare important factors determining the entrepreneurial propensity of students to the entrepreneurship, an aggregated *index of the entrepreneurial propensity* of students to the entrepreneurship was created.

It can be characterised as the average/mean value of the positive evaluation of individual factors:

$$AI_{EP} = \frac{(\emptyset SE + \emptyset BSS + \emptyset ME + \emptyset QBE + \emptyset AFR + \emptyset QUE + \emptyset PT + \emptyset BA)}{8}$$

where:

AI_{EP} – aggregated index of the entrepreneurial propensity

$\emptyset SE, \emptyset BSS, \emptyset ME, \emptyset QBE, \emptyset AFR, \emptyset QUE, \emptyset PT, \emptyset BA$ – the average/mean value of the positive evaluation of individual constructs integrated into the aggregated index.

$$\emptyset SE = \frac{\sum_{i=1}^4 SE_i}{4}; \emptyset BSS = \frac{\sum_{i=1}^4 BSS_i}{4}; \dots; \emptyset BA = \frac{\sum_{i=1}^4 BA_i}{4}.$$

Also, a *partial index of the entrepreneurial propensity* (PI_{EP}) was created, which can be calculated as the average value of positive answers to the respective EP indicators:

$$PI_{EP} = \frac{\sum_{i=1}^4 EP_i}{4}$$

In theory, the following should be true: $AI_{EP} = PI_{EP}$. It means that the evaluation of important factors determining the entrepreneurial propensity of students to the entrepreneurship should equal the direct evaluation of the entrepreneurial propensity of students to the entrepreneurship. If the difference between the given indexes is less than 10 %, it can be said that this model has a good predictive potential. The evaluation of indexes: the interval of 0.001 to 0.250: the value is low, the interval of 0.251 to 0.500: the value is below average; the interval of 0.501 to 0.750: the value is above average, the index value of over 0.750 is high. When developing this paper, the following hypotheses were constructed:

H1: The aggregated index of the entrepreneurial propensity of university students to the entrepreneurship in the Czech Republic will be below average (lower than 0.501).

H2: The difference between the aggregated and the partial index of the entrepreneurial propensity of university students to the entrepreneurship will be lower than 10 % in the Czech Republic.

The method of descriptive statistics (indexes) was used to evaluate the first and second hypothesis. All these results were performed using the SPSS Statistics analytical software for data evaluation.

Results

The research results are listed in the tables below.

The results in Table 1 indicate that Czech students rated the macroeconomic environment (Index = 0.512) and the quality of the business environment (Index = 0.408) more positively than the social environment and business support from the state (Index SE = 0.344; Index BSS = 0.285). Partial factors SE, ME, BSS, and QBE, were not rated similarly. For example: Indexes SE indicators ϵ (0.071; 0.680). The assessment of selected social environment indicators is different.

The results in Table 2 indicate that Czech students rated the quality of university education (Index = 0.659) and the business advantages (Index = 0.591) more positively than the access to the financial resources and personality traits (Index AFR = 0.472; Index PT = 0.493). Partial factors SE, ME, BSS, and QBE, were not rated similarly. For example: Indexes PT indicators ϵ (0.161; 0.848). The assessment of selected personality traits indicators is different.

The results in Table 3 indicate that only 30.3% of Czech students have an entrepreneurial propensity to the entrepreneurship. Partial indicators EP1, EP2, EP3, and EP4, were rated similarly.

Based on the research results, an aggregated and a partial index of the entrepreneurial propensity of students to the entrepreneurship in the Czech Republic was quantified in table 4.

The aggregated index of the entrepreneurial propensity of Czech students reached the value of 0.470 (see table 4). It can mean that the average value of the positive ratings of factors determining the entrepreneurial propensity reached the value of 47.0%. The partial index of the entrepreneurial propensity of Czech students to the entrepreneurship reached the value of 0.303 (see table 4). It is interesting to see that the value of the aggregated index is higher than that of the partial index (difference of 16.7 %).

The presented results (see table 5) indicate that the presented model used for the evaluation of the entrepreneurial propensity of students to entrepreneurship is of adequate propensity, as the difference between the aggregated index value and the partial index value oscillates around 10-15%. It is interesting to see that the value of the aggregated index is higher than that of the partial index. It may be explained by the fact that the value of the

aggregated index is influenced by extreme values in the model used: the lowest index value was recorded in the evaluation of business support from state and the highest in the evaluation of the business advantages.

Our results show that the business advantages (doing business enables: to have career growth; interesting job opportunities; to make use of own abilities). It is in contrast with Silva & Noble (2018, pp. 1-7), their results showed that the most influential factors in explaining student's entrepreneurial propensity are both the university education and the risk propensity.

Our results also demonstrated that university education is also a significant factor in the Czech Republic (\emptyset QUE=0.659). Entrepreneurial education is the most important factor in the entrepreneurial propensity of university students to the entrepreneurship.

Conclusions

The paper aimed to define and quantify significant factors that shape the entrepreneurial propensity of university students and create the entrepreneurial propensity index. A part of this aim was a comparison of defined factors in the Czech Republic.

The aggregated Entrepreneurial Propensity Index in the Czech Republic reached the value of 0.470. According to Czech students, the most important impact of entrepreneurial propensity to the entrepreneurship is „doing business enables to make use of own abilities” (Index =0.868) and „it is easier to do business if close relatives are in business” (Index = 0.848). According to Czech students, the most important barriers of entrepreneurial propensity to the entrepreneurship is factor "media provide true information regarding status and activities of businesspersons" (Index = 0.071) and "the amount of administrative work of businesspersons in my country has decreased in the last five years" (Index = 0.130).

The results of this paper are interesting for career guidance centres; graduate offices and career fairs, entrepreneurship support organisations and also for business subjects in the Czech Republic.

The authors are awareness of the research limits (e. g. regional character of the study – Czech Republic, the sample size - only 409 students of one country, basic statistical methods as aggregated and partial index of the entrepreneurial propensity). The authors believe that the paper has brought several interesting findings and new incentives for further research and discussion regarding assessing the selected factors and their indicators in the propensity and new attributes of entrepreneurship of students.

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It is worth to concentrate our future research on the comparison of the evaluation of the factors and their indicators with other countries in the Visegrad group. The authors would like to cooperate with other Visegrad researchers because the authors believe that the factors and their indicators differently influencing the entrepreneurial propensity of the students to the entrepreneurship in this countries.

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Annex

Table 1. Evaluation of social environment (SE), business support from the state (BSS), macroeconomic environment (ME) and quality of the business environment (QBE) in the Czech Republic

Factor	Ratio of positive answers CR	Factor	Ratio of positive answers CR
SE1	0.680	ME1	0.487
SE2	0.435	ME2	0.445
SE3	0.188	ME3	0.606
SE4	0.071	ME4	0.511
<i>Index SE</i>	<i>0.344</i>	<i>Index ME</i>	<i>0.512</i>
BSS1	0.330	QBE1	0.408
BSS2	0.298	QBE2	0.677
BSS3	0.254	QBE3	0.386
BSS4	0.259	QBE4	0.130
<i>Index BSS</i>	<i>0.285</i>	<i>Index QBE</i>	<i>0.400</i>

Source: own calculation.

Table 2. Evaluation of access to financial resources (AFR), quality of university education (QUE), personality traits (PT) and business advantages (BA) in the Czech Republic

Factor	Ratio of positive answers CR	Factor	Ratio of positive answers CR
AFR1	0.274	PT1	0.330
AFR2	0.592	PT2	0.633
AFR3	0.560	PT3	0.848
AFR4	0.460	PT4	0.161
<i>Index AFR</i>	<i>0.472</i>	<i>Index PT</i>	<i>0.493</i>
QUE1	0.685	BA1	0.533
QUE2	0.709	BA2	0.355
QUE3	0.680	BA3	0.609
QUE4	0.560	BA4	0.868
<i>Index QUE</i>	<i>0.659</i>	<i>Index BA</i>	<i>0.591</i>

Source: own calculation.

Table 3. Evaluation entrepreneurial propensity in Czech Republic

Factor	Ratio of positive answers CR
EP1	0.494
EP2	0.269
EP3	0.259
EP4	0.191
<i>Index EP</i>	<i>0.303</i>

Source: own calculation.

Table 4. Evaluation aggregated and a partial index of the entrepreneurial propensity of students.

Selected Country	Aggregated index of the entrepreneurial propensity (AI_{EP})	Partial index of the entrepreneurial propensity (PI_{EP})
Czech Republic	0.470	0.303

Source: own calculation.

Table 5. Evaluation of the statistical hypotheses.

Hypothesis	Evaluation of hypothesis	Explanation
H1	Confirmed	The aggregated index of the entrepreneurial propensity in CR was lower than 0.501.
H2	Rejected	The difference between the aggregated index of the entrepreneurial propensity and the partial index of the entrepreneurial propensity in CR was higher than 10%.

Source: own calculation.

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Areas of cooperation between Cittaslow cities

JEL Classification: *O21; R58; Z32*

Keywords: *cooperation of cities; network of cities; Cittaslow*

Abstract

Research background: Many social, economic and spatial problems have accumulated in small cities in Poland. A chance for their development may arise from the cooperation within a network of cities which associates cities similar in size, paradigm and vision of development, such as the ‘Cittaslow – International network of cities where living is good’.

Purpose of the article: The aim of the article is to present and analyze the areas of cooperation between 28 cities that are members of the network and the Polish Cittaslow Cities Association.

Methods: Analysis of primary documents, for example urban development strategies, Cittaslow network’s statute, and results of own research (a questionnaire conducted among mayors and Cittaslow coordinators in the offices of member cities).

Findings & Value added: The Cittaslow network is diverse, as it encompasses member cities which have belonged to the network for several years and the ones which joined it only a few months ago. Thus, more time is needed to build lasting cooperation. The analysis of the measures taken so far has revealed many positive outcomes, but building permanent cooperation based on trust is a long-term process, which is not facilitated by the local authorities being elected to serve relatively short terms. The cooperation of cities belonging to the Cittaslow network in Poland is becoming more and more complex, and concerns mainly the development of tourism and urban promotion, planning of development policy and urban revitalization. The shared logo and promotion of the urban network, organization of cultural events, exchange of experience, implementation of a supralocal revitalization program for several ‘slow cities’ from Warmińsko-Mazurskie Voivodeship, are examples of active cooperation.

Introduction

Cooperation between towns has different forms – from mutually lobbying for regional development, representing and defending the interests of small towns, developing local government administration to protecting and promoting cultural heritage. Some urban networks participate actively in international conferences and EU consultations regarding priorities in such fields as internal EU policy, regional policy, spatial policy, public services, natural environment or towns' partnership (for instance the European Network of Small Towns). A group town networks which concentrate their actions on a narrow range of endogenous factors, for example on cultural heritage, can be distinguished. Such networks mainly serve to maintain and strengthen the historic character of their member towns, to exchange the know-how connected with archaeological research, tourism, or promotion, to take into consideration the historical structures in urban planning, and to apply for European funds so as to participate in European projects together (the Network of European Walled Towns and the Network of the Oldest European Towns) (Mazur-Belzyt, 2017, pp. 2-3).

An example of a network of small cities that is dynamically developing not only in Europe is the Cittaslow International Network.

The Cittaslow movement was initiated in 1999 by Paolo Saturnini, the mayor of Greve di Chianti in Italy and the mayors of other small cities: Bra, Orvieto, Positano, as well as the Slow Food Association, who together founded the International Association of Cittaslow. This is how the 'Cittaslow – International network of cities where living is good' began. The Cittaslow association has its own logo, depicting 'an orange coloured snail bearing a crown of modern and historical buildings'. The organizational structure of the International Association of Cittaslow consists of the International Assembly, the International Coordinating Committee, the International President, the President Council, the Board of Guarantors, the International Scientific Committee and Accounting Auditor. All organs are appointed for 3 years. Candidate cities are evaluated in 7 areas: energy and environmental policy, infrastructure policies, quality of urban life policies, agricultural, touristic and artisan policies, policies for hospitality, awareness and training, social cohesion, and partnerships. If a town's certification score exceeds 50% of the requirements, it will be declared a new Cittaslow member (*Cittaslow International charter*, 2017, pp. 11, 28).

'Slow cities' are places where citizens and local leaders pay attention to the local history and employ the distinct local context to develop their cities in better and more sustainable ways. More generally, the 'slow city model' focuses on local distinctiveness and explicitly links the three E's (economy,

environment and equity) of sustainable urban development (Mayer & Knox, 2006, p. 322).

The first conference of the International Association of Cittaslow, with the participation of the European Parliament, was held in Brussels in 2012; the conference aimed to present the Cittaslow as a movement towards improving the quality of life of the European community. During this conference, Zygmunt Bauman, a sociologist, philosopher and the author of the concept of 'liquid modernity', stated that 'Cittaslow is one of the world's 18 forces capable of restoring the power of local communities. The development and incorporation of new cities into the Cittaslow movement in Europe unites nations that exchange experiences and, together, create a new quality of local life' (Zawadzka, 2017, p. 97).

Unsurprisingly, the number of cities in the Cittaslow International Network is constantly growing. There are already 252 member cities from 30 countries around the world. The Polish Cittaslow Network is the second most numerous national Cittaslow network, after the Italian one. In Poland, all the member cities belong to the Association 'Polish Cittaslow Cities'.

The conditions of the development of 'slow cities' are not only the optimal use of local endogenous resources but also the development of multi-level cooperation in various areas, such as tourism, entrepreneurship, promotion and city management (see Rysz & Mazurek, 2015, p. 45).

Therefore, the main aim of the article is to present and analyze the areas of cooperation between all the 28 cities that are members of this network and the Polish Cittaslow Cities Association.

The article consists of the following sections:

- Introduction, that includes the aim of the article and the justification for the topic importance.
- Research methodology section, that includes description of research methods (surveys).
- Results, where the results of the research have been presented.
- Conclusions – summary and possible directions of future research.

Research methodology

The Polish National Cittaslow Network is the world's second largest network (after the Italian one) in terms of the number of member cities which have joined the international Cittaslow movement. It comprises 28 member cities, 20 of which lie in the Warmińsko-Mazurskie Voivodeship, including 4 founder cities: Biskupiec, Bisztynek, Lidzbark Warmiński, Reszel, and several others: Barczewo, Bartoszyce, Dobre Miasto, Działdowo, Gołdap,

Górowo Iławeckie, Jeziorany, Lidzbark, Lubawa, Nidzica, Nowe Miasto Lubawskie, Olsztynek, Orneta, Pasym, Ryn, Sępólno; there are 2 cities from the Opolskie Voivodeship (Głubczyce, Prudnik); 1 city from each of the following voivodeships: Pomorskie (Nowy Dwór Gdański), Lubelskie (Rejowiec Fabryczny), Łódzkie (Rzgów), Śląskie (Kalety), Wielkopolskie (Murowana Goślina) and Zachodnio-pomorskie (Sianów). The supporting member of the Polish Cittaslow Network is the Marshal's Office of the Warmińsko-Mazurskie Voivodeship.

The idea behind the international Cittaslow movement is to promote the culture of good, harmonious life in smaller cities, as an alternative to the metropolitan rush and progressing globalization. Cities associated in this network strive towards sustainable development, which relies on a well-planned urban policy that ensures proper relations between economic growth, environmental protection and improved quality of life for residents. The principal goals of the Cittaslow movement are: sustainable development of cities based on local resources, improved standard of living, for example by constructing adequate urban infrastructure and developing places where residents can rest and relax, protecting the natural environment and promoting pro-environmental attitudes among residents, taking care of the historical urban structure, renovating historical buildings, paying attention to the aesthetic quality of the city, promoting the culture of hospitality, but also by ensuring that both residents and visitors are offered a wide range of cultural and leisure time activities. It is also recommended to promote the aforementioned values of a city, to advertise local products, local crafts and cuisine, and to take advantage of the latest technologies and achievements of the modern world, in the scope that will serve to attain the goals of the Cittaslow movement, such as the development of 'cities where living is good.'

Certainly, benefits derived from the implementation of a 'slow city' model contribute to the actual development of cities. These cities have characteristics of small-town socioeconomic problems, namely diminishing population, unemployment, poverty, low interest from external investors, rather low quality tourism and recreation infrastructure, excessively low quality of municipal and local roads, inadequate waterworks and sewerage infrastructure, low revenue to the municipal budget, etc. (Zadęcka, 2018, pp. 96-97).

Cooperation in a network of cities as an opportunity for the development of small towns, not only in Europe, but all over the world. Small cities in the network can achieve network effects and synergy effects (see Meijers, 2005, pp. 766-767). Network cooperation of small cities can be a prospective way to improve their socioeconomic positions of the region (Min-

galeva *et al.*, 2017, p. 151). A perfect example of this is the development of cooperation between cities in the Polish Cittaslow Network (see Farelunik *et al.*, 2017, pp. 421-422). Because of this, the main aim of the study is to present and analyze the areas of cooperation between 28 cities that are members of Polish Cittaslow Network.

The applied research methods were a critical literature analysis, analysis of original documents, for example urban development strategies, revitalization programs and the Cittaslow network statute and results of questionnaire survey. The questionnaire was addressed to mayors of Cittaslow cities and Cittaslow coordinators in the offices of member cities. The survey was emailed to all 28 Cittaslow cities in Poland and returned by all addressees.

The study comprised all the member cities of the Polish Cittaslow Network (in December 2018): Barczewo, Bartoszyce, Biskupiec, Bisztynek, Dobre Miasto, Działdowo, Głubczyce, Gołdap, Górowo Iławeckie, Jeziorany, Kalety, Lidzbark, Lidzbark Warmiński, Lubawa, Murowana Goślina, Nidzica, Nowe Miasto Lubawskie, Nowy Dwór Gdański, Olsztyn, Orneta, Pasym, Prudnik, Rejowiec Fabryczny, Reszel, Ryn, Rzgów, Sępól, Sianów.

Results

The Cittaslow cities in Poland are diverse in terms of size, population and length of their membership the network. As many as 25 cities have fewer than 20,000 residents. In particular, nine cities have a population below 5,000. These are: Bisztynek, Górowo Iławeckie, Jeziorany, Pasym, Rejowiec Fabryczny, Reszel, Rzgów, Ryn, Sępól. There are between 5,000 and 10,000 inhabitants in seven cities: Barczewo, Kalety, Lidzbark, Nowy Dwór Gdański, Olsztyn, Orneta, Sianów. Nine cities, Biskupiec, Dobre Miasto, Głubczyce, Gołdap, Lidzbark Warmiński, Lubawa, Murowana Goślina, Nidzica, Nowe Miasto Lubawskie, are inhabited by 10,000 to 20,000 people. The three largest cities in the network, Bartoszyce, Działdowo, Prudnik, have a population of 20,000 to 30,000.

Until 2013, the Polish Cittaslow Network had consisted of 12 cities: Biskupiec, Bisztynek, Lidzbark Warmiński, Reszel (these cities accessed the network in 2007), Murowana Goślina, Nowe Miasto Lubawskie (2010), Lubawa, Olsztyn, Ryn (2012 r.), Barczewo, Dobre Miasto, Gołdap (2013). Sixteen other cities have joined the network since 2013: Górowo Iławeckie, Kalety, Nidzica, Nowy Dwór Gdański, Pasym, Rejowiec Fabryczny (2014), Bartoszyce, Działdowo, Lidzbark, Orneta, Prudnik (2015), Głubczyce, Jeziorany, Sępól (2016), Rzgów, Sianów (2017).

According to our research, the main areas of cooperation between Cittaslow cities in Poland are: promotion of the city – 21% of respondents, tourism – 16%, culture – 15%, sport – 10%, recreation – 9%, management – 7%, spatial economy – 6%, environment protection – 6%, local enterprise – 3%, education – 3%. Examples of activities are: promotion of cultural, sports and integration events held in the member cities, on the website of the Polish Cittaslow Network and International Cittaslow Network, websites of member cities' municipal offices and on Facebook; the permission to use the Cittaslow logo to promote network products; educating children about the need to protect the natural environment and local tradition; exchange of experience among the authorities and local entities; the implementation of the 'Supralocal revitalization program of the cities of the Cittaslow network of the Warmińsko-Mazurskie Voivodeship' financed from European Union funds.

Common bottom-up initiatives and activities that are implemented in 'slow cities' are: cooking courses in schools and kindergartens in accordance with the 'slow food' philosophy, new projects aimed at protecting local products and crafts (rediscovering them), programs of communication between local entities, expansion of pedestrian and cyclist zones, periodic inspections of water and air quality, creation of public green areas, establishment of construction companies which meet the environmental protection requirements, regulation of construction methods, organic production growth, establishment of vegetable gardens in accordance with the 'slow food' philosophy, promotion of local cultural events, publishing tourist guides to slow cities, designation of routes for tourists, promotion of hospitality among inhabitants.

The respondents indicated types of activities important for permanent cooperation of Polish 'slow cities'. The main ones are:

- Exchanging experience and good practice during mutually held events, meetings and conferences (16.0% of all indications) – subjects from the Cittaslow networked cities (mayors, representatives of NGOs, inhabitants, etc.) participate in workshops, trainings, and scientific conferences, where they discuss directions in which their cities can develop, what initiatives and projects they can implement together, what instruments and chances for the implementation of such projects they have, and where the 'slow' concept can be promoted. Such events contribute to stronger integration, exchange of know-how and experience, as well as collaboration among various objects involved.
- Conducting promotional activities with another member city or other member cities (15.2%) – the member cities highlight the fact that they belong to a network of cities with good quality of life, and they use the

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Cittaslow's logo such as an orange-coloured snail, for example in a member city's promotional materials, they also promote local events on websites of the Polish and international networks of Cittaslow, and on webpages of tourist organizations and in Facebook.

- The multidimensional cooperation with the supporting member, the Marshal's Office of the Warmińsko-Mazurskie Voivodeship (11.2%) – it is particularly important not only at the early stage of the network's development in Poland, but also today, when the network has 28 member cities. The Marshal's Office of the Warmińsko-Mazurskie Voivodeship, and more specifically its Department of Tourism, comprises the Office for Cittaslow Matters, which coordinates the process of certification of cities, and initiates as well as co-organizes many activities within the network.
- Implementation of the project 'Supralocal revitalization program of the cities of the Cittaslow network of the Warmińsko-Mazurskie Voivodeship' (10.4%) – under the integrated program of revitalization, involving 19 Cittaslow member cities, the cities carry out revitalization projects, which improve the quality of space, bring about positive social effects, and contribute to a better standard of living. They also take advantage of the opportunity to gain additional funds for revitalization, for example from the European Regional Development Fund.
- Acting as a 'mentor city' for a candidate city applying to join the Cittaslow network (9.6%) – this can give rise to permanent relations between the two cities, which recognize the opportunity for development owing to the adopted 'slow city' development model.
- Executing cultural projects together with one or several member cities (9.6%) – such measures often involve naturally developing neighborhood relations between cities, similarities in local culture features, nurturing what is local, unique, rare in the architectural and cultural heritage of a city.
- Executing together with one or several member cities projects or programs connected with the social sphere (8.8%) – inclusion of different social groups in a dialogue about the city, integration of the local community, exploring the needs and ways of satisfying such expectations among different groups of the city's users, solving social problems through the complex revitalization of areas where social, economic or architectural problems have accumulated, promoting positive attitudes among young people, integrating residents around the 'slow' concept.
- Using the support of the 'mentor city' in the application process to join the Cittaslow network (8.0%) – this is a relation between cities where

positive experiences can influence the future cooperation between these cities, once the candidate city has passed the certification process.

- Executing together with one or several member cities infrastructural projects (6.4%) – mainly the transportation infrastructure, which affects the communication between the cities and accessibility of sites to tourists, e.g. a grid of bicycle paths or tourist trails connecting the cities.
- Active participation in the association's organizational structures (3.2%)
 - it is not only the board of the Association 'Polish Cittaslow Cities', but also the representation of Polish cities in the organs of the international Cittaslow Network, which helps to build strong cooperation between the authorities of the member cities.

This proves that cooperation of small cities allows to achieve many positive social, economic, and spatial effects. Permanent cooperation of cities in the Cittaslow network is an opportunity for the development of small cities in Poland (see Farelnek & Stanowicka, 2016, p. 359).

Conclusions

The research results indicate that the Cittaslow member cities in their efforts to implement a 'slow city' model take advantage of the ongoing cooperation within the network in the field of promotion and tourism, they undertake actions to perform shared projects, exchange of experience, and they organize events, meetings and conferences, the aim of which is to strengthen the cooperation. The network is diverse, as it encompasses member cities which have belonged to the network for several years and the ones which joined it only a few months ago. Thus, more time is needed to build lasting cooperation. The analysis of the measures taken so far has revealed many positive outcomes, but building permanent cooperation based on trust is a long-term process, which is not facilitated by the local authorities being elected to serve relatively short terms. The collaboration of cities can contribute to maximizing the benefit from the membership in the Cittaslow network, and gaining so-called network effects, which can also help the Polish Cittaslow Network to distinguish itself internationally as a network of cities by its unique character and a high-quality label of 'Polish slow cities'. The cooperation between the cities seems crucial to building such a brand.

The cooperation of cities belonging to the Cittaslow network in Poland is becoming more and more complex and concerns mainly the development of tourism and urban promotion, planning of the development policy and urban regeneration. The shared logo and promotion of the network, organi-

zation of cultural events, exchange of experiences, and the implementation of a supralocal revitalization program are examples of active cooperation. This shows that the competition of cities can evolve into effective cooperation of cities. The idea of ‘slow’, which is fundamental to the growth of the Cittaslow member towns, offer a chance to find an individual development model for small cities in Poland and elsewhere in the world.

The future scientific research by the author will be concern on identification an areas of cooperation between cities within the Cittaslow network in different countries.

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Compensations for aircraft noise: state intervention in the limited land use area around airport

JEL Classification: *P43; R38; R41*

Keywords: *compensation value; court procedure duration, public intervention; land use; negative externalities; airports*

Abstract

Research background: The economic benefits, that arise with the development of airport infrastructure, are accompanied by negative externalities. Legal, technical and institutional instruments are used to mitigate or limit these effects. It involves state intervention in the use of real estate located in the vicinity of the airport, and the cost of such intervention.

Purpose of the article: The study evaluates the value of compensations for loss of residential property value due to aircraft noise. The state intervention system is also assessed through the prism of the lack of a methodology for assessing damages and subjective claims of property owners. The study is based on the example of one regional airport.

Methods: The study evaluates the current compensation model related to the introduction of Limited Land Use Areas around airports in Poland, based on Poznan-Lawica airport case study. In the empirical part of the paper we use regression

analysis to examine the value of compensations for loss of property value ruled by courts, and duration analysis to explore court procedure duration time.

Findings & Value added: This research is one of the important basic research on socio-spatial connection near airport in Poland. The results are important due to pending disputes and costs threatening the functioning of airports in Poland.

Introduction

One of the key areas of state intervention is environmental issues, including the resolution of growing conflicts caused by externalities related to noise immission. The article focuses on the effects of the negative impact of airport noise, resulting in a reduction in the use and market value of residential buildings. Airports, which are most often the focus of various real estate disputes, are perceived from the perspective of public or quasi-public goods, which justifies various types of interventions in market relations (bilateral agreements) between the airport and homeowners in the vicinity of airports. This has the effect of interfering in the operational conditions of the real estate market around airports and the introduction of tripartite agreements. The state becomes a third party to the transaction, which usually results in the limitation of the liability for damages of airports and shapes the ownership rights of real estate in this area.

The publication deals with the impact assessment of a specific intervention to resolve the noise immission dispute through spatial planning tools of a local law nature. A restricted use area is introduced in the areas around the airport where noise standards are exceeded. Intervention leads to a change in the position of the parties to the conflict. Depending on how a dispute is resolved, the level of transaction costs changes, which affects the operational conditions of a market that adapts and balances itself after the impact of new factors triggered by intervention. The research problem is considered at the junction of issues of market adaptation efficiency, principles of damage estimation and methodology of social costs valuation in a situation when market conditions are adjusted as a result of factors caused by intervention.

The study used unique original source data describing the structure of claims for compensation and actual transaction costs, as well as original results of our own research on the residential real estate market in the areas affected by noise from the airport under study. The research problems addressed are common in Poland and the research results indicate that they occur at the five largest national airports. The choice of a specific airport for the study was dictated by the large scale of the systemic error in inter-

vention. It concerns the overcompensation of damages due to partial double-compensation of damages (Habdas & Konowalczyk, 2018, pp. 12-13).

Literature review

The ways of resolving conflicts over capital protection for homeowners vary from country to country. This also applies to countries with similar economic systems (see: Batóg, *et al.*, 2019, pp. 22, Habdas & Konowalczyk, 2019). These differences are not eliminated by a uniform theoretical concept of compensation based on an effective theory of transaction costs. In the national literature the results of research on prices on the market of apartments and single-family houses are presented (Batóg, *et al.*, 2019; Trojanek & Huderek-Glaska, 2018), and only one of them additionally deals with the topic of calculating social costs of intervention (Trojanek & Huderek- Glaska, 2018, pp. 103-114). These studies relate to the overall impact of noise on the value of real estate and in this context social cost calculations according to market data are presented. They cannot therefore be equated with the actual social costs of this intervention, since no studies have been carried out taking into account the actual state of the claims, their structure and the actual social costs that occurred in resolving the dispute. In this respect, the research presented in this article uses market data on the actual costs of disputes.

Research methodology

Empirical data

The empirical objectives in the paper are twofold: (1) to investigate the value of compensation for loss of value due to the introduction of Limited Land Use Area (LLUA) around Poznan-Ławica airport; (2) to explore the duration of legal procedure. The LLUA was set up on 28 February 2012, and consist of two zones: inner zone was created based on the noise level equal to LAeqD=60 and LAeqN=50dB; outer zone was based on the LAeqD=55 and LAeqN=45dB noise levels. The choice of the study area is not random. Firstly, due to its location there are significant social and economic conflict around externalities generated by the airport operation. The latter resulted in relatively large number of claims for loss of property value and acoustic improvements, and as a consequence a substantial financial burden for the airport due to compensation costs.

The dataset consists of 709 claims of residential property owners (buy out, loss of value, acoustic improvements or lost profit) that were brought to court, and resulted in court ruling the value of compensation. The individual cases were described by several variables: Total value of claim in PLN ($X1$), Loss of value claim in PLN ($X2$), Acoustic improvements claim in PLN ($X3$), Property value ($X4$), Loss of value ruled by court in PLN ($X5$), Loss of value ruled by court relative to property value ($X6$), Acoustic improvements ruled by court in PLN ($X7$), Compensation value (partial) in PLN ($X8$), Compensation value (final) in PLN ($X9$), End of court proceedings date ($X10$), Introduction of LLUA date ($X11$), Proceedings duration ($X12$), Number of house sales within 1km from subject residential property since the introduction of LLUA ($X13$), Mean sales price in PLN ($X14$), Distance from the airport in km ($X15$), Location within LLUA zones (0 if located in inner zone, 1 if located in outer zone) - $X16$.

Econometric methods

To estimate the impact of selected variables on the value of compensation ruled by court a stepwise multiple linear regression model was used (Mayers, 1990). Additionally we explore the expected duration of court proceedings (*duration analysis*) and investigate the effect of several salient variables on survival time (Cox & Oakes, 1984). The subject of this study is the period of time between the start of the observation and the event which ends the observation, but first of all its likelihood in subsequent units of time. If the event does not happen by the end of the observation, the observation is terminated (a censored observation). Most commonly it is right censoring because of the time of termination (Blossfeld, *et.al.*, 1989).

The time of an event incidence t is a random variable of non-negative values which can be described by means of a distribuant $F(t)$, a density function $f(t)$, a survival function $S(t)$, a hazard function $h(t)$ of randomly chosen non-negative values and a cumulative hazard function $H(t)$ as well as a plausibility function (L). The measure of probability that in time $\langle 0; t \rangle$ the compensation will payment is a distribuant of a random variable t (continuous and non-negative) defined by the following formula:

$$F(t) = P(T \leq t) = \int_0^t f(z) dz,$$

where $F(t) \in \langle 0; 1 \rangle$. A probability density function:

$$f(t) = \lim_{\Delta t \rightarrow 0} \frac{P(t \leq T < t + \Delta t)}{\Delta t}, \Delta t > 0$$

allows to estimate the empirical distribution of events in the assumed duration intervals. The function of probability that by the time t the episode ending event has not happened and the process is being continued is described as the following survival function:

$$S(t) = P(T > t) = \exp\left(-\int_0^t h(z)dz\right)$$

The transition intensity rate is a hazard function described as:

$$h(t) = \lim_{\Delta t \rightarrow 0} \frac{P(t \leq T < t + \Delta t | T \geq t)}{\Delta t}, \Delta t > 0$$

that provides information about failure levels.

Popular procedures of estimating theoretical survival function are grounded on the method of least squares and on the weighted least squares method (Bowers, *et.al.*, 1986) or Kaplan-Meier method (Hosmer & Lemeshow, 1999, pp. 28-31). Duration can be analyzed with many additional factors in view and by means of non-parametric regression. In the model for every group distinguished due to its feature that is independent of duration the survival function is estimated and pairs of the obtained functions are compared by means of non-parametric tests.

The impact of many features on the expected duration of an unknown survival function can be measured by means of semi parametric models, including the Cox proportional hazards model:

$$h(t; x_1, x_2, \dots, x_n) = h_0(t) \cdot e^{\sum_{i=1}^n a_i x_i}$$

where $h(t; x_1, x_2, \dots, x_n)$ the first element of the model, parametrically non-specified time function t , resultative hazard of given n – concomitant variables x_1, x_2, \dots, x_n and an adequate survival time and $h_0(t)$ the hazard function for which all the variables equal zero (base hazard). The second element of the model $e^{\sum_{i=1}^n a_i x_i}$ – a specified exponential function and a_i – model coefficients, t – observation time. The elementary method of estimating the model coefficients is the partial likelihood method, while in a popular Statistica software the Cox model coefficients are estimated by means of the maximum likelihood method.

Results

Compensation value analysis

In the paper we investigated the values of compensation to the individual residential property owners related to the introduction of LLUA around Poznan-Lawica airport ruled by courts. In this paper we focused primarily on the compensations for loss of property value caused by the introduction of LLUA and related nuisances. Mean value of compensation due to loss of property value ruled by courts was 53305 PLN (on average 8.8% of property value). Based on our sample, we conclude that compensations were higher in case of inner LLUA zone (more affected by airport operation) than outer LLUA zone. Loss of property value ruled by court relative to property value was 10.7% in the former and 5.1% in the latter group. The distribution of the relative values of compensations for loss of value due to introduction of Poznan-Lawica LLUA is presented in Figure 1.

Aside from location within different LLUA zone, there are other factors that could affect the value of compensation ruled by courts. Amongst plausible factors that could have an impact on the court procedure outcome is property value. One could argue that the relative impact (thus compensation) is higher for more expensive residential properties. The basic exploratory analysis does not provide strong empirical evidence supporting this particular hypothesis.

To explore the impact of potential factors on the compensation for loss of property value due to LLUA we used multiple regression analysis. We regressed the relative value of compensation for loss of value ruled by court (value of compensation divided by property value) on several independent variables using stepwise procedure. The estimation results are presented in the table (Table 1). The model estimated on a subsample of 617 cases (initial sample was 709 observation, but some cases were removed due to missing information on key variables) has moderate fit to the empirical data (R^2 is 0.459, and adjusted R^2 is 0.456).

We found three variables that significantly affect the relative value of compensations ruled by courts in case of Poznan-Lawica LLUA. As noted before the value of compensations were significantly lower for properties located inside outer LLUA zone than those within inner LLUA zone (X16) – by 5.5 percentage points, other stay equal. Additionally, we observe that the relative value of compensation decreased with the distance from the airport (by 0.2 percentage points controlling for other factors in the model). Last but not least, the relative value of compensation tend to decrease with the number of house sales recorded in the neighborhood (1 km distance

band). The latter could suggest that the market information coming from property sales provided some anchor to loss of value claims, and potentially limit the compensation ruled by courts. This particular result, and related efficient market hypothesis, demands further investigation that is beyond the scope of this paper. We did not find the evidence that acoustic damages compensation has significant impact on compensation for loss of value. This may suggest that courts treat these two types of claims separately.

In the next section, we investigate the duration of court procedure.

Court procedure duration analysis

In case of court proceedings, being analyzed within this paper, the duration analysis involves estimation of survival function, density function, and hazard function. Duration time is a period between the date of the introduction of LLUA, triggering all related claims to be officially notified (initial date) and official date of court ruling the compensation (end date). Cases not being finalized in court by 30 April 2018 has been censored (right hand). We can reasonable argue that these cases have also been resolved but after the study period, thus their respective duration times could not be directly observed.

Estimation was based on four different distributions: exponential, Weibull, linear and Gompertz with different weights and maximum likelihood test (significant chi²) they do not allow to conclude that the adjusted distribution is not significantly different from the empirical distribution. Estimators from the life tables depend on the selection of the number and width of life time intervals. Estimators independent of data grouping are obtained using (continuous survival times) Kaplan –Meier method. Survival functions indicates the probability that court procedure will last longer than given time t . We can deduct that with probability equal to 75% court proceedings will last longer than 4.4 years, additionally with probability equal to 25% the duration time will be longer than 5,6 years. Contrary, hazard function gives the probability of court procedure ending within given time t .

Additionally we grouped all resolved cases based on the location of residential properties the claims were related to (based on X16 variable). First group consisted of properties located inside the inner LLUA zone, and the second group consisted of properties located inside the outer LLUA zone. For each group we estimated two separate survival functions, and compared court procedure duration times. The null hypothesis H_0 is: $S_1(t) = S_2(t)$ for all t , that is no difference between two survival functions. In case of censored observations nonparametric test can be used – for example Wilcoxon

test. In our case, where several observations were dropped (censored) generalization suggested Peto and Peto of Wilcoxon test was applied. Based upon test results (WW=-22.77, Sum=189.0, War=41.696, WP=-3.52687, $p=0.00042$) and $p=0,01488$ taken from normal distribution table (two-sided test) we reject null hypothesis that of no differences between survival functions (Figure 2). Initially, the probability of staying in court was higher for procedures involving properties located inside the outer LLUA zone. After 4.4 years the probability of case being unresolved was higher for all claims related to residential properties inside inner LLUA zone.

To explore procedure duration time in more detail, nonparametric methods like Cox proportional hazard models, can be applied. The method can be used to measure the impact of several variables (measured on different scales) on duration time. Cox proportional hazard model allows us to examine the risk that particular outcome (court proceedings end in our case) occurs in time t for given set of predictors. We used several plausible factors that could potentially affect the duration of court procedure: X_6 , X_{13} , X_{15} , X_{16} . We estimated two models, with or without grouping variable. The results are presented in the table (Table 2).

In both models, the court procedure duration time depended upon the distance of given property from the airport (X_{15}). The distance from the airport may be treated (by all parties involved) as a rough measure of externalities generated by the airport (most importantly aircraft noise nuisance). Further distance from the airport increased the risk of ending of court procedure (to put it differently, the further the property was located from the airport the more likely was the procedure to end). In second model, the risk of ending the court procedure is associated with the location within LLUA zone (X_{16}). Other independent variables (X_6 , X_{13}) were not statistically significant, thus had limited explanatory value.

Estimation results must be treated with caution. Low model fit may suggest that multivariate survival analysis using Cox proportional-hazard model has limited value in explaining the effect of several factors upon the time of court procedure, especially in the case of currently available independent variables.

Discussion

The validity of the results obtained within the study reflects the quality of data available, especially regarding the limited information on characteristics of the real estate being the subject of the dispute and the preferences of property owners reporting damages. The prolonged duration of disputes is

influenced by both the low information efficiency of the real estate market (uncertainty regarding transaction prices and asymmetric information), the fact of not incurring expenditure on acoustic revitalization (the subject of the dispute is the hypothetical value of outlays) as well as defects in the procedure and dispute resolution system (eg. court proceedings). However, the results obtained are unique, as there are no prior studies directly investigating the compensations to the residential property owners related to the externalities generated by the airports.

The paper examines the current compensation model. We argue that current practice related to compensation ruled by courts has substantial flaws (including the methodical error regarding the valuation of claims, where acoustic damage and value loss claims are treated as unrelated, thus both compensations are independently assessed). The interesting extension of the study would be to evaluate possible alternative compensation models: (i) compensation model without public intervention; (ii) compensation model with effective public intervention, where acoustic damages claim and value loss claim are related (and acoustic damages compensation is based on real acoustic revitalization costs incurred). The results could be compared with current ineffective compensation model.

Conclusions

Low information efficiency of the real estate market (few transactions, under-information of market participants, discrepancies in the expectations of property owners and market value) affect the length of compensation processes and the low level of out-of-court settlements.

The hitherto practice of settling the majority of disputes at the level of courts results in the extension of the compensation procedure over time, which in effect means losses on each side of the dispute. The owner of the property does not have the resources that he could spend on acoustic revitalization, and as a result, maintains the state of health exposure. The airport maintains a financial reserve for future payments, and at the same time, the prolonged litigation increases the value of compensation paid. In addition, frozen funds cannot be invested in the development of the enterprise, and the scale of claims often results in the risk of losing liquidity. This, in turn, contributes to social losses both on the local and community level. Airports are state-owned enterprises that meet the transport needs of the general public, and the inhibition of their development adversely affects local infrastructure and economic development. Both literature studies and

foreign experience point to socially justifiable compensation for acoustic damage, but closely correlated with the scope of real revitalization work.

The empirical study did not include the model of payment of damages in the model without intervention, due to the huge range of data difficult to obtain (estimating the value of potential claims for all properties located in the impact zone of aviation noise) and the model without error due to unidentified real estate in the area, eligible to such claims.

Future comparative research will focus on other airports in Poland and on the empirical verification of the other two scenarios: damage models without intervention, as well as interventions without error. In addition, the reactions of local markets will be analyzed for the creation of LLUAs and distortion of real estate prices and market mechanisms as a result of State intervention.

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Annex

Table 1. Estimation results (dependent variable is loss of value ruled by court relative to property value - X6)

Variables	B	SE	t	P>t
Constant	0.116	0.003	34.720	0.000
X13	-0.001	0.000	-4.170	0.000
X15	-0.002	0.001	-2.160	0.031
X16	-0.055	0.003	-21.830	0.000

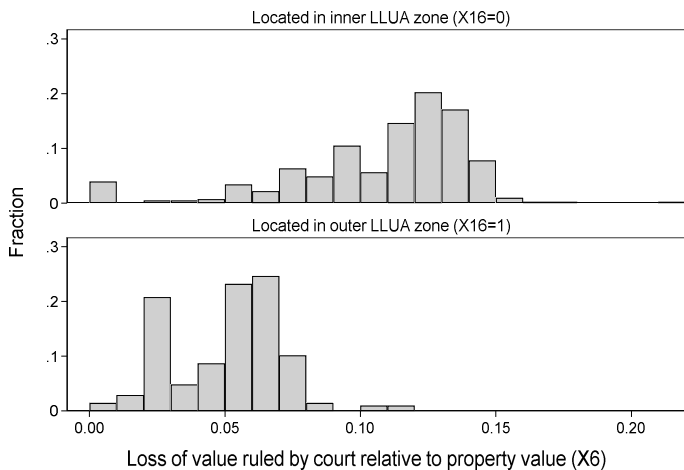
Source: own calculations.

Table 2. Oceny parametrów funkcji hazardu proporcjonalnego Coxa

Variable	B	SE	Chi-kwadrat	p-value	Hazard Ratio
Grouping variable X16					
X13	0.006	0.014	0.180	0.671	1.006
X15	0.078	0.031	6.184	0.013**	1.081
X6	-1.817	1.500	1.467	0.226	0.163
Without grouping variable					
X13	0.006	0.014	0.206	0.650	1.006
X15	0.079	0.032	6.202	0.013**	1.082
X6	-1.750	1.491	1.378	0.240	0.174
X16	-0.102	0.059	2.955	0.086*	0.815

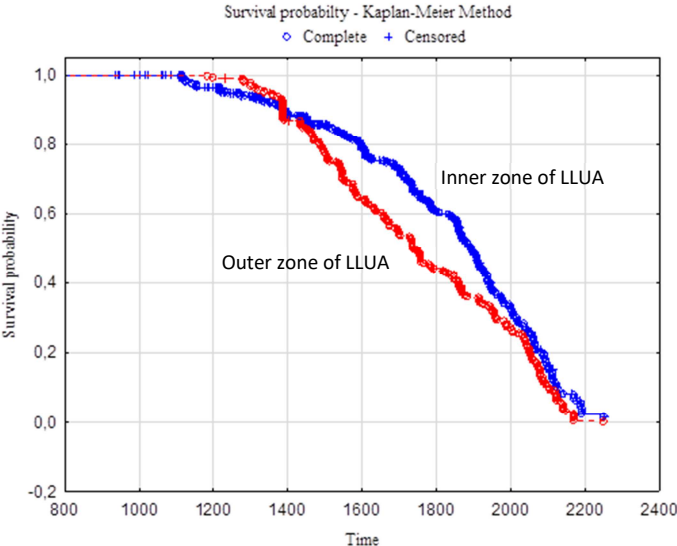
Source: own calculations.

Figure 1. The distribution of the relative values of compensations for loss of value



Source: own calculations.

Figure 2. Survival functions for inner and outer LLUA zones



Source: own calculations.

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Institutional infrastructure of local self-government: constancy versus flexibility

JEL Classification: *H83, R11*

Keywords: *local economic development; consolidated community; administrative-territorial reform; institutional infrastructure*

Abstract

Research background: The administrative-territorial reform that is being implemented nowadays in Ukraine significantly changes the socio-economic landscape of the country from the centralized way of management of economic processes towards the independence of emerging communities. De facto newly formed consolidated communities acquire a real subjectivity in the processes of the management of territorial development: they become responsible for a significant share of day-to-day economic activities within their sphere of responsibility. Thus, local governance in Ukraine, faces so significant institutional transformations that create a fundamentally new approach to the management of local economic development. The foregoing description substantiates the relevance of the research topic and determines the choice of a local self-government as its object.

Purpose of the article: The purpose of the study was to determine the level of influence of the transformational processes of the institutional sphere on the economic and social conditions of local development.

Methods: In the process of research such methods as empirical research (for the study of secondary information regarding trends in local economic development), questionnaires and in-depth interviews (for the study of the perception of inhabitants and local authorities of institutional change) were used.

Findings & Value added: The positive economic effect of institutional transformations was shown in the article under the conditions of decentralization of authority in Ukraine, applied aspects, which should be the base for the activity of local governance, are substantiated.

Introduction

The success of the administrative-territorial reform and absence of conflict during its implementation in Ukraine are under the influence of the existing institutional and infrastructural support, and its perfection will ensure the achievements of the decentralization pivotal goals, the balancing of central and local development mechanisms. While the adequacy of infrastructure provision is related to a significant material component of its formation, which requires considerable financial and time resources, the adequacy of institutional support is formed under the influence of the local government saturation with the relevant institutions (norms, rules, algorithms, decisions, experiences, good practices, etc.), which means the priority of the non-material component, the contributions in which are tolerated as the least risky investment projects by the world community actors, international funds, grant policy of the developed countries, etc.

Literature review

The issue of the public administration system transformation, and various ways of influence on it, is constantly in the focus of scientists' attention and becomes an object of researches.

Thus, Caroline A. and Goldsmith M. (1998, pp. 101-117) note the growing importance of the local government in the economic development management process at the territory in the context of globalization, which, according to the authors, is a catalyst for changes of leverage on economic processes at the local level. In turn Matei, Antonovoci and Savulescu (2017, pp. 480-503) emphasize the critical importance of ensuring the

adaptability of managerial approaches used by the local government in today's highly turbulent environment.

In some researches authors focus on risks that are crystallized in the post-crisis period in the entire system of public administration: this applies to the growth of the populism weight (Nadiz and Chryssoyelos, 2017, pp. 399-411), as well as to the conflict of short-term political (caused by the cadentiality of elected positions) and strategic objectives of the territories development (Cuadrado-Balesteros, Garcia-Sanchez, 2018, pp. 835-858), and to the lack of the methodological approaches adaptation proposed as recommended management models by different institutions for the developing countries (Dasanti, Esteve, 2017, pp. 231-245).

Separate markers of changes in the institutional mechanisms of territories development are emphasized by Bandeira and Ferrara (2016, pp. 642-658), Tandardini, Guo and Ganapati (2017, pp. 480-503). In particular, in the first of mentioned cases, the need to involve the various groups of stakeholders, that are outside the formal system of public authorities, into the territories economic development is justified. The stakeholders include industry associations, public associations, unions, etc. Tandardini, along with colleagues, without focusing on the specific components of the institutional infrastructure, notes the importance of local social capital in achieving the economic success at the territories.

Research methodology

In view of the weakly structured and weakly formalized processes in the local government environment (internal and external), the observation method was taken as a base for empirical researches, taking into account the expected results according to Shuhart-Deming PDCA model (cycle, loop), which provides an appropriate modification through updating and taking into account special / unique conditions and prerequisites at each stage of the mentioned cycle. A survey questionnaire on the evaluation of certain spheres of community activity was carried out among residents aimed at sociological data base formation. A separate unit of the general population was the household. The sample of the survey was formed on the basis of the quota principle in view of the settlement size and its territorial dispersal.

Results

Thoughtfully the prerequisites for the local economic development vary in different territories, sometimes significantly. To some extent, this is illustrated in Figure 1, which shows (1a) the volume of revenues to local budgets and the size of local government capital expenditures (both indicators – per capita) and the ratio of these two indicators (1b).

Based on the data presented in the figure above, we can state that the basic prerequisites for development are objectively different. In this context objectivity means that the level of territory economic development, especially in the case of transition from a centralized to a decentralized management model of the economic processes, in the vast majority of cases is not a consequence/indicator of the effective local government – rather it is a derivative of a wide range of factors, outside of its control, in particular as following:

- favourable geographical location;
- proximity to the raw material base and/or availability of the territory natural potential;
- the consequences of centralized management in the distribution of productive forces.

The institutional infrastructure transformation, which takes place in view of the decentralization of powers of authority, fundamentally changes the state of affairs in the local economic development management. Moreover, these changes cover both the organizational component of this infrastructure, and the system of norms, rules and principles of conduct of all parties interested in the economic development at the territories.

As for the organizational component, it should be noted that structural units, whose functional responsibilities include, among other things, the promotion of local economic development, only began to be formed in the structure of the local government executive bodies (especially in small communities). At the same time, the common practice in this case is the residual nature of the attention given to this area of responsibility, because a number of pressing problems are considered as priorities to be solved: first of all, issues related to unsatisfactory condition of the local engineering infrastructure, need of municipal facilities energy efficiency improvement, and the whole spectrum of social problems.

However, the today's realities make it necessary to change the priorities of attention in favour of issues related to the attraction of potential investors, support for local economic entities at the accelerated pace: the usual administration of economic processes at the local level continues the logic of passive behaviour that prevailed over the recent decades and makes the

community excessively dependent upon various forms of the state financial support (grants, categorical subventions from the state budget). In the short term, such an approach can provide measurable benefits: the situation in the Mateyivetska OTG, where the absolute indicators for capital expenditures of the local budget are relatively high, disproportionately to own revenues, is a case in point (see Fig. 1). These expenditures are covered by subventional funds of the top-level budgets due to the availability of ways to have subjective influence on decision takers of these funds distribution. On the other hand, the specified approach of providing sources to local budgets (in view of the gradual objectification of the intergovernmental transfers distribution process, and hence the reduction of the human factor in decision-making) is not deterministic and constant in time.

The proactive management model, as an alternative to the described passivity of the local governments, introduces changes in the whole complex of norms, rules and principles of economic entities conduct and allows early changes at the level of a community as a personified economic system: the local authorities initiate such changes that would ensure the sustainability of the economic development in time through steady monitoring and future development trends prediction on its basis.

The results of the assessment of local economic environment components by the residents in the investigated communities, shown in Figure 2, speak in favour of this model appliance.

The values shown in the figure are obtained by the multiplying of the assessments of the indicated components by the level of importance (from 0 to 1) and by their positive or negative value (from -2 – "very bad" to +2 – "very good"). Besides aimed at better graphical data interpretation and considering that the obtained assessments were entirely negative (less than zero), their values are taken modulo.

As we can see in this figure, the alternative "Support provided to entrepreneurs by authorities" received the highest assessments among other components almost without any exception – the average value of the integral indicator for all communities is 0.44 with a high (however, the lowest among the estimated components) variation coefficient of 31.6%. Even with a fairly significant spread of values in the context of the investigated communities, we can generally assert that residents who de facto form their labour and entrepreneurial potential and, at the same time, are beneficiaries of the local economic development, with a general negative assessment of local government actions in the economic sphere, expect it to take a more active position in support for local business to ensure its activities in competitive commodity markets.

The lowest assessments of the "Worksite accessibility" component indicate that:

- first, the residents are less likely to expect that the local government will act as an active economic entity: will act as their co-founder, finance their activities, etc.;
- second, the employment opportunities in the desired profile and on acceptable terms in various communities differ significantly – the variation coefficient in this case is the largest and equals 47.8%.

Integrated assessments of the importance and level of opportunities for establishing own businesses, as well as the activities of business supporting organizations, is an additional evidence of changing in the mental models of the general public: in their minds, local economic development, the development, promoted and supported by various groups of stakeholders, clearly correlates with the level of their well-being as the ultimate goal. The dispersion of values in the context of the investigated communities remains significant – the variation coefficient for the first of the mentioned components is 43.9%, for the second one – 35.6%.

An important context in considering the processes of institutional infrastructure transformation at the local level is the evaluation of the residents opinion as active participants in economic processes: in particular, their level of perception of the economic system activity results ("the level of community prosperity"), the feeling of personal subjectivity ("the possibility of influencing the local government") and the probability of moving to a permanent place of residence outside the community ("the possibility of migration"). Visualization of the results of the answers to these questions is presented in Fig. 3.

We see that according to the results of the answers to the question on the assessment whether the community is rich compared to others in Ukraine, most residents noted that they cannot attribute their community clearly to the category of poor or rich ones (given extremes 1 – "very poor", 5 – "very rich"). Moreover, these results in terms of the investigated communities are characterize with a high level of differentiation – the coefficient of variation is only 29.1%. The comparison of these subjective assessments with one of the main objective criteria mentioned earlier – the size of own budget revenues per 1 resident – makes it possible to state that the indicators coincide only partially: the Pearson correlation coefficient is 0.58 for them.

At the same time, the residents of the newly formed communities experience their moderate influence on important decisions taken by the local government – the average value of the sample is 3.26 points (given extremes 1 – "have no influence at all", 5 – "have a very large influence"). The low coefficient of variation on this issue (6.3%) indicates a slight dif-

ference in the assessments among the investigated communities. Nevertheless in this context, it should also be pointed to the conclusion reached by the authors during the in-depth interviews with the respondents: the residents under the changed conditions may not yet be able to distinguish between the local and/or state authorities competence areas, often combining representatives of the local government and representative bodies of the state power at the local level under the term of "authorities". Hence, it follows that the object of evaluation is partially indistinct.

The desire to change the place of residence (according to the authors – one of the main indicators that indirectly reflects the success of the community development) is declared by the respondents at a rather low level – on average, this indicator equals 3.5 points (given extremes 1 – "I would definitely like to change the place of residence", 5 – "I definitely do not want to move anywhere"). Interestingly, if the specified parameter is set exactly as a resultant feature, and the subjective assessment of the community prosperity level – as a factor one, the correlation coefficient between them shows the existence of moderate positive dependence (+0.58), the explanation of which requires further researches. We believe that the behaviour model of an economic entity when choosing a place of residence should be supplemented by a number of other important factors (level of household infrastructure development, opportunities for spending free time, etc.).

Discussion

Unsolved in a frame of the research tasks that leave a space for discussion and further researches relate to the goals of balanced development at the territories. The research, in the first instance, was focused on the goals of the local development, which are contained, first of all, in the economic plane, leaving the goals of social and environmental nature for the further in-depth analysis. The obvious close interaction and potential conflict of these goals, within the framework of defining strategic development priorities, almost always require sub-optimal decisions taking, the complexity of which is unique in the case of such open socio-economic systems as the territorial communities.

In view of this the directions of further researches should cover the areas of social and environmental development of the territories and include approaches to the search for priorities agreed with economic goals.

Conclusions

Based on the results obtained, we can state that the rapid changes that take place in the institutional infrastructure in the process of decentralization should not be interpreted as a clear precondition for the success of the local development in each individual case. They will play more the role of a catalyst for managerial capacity, human and social capital, that a given territory possesses. For those administrative and territorial entities in which an effective system of the local government is formed (under such system, in the first, we understand the human factor – from the chairman of the community to the team formed by him), additional powers and resources (even increased disproportionately with respect to extended powers) provide an opportunity to show the result of effective actions and decisions taken in the short and midterm. And vice versa. As a result, on a national scale, the effect of improving the efficiency of public finance management becomes tangible, even with limited sources of their formation.

Obvious at the first stage of changes in the field of public administration the socio-economic stratification of the territories can only partly be explained by the objective preconditions for their development analysed in the article. In this case, the role of the local government is significant, too. Acting within the framework of limited powers and naturally limited financial resources, it is capable to show a tangible result, comparable both in time and among the background of other communities.

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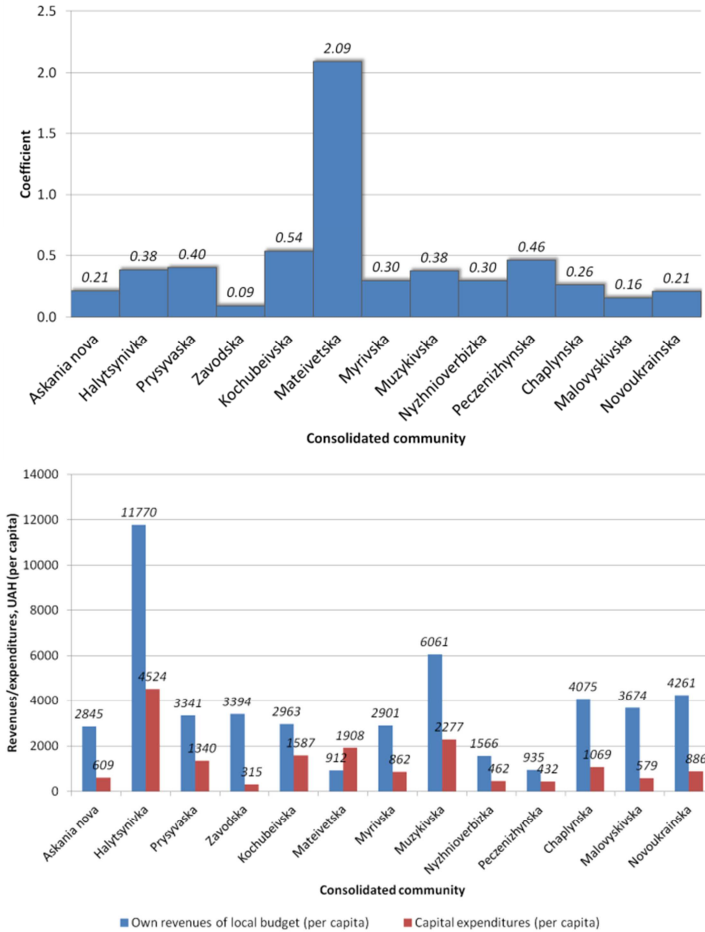
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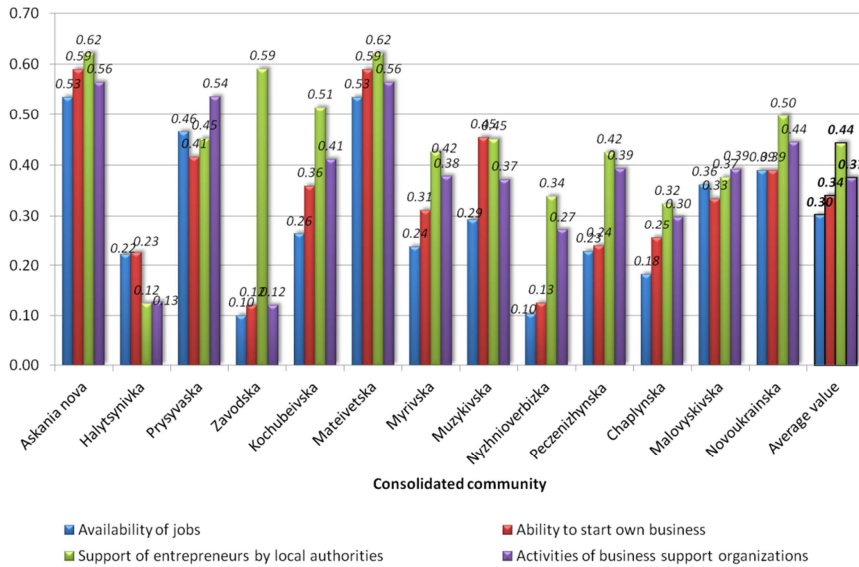
Annex

Figure 1. The volume of local budgets revenues and capital expenditures (a) and capital expenditures – own revenues ratio (b) in the investigated communities



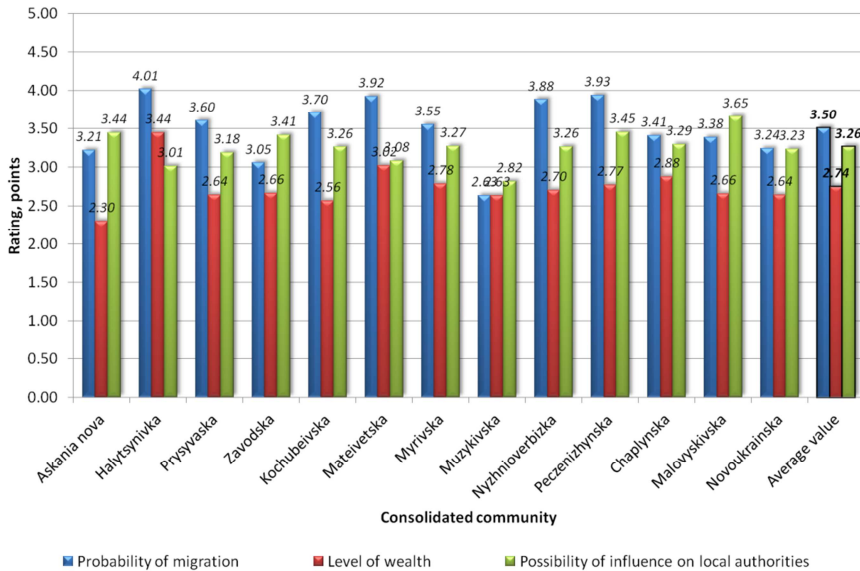
Source: own calculations based on Central Reform Office under MinRegion (2019).

Figure 2. The assessment of the local economic development preconditions by the residents



Source: own research

Figure 3. The residents' assessment of the possibility of changing their place of residence, the wealth level of their community and the possibilities of influencing the local authorities (on a scale from 0 to 5)



Source: own research.

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Theory of planned behavior with the extension of value co-creation to predict purchase intention toward organic food in Vietnam

JEL Classification: *M31*

Keywords: *purchase intention; organic food; value co-creation; theory of planned behavior*

Abstract

Research background: The more and more awareness increasing of customer purchasing safe food, especially organic food has been considered in Vietnam. Despite purchase intention of customers toward organic food in many nations being commonly studied, there is a lack of research related to value co-creation based on the Theory of Planned Behavior

Purpose of the article: This study aims to understand how the Theory of Planned Behavior (TPB) with the extension of value co-creation explains the purchase intention of customer toward the organic food in Vietnam.

Methods: This article uses both qualitative and quantitative method. The data used in this study is collected from 300 customers in three biggest cities in Vietnam: Ho

Chi Minh, Da Nang and Ha Noi. Structural equation modeling is applied to analyze the data.

Findings & Value added: The result shows that there is a positive relationship between value co-creation and purchase intention toward organic food. This enriches the existing literature with the effect of value co-creation to purchase intention toward organic food based on the Theory of Planned Behavior.

Introduction

Nowadays with the development of technology, the agriculture is using chemical fertilizer, pesticide in order to have producing massive amounts of food (Carvalho, 2006). This cause the bad fluencies to the environment for the long term such as: water pollution, air pollution and the health society (Carvalho, 2006; K.-H. Kim & Ikemoto, 2015; K. H. Lee, 2014). The long-term benefits to environment and people can be recognized from organic farming such as: soil fertility increasing, environment and water resources protection and providing nutritious food (Yazdanpanah & Forouzani, 2015). Moreover the awareness of health problems when consume food has become a significant concern recently (Michaelidou & Hassan, 2008). Especially in developing countries such as Vietnam, the problem of environment and health are more and more concerning (Pham, Nguyen, Phan, & Nguyen, 2018). Safety food such as organic food become one of the hot topics in the researching. According to Lockie, Lyons, Lawrence, & Mummery (2002), they suggest that organic food consumption is one of the important points to contribute to the environmentally sustainable lifestyles. Consumers perceive food labeled as organic to be healthier than conventional food (Grankvist & Biel, 2001). Since organic food must be produced in compliance with organic principles, such food is believed to cause less harm to the environment (Cornelissen, Pandelaere, Warlop, & Dewitte, 2008). Awareness of the necessity protect environment and contribute to health protection, the using organic food is an appropriate choice for consumers (Rahmani & Sazvar, 2017).

To be considered organic, the food must be produced without the use of synthetic fertilizers and pesticides, generic engineering, growth hormones, irradiation or antibiotics (IFOAM, 2018; Vieira, de Barcellos, Hoppe, & da Silva, 2013). Moreover, according to Research Institute of Organic Agriculture and International Federation of Organic Agriculture Movements (IFOAM), the term “organic” refers to the particular farming system described in IFOAM’s basic standards for organic agriculture (IFOAM, 2018; H. C. Lee, Chang, Cheng, & Chen, 2018).

So far, scholars have published papers on the number of aspects related to intention purchasing towards organic food. To have better understanding the purchasing intention used theory of planned behavior, some studies have been investigated (e.g. (Michaelidou & Hassan, 2008; Peighambari, Sattari, Kordestani, & Oghazi, 2016; Rana & Paul, 2017; Scotia et al., 2006) as well as empirical studies regarding factors influencing purchasing intention of organic food (Shaharudin, Pani, Mansor, & Elias, 2010; Singh & Verma, 2018); willingness to pay organic food (Aryal, Chaudhary, Pandit, & Sharma, 2009; Krystallis & Chrysohoidis, 2005; Millock & Hansen, 2002; Zhang, Fu, Huang, Wang, & Xu, 2018). However, the published studies in this area still have a research gap. Additionally, customers play a very important role in business not only in creating revenue to companies but also in the aspect of value creation such as giving feedback, advocacy, helping and tolerance (Yi & Gong, 2013). Moreover, many researchers are increasingly proving that through co-creation, the relationship of customer involvement in the creation of products and service delivery are recognized (Payne, Storbacka, & Frow, 2008). Therefore, value co-creation has become a strategic options for companies and consumer effort in co-creation is helpful in building value. (Cheung & To, 2016). The effect of value co-creation to purchasing intention toward organic food has received less attention. Consequently, this study contributes to the literature analyzing the relationship between value co-creation and purchase intention bases on the Theory of Planned Behavior.

This study has two main objectives. Firstly, the relationship between value co-creation and purchase intention will be examined. Secondly, attitude, subject norms and perceived behavior control are looked at as determinant factors of purchase intention toward organic food.

The structure of the paper consists of five main sections. The first section is the literature review which is a theoretical background to develop hypotheses in the second section. Methodology and data collection are illustrated in the third section. The next section is an empirical result discusses the findings. The last section mentions to the conclusion.

Literature review

Theoretical background

The theory of planned Behavior (TPB) is an cognitive model that targets to predict the intention and behavior (Ajzen, 1991). There are many fields that successfully applied this model for explanation such as health psychology

(Walker, Grimshaw, & Armstrong, 2001; Zemore & Ajzen, 2014), environmental behavior (Abrahamse & Steg, 2009; Whitmarsh & O'Neill, 2010), intention and behavior with regard to diet and food choice (Arvola et al., 2008; E. Kim, Ham, Yang, & Choi, 2013), green consumption (Al, Rosli, Ra, & Mohiuddin, 2018), intention of tourists and green hotel choices (Han, Hsu, & Sheu, 2010; Wang, Zhang, Yu, & Hu, 2018).

From the Theory of Reasoned Action (TRA), The Theory of Planned Behavior was developed (Fishbein & Ajzen, 1975). This model is a social psychological model which illustrate the behavioral intention and actual behavior based on attitude and subjective norm (Fishbein & Ajzen, 1975). For many reasons, there are limitation between actual behavior and behavioral intention, Ajzen provided an additional variable in 1985 when the Theory of Planned Behavior was published. This mediate variable is called "perceived behavior control" (PBC) which influences directly intention and behavior.

In the Theory of Planned Behavior, the first part of the model aims to find out a person's "personal attitude" to the behavior by identifying their outcome beliefs and outcome evaluations. The outcome beliefs is related to what we believe to be the outcome of taking their behavior and the outcome evaluation mentions how worthwhile we consider the outcome of the behavior (Ajzen, 1991). The second part of the model aims to find out a person's "subjective norms" which is made of their normative beliefs and motivation to comply. The third part of the model looks at our personal control beliefs which are made up of self- efficacy beliefs and perceived external barriers. The self- efficacy beliefs are about how confident we are we can achieve the change even in the face of barriers and the perceived external barriers describe external factors that we perceive might prevent to achieve goals (Ajzen, 1991). Therefore, according to the Theory of Planned Behavior (TPB), customers who have positive attitudes in regard to organic food, have normative support for using it, feel easy and comfortable to use this food, have strong intention to purchase this organic food.

Hypotheses development

In the Theory of Planned Behavior, attitude refers to negative or positive evaluation related to behavior investigation. There is an assumption that the more positive the attitude, the more possibly the intention (Nosi, Pucci, Silvestri, & Aquilani, 2017). Moreover, the more support of normative factor is, the more positive affect to purchase intention is. The normative support can be from parents, friends, or someone who has influences to. Besides, if customer feel comfortable to purchase organic food and it is

easy for them to approach the purchasing this food, the relationship between perceived behavioral control and purchase intention is positive. There are many researches that prove the positive relationship between attitude of customer, subject norm, perceived behavioral control and purchase intention toward organic food (Arvola et al., 2008; Chen, 2007; Singh & Verma, 2018; Tsakiridou, Boutsouki, Zotos, & Mattas, 2008; Yazdanpanah & Forouzani, 2015). Thus, we posit that:

H1: Attitude toward organic food will be positively related to purchase intention

H2: Subject norm toward organic positively affects purchase intention

H3: Perceived behavior control positively affects purchase intention

A service dominant (S-D) logic in marketing have developed by Vargo & Lusch (2004). It illustrates that when a customer consumes or uses a product or service the occurring of value-creation is recognized (Payne et al., 2008). This means that the customer is a co-creator of value based on the concept of S-D logic (Yi & Gong, 2013). The author develops value co-creation includes two dimensions: customer participation behavior and customer citizenship behavior. This study bases on the dimension of customer citizenship behavior which consists on feedback, advocacy, helping and tolerance (Yi & Gong, 2013). Although there is little information on the effect of value co-creation in the green industry, the literature shows that, in general, co-creation increases trust toward companies and eventually rises consumer intention to purchase products (Nosi et al., 2017). Thus, the hypothesis can be as follows:

H4: Value co-creation toward organic food positively influences purchase intention

Methodology

Research design

The qualitative method is conducted by focus group discussion with ten people to identify and find out more which construct listed in literature review affecting to customers. The pilot study will be examined to evaluate feasibility in order to develop full-scale survey. In the pilot study the ex-

ploratory factor analysis (EFA) and Cronbach alpha will be conducted in order to evaluate the reliability and the validity. After exploratory factor analysis the survey for full-scale study will be completed in order to be ready for full-scale investigation. The confirmatory factor analysis (CFA) will be carried out in order to evaluate the fit of the model, the weight CFA, general reliability, single direction, converging values and discrimination. Structural equation modeling will be applied to test the hypothesized relationships among various constructs.

Data collection

The questionnaire is designed in English in this dissertation and it is translated into Vietnamese in order to delivery to Vietnamese customers. Three biggest cities in Vietnam which are Ho Chi Minh City, Ha Noi City and Da Nang City are chosen for investigation because most of organic consumers are living there.

Sample size

Sample size of this study is forecasted about 300 samples. Survey will be delivered to consumers in three biggest cities in Vietnam.

Expected results

Measurement

The Cronbach Alpha of all constructs is higher than 0.6 and the items with item-total correlation less than 0.3 will be removed. The composite reliability is greater than 0.6. The factor loading of all items are less than 0.5 will be removed. The Exploration Factor Analysis is applied with principal components method, varimax and eigenvalue =1. The scales of all constructs are accepted with the total variance explained > 0.5. Thus, scales for evaluating constructs reflected a sufficient of convergence reliability. Moreover, the average variance extracted (AVE) for all constructs are higher than 0.7. therefore, all constructs have discriminant validity

Structural model

The result shows that the estimated model is fit to the data. The expected results are Chi-square < 0.3, p-value for the model >0.5, CFI>0.95, AGFI >0.8, SRMR <0.9, RMSEA <0.5 and PCLOSE >0.5.

Hypothesis testing

With the p value is less than 5%, all hypothesis which illustrated in the literature review section are accepted as follow:

H1: *Attitude toward organic food is positively related to purchase intention.*

H2: *Subject norm toward organic positively affects purchase intention.*

H3: *Perceived behavior control positively affects purchase intention.*

H4: *Value co-creation toward organic food positively influences purchase intention.*

Conclusions

The concern of customer related to organic food has increased recently in Vietnam. There are many articles which has been studies to investigate the purchase intention of customer based on the Theory of Planned Behavior (TPB). This study is based on the Theory of Planned Behavior with the extension of value co-creation to predict the purchase intention of Vietnamese customer toward organic food. The result confirmed these hypotheses which illustrated in the literature section. The positive relationship between value co-creation and purchase intention is investigated. It contributes not only to the literature but also to the practical business management. Organic stores may pay attention to the value co-creation which includes feedback, advocacy, helping and tolerance to improve the quality service as well as attract more customers.

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External imbalances in the global economy after the 2008+ crisis

JEL Classification: *F21; F3; F65*

Keywords: *international capital flows; global imbalance; current account; global economy; crisis 2008+*

Abstract

Research background: In the contemporary international monetary system adjustment mechanism does not work properly to eliminate the excessive surpluses/deficits on the current accounts of the major countries participating in international trade. As a consequence of such a situation the adjustment changes do not take place in an evolutionary way through the process of the market changes or decisions taken by the national authorities, but first of all they are results of crisis events that reflect the unfavourable macroeconomic situation in different countries.

Purpose of the article: The aim of the article is to analyze the functioning of the adjustment mechanism in the contemporary international monetary system and the circumstances in which significant imbalances emerge on the global (US-China) level.

Methods: Qualitative: the analysis of the rules and limitations of the contemporary international monetary system; quantitative: analysis of the selected macroeconomic data (inter alia current account balance, investment, savings); source: WEO IMF; covered period: 2002-2017.

Findings & Value added: Increasing external imbalances are an immanent systemic feature of the contemporary international monetary system. The lack of the adjustment mechanism in this system leads to potentially cyclical emergence of such imbalances and their correction by the crisis events. It means that the current post-crisis period may only be a stage before the next period of growing imbalances. The remedy for this threat lies in correcting the existing principles of the system.

Introduction

External imbalances that have been growing for some years already in the global economy are sometimes seen as one of the main causes of the 2008+ global financial crisis (see, e.g., Borio. & Disyatat, 2010, pp. 198-216; Obstfeld, 2012, pp. 469-480). Contrary to the intertemporal approach, which explains why countries maintain significant current account deficits, economic and financial stability of countries turned out to be significantly dependent on maintaining the external balance. In a simplified way, this balance is defined as a current account of the balance of payments deficit/surplus not in excess of 4% of GDP. If the latter value is exceeded, it means not only that the adjustment mechanisms that help absorb external imbalances or prevent their occurrence have failed but also indicates a country's becoming susceptible to financial crisis (see Janicka, 2018). Significant reduction of current account deficits/surpluses of the main actors of the global economy – USA and China – took place after the outbreak of the financial crisis which, by the same token, acted as highly imperfect imbalance adjustment mechanism. That may suggest that if the adjustment mechanism within the international currency system in its current framework falls short of effectiveness, next wave of external imbalances may trigger next wave of crises which will take over the role of the mechanism in the global economy. The aim of the article is to analyze the functioning of the adjustment mechanism in the contemporary international monetary system and the circumstances of the emergence of the significant imbalances on the global (US-China) level.

Literature review

The problem of increasingly concentrated global imbalances in the contemporary international currency system and poor performance of the adjustment mechanism are being hotly debated by economists, e.g., Collignon (2006, pp. 5-26) or Clarida, Goretta, Taylor (2007). After the outbreak of the crisis, further studies on global imbalances were published, e.g., Ca'Zorzi, Chudik, Dieppe (2012, pp.1319-1338), Lane & Milesi-Ferretti (2012, pp. 252-265), and Ferguson & Xu (2018, pp. 239-252).

Research methodology

This paper uses qualitative and quantitative research methods. The first part of the survey analyses the circumstances, in which contemporary international currency system operates in the context of its principles and their consequences for the operations of global economy players. The second part focuses on the analysis of data concerning the current account deficits of countries covered by the study, i.e., the U.S. and China, their savings and investment, as well as the dynamics of international trade.

In the light of the intertemporal exchange theory, external imbalances are justified by differences in economic development level of countries and their savings while directions of capital flows concur with the neoclassical theory: developed countries are surplus countries and through the financial markets they make their financial resources available to developing countries. The impact of developing countries on economy is relatively small, they absorb economic policy pursued by developed countries.

Yet the turn of centuries brought about a significant change, which distorted the functioning of the multi-currency system. The growth of crucial developing economies whose economic policy is different from the one adopted for the system (China, India) speeded up. Restrictions on cross-border capital flows, stabilisation of foreign exchange rate and independent monetary policy were approved by the developing countries as a preliminary stage in the sequence of steps leading them to the developed economies model. The Chinese economy whose development model is based on exports was seeking to stabilise the exchange rate of yuan to the U.S. dollar at the level that would help it maintain competitiveness. China is a developing country that escapes any classifications or economic development paths followed by the developed countries. It is also a powerful actor in the group of dominant countries of the system pursuing economic policy in the spirit of neoclassical economics, which sees the policy differently and makes references to the Keynesian ideas by managing the exchange rate and maintaining restrictions vis-à-vis free movement of capital.

Tables 1 & 2 and 4 & 5 contain data concerning current account balance, investment, savings, and trade dynamics in China and in the United States while Table 3 informs about the USD/RMB exchange rate. Undervalued yuan/U.S. dollar exchange rate was surely one of the factors that allowed China gain competitive advantage in international markets. Over the period 2002-2005 we can not only see a quantum leap increase in the current account surplus but also an increasing foreign trade dynamics (including imports of intermediate goods) and a significant increase in investment and savings. Immediately before the outbreak of the crisis, despite

the strengthening of yuan exchange rate vis-à-vis the U.S. dollar, China's surplus had been increasing in absolute and relative terms reaching the record-breaking level of over USD 420 bn in 2008. It means that the change in the foreign exchange policy of China did not hinder the demand for Chinese goods even though the dynamics with which exports grew at that time exhibited a significant slowdown. The drop reported for 2008 amounted to ca. 10 p.p. compared to 2007 but the real breakdown came in 2009 despite China's efforts invested in stabilising the exchange rate of the domestic currency. Shrinking external demand, a derivative of the global crisis, was the factor which triggered the adjustment. The coming back to the managed floating exchange rate in 2010 strengthened the Chinese currency, which contributed to the worsening of indicators covered by the analysis in 2011 (see Table 2).

The analysis of data from Table 2 proves that hurt by the consequences of the financial crisis 2008+ the Chinese economy was unable to regain its position in the international market. Although in absolute terms the value of current account surplus of this country remains impressive (we need to bear in mind that current account includes more than trade in goods), its relative value compared to the GDP clearly decreased. At the same time, growth dynamics of exports and imports slowed down. We also need to highlight huge savings/investment in the Chinese economy, which oscillate around 45-50% of GDP.

Undoubtedly, the crisis triggered the adjustments of external imbalances seen through the lens of the relationship of current account balance to GDP ratio. Between 2008 and 2009 current account surplus was almost halved in relative and absolute terms. Earlier change in the exchange rate policy (2005), which strengthened the Chinese currency vis-à-vis the U.S. dollar neither reduced the surplus nor prevented its further increases (see Duarte & Schnabl, 2015, pp.531-544). On the contrary, over the period 2005-2007, i.e., just before the crisis, we could observe dynamic increases of the surplus. Under such circumstances, there is no doubt that the adjustment mechanism in a multicurrency system failed to operate effectively and the exchange rate turned out to be an insufficient instrument while the outbreak of the financial crisis generated by the crisis in the U.S. economy was the factor that triggered adjustments and helped China offset its significant external imbalances.

As mentioned above, in accordance with the theory of economics, the growing current account surplus reported by some countries means deepening current account deficit experienced by others. The growing current account surplus of China was closely linked with the deepening current account deficit of the main recipient of Chinese exports, i.e., the United

States (see Table 4). Taking into account that the United States are the leader of the global economy and of the contemporary international currency system, the country's savings of less than 14% of the GDP and investments below 18% of the GDP are far from standards of highly developed countries, not mentioning the developing countries. It is worth stressing that in the period preceding the crisis, domestic savings in the U.S. ranged around 17-18%, i.e., at the level disproportionately low compared to the investment needs of the country.

Financial crisis began in the U.S. market in 2007, we can clearly see that values covered by the study, i.e.: current account deficit, domestic savings and investments, exports and imports dynamics, dropped in that particular year. While the crisis unfolded and "spilled over" the global economy, these parameters further deteriorated until the critical year 2009, which can be considered the turning point from which indicators reflecting the performance of the U.S. economy started to gradually improve (Table 5). Similarly to the Chinese economy, also in the American economy adjustments of external imbalances come as an effect of the financial crisis. Previously, the United States failed to act towards reducing their huge deficit; they were using foreign savings to finance the expansion of their own economy. They simply took advantage of their privileged position of the leader of the global economy, who issues international currency and runs the most developed financial market (in quantitative and qualitative approach).

The investigation into the China-U.S. case raises a question about the validity of the theory of intertemporal exchange, according to which rich aging societies of highly developed countries temporarily make their savings available to the developing countries, whose investment needs are disproportionate to their savings. The example of the U.S.-China relationship is a completely opposite case. A rich and highly developed country has got relatively small savings and widely uses the savings of other countries, including developing ones. We also need to have a look at economic growth and GDP per capita indicators in China and the U.S. to realise significant differences between these countries in the period covered by the study (Tables 6 and 7). Surely, China can be considered a "catching up" country with impressive economic growth performance until 2007 – the drop by almost 5 p. p. in 2008 does not change the fact that the growth continued at a very high rate of ca. 9% year-to-year. For China and the U.S. the intertemporal exchange theory does not work; it is China who makes its savings available to the U.S. and has a share in funding American investment. Surely the argument that explains the increasing external imbalances between the countries with intertemporal exchange does not hold water in this case.

Conclusions

Dynamic increases in external imbalances between China and the U.S. referred to as the global imbalances have never been suppressed in any way by these countries. China, the country implementing the exports-driven economic growth model was totally disinterested in doing so while the U.S. did not have tools that they could deploy for that purpose. Contemporary international currency system turned out to be completely inefficient with this regard. The absence of clearly stated operating principles binding on all the members means there are no procedures/mechanisms that could be activated in situations of significant imbalances between countries within the global economy. In other words, contemporary currency system does not have any efficient adjustment mechanism that would contain excessive current account deficits/surpluses and bring countries back to the condition of relative equilibrium. Considering the case of China and the U.S. we cannot use the global theory of intertemporal exchange to explain global imbalances because directions of capital flows – from a developing to a developed country - are exactly opposite to what the theory proposes. In the absence of any other new solutions for the international currency system we may expect that another episode of escalating external imbalances between the countries may trigger the next financial and economic crisis which, by the same token, will become a highly imperfect adjustment mechanism for external imbalances.

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Annex

Table 1. China – current account balance total, domestic investment and savings, foreign trade dynamics (bn USD, % of GDP, %), 2002-2009

		2002	2003	2004	2005	2006	2007	2008	2009
Current account balance total (bn USD)		35.4	43.1	69.0	132.4	231.8	353.2	420.6	243.3
Current account balance (% of GDP)		2.4	2.6	3.5	5.7	8.4	9.9	9.1	4.6
Investment (%GDP)		36.9	40.4	42.7	41.0	40.6	41.2	43.2	46.3
Savings (%GDP)		39.3	43.0	46.2	46.7	49.0	51.1	52.3	51.1
Imports dynamics (%)		21.7	34.4	20.3	12.9	17.0	12.9	5.2	3.0
Exports dynamics (%)		25.1	33.5	27.0	24.0	26.2	19.5	9.8	-11.2

Source: author's calculations based on WEO October 2018. <https://www.imf.org/external/pubs/ft/weo/2018/02/weodata/index.aspx>, accessed: 18.03.2019.

Table 2. China – current account balance total, domestic investment and savings, foreign trade dynamics (bn USD, % of GDP, %), 2010-2017

		2010	2011	2012	2013	2014	2015	2016	2017
Current account balance total (bn USD)		237.8	136.1	215.4	148.2	236.1	304.2	202.2	164.9
Current account balance (% of GDP)		3.9	1.8	2.5	1.5	2.2	2.8	1.8	1.4
Investment (%GDP)		47.9	48.0	47.2	47.3	46.8	44.8	44.1	44.4
Savings (%GDP)		51.8	50.0	50.0	48.9	49.0	47.5	45.9	45.8
Imports dynamics (%)		23.4	11.7	5.8	9.7	3.7	-0.7	5.8	7.8
Exports dynamics (%)		28.8	10.54	6.8	9.6	4.3	-2.4	1.7	9.0

Source: author's calculations based on WEO October 2018. <https://www.imf.org/external/pubs/ft/weo/2018/02/weodata/index.aspx>, accessed: 18.03.2019.

Table 3. USD/RMB exchange rate, quotation as at the end of December of each year, 2009-2018

2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
6.8	6.6	6.3	6.2	6.0	6.2	6.5	6.9	6.5	6.9

Note: between 1997 and 2005 the Central Bank of China stabilised the RMB exchange rate to U.S. dollar at the level of 8.28. Change in the currency policy in July 2005 (adopting a managed floating rate) strengthened the RMB against the USD, while the outbreak of the financial crisis encouraged China in July 2008 to stabilise the exchange rate again at 6.83. Comeback to the managed floating rate took place in July 2010.

Source: Federal Reserve Economic Data, Economic Research Division, Federal Reserve Bank of St. Louis, <https://fred.stlouisfed.org>, accessed 18.03.2019

Table 4. USA – current account balance total, domestic investment and savings, foreign trade dynamics (bn USD, % of GDP, %), 2002-2009

	2002	2003	2004	2005	2006	2007	2008	2009
Current account balance total (bn USD)	-450.8	-518.8	-631.6	-745.2	-806.0	-711.0	-681.4	-
								372.5
Current account balance (% of GDP)	-4.1	-4.5	-5.2	-5.7	-5.8	-4.9	-4.6	-2.6
Investment (%GDP)	21.7	21.7	22.7	23.4	23.5	22.6	21.1	17.8
Savings (%GDP)	18.32	17.4	17.7	18.2	19.2	17.6	15.2	13.9
Imports dynamics (%)	3.7	5.8	11.4	7.0	6.2	2.1	-3.4	-15.3
Exports dynamics (%)	-3.3	2.9	8.8	7.7	9.9	7.0	5.8	-11.9

Source: author's calculations based on WEO October 2018. <https://www.imf.org/external/pubs/ft/weo/2018/02/weodata/index.aspx>, accessed: 18.03.2019.

Table 5. USA – current account balance total, domestic investment and savings, foreign trade dynamics (bn USD, % of GDP, %), 2010-2017

	2010	2011	2012	2013	2014	2015	2016	2017
Current account balance total (bn USD)	-431.3	-445.7	-426.8	-384.8	-365.2	-407.8	-432.9	-
								449.1
Current account balance (% of GDP)	-2.9	-2.9	-2.6	-2.1	-2.1	-2.2	-2.3	-2.3
Investment (%GDP)	18.7	19.1	20.0	20.4	20.8	21.0	20.3	20.6
Savings (%GDP)	15.4	16.5	18.7	19.2	20.3	20.1	18.6	18.9
Imports dynamics (%)	15.4	6.1	2.6	1.8	5.6	5.8	1.4	4.6
Exports dynamics (%)	15.0	7.1	3.8	3.2	4.6	-0.3	0.3	3.3

Source: author's calculations based on WEO October 2018. <https://www.imf.org/external/pubs/ft/weo/2018/02/weodata/index.aspx>, accessed: 18.03.2019.

Table 6. Economic growth and GDP per capita in China and in the United States, 2002-2009 (% , USD)

	2002	2003	2004	2005	2006	2007	2008	2009
China, year-to-year economic growth (%)	9.1	10.0	10.1	11.3	12.7	14.2	9.6	9.2
China, GDP per capita (k of USD)	1.15	1.29	1.51	1.77	2.11	2.70	3.47	3.84
USA, year-to-year economic growth (%)	1.7	2.9	3.8	3.5	2.9	1.9	-0.1	-2.5
USA, GDP per capita (k of USD)	37.97	39.41	41.63	44.03	46.21	47.87	48.28	47.01

Source: author's calculations based on WEO October 2018. <https://www.imf.org/external/pubs/ft/weo/2018/02/weodata/index.aspx>, accessed: 18.03.2019.

Table 7. Economic growth and GDP per capita in China and in the United States, 2010-2017 (% , USD)

	2010	2011	2012	2013	2014	2015	2016	2017
China, year-to-year economic growth (%)	10.6	9.5	7.9	7.8	7.3	6.9	6.7	6.9
China, GDP per capita (k of USD)	4.52	5.58	6.33	7.08	7.70	8.17	8.12	8.64
USA, year-to-year economic growth (%)	2.56	1.6	2.3	1.8	2.5	2.9	1.6	2.2
USA, GDP per capita (k of USD)	48.40	49.82	51.54	53.03	54.95	56.72	57.81	59.79

Source: author's calculations based on WEO October 2018. <https://www.imf.org/external/pubs/ft/weo/2018/02/weodata/index.aspx>, accessed: 18.03.2019.

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Does brand matter in shoppers' decision on used-products? A Review of Empirical Literature

JEL Classification: *M3; M13; M31*

Keywords: *brand; used-product; brand motivations; shoppers' buying decision; retailing market*

Abstract

Research background: The growing and widespread of consumers' retail marketplace has been polarized heavily by used-products (second-hand goods). Yet, consumers' income, brand motivations among others to somewhat extent included in determining consumers' motivation in buying used-products. However, an array of empirical literature on this theme show a varied interpretations regarding the brand attributes (core values) as a variables informing and triggering the buying of used-products.

Purpose of article: The paper sought to draw attention to sellers by exploring how brand plays a key role in consumers' buying decision regarding used-product.

Methods: we employed document analysis to review a related published articles from reputable international journal indexed in Scopus, web of science, and science direct data base for this study.

Findings & Value added: Findings show that, attributes of brand including not limited to brand loyalty, brand experience, brand image, brand origin and brand affiliate were deduced from previous studies as consumer-motivators of brand in buying decision process of used-product. Practical and managerial implication of this study would be a wake-up call to operators in the retailing market especially, start-ups, and small and micro shops in their effort to clamor for market share. The study offers a theoretical insight by widening the scope of demand factors in the field of marketing and business economics. Recommendation for future research direction were indicated at the latter part of the paper.

Introduction

Today, the trading of used-products, popularly called second-hand goods especially within the scope of retailing market has been discovered to be growing at a faster rate. This marketing phenomenon has drawn constant and consistent attention to practitioners and scholars specifically in the business and economics field. Although the demand for goods and services in all categories (both used and unused products) within the perspectives of classical economists is said to be influence largely by price relatively to others factors of demand. Also in a related development, innovations and marketing dimensions with specifics in branding and promotional activities other than price are among several factors that trigger the growth and progress of any competitive firms (Sridhar, 2007; Williams & Paddock, 2003).

Brand concept in this context and other literature refers to an array of unique features of a product that distinct one product from others or closely related products (Kim, 2018; Kotler & Gertner, 2002) . It also means some identifiable characteristics that goes beyond a product by taking into consideration how a firm (for instance a retailing shop) may appeal to the end users of its product and services in a competitive environment. These features according to (Guiot & Roux, 2010) plays a significant role in marketing strategies from firms perspective regarding the sales pattern of certain products. Again the psychological behaviour of consumers in the mass market inform marketers, business owners and other industry players for a logical decision making towards product design and development. This cue according to some scholars including not limited (Anderson & Ginsburgh, 1994; Asamoah, Chovancová, De Alwis, Kumara, & Guo, 2011) are major influential factors affecting consumers' buying decision making process in all categories of goods (either new or old). Meanwhile marketers believe that consumers are the pivotal agents in every business transaction and therefore their desire and expectation of product features cannot be overlooked inasmuch as buying and selling is concerned (Cervellon, Carey, &

Harms, 2012; Foroudi, 2019). However, the used-products in particular is evidenced that the growth of its market (second-hand shops) reduces the demand of new goods which is primarily orchestrated by less transaction cost.

Thomas (2003), argued that used-product retailing market in general increases the patronage of old products mainly as a result of some behavioural and economic factors which have a tendency of influencing shoppers decision. Such empirical survey indicated cost reduction as one of the motivating factors of demand of used-products in the used-goods retailing markets. Though he acknowledges other factors equally important in informing decision making process towards buying used-products. However, those specific factors such as brand (taste and preference) as maintained by (Osakwe, 2016; Thomas, 2003) were highlighted in their works but could not give vivid dimensions of brand as they claimed. In spite of primary factor(s) affecting the purchasing decision of used-product, several retailing shops connected to used-products have devise strategies to compete in the market. Among these strategies is the brand of the product in question. Many are optimistic that popularity and familiarity of a given product inform consumers psychologically geared toward purchase intention, hence according to (Guiot & Roux, 2010) influences shoppers positively in their quest to purchase goods regardless of its category (used or unused).

In view of this, extant literature in line with the present study undertaking, there has been a remarkable works associated with the theme on focus. However, many of these works have mixed reaction depending on the research approach employed. For example (Lin & Chaney, 2007; Zhao & Zou, 2002) attributed the demand for used-product is caused by product familiarity and brand loyalty. Also consumers in recent times prefer in all situations products that meet their desired characteristics which would ultimately translate into customer brand satisfaction (Sutton, 1995). Meanwhile, an array of empirical literature on this study show a varied interpretations regarding the brand attributes (core values) as a variables informing and triggering the buying of used-products. Invariably, the consistencies and discrepancies in measurement items of brand constructs to which they were highlighted in previous articles have not been given the needed attention (Berthon, Ewing, & Napoli, 2008). Against this background the paper aims at reviewing previous works on how brand affect shopper's decision making process regarding used product. By doing so we deduced several brand dimensions into brand attributes which were traced from related literature and were described as brand motivations.

The present study would be a wake-up call to operators in the retailing market especially, start-ups, small and micro shops in their effort to clam-

our for market share despite product polarization. It offers a theoretical insight by widening the scope of demand factors in the field of marketing and business economics. Therefore, subsequent phases of this paper have been outlined up to the concluding part.

Prior studies on brand as a determinant of purchasing used product in a retailing market

Globally, the proliferation of used product (second-hand goods) consumption has drawn attention to scholars and practitioners and raised a question like; why do customers purchase used product? (Guiot & Roux, 2010, p.355). An interesting answer from (Argo, Dahl, & Morales, 2006) shows product familiarity and loyalty do initiate the buying decision of used product in most retail market.

Eminent scholars like (Kotler & Gertner, 2002; Wood, 2000) made a convincing argument that brand element on products and services denote an important asset to the producer or the firm in question. Their papers stress that a brand could mean an identity, a symbol, a name or a trade mark which signifies a product or service quality and among others, and could be distinct from competition. In a related development, (Keller & Lehmann, 2006) interestingly discussed that for a firm to maximize profit from medium to long term business, it is necessary to enhance the marketing strategy. This strategy could be effectively and efficiently executed by seeking marketing information from the customer point of view. Also brand as viewed from the literature is considered as a unique feature that takes into consideration the value proposition of a customer in all business environment.

From marketing perspective, branding is widely perceived as a key strategic pillar in marketing through which existing and prospective businesses in general capture more customers in the market place). This therefore becomes highly important for SME's in today's businesses since branding in firms create an enabling environment that speed up customer-centric performance outcome (Osakwe, 2016). In view of this Pappu, Quester, and Cooksey, (2005) confirmed that customer-centric performance outcome like brand as a product characteristics largely relate to consumer-based brand equity and eventually converts to a market place equity. Consumers in general are seen as the major key players for decision making process regarding product design and development. In this view, it suggests that shoppers' purchases used-product when they feel like attaining their satis-

faction with respect to a product category (Kotler & Keller, 1988; Kwarteng et al., 2018).

Interestingly, buyers and potential customers of small to medium enterprises in most developing economies the base of the pyramid (BoP) market. This suggest that many product brand of new business opportunities lies in designing and distributing goods and services for poor communities (Delgado-Ballester & Luis Munuera-Alemán, 2005). By extension, brand orientation as a business mediator and more importantly a marketing strategy is very imperative in achieving a competitive advantage among firms.

Methodology

The ultimate goal of the present study is the development of a conceptual framework as indicated in Figure 1. Since the present study is entirely based on qualitative inquiry, the researchers employ document analysis (DA) as the research technique for executing the general aim of the research. Though document analysis could be seen as a simplified technique for this study, however it is an excellent beginning point for retrieving an extant and relevant issue considering the wider coverage areas ((Keller & Lehmann, 2006; Osakwe, 2016). In going forward, and to more precisely, the document analysis was premised on the bases on high volume of scientific manuscript that were traced from open databases such SCOPUS, EBSCO, Thomson Reuter's WoS as well as Google scholar via the use of keywords search. For the purpose of deeper understanding, the researchers identified the relations and conformity of research constructs through theme analysis. This procedure gives the writers the due advantage of searching for relations and patterns across a variety of related articles given the interplay of the current study focus. In spite of this, the method gives an extant literature a broader scope of branding as the theme of focus, hence it is reasonable to use a document analysis as our methodology in this case since it provides a variety of study context in this situation (Bowen, 2009).

Development of a conceptual framework and research preposition

Williams & Paddock, (2003) analysed consumers' inclination for used product in diverse ways but however made some substantial emphasis on brand in consumers' buying decision. Their research constructs include among others, brand, price, location, and risk associated with used-product. Though, those factors as mention in related articles from scholars like

(Kazmi, 2012; Kwarteng et al., 2018; Roux & Guiot, 2008) in many instances made a categorical statement on the influence of brand on used-product in the retailing market. By virtue of this, the present study concentrates solely on brand concept specifically attributes of a strong brand that moderate and mediate the initiation of a purchasing process of a used-product.

In going forward, the conceptual framework of this article is to unravel and substantiate the major attributes of a strong brand which is a major driving force to buy used-product based on customers' point of view. The current model (see Figure 1) is embedded in a single structural network which reveals that for a retailing shop (like a used-product store) to achieve a competitive advantage, the product in questions must have some unique characteristics (brand motivations) which has a tendency in informing consumers' purchasing decision. To this, the current study tapped suitable data from existing academics and practitioners' literature for the purpose of highlighting the relevant brand attributes and how they matter in shoppers' decision in the used-product market (retail stores).

Meanwhile, some scholars argued that these relevant brand constructs in the conceptual framework could potentially enhance the buying and selling of used-product in the retailing shops (Barney, Ketchen Jr, & Wright, 2011; Guiot & Roux, 2010). In line with this, it is crucial for marketing practitioners to intensify the product brand selection that meet the desire and aspiration of the target consumers. Indisputably, consumers according to (Chovancová, Osakwe, & Ogbonna, 2015; Keller & Lehmann, 2006; Kotler, Ang, & Tan, 1996) are viewed as 'deciders' of brand design regarding product development, usage, and satisfaction. Related article from (Roux & Guiot, 2008) posits that used-product from customers view point do not depend on the life span of the product (thus whether new or old product) but rather the brand satisfaction is their primary motive.

Brand motivations: impact on used-product

For the purpose of deeper understanding, readers should note that the key words (thus, brand motivations and brand attributes) are used interchangeable in this manuscript. The concept brand according to (Kim, 2018; Kotler & Keller, 1988; Louis & Lombart, 2010) help marketers to distinguish their numerous product among themselves in all market categories (such as B2B, B2C, and C2C). By extension they indicated that people (consumers) choose a product like their friends which suggests that a brand reflect in consumers thought, thereby translating into decision making process. In the light of the above statement, we can conclude that a brand con-

veys a good image (meaning) to a customer on a specific product. Also studies by (Louis & Lombart, 2010) revealed that brand image provide security in terms of product quality to loyal and potential customers. Similarly a good friend gives you a comfort mainly due to trust among each other (De Chernatony, 1999; Konecnik & Gartner, 2007) suggesting that consumers have passion for a particular product brand since they are guaranteed with product quality.

In view of this, the researchers can establish that, beyond other factors associated with purchasing decision, brand is key driver in the recent marketing transaction. In a previous studies for a past decade like (Delgado-Ballester & Luis Munuera-Alemán, 2001; Pandey, Singh, & Dalla, 2017; Keller & Lehmann, 2006) did acknowledge that brand has a personality like humans, where this personality traits influences consumers behaviour regarding purchasing decision and intention. They debated that these personality traits associated with product brand make it possible for loyal customers to affiliate themselves to the brand. Notwithstanding to brand affiliation, customers feels proud and confidence by associating themselves with a particular product brand. Such association create a sense of belongings, and sign of social recognition regarding product classification. However, it is also important to know that a lot of works have transcended in relation to this theme which include others factors not necessarily brand concepts has been established.

Meanwhile, with the growing interest of research in branding especially in the multiple grocery market, scholars like (De Chernatony, 1989; De Chernatony & McWilliam, 1989) theorised that strong brand manufacturers continue to maintain brand supports (features) for a sustainable business growth while weak strong manufactures gradually decline in brand investment. This translate to mean that firms (like multiple grocery retail market) with good (strong) brand has the tendency in maximising economic profit over firms with weak brands. Furthermore, brands that have been able to stand for a test of time in the minds of consumers such that those product brand over the years are regular and reliable to end users has possibility of retaining customers and the tendency to influence potential customers' decision and intention (De Chernatony & McWilliam, 1989). This eventually create and develop some level of association between consumers and the brand with or without decision making process for buying the product (Cervellon et al., 2012; Dewhirst & Davis, 2005).

Regarding the theme of this present study, literature shows that used-product and the interconnection of 'brand' are mutually exclusive from both marketers and consumers' perspectives. So it is necessary for readers to note that the concept 'brand' has been construed in diverse ways in the

literature some practitioners, for instance (De Chernatony & McWilliam, 1989) in their article considered brand to mean, “*a devices to show marketing control (ownership), as differentiating devices, as a means of communicating a guarantee, as an aid for consumers' rapid decision-making and as symbolic devices to enable consumers to express something about themselves. Each interpretation carries with it significant implications for marketing strategy and, in particular, advertising strategy, which should be pursued*”. This means that brand plays a moderating and mediating role in terms of product communication and acceptance in the market place.

Brand as suggested by (Clifton, 2009; Das et al., 2019; Kotler & Gertner, 2002) in their empirical evidence, confirmed brand attributes which include among others; brand trust, brand loyalty, brand experience, brand personality, brand identity, brand image, brand (product) origin and brand affiliate as goodwill (asset) to firms. Obviously asset is property to an organization or an individual and for that proper care must be taken to ensure the survival or continuity. Again, observation from their study shows consumers preference for a particular brand moderate the selling activities of in the market, especially among the retailing stores since it is clear (see from Williams & Paddock, 2003) that used-product shops in recent time prefer selling product based on customers' brand affiliate. By brand affiliate we interpreted to mean how brand identity and its attribute is connected to customers' life style such that they feel attached to some what a prestigious or certain class of people in the society. Brand affiliation reflects both customers and companies brand attributes in all business transactions. This perspective according to some brand owners and marketing practitioners, the phenomena keeps the cordial relationship between consumers and a product brand (Jacoby & Kyner, 1973; Wood, 2000).

However, regarding brand loyalty, (Argo et al., 2006; Kotler et al., 1996; Williams & Paddock, 2003) argue that consumers satisfaction for a specific product brand retains them at all time irrespective of their location or shop visibility (location). By virtue of this statement, consumers feel loyal to a specific product wherever those products could be traced. This according to (Berthon et al., 2008; Williams & Paddock, 2003) is the trust and love people have for the product over the past and the ultimate satisfaction they derived. In a related development, brand name and origin is used as a tracing tool or even a recognition for a company's product. Osakwe, Ciunova-Shuleska, Ajayi, & Chovancová, 2015) argue that countries in developing nations rely heavily on used product which are mainly due to country of origin of these products. Additionally, the study indicated that due to the higher number of low income earner in developing countries, many customers within that income bracket are compelled to substitute

used-product brand for 'brand new' product. In sum, we could strongly analyse this brand attributes as some influential determinants of purchasing second hand goods in the mass market.

With respect to the aforementioned brand attributes and their interconnection with retail marketing sentiments (retailing market, shoppers' decision and used-products), the current study proffered the conceptual model that translate brand motivations (loyalty, experience, image, origin and affiliate) into buying of used product or even the initiation purchasing decision specifically in the used-product market. Therefore, the conceptual framework for this study is indicated in figure 1 below.

Conclusions

The present study sought to draw attention to used-product retailers by exploring how brand plays a key role in consumers' buying decision regarding used-product. By extension, the ultimate goal of this paper was to review the various attributes of brand (brand motivations) in the existing literature on how these attributes influence shoppers' decision in purchasing used-product. Document analysis as a convenient technique for this study (qualitative inquiry) was employed to harness relevant literature connected to the theme. From our inquiry, diverse views about brand concept were interpreted from marketers' view point. To them, brand is a strategic 'weapon' to canvass for shoppers from short to medium to long-term business continuity. Whiles customers viewed brand as some unique characteristics that distinguish a particular product from its competitors by taken into consideration product quality. Such characteristics based on our rigorous analysis showed among others; brand loyalty, brand experience, brand image, brand origin and brand affiliate are the key motivators that influence shoppers in their purchasing decision regarding used-product in the retailing market.

The practical implication of this research offered a conceptual model to marketers and dealers in the used-product retail market on how best they could re-consider their branding strategy to win customers. Notwithstanding, marketers according our review considered brand as a communicating tool to initiate product-customer contact. This suggests a firm or a seller's commitment to a brand in a situation characterised by an intense competition in the market. Again, the general idea from this study would strengthens marketers' views on brand as they considered branding as the process of translating the image of a product brand into the minds of customers. To

sum up, the study would provide more insights to brand managers and their partners to improve more on effective brand strategies.

For theory, the study adds up to the previous study by widening the concept of consumer behaviour in the retail market, specifically, the used-product market. It gives more understanding about the interconnection between the brand concept, retail market, and the purchasing decision of used-product. The authors agreed that if the proposed framework is implemented strategically, scholars and practitioners would be interested to the dimension and patterns of shoppers' behaviour on used-products.

The major limitation of this study is the proposed conceptual framework, since the model was not tested statistically, hence the possibility of having any empirical evidence may render the model invalid. Also considering the volume of extant literature in the marketing, especially in the branding sphere, we may fail to observe some important brand motivation that may not be highlighted in the present study. Future researchers could undertake a mixed approach so as to establish the validity the proposed conceptual framework.

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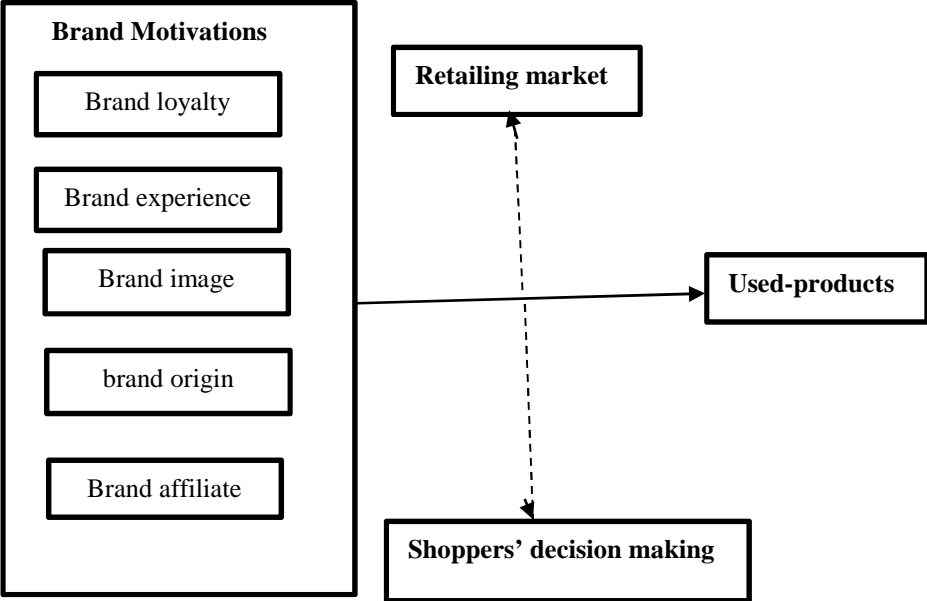
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Annex

Figure 1. A conceptual framework



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Transformation scenarios of the energy balance in Poland – theoretical and empirical perspective

JEL Classification: *F62; F64; O13*

Keywords: *energy balance; Polish economy; links between energy policy and economy*

Abstract

Research background: Energy policy is strictly connected with economies' development and its optimization is an important issue especially in the contemporary European environmental conditions. Therefore, the first part of the article examines theoretical possibilities of changes in energy balances and their consequences for the economy in the perspective of the European legal and environmental conditions. In the second part of the article Polish energy balance is examined. Particularly, the analysis of the trends in their energy balances in the years 1990-2017 is conducted. At the end of the article the economic consequences of identified changes are assessed, and recommendations are formulated aimed at optimizing the structure of Polish energy balance in the future.

Purpose of the article: The main purpose of the article is to identify possible scenarios for the transformation of energy balance in Poland as economy with significant coal consumption.

Methods: The research uses data on non-renewable energy consumption and renewable energy resources and total energy consumption. The research methodology includes: analysis of structure and dynamics, evaluation of trends and comparative analysis and presentation of development scenarios.

Findings & Value added: Generally, there are four theoretical and empirical patterns of transformation scenarios of energy balances with dominant coal consumption: 1) using other non-renewable energy resources; 2) replacing non-renewable energy resources with renewable ones; 3) using nuclear energy instead of coal; 4) increasing coal consumption as available and efficient energy resource. Poland has

implemented mostly the first of mentioned scenarios that impedes realization of European environmental policy and weakens energy safety.

Introduction

Economic and civilizational development is strictly associated with the efficiency of obtaining electrical and heat energy that constitutes the driving force of all branches of industry and that is decisive in terms of the quality of life of households. In the current European conditions, use of basic energy media depends not only on their availability, but also on environmental regulations applicable in the European Union. Those regulations assume a shift from non-renewable energy sources and complete liquidation of carbon dioxide emissions associated with their use until 2050. Such an ambitious environmental objective is a difficult challenge for contemporary economies and their energy security. It is especially complicated in case of those countries which widely used and use bituminous coal and lignite for the purpose of generation of energy and heating, since their use is associated with the highest emission of carbon dioxide to the atmosphere. Poland is also among those countries, since coal have constituted the dominant source of electrical and heating energy in its energy balance for many years now.

Having regard to the aforesaid circumstances, the main purpose of this article is to identify possible scenarios of transformation of energy balance in Poland as economy with significant coal consumption. The aforementioned objective is implemented in a theoretical aspect through determination of all possible options of transformation and in the practical aspect by studying the transformation applied in Poland.

The study uses scenario method and comparative analysis in relation to the possibility to shape the energy balance. Moreover, the research methodology includes structure and dynamic indicators, as well as trend analysis. The study period covers the years 1990-2017.

The structure of the article was appropriately adapted to implement the research objective indicated above. Its first element are literature studies related to the conditions of the European energy industry and scenarios of its development. Then, it presents the study methodology including detailed stages of the analysis. The further part covers theoretical and practical scenarios of transformation of energy balances including specification of determinants and consequences of their implementation. The summary formulates recommendations for expected changes in Polish energy balance.

Literature review

Currently, the source literature most often discusses the issues associated with the development of energy balances in two contexts related to environmental aspects. The first one relates to the problem of reducing carbon dioxide emissions, while the second one to the efficiency of use of renewable energy sources (Papież et al., 2018, pp. 918-934; Schmidt & Sewerin, 2016; Sharvini et al., 2018, pp. 257-266; Vehmas et al., 2018).

Additionally to environmental issues, the literature also discusses problem associated with internal energy safety and risk associated with changes in the energy policy (Matsumoto et al., 2018, pp. 1737-1748). It must be emphasized that decisions regarding transformation of the existing energy supply structure have long-term consequences and require significant infrastructural changes that are associated with high investment expenditure. This strand includes publications related to individual national energy balances and methods of their development, which constitute peculiar case studies of particular energy policies.

Moreover, there are many publications regarding relations between economic development and energy policy (Chen et al., 2018, pp. 94-105; Shahbaz et al., 2018, pp. 282-301), including issues associated with functioning of organized energy markets (Lee et al., 2018, pp. 218-232; Vriesb, 2019, pp. 264-276) and planning of national energy needs.

The Polish source literature focuses on issues related to use of coal as an energy source due to its long-term domination in the energy balance. In the past and currently, there were and are numerous publications regarding scenarios of development of the Polish energy industry. The majority of them treat coal as the leading energy source due to its availability, amount, and social and political support for coal mining. Currently, the government also prepares a new energy policy (assumptions of the existing policy of the Polish energy industry until 2030 are largely obsolete) until 2050, which, however, does not assume complete abandonment of coal, but merely a slow reduction of the share of this resource in the energy balance.

Meanwhile, the environmental policy of the European Union is explicit, and one of its key objectives is the elimination of coal from energy balances in the European Union and in the countries that aspire to enter the community. The decarbonization in the European Union was started by the so-called Climate package of 2008, which assumes, for example, the following: (1) reduction of emission of greenhouse gases by 20%, (2) increase of energy efficiency by 20%, (3) as well as achieving 20% of the share of energy generated using renewable energy sources. In 2014, the aforementioned limits were increased to, respectively: 40%, 27% and 27%, and 2030

was set as the deadline for their implementation. Until 2050, the European Union plans further, radical reduction of emission of greenhouse gases, ultimately by 80%. In all indicated assumptions, 1990 is the point of reference to the level of reduction (Michalak & Dziugiewicz, 2018, pp. 237-240).

Research methodology

The point of reference for changes in climatic packages is the year 1990, and this is the year that marks the beginning of the analyzes conducted in this article. The studies were carried out in the following stages:

1. Analysis of consumption of coal for power supply objectives based on energy consumption in Europe (analysis of trends, indicators of dynamics).
2. Identification of potential opportunities for transformation of energy balances of significant share of bituminous coal (scenarios method).
3. Determination of practical paths of transformation of the energy balance in Poland.
4. Indication of economic consequences of selection of specific options of transformation of energy balances and recommendations aimed at their compliance with current environmental conditions.

Results

Coal consumption in Europe in the context of energy needs

The first stage compares consumption of energy and coal as an energy source in Europe in the years 1990-2017. Results including appropriate functions of the trend are presented in figure 1.

In turn, coal consumption in Europe in the entire analyzed period is reflected by a well-adjusted linear downwards trend ($R^2=0.7797$), which shows efficiency of the anti-coal policy and gradual resignation from use of this raw material for power supply purposes. It is worth mentioning that energy consumption in Europe increased by over 6% and coal consumption decreased by nearly 40% within the studied period of 28 years.

Identification of potential scenarios of transformation of energy balances with significant share of coal

Countries which use coal for energy and heat generation purposes to a large extent – as Poland – may potentially choose three scenarios of energy balance transformation:

- I. replacing coal with other non-renewable resources:
 - a) oil,
 - b) gas.
- II. replacing coal with nuclear energy,
- III. replacing coal with renewable resources:
 - a) water energy,
 - b) wind energy,
 - c) solar energy,
 - d) geothermal energy,
 - e) biomass and other.

The common feature of all mentioned scenarios is reduction of carbon dioxide emissions, as even in a situation when coal is substituted with another non-renewable energy source the level of emission will still be lower. The first scenario is relatively the easiest one to implement due to the availability of remaining non-renewable resources (including both those possible to be extracted and purchased), commonness of their usage and the possibility to use existing power supply infrastructure and already developed technological solutions.

Replacing coal with nuclear energy is a significantly more complicated venture due to two key factors. Construction of a nuclear plant is costly, time-consuming, and is not easily accepted socially and ecologically.

Undoubtedly, the best solution, from the point of view of current European climatic conditions, is the third scenario, in which coal is substituted with renewable energy sources. Nevertheless, its implementation largely depends on availability and sufficiency of those sources. That is due to the fact that the use of solar, water or geothermal energy is restricted in certain regions due to existing and fixed geographical conditions. Use of those sources also requires creation of new power supply infrastructure, which in turn demands additional capital expenditure and causes social and ecological disputes (for example in case of construction of wind farms or water power plants).

Moreover, each of the aforementioned scenarios must take into account the question of energy security, that is the possibility of becoming independent from supply of energy sources or energy from the outside to a maximum extent possible, which significantly complicates selection of a

specific scenario of transformation of energy balance, since it constitutes an additional decision criterion. It should also be emphasized that, regardless of the selected scenario, significant changes in energy balance are highly time-consuming and require transformation of the entire energy and economic infrastructure, therefore, the effects of their use are visible only after several or several dozen years. Having regard to the above, the energy policy must be thoroughly thought through and planned, since its change and/or modification of the effects of its implementation will not be possible in a short term.

Identification of actual scenarios of transformation of the energy balance in Poland

This subsection identifies actual directions of transformation of energy balances in Poland. Tables 1 presents the structure of its energy balance in five-year intervals in the period from 1990 until 2015, and additionally in 2017 as the last year of the analysis.

In Poland, the starting share of coal was the highest among European countries. Until 2017, the share decreased from 75.40% to 47.93%, nevertheless, it remains the leading energy source. It was mainly complemented by oil and gas, the share of which in meeting the energy demand was systematically increasing in the analyzed period. Also, the share of renewable sources has been constantly increasing, which included mainly wind energy and energy generated from biomass, however, the increase was slow and allowed for achieving the total share of renewable sources in energy generation at the level of 4.70% in 2017. In view of the above, Poland implements scenario I in variants a and b. Whereby, due to the fact that it does not extract oil and is able to meet merely about 23-25% of its current demand for gas on its own, its energy security decreases.

Conclusions

On the basis of the results of conducted studies, we may state that the use of coal as an energy source systematically decreases in Europe due to anti-coal policy of the European Union. Nevertheless, the countries that consumed and consume the largest amounts of this resource include: Czech Republic, Germany, France, Poland, Turkey, Spain, and the United Kingdom.

In case of Poland, the starting share of non-renewable sources was the highest, and its decrease was the lowest in the analyzed period. Also the

share of renewable energy sources is the lowest. This means that Poland is the least efficient in implementation of the climate objectives, despite the fact that the use of coal in the Polish economy systematically decreases. It should also be noted that the lack of oil deposits and limited possibilities in terms of obtaining gas reduce Polish energy security.

Having regard to the above results and current environmental conditions, in the future we should focus on diversification of energy sources and on increasing the share of renewable sources in energy balances, and at the same time by optimizing energy security. Potential capabilities in this scope should be subject to further detailed studies and strategic considerations.

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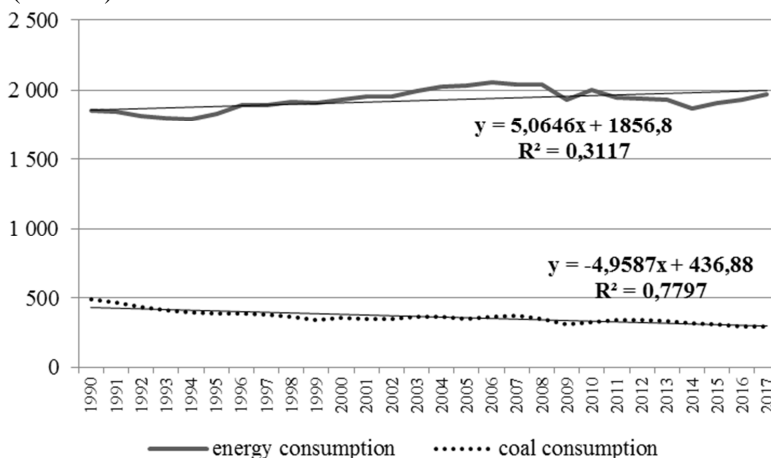
Annex

Table 1. Share of particular energy sources in the balance of Poland in the years 1990-2017 [in %]

Energy source	1990	1995	2000	2005	2010	2015	2017
Oil	15.68%	16.28%	23.66%	25.27%	28.10%	28.09%	31.15%
Gas	8.59%	9.44%	11.39%	13.33%	13.71%	15.39%	16.21%
Coal	75.40%	73.81%	64.31%	60.05%	54.10%	50.96%	47.93%
Nuclear energy	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Hydroelectricity	0.31%	0.45%	0.54%	0.54%	0.65%	0.43%	0.57%
Solar energy	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.04%
Wind energy	0.00%	0.00%	0.04%	0.44%	2.04%	2.75%	2.73%
Geothermal, biomass and other	0.01%	0.02%	0.06%	0.37%	1.40%	2.35%	1.36%
Total	100%	100%	100%	100%	100%	100%	100%

Source: own study based on BP Statistical Review of World Energy 2017.

Figure 1. Consumption of energy and coal as an energy source in Europe in 1990-2017 (in Mtoe)



Source: own calculations based on BP Statistical Review of World Energy 2017.

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Sectoral prices changes after euro adoption – the case of CEE Countries

JEL Classification: *E31; F31; F45*

Keywords: *Euro area; New Member States; Inflation; Euro adoption*

Abstract

Research background: Five from ten former transition countries from Central and Eastern Europe (CEE) acceded to euro area. Based on the theory, the introduction of the single currency causes a decrease in transaction costs, which in effect gives a drop in consumer prices. But there is a common perception that the introduction of the single currency is conducive to excessive price increases with this providing a sufficient justification against the introduction of the euro. People subjectively estimate information on a certain economic phenomenon, and that estimation not necessarily corresponds to facts. The discrepancy between perceived inflation and its actual level in the new euro area member states may result from different inflations levels of varying consumption categories.

Purpose of the article: The aim of the presented research is to assess the impact of the introduction of the single currency (euro) on the inflation rate in a breakdown by COICOP category in 5 countries of Central and Eastern Europe, which in the years 2007-2015 adopted the common EU currency.

Methods: The research was carried out using the comparative method. The inflation indicators were used in 12 categories of classification of individual consumption by purpose (COICOP). The research was conducted in medium-term perspectives: in the five years before the adoption of the euro and after the five years of it.

Findings & Value added: After the adoption of the euro, prices of services grew faster than the general indicator of inflation, except of Estonia. The inflation of industrial goods was lower than the overall index, and often it was even a fall in the level of prices of these goods. In all investigated Central and Eastern Europa countries the medium-term HICP inflation is lower after euro adoption than before.

Introduction

Although the overall actual price effect of the cash changeover was very small in most euro area countries, inflation perceptions increased notably after the changeover as there was a widespread feeling among the public that the euro had brought about significant price hikes (Ehrmann, 2010, pp.33-58). Among the 10 EU Member States that geographically belong to Central and Eastern Europe – half have joined the Euro. Slovenia joined the eurozone on 1 January 2007, Slovakia on 1 January 2009. Estonia on 1 January 2011, Latvia on 1 January 2014 and Lithuania on 1 January 2015. Public opinion and some researchers afraid (Hüfner & Koske, 2008, p.5) that adopting the euro as a new currency will also give rise to more medium-term effects on prices, notably for a countries with a lower income level than the euro area average like Central and Eastern Europe EU-members. A contrary, another authors (see Merikull & Room, 2015, pp. 825-826) point up that the main factors that contributed to higher inflation in Central and Eastern Europe countries were price convergence and high growth rates fed by strong capital inflows. There is no reason to believe that the change in the currency regime had any inflationary effect. Countries of Central and Eastern Europe are similar to Poland in terms of the level of economic development and time of introducing a market economy. Above mentioned countries at the same time became members of the European Union. Therefore, there is some possibility that the changes that have occurred in these countries after the introduction of the single currency may also be revealed in other Central and Eastern European countries, which didn't adopt the single euro currency yet.

As a result of the conversion of the national currency into the euro, there is no increase in the money supply in circulation and the purchasing power of the society is not growing. The change of the national currency into the euro is nominal, and thus does not trigger significant economic stimulants of short-term price growth in this way. Therefore, there are no rational premises that could, based on economic considerations, explain the possible process of immediate price growth as a consequence of the adoption of the euro's common currency (Heller et al. 2019, Folkertsma et al. 2002, p. 9). The impact of the changeover on the aggregate price level is negligible, but at a lower level of aggregation an effect on prices is noticeable. Prices in some sectors increased significantly in some countries, but there are also countries where the impact appears absent. People perceived the euro changeover to have had a profound impact on prices. This phenomenon is sometimes considered something policy makers cannot do much about. Eife (2006, pp. 1-30) argue that, this is actually caused by the inexperience

of the authorities to cope with such a phenomenon. As with the actual impact, the perceived impact can be avoided with good economic policy. Countries joining in later may use the experience of other countries and, thanks to the appropriate policy, avoid the unfavorable phenomena associated with the adoption of the euro.

The discrepancy between perceived inflation and its actual level in the new euro area member states may also result from the experience of countries in which – as a result of the price rounding effects – there was an increase in the prices of some consumer goods. The aim of the presented research is to assess the impact of the introduction of the single currency (euro) on the inflation rate in a breakdown by COICOP category in 5 countries of Central and Eastern Europe, which in the years 2007-2015 adopted the common EU currency. In other words, the purpose is to indicate which sector, industrial goods or services is characterized by the highest price increase after the euro changeover.

The main method is comparative analysis. The inflation level of services and industrial goods are compared to the total inflation index in the five countries studied (Slovenia, Slovakia, Estonia, Latvia and Lithuania) over the medium term, i.e. 5 years before and 5 years after the adoption of the euro.

Research methodology

The main method is comparative analysis. Examined countries adopted euro in different years (Slovenia - 2007, Slovakia - 2009, Estonia - 2011, Latvia - 2014 and Lithuania - 2015). Research in identical calendar years has not been possible. Each of the five countries surveyed, adopted a common currency in a different period. The research covered each time in the five years before the adoption of the euro and after the five years of it. In this way, a comparable phase of adoption of the euro by particular countries was achieved, but at the same time different price factors affected on price growth, which – depending on the study year – could shape inflation differently.

Hypothesis: In the Central and Eastern European countries, after euro changeover, prices are rising faster in the services sector and falling in the industrial goods sector.

The data source is European Statistical Office Eurostat. The Harmonised Index of Consumer Prices (HICP) gives comparable measures of inflation for the countries and country groups for which it is produced. It is an economic indicator that measures the change over time of the prices of con-

sumer goods and services acquired by households. In other words, it is a set of consumer price indices (CPI) calculated according to a harmonised approach and a set of definitions as laid down in regulations and recommendations. In addition, the HICP provides the official measure of consumer price inflation in the euro area for the purposes of monetary policy and the assessment of inflation convergence as required under the Maastricht criteria for accession to the euro. The HICP components are currently classified according to the ECOICOP (European Classification of individual consumption by purpose).

Main ECOICOP headings are:

00. All-items (total or all-items index)
01. Food and non-alcoholic beverages
02. Alcoholic beverages and tobacco
03. Clothing and footwear
04. Housing, water, electricity, gas and other fuels
05. Furnishings, Household equipment and routine maintenance of the house
06. Health
07. Transport
08. Communication
09. Recreation and culture
10. Education
11. Restaurants and hotels
12. Miscellaneous goods and services

Additionally, Eurostat produces special aggregates that are derived from the hierarchically classified indices. This study uses two of them: services and industrial goods. When the price level in a category increased more than the general index, it could have affected the public perception that the changeover has led to general price increases.

Results

Slovenia was the first post-transition country which adopted euro. Before the adoption of the euro, at the beginning of the period under consideration, the inflation rate was relatively high. In first and second year after the changeover the inflation rate was higher than inflation target of the European Central Bank (table 1). In the third year (2009) the inflation rate dropped to 0.8%, in subsequent years it has stabilized at a level slightly above the inflation target. Services sector inflation was higher than overall inflation indicator, only in the second year after the change the euro reached a level

close to the general indicator. Next services sector inflation dropped, in the fourth and fifth year was below the general inflation index. The inflation rate of industrial goods was slower (even deflation appeared), except for the fourth and fifth year after the adoption of the euro. But in fourth and fifth years after euro changeover the increase in industrial goods prices accelerated. The average HICP inflation rate over 5 years before the adoption of the euro is 4.3%, and the average of 5 years after the adoption of the euro 2.9%.

In Slovakia, inflation rates of services were higher than all-items inflation and industrial goods inflation. Except the third year before and third year after euro adoption (see table 2). Deflation of industrial goods is observed within two years after joining the euro area. The overall average HICP inflation rate over 5 years before the euro adoption is 4.1%, and the average of 5 years after the adoption of the euro 2.2%.

A Estonian government took a number of initiatives to ensure price transparency after the changeover and to minimize the inflationary effects. There were no changes in value-added tax (VAT) rates and alcohol excise taxes, but the excise tax on tobacco was increased in January 2011 (Merikull & Room 2015, p.825). In first year (2011) general inflation rate increased from 2.7% to 5.1% (see table 3). Inflation of industrial goods was higher than inflation of services from year 2010 till 2013. After this period deflation of industrial goods prices is observed. Before 2010 prices of services grew more rapidly than industrial goods prices. Medium-term average all-item HICP inflation rate dropped from 4.9% (average over 5 years before euro changeover) to 2.6% (average over 5 years after euro adoption).

Latvia joined euro area in 2014. One year before and three years after euro adoption the prices of industrial goods decreased, what means deflation (see table 4). The prices of services dropped only in 2010, in very deep crisis times. The last two years inflations of services is a slightly higher than industrial goods inflation. But in the 5-years period before euro changeover, there is no trend in which the sector prices rise faster. The average over 5 years before the adoption of the euro HICP inflation rate is 1.7%, the average HICP inflation rate over the 5 years after the adoption of the euro fell to 1.3%.

In case of Lithuania trend is clear. A few years before euro adoption prices of services increased slower than industrial goods and overall inflation index (table 5). Similar to Latvia, during the crises in 2010 was noticed a deflation in services sector (-1.5%). But from two years before accession to euro area, prices of services increase relative rapidly. There was a deflation in sector of industrial goods for three years, the deepest one(-3.2%) in the first year after euro changeover. The average HICP inflation rate over

the 5 years before the euro changeover is 2.0%, the average HICP inflation rate over the 4 years after the euro adoption fell to 1.6%.

A general belief in the public that the changeover has increased prices dramatically is not true. Prices increases have been concentrated in few sectors, but in another sectors prices have been declined. In all investigated Central and Eastern Europa countries the medium-term HICP inflation is lower after euro adoption than before.

Conclusions

The effects on prices growth are observed only two year after euro adoption, in the third year disappears. In all investigated Central and Eastern Europa countries the medium-term HICP inflation is lower after euro adoption than before. But the prices of services rose rapidly then overall index in medium term before euro changeover. The hypothesis is confirm.

The results achieved for the countries of Central and Eastern Europe are similar to those observed in the countries that were the first to adopt the euro. Several contributions (Ercolani&Dutta 2007, Folkertsma et al. 2002, Hobijn et al., 2006, pp.1103-1131, Gaiotti & Lippi, 2008, pp. 71-107) point out that there have been noticeable price increases in some sectors, particularly the service sector.

This research basis on only two sectors. In-depth studies should be based on more detailed data. Data for this more detailed level of the ECOICOP are available for most EU Member States. Fear of excessive price increases is a widely accepted argument against the adoption of the single currency, also in Poland and other Central and Eastern Europe countries. If it basis only on discrepancy between perceived inflation and actual inflation, then the causes of this phenomenon should be searched for and actions should be taken to minimize or completely eliminate its.

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Annex

Table 1. Slovenia inflation – annual average rate of change

	Year before euro adoption					Year after euro adoption				
	5th	4th	3rd	2nd	1st	1st	2nd	3rd	4th	5th
All-items HICP	7.5	5.6	3.7	2.4	2.5	3.8	5.5	0.8	2.1	2.1
Services	9.9	7.1	5.8	3.3	3.5	4.9	5.3	3.2	1.1	0.0
Industrial goods	5.1	4.4	3.3	3.2	1.8	1.2	4.4	-1.5	2.7	2.3

Source: Eurostat.

Table 2. Slovakia inflation – annual average rate of change

	Year before euro adoption					Year after euro adoption				
	5th	4th	3rd	2nd	1st	1st	2nd	3rd	4th	5th
All-items HICP	7.5	2.8	4.3	1.9	3.9	0.9	0.7	4.1	3.7	1.5
Services	10.0	5.3	3.5	2.9	4.8	4.4	1.9	3.5	3.9	2.0
Industrial goods	6.9	3.1	6.0	-0.1	2.0	-0.7	-1.3	3.7	3.4	0.1

Source: Eurostat.

Table 3. Estonia inflation – annual average rate of change

	Year before euro adoption					Year after euro adoption				
	5th	4th	3rd	2nd	1st	1st	2nd	3rd	4th	5th
All-items HICP	4.4	6.7	10.6	0.2	2.7	5.1	4.2	3.2	0.5	0.1
Services	5.2	9.6	10.1	1.3	0.2	3.2	3.4	2.3	2.1	1.9
Industrial goods	3.9	4.0	8.3	-0.7	4.1	3.9	5.0	3.0	-1.3	-2.3

Source: Eurostat.

Table 4. Latvia inflation – annual average rate of change

	Year before euro adoption					Year after euro adoption				
	5th	4th	3rd	2nd	1st	1st	2nd	3rd	4th	5th
All-items HICP	3.3	-1.2	4.2	2.3	0.0	0.7	0.2	0.1	2.9	2.6
Services	4.7	-4.5	0.5	1.7	0.3	2.8	2.3	1.8	3.0	3.2
Industrial goods	1.2	-0.2	4.6	2.6	-1.3	-0.6	-0.9	-2.4	1.5	2.8

Source: Eurostat.

Table 5. Lithuania inflation – annual average rate of change

	Year before euro adoption					Year after euro adoption				
	5th	4th	3rd	2nd	1st	1st	2nd	3rd	4th	5th
All-items HICP	1.2	4.1	3.2	1.2	0.2	-0.7	0.7	3.7	2.5	x
Services	-1.5	1.3	2.9	1.9	1.6	3.4	3.2	5.1	4.1	x
Industrial goods	1.7	4.0	3.3	0.1	-1.5	-3.2	-1.5	1.7	1.8	x

Source: Eurostat.

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Financial result of transport companies and its relation to exchange rates

JEL Classification: *R40; C58; F31*

Keywords: *correlation; exchange rate; financial result; transport company*

Abstract

Research background: Transport has a key meaning for the development and functioning of the industry, it is said to be its barometer. The development of the transport infrastructure (bridges, land, sea, rail roads, seaports, airports, logistics centers, terminals, border crossings etc.) is a necessary condition of the economy's efficient functioning. Wider, more modern understanding of this issue should cover entities dealing in transport, logistics or forwarding. The microeconomic approach to transport is determined by transport companies. Transport companies are a very important economic link. Many factors affect their economic condition, one of them being the exchange rate.

Purpose of the article: The purpose of the article is to show the importance of transport enterprises for the economy. The dynamics of their development will be shown from the point of view of the increase in financial results. The article will show the relationship between exchange rates and financial results of Polish transport enterprises. The expected research period will cover the years 2010-2017.

Methods: The first stage of research, based on the method of analysis and criticism of the literature, will be prepared in the area of the subject taken, including relations between the main concepts. This stage is auxiliary and constitutes a starting point for further research. Article will apply the data of National Polish Bank and the Statistical Office.

Findings & Value added: Analyzes and research will confirm the great importance of transport companies. The dynamics of their growth will be shown. The relationship between the financial result and exchange rates will be drawn clearly.

Introduction

Transportation plays a broad role in shaping economies. Transportation supports clusters and agglomerations, increases productivity, enhances jobs and labour market accessibility, opens new markets for businesses and enhances supply chain efficiency (see Rodrigue et al., 2017). The concept of transport is very wide and can be considered with many areas of the economy. The basic goal of transport is handling transport needs generated by the economy and the society. The following elaboration focuses on the connection of financial aspects of transport enterprise functioning with changeable retrenchment of macroeconomics. The following elaboration focuses on the supply side of the transport market, i.e. transport companies.

Unstable, changeable conditions of the outside surrounding create the frames of transport enterprises functioning, serving the transport needs of the society. A vigorous transport industry determines the further economic development in Poland. It is crucial to analyse the financial condition of companies providing transport services. The financial result, revenues and costs in view of the high degree of internationalization of the industry are mostly dependent on exchange rates. This dependence is twofold: direct and indirect. The direct impact of the exchange rate results from the costs (see Krawczyk, 2016, pp. 102-110) born in both domestic and foreign currencies. The indirect impact results from the general dependence of the economic situation, in particular the volume of export and import on the level of currency prices.

The goal of this elaboration is to present the financial result of transport sector enterprises broken down into revenues and costs. The financial result will also be separated for entities employing more than 49 people. The gross turnover profitability will be presented. The exchange rates fluctuations will be shown during the considered period. In the research part of this study, the change dynamics of the presented indicators will be calculated. Further considerations will be directed towards the relationship between financial results and exchange rates. The usefulness of Pearson's coefficient as a research tool for the correlation of the presented data will be verified. Research hypotheses for further research will be formulated.

The initial stage of the study begins with the critical analysis of the literature and industry reports. A review of the writing likewise references to

observation of business practice, own experiences and thoughts grants to create a theoretical basis for the study of numerical data with the assistance of statistical methods. Article will be divided into following sections: introduction, research methodology, results, conclusions.

Research methodology

The quantitative methods are used to analyse the data. The study is based on historical data to identify the relationship of defined variables. The study uses statistical data published by Statistics Poland (GUS – Główny Urząd Statystyczny) and National Polish Bank (NBP – Narodowy Bank Polski). Publications developed by these institutions are highly reliable, and thus the collected research material is credible. Information concerning the financial results of enterprises from the transport sector will be selected from the annual Statistic Poland reports - "Transport - activity results" in the analysed years 2010-2017. The second part of the analysed dependence - the average annual exchange rates will be calculated on the basis of archival data collected by the National Bank of Poland.

The presented data include activity results of economic entities which run (GUS):

- an activity connected with the provision of goods or passenger transport, scheduled or non-scheduled, by rail, pipelines, road, water or air,
- a supportive activity, such as e.g.: handling of goods, storing, maintenance, and small repairs of means of transport other than road motor vehicles, port and parking services,
- renting transport equipment with a driver or operator.

The analysed elements will be:

- revenues from the sale of services include receipts from: transport of goods, passengers, luggage and mail, as well as receipts from handling of goods, freight, storage and warehousing of goods and other services connected with transport supporting activities, as well as revenues from the activities of travel agencies, tour operators and tour guides;
- costs of obtaining revenues from total activity include: prime costs of products, goods and materials sold, connected with the main operating activity, which includes the value of sold goods and materials, as well as the total costs decreased by the cost generating benefits for the needs of the entity and corrected by the change in product inventories, other operating costs, financial costs;

- the gross financial result (profit or loss) – represents the difference between net income gained from the sale of products, goods and materials and costs bore for their obtaining, corrected by the balance of extraordinary profits and losses;
- the profitability rate of gross turnover constitutes the relation of gross financial result to revenues from total activity, expressed in percent.

Correlation examines the relationships between pairs of variables. Pearson product-moment correlation coefficient is widely used in economics, social sciences, medicine, etc., as a measure of linear relationship between two variable X and Y. The mathematical formula for this coefficient developed by Pearson in 1895 is:

$$r_{XY} = \frac{C(X, Y)}{\sqrt{S_X^2 \cdot S_Y^2}} = \frac{\sum_{i=1}^n (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^n (x_i - \bar{x})^2 \cdot \sum_{i=1}^n (y_i - \bar{y})^2}} = \frac{C(X, Y)}{S_X \cdot S_Y}$$

where:

C(X, Y) – covariance between features X i Y,

S_X^2 covariance features X,

S_Y^2 covariance features Y,

S_X standard deviation X,

S_Y standard deviation Y.

The Pearson correlation coefficient, r, can take a range of values from +1 to -1. A value of 0 indicates that there is no association between the two variables. A value greater than 0 indicates a positive association; that is, as the value of one variable increases, so does the value of the other variable. A value less than 0 indicates a negative association; that is, as the value of one variable increases, the value of the other variable decreases. The dependency gradation varies according to different researchers. The following research will use (Stanisz 1998):

- $|r|=0$ no correlation
- $0,0<|r|\leq 0,1$ – faint correlation
- $0,1<|r|\leq 0,3$ - weak correlation
- $0,3<|r|\leq 0,5$ - average correlation
- $0,5<|r|\leq 0,7$ – high correlation
- $0,7<|r|\leq 0,9$ – very high correlation
- $0,9<|r|<1,0$ – almost full correlation
- $|r|=1$ - full correlation

For each case we must check if the interpretation is in line with the particularities of data and the used model. Importantly, we have to be constantly aware of the limitation of any financial model. Correlations may be interpreted as strong, weak and negative. This type of rendering is arbitrary and we can not treat it too closely. Moreover, Pearson's coefficient is very sensitive to outliers (extreme). If we have even one of such outliers it can influence our results in a very negative way. No financial model will ever be able to replicate complex economic reality perfectly. However, this does not mean models are useless.

Results

The financial reality is extremely complex, with thousands of entities, who may behave irrationally and numerous markets such as equity, fixed income, commodities, foreign exchange, real estate, and more, which are correlated. The study analyses the selected area, which is the result of the activities of Polish enterprises in the transport industry. It makes an attempt to provide a numerical proof of the relationship between the financial result and selected exchange rates.

First, it is worth presenting a numerical exemplification of the growing importance of the transport industry in the Polish economy. GUS data show that the transport industry employed almost 600,000 people. Transport currently produces 5.8% of the total GDP of Poland, being the third most important branch of the economy: after industry and trade, and before construction. The share of transport in generating GDP in Poland is at a much higher level than in most European countries. The average for the whole Union is just over 2%, and in large developed countries, such as Germany or France, is on average below 2% of GDP. It clearly shows that transport has much more significance for the Polish economy than in other European Union countries. In quantitative terms, Polish transport companies begins to dominate in transport (for example: Eurostat data indicate that the share of Polish transport companies in this market segment in 2016 was 30.6%, when in 2010 it came to 24.7%).

By analyzing the results of transport enterprises (see Table 2) the clear increase is visible, in 2010 it was more than 8 147 mil zlotych and in 2017 it was 26 650 mln zlotych. This situation presents more than threefold growth over 8 years. The growth rate was the highest in 2011/2012 and approached to over 800%. In the observed years 2010-2017 there were also declines in the profitability of the industry, the largest in 2011 when the benefits from conducting this activity decreased by 84.16% for all entities

of the transport sector (see Table 3). The downfall in profitability will not affect larger entities employing more than 49 people. Despite temporary declines in income, the turnover in the industry is steadily growing. The highest dynamics was recorded in revenues and costs in 2012 (revenues increased by 20.06%, costs by 13.26%). Gross turnover profitability rate - being the ratio of gross financial result to revenues also increased from the level of 2.4% in 2010 to 5.0% in 2017. The growth rate of profitability was the high-est in 2015 and amounted to 46.67%.

The exchange rate of the Polish currency varies, which can be seen in table 1. The highest difference in relation to the zloty is the British pound, its average exchange rate ranged from the lowest - 4.6587 in 2010 to 5.7675 in 2015, so that in the subsequent years after the referendum decision to leave the European Union by the British fell to 4.8595. The smallest fluctuation in the zloty is in relation to the Euro, the lowest level of this exchange rate was 3.9939 in 2010, the highest in 4.3637 in 2016.

Writing and statistic data analysys show a large meaning of transport enterprises in the industry. This sector is developing in Poland very dynamically. One of the main factor that forms the level of financial result of transport industry and mainly those with a high level of internationalization are exchange rates. It is legitimate to lead further researches of these two areas. The first step of the analisis will be to formulate a hypothesis if there is a dependence between financial results of transport enterprises and exchange rates. This verification will be carried out using the Pearson correlation coefficient.

Conclusions

The importance of the transport industry (see Rodrigue et al., 2017, pp. 98-115) called by some the barometers of the economic condition is enormous. Transport takes on even more importance in combination with internationalization and globalization processes. Polish transport enterprises successfully undergone a period of economic transformation and at present they perform a significant role in the area of European Union. In the audited period, their financial results increased, from PLN 8 147.1 million in 2010 to PLN 26 650 million in 2017 (Table 2). Profitability also increased, the gross turnover profitability indicator was 5.0% in 2017 as compared to 2.4% in 2010.

It must be said that the fluctuations of zloty have a remarkable impact on the economy from the macroeconomic point of view and they also affect individual entities, including the transport sector. Conducted analyses allow

to formulate a research hypothesis for further research. Is there a relationship between the financial results of transport companies and exchange rates? The study may be deepened by the following questions:

- Is the dependence conditioned by the size of the enterprise?
- The dependence of which of the exchange rate in the analysed period was the strongest and which was the weakest?
- The relation of which of the elements of the financial result (revenues, costs) is the largest?

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Annex

Table 1. Average annual exchange rate of foreign currencies: USD/PLN, EUR/PLN, GBP/PLN, CHF/PLN; period 2010-2017

	2010	2011	2012	2013	2014	2015	2016	2017
USD/PLN	3,0179	2,9636	3,2581	3,1615	3,1537	3,7730	3,9435	3,7782
EUR/PLN	3,9939	4,1190	4,1852	4,1976	4,1845	4,1843	4,3637	4,2583
GBP/PLN	4,6587	4,7463	5,1605	4,9426	5,1919	5,7675	5,3405	4,8595
CHF/PLN	2,8983	3,3474	3,4724	3,4101	3,4453	3,9228	4,0027	3,8364

Source: Archiwum kursów średnich - tabele A, 2010-2017, <https://www.nbp.pl/home.aspx?=/ascx/archa.ascx> (03.12.2018)

Table 2. Financial result of the transport industry, selected elements 2010-2017

	2010	2011	2012	2013	2014	2015	2016	2017
Revenues from total activity, million PLN	1415	1504	1806	1857	1957	2034	2285	2502
Costs of obtaining revenues from total activity, million PLN	80,1	99,2	96,8	40,4	70,9	42,4	30,8	29,2
Financial result, million PLN	8147	1290	1169	9949	9851	1121	1838	2665
Financial result, million PLN*	,1	,5	6,5	,8	,9	4	6,8	0
Gross turnover profitability indicator, %*	2,4	2,5	2,5	3,1	3,0	4,4	4,6	5,0

* data for entities employing more than 49 people

Source: Transport – wyniki działalności 2010-2017, <http://stat.gov.pl/obszary-tematyczne/transport-i-laczynosc> (03.12.2018).

Table 3. Multi-base dynamics of selected elements of the financial result in the years 2010-2017 (in %)

	2010 /11	2011 /12	2012 /13	2013 /14	2014 /15	2015 /16	2016 /17
Revenues from total activity, million PLN	6,3	20,06	2,7	5,4	3,9	12,33	9,49
Costs of obtaining revenues from total activity, million PLN	11,82	13,26	4,02	5,76	3,39	9,32	6,39
Financial result, million PLN	-84,16	806,35	-14,93	-0,98	13,83	63,96	44,94
Financial result, million PLN*	4,93	12,85	25,11	2,41	55,57	16,23	23,19
Gross turnover profitability indicator, %*	4,17	0,00	24,00	-3,23	46,67	4,55	8,70

*data for entities employing more than 49 people

Source: own calculations based on GUS (2010-2017).

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The use of public support in innovative activity of enterprises

JEL Classification: *H81; A14; B16*

Keywords: *public support, innovations, sources of financing*

Abstract

Research background: One of the major challenges faced by modern enterprises is implementation of innovative solutions involving a higher degree of risk and enhanced demand for capital. Unfortunately, insufficiency of resources, especially financial ones, diminishes considerably development opportunities and has a negative influence on enterprises' innovative activity. Confronted with low levels of own resources, enterprises are forced to search for other funding sources, for instance public support from the national or the EU budget.

Purpose of the article: The purpose of the article is to analyze the innovative activity of enterprises taking into account the use of public support for this purpose.

Methods: The first part of the article is based on an analysis of literature on the issues discussed. However, in the research part, based on statistical methods, data from the CSO studies from 2008-2016 were analyzed.

Findings & Value added: The use in innovative activities not only own financial resources, but also funds from external sources affects the implementation of innovation in enterprises. Public support is particularly important, often providing a significant incentive, and sometimes even a condition for implementing new solutions. The research results confirms the existence of relationship between public support and innovative activities, however, the level of correlation is influenced by the type and scope of the activity.

Introduction

The condition which must be fulfilled for enterprises to improve their competitive position is ensuring continuous growth, and this depends largely on innovation. Innovative activity enables enterprises to adapt themselves better to their environment and respond rapidly to the growing needs and expectations of customers. Investing in novelties, which is accompanied by a higher demand for capital, is one of the main challenges of enterprises operating in the changeable and competitive environment. Provision of adequate resources, in particular financial ones, plays an essential role in furthering the growth of economic entities. One of the tools stimulating innovative activity of enterprises while implementing innovative schemes is resorting to public support. The possibility to use public resources, frequently non-repayable ones, is an important stimulus for enterprises to resolve to implement innovative schemes. Taking into account that the level of innovativeness in case of Polish enterprises is low, it is vital to define the significance of public support in their innovation activity.

The aim of the study is to evaluate innovative activity of enterprises chosen with respect to the type and scope of their business, especially taking into consideration public support for innovations implemented in the years 2008-2016. This paper focuses on the dynamics of changes in the examined values in the course of time and then presents the relationship between the amount of public support and the extent of innovative activity of enterprises. The method employed to determine the interdependence between the examined variables will be the Pearson correlation coefficient.

At first critical analysis of the published sources and reports on the analyzed issues will be revealed and research methodology will be discussed. Next, the authors intend to conduct statistical analysis of the gathered data. In the last part there will be a summary presenting conclusions drawn with regard to the research. Article will be divided into following sections: introduction, literature review, research methodology, results, discussions, conclusions.

Research methodology

The quantitative methods are used to analyse the data. The study is based on historical data to identify the relationship of defined variables. The tools employed in the research are quantitative methods. Using historical data the authors attempt to identify the relationship of defined variables. They focus on statistical data published by the Central Statistical Office (CSO – GUS)

and the Office of Competition and Consumer Protection (OCCP - UOK). Both high usefulness and credibility are main qualities of the publications issued by these institutions. Information with regard to innovative activities undertaken by enterprises and public support for them comes from the annual reports released by GUS. The analyzed amounts take into account the size of the business (small, medium and large enterprises) and the scope of business (industrial and service enterprises). While the data on public support was taken from the UOKiK reports in the years 2008-2016.

In the first place the dynamics of innovative activity of enterprises and public support for such undertakings will be examined. While analyzing variability of the examined values in the course of time there will be applied most of all chain indexes, which will help to spot changes in values in the analyzed period in relation to a preceding year. Moreover, the change in the last year of the research will be examined and compared to the basic year, that is 2009. Then, allowing for the fact that economic processes frequently have an effect or depend on one another, what follows is an attempt to examine the relationship between the already analyzed values by means of the Pearson correlation coefficient. The mathematical formula for this coefficient developed by Pearson in 1895 is:

$$r_{xy} = \frac{C(X, Y)}{\sqrt{S_x^2 \cdot S_y^2}} = \frac{\sum_{i=1}^n (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^n (x_i - \bar{x})^2 \cdot \sum_{i=1}^n (y_i - \bar{y})^2}} = \frac{C(X, Y)}{S_x \cdot S_y}$$

where:

$C(X, Y)$ – covariance between features X i Y,

S_x^2 covariance features X,

S_y^2 covariance features Y,

S_x standard deviation X,

S_y standard deviation Y.

If $C(X, Y) = 0$, then the variables are not correlated, and if $C(X, Y) > 0$ or $C(X, Y) < 0$, the correlation is positive or negative respectively. The symbol for the Pearson's linear correlation coefficient provides information on the relationship direction of the examined variables, while the absolute value says a lot about its strength. The coefficient takes a range of values (-1, 1), and the closer the coefficient is to either -1 or 1, the stronger the association of the variables. (Białek & Depta 2010, p 53). In the published sources there are assumed various ranges of the coefficient absolute value to assess the relationship strength. The following ranges of absolute values can be assumed to evaluate the strength of dependence:

- $|r| = 0$ - no correlation
- $< |r| \leq 0,1$ – faint correlation
 - a. $< |r| \leq 0.3$ – weak correlation
 - b. $< |r| \leq 0.5$ – average correlation
- $0.5 < |r| \leq 0.7$ – high correlation
- $0.7 < |r| \leq 0.9$ – very high correlation
- $0.9 < |r| < 1.0$ – almost full correlation
- $|r| = 1$ – full correlation

First of all, we have to be aware of the limitation of any financial model. Though the correlation coefficient defines the relationship between two features, it gives no clues on whether one of the features is the source of the other. The process of correlation analysis distinguishes neither dependable nor undependable variable but treats them in the same way. Furthermore, one must remember that the correlation coefficient examines only linear relationships. Correlations can be described as strong, weak, positive and negative. However, such interpreting is arbitrary and should not be assumed as comprehensive. Besides, the Pearson's coefficient is very sensitive to outliers (extreme observations), which may considerably distort the obtained results. No financial model will ever be able to replicate complex economic reality perfectly. However, this does not mean models are useless.

Results

In the present day, innovation has become a key element of competitive advantage (Prokop & Stjeskal, 2017, p. 47). However, it has been stated repeatedly that the main barriers constraining innovative activity of the assessed enterprises include financial barriers (Zwolinska-Ligaj, Adamowicz M, 2018, p. 433). The insufficient level of the sources of financing drives enterprises to search for other opportunities, and among them public support for innovative activities from the state budgeted or local government entities and EU funds (Krawczyk-Sokołowska & Łukomska-Szarek, 2017, p. 50; Kokot-Stępień, 2016, pp. 50-58).

One of the public policy tools used to foster innovation is state aid, that is a transfer of state resources which constitutes an economic advantage that the undertaking would not have received in the normal course of business. The advantage is conferred on a selective basis and thereby affects competition and trade in the EU internal market (Kubera, 2016, p. 81). The

control over appropriate allocation of public resources and support intensity is a significant factor in securing effective competition and free trade on the internal market (Podsiadło, 2017, p. 67).

Public aid is a tool of economic policy, which, from the point of view of the protection of competition, is subject to a strict legal regime. On the one hand, these legal regulations constitute a strictly defined framework of using this instrument – controlling admissibility criteria, which must be met in case of public support, and on the other hand, they serve as the foundation of its application. The admissibility criteria concerning state aid in the European Union, including the rules pertaining to regional support for enterprises, have been presented in the work by Podsiadło (2016, pp. 771-781).

Each state aid interferes with the market mechanism. Therefore it is of vital importance to monitor every granted aid. Such monitoring will help to observe what main directions this type of support follows, as well as changes in the allocation of support in different years.

The fact that so far there have been no publications covering the impact of particular funding sources on the scope of innovative activity undertaken by enterprises, especially with regard to public support, was the reason of carrying out the research on the relationship between the volume of support from the national and the EU budget and the value of expenditure on innovation.

In the first place, the authors provide more insight into the scope of innovative activity of enterprises in Poland in terms of public resources, which are a noteworthy supplementation of own resources constituting the main financing source of innovation. In the examined period (2008-2016), the lowest value of expenditure on innovations was reported in 2009 (PLN 30912.2 million) and the highest one in 2015 (PLN 43735.1 million). The highest growth rate was reported in 2015 and 2012 (the expenditure increased by 16 and 15 % respectively, as compared with the preceding year). However, taking into account the first and the last year of the analyzed period, its growth was inconsiderable, as the expenditure increased merely by 3% (from PLN 37948.4 million in 2008 to PLN 39010.9 million in 2016). As far as the business size is concerned, the major group in this field is large enterprises having the widest access to all sorts of resources and highest propensity to take risk always accompanying innovative undertakings (the share of expenditures in case of large companies ranged from 67% in 2013 to 79% in the last year of the analyzed period).

The prevalent source of financing expenditures on innovations is enterprises' own funds, which is often due to limited access to external means of financing, mostly bank loans and the high cost of their acquisition. An im-

portant instrument to supplement own financial resources is public support for innovative activity. In the years 2008-2014 public support for innovations grew regularly, while in 2015 this trend reversed, with a slight initial decline by 3%, but during the last year of the examined period this type of funding dropped completely, by as much as 71%. Taking into account the first and the last year of the examined period one can notice that the volume of public support increased by 56%, as its value grew from PLN 922 million to PLN 1437.2 million. Undoubtedly, this was due to the completion of numerous undertakings co-financed by the EU budget under the Multi-annual Financial Framework for the years 2007-2013 and the launch of the new one, which many support programmes connected with the growth of innovation in enterprises were not fully set in motion. Industrial enterprises were the greatest beneficiaries of public resources coming from the government and the EU budget. Enterprises providing services benefited from public resources to a lesser extent because of lower spending on less costly innovations connected with marketing. Although one may notice the highest value of public support in case of large enterprises in some years, their share is inconsiderable, at times even faint after having studied the amounts of expenditures on innovations implemented with the use of resources of this type. Therefore, the use of public resources had the most powerful effect on innovative activities of enterprises from the sector of SME

Further analysis focuses on determining the relationship between public support and innovative activity of enterprises. The phase preceding the analysis of correlation is formulating hypotheses with respect to the existence of interdependence between the examined variables, verification of which will be carried out by means of the Pearson correlation coefficient.

The correlation results for all enterprises, confirmed substantial interdependence between the amount of the obtained support and the value of expenditure on innovations, which was the basis for the deepening of research is this correlation determined by the size and type of business.

Conclusions

Implementation of innovations requires substantial capital expenditures, the return of which can be expected only after a few years. Moreover, they involve a lot of risk, which makes for limited access to external funding sources. Financing innovative activities mainly by means of own resources is reflected in the amount of expenditure on innovation. State aid may be a perfect solution in case of insufficiency of own resources, since they provide public funding and thus, boost innovative activity of enterprises. Alt-

though public support serves to prompt enterprises to undertake specific schemes, it is necessary to provide a level playing field for all market participants and to this end this type of aid must be under control.

The possibility of obtaining public support has a positive effect on innovation activity, especially in case of small enterprises, which more than others need this type of aid to implement innovation projects. Their own resources are quite limited, and they face difficulties in gaining access to external funding sources. The existence of the relationship between public support and the amount of expenditures on innovations has been proved by the analysis in which the Pearson correlation coefficient was used.

The structure of financing innovative activities indicates that the dominant source is always the own funds of the enterprise. Public funding stimulates the innovative activity of enterprises, but does not significantly increase their innovation. It is therefore important to match the co-financing of projects in the field of implementing innovation to the state intervention mechanism and to create support programs promoting projects with high innovation potential.

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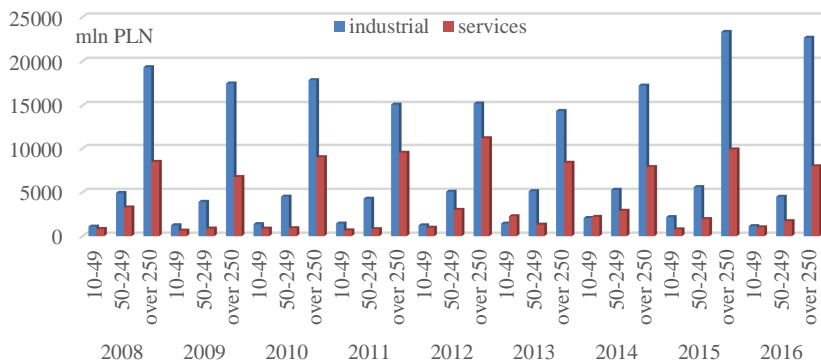
Annex

Table 1. Dynamics of expenditures on innovation and public support in the years 2008-2016 (in %)

	2009/ 2008	2010/ 2009	2011/ 2010	2012/ 2011	2013/ 2012	2014/ 2013	2015/ 2014	2016/ 2015
expenditures on innovation	81	112	92	115	90	114	116	89
public support	118	227	104	198	68	147	97	29

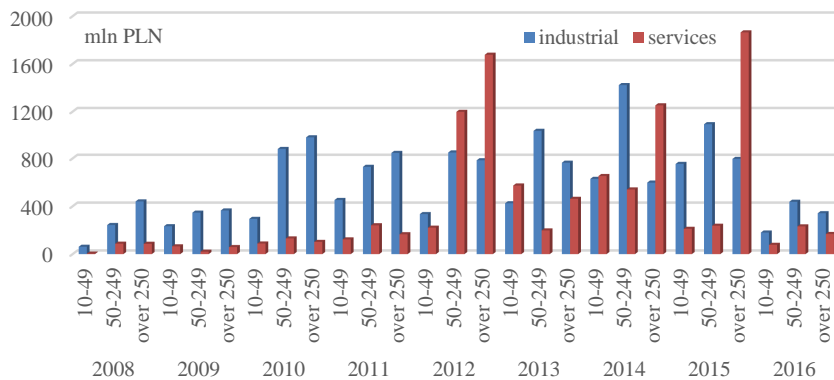
Source: Own calculations based on GUS (2008-2016).

Figure 1. Expenditures on innovation in Poland in the years 2008-2016



Source: The author's study based on <https://www.stat.gov.pl> (06.01.2018).

Figure 2. Public support for innovative activity in the years 2008-2016



Source: The author's study based on <https://www.stat.gov.pl> (06.01.2018).

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The dynamics of high technology sectors within global value chains

JEL Classification: *F19; M16*

Keywords: *high technologies; global value chains; value added; intermediate consumption*

Abstract

Research background: Contemporary the concept of global value system extensively elaborated by the scientists and applied by practices in the fields of management, economics and politics. Thought the processes of globalization encouraging the interest to investigate global value chain concepts but the opportunities of research in sectoral level is still not extensively explored.

Purpose of the article: The aim of this article is to underline the relevance of global value chain approach in recent research and empirically observe the trends of value added fragmentation and shifts in international markets. The high technology sectors are distinct due to high rate of public support to R&D, and thus as a consequence perception in the added value dissemination, and due to peculiar impact to the arrangement of global value chains.

Methods: Contemporary academic literature analysis and synthesis, exploration of descriptive statistics of high technology sectors based on longitudinal World Input Output data, and comparative investigation of high technology sectors in the Baltic Region countries.

Findings & Value added: This article is addressed to evaluate the dynamics of value added of the high technology sectors and encourage further research in the sectoral level in order to identify the dynamics of high technology sectors' performance. The comprehension of international environment trends at sectoral level may provide insights for the innovation system policies as well as for the development of business strategies.

Introduction

The global value chain (GVC) paradigm engage researches linked to globalization issues: international management as well as policy and economics. The interest investigate processes of value creation and value capture encouraged due to growing concern evaluating the gainers and losers in global value chains. In high technology sectors value is created from innovations and it is distributed among different countries. There is a great interest in research attempting to quantify the benefits of R&D, though the empirical results indicates that highest rate value is generated in downstream value chains processes (Shin, Kraemer, & Dedrick, 2009, pp. 315-330). The investigation of absorptive capacity indicates how added value should be captured at a country level (Dedrick, Kraemer, & Linden, 2009, pp. 81–116).

There are highlighted three megatrends that changing the policies concerning globalization issues: shift, from trade-in-goods to trade-in-activities, the rise of knowledge-intensive intangibles and rise of emerging markets (Cano-Kollmann, Hannigan, & Mudambi, 2018, pp. 87-92). These megatrends enabled the migration of value and enhanced market competition, more rapid diffusion of technology and information, and increased incentives for firms to innovate and adapt production to the international market (Marcolin & Squicciarini, 2018). The proponent of the GVC concept argue that the chain's governance structure is crucial factor that determines how countries 'upgrade' and 'catch up' value within GVC (Panand, 2013, pp. 207–219). Consequently in the global innovation system's theoretical framework recognized the tensions between territorially embedded and spatially dispersed innovation systems, thus the concept for incorporating sectoral innovation system to international innovation systems is proposed (Binz & Truffer, 2017, pp. 1284–1298).

This article is dedicated to the empirical research of high technology sectors, highlighting the differences between tangible products' manufacturing and intangible information, communication, research and development services. The comparative analysis of the Baltic region will be based on import of added value data, covering period from 2000 till 2014. The research results will enable observe the dynamics of upstream added value migration and trends in county's specialization in high technology sectors' within Baltic region. The estimation of share of domestic added value may be used as the complement indicator evaluating the internationalization of the sectors' value added activities (Asmussen, Pedersen, & Petersen, 2007, pp. 791–813) and trends in national specialization (Asmussen et al., 2007 pp. 791–813).

The technological progress and dynamics in GVC are intertwined, and often mutually reinforcing, therefore the investigation of high technology sectors would also benefit appreciate the trends in GVC.

Research methodology

Recently in sectoral approach the definition of high technologies evolved. In NACE Rev. 1.1. only the manufacturing industries were classified according to the technological intensity (ratio of investments to R&D and added value), though in 2008 NACE was revised to Rev.2 and knowledge intensive services considered as high technology sectors, therefore this article is dedicated to high technology manufacturing industries (sectors C21, C26) as well to knowledge-intensive services (J59, J60, 61J, J62, J63, and M72).

A growing interest to estimate the value-added trade using global Inter-Country and Input-Output (ICIO) tables and World Input Output Database (WIOD) (Timmer, Dietzenbacher, Los, Stehrer, & de Vries, 2015, pp. 575-605) encouraged to analyse the dynamics of high technology sectors' involvement into global value chains. The investigation of this article is based on WIOD data, which is available for the period from 2000 till 2014 and covering 43 countries with some aggregated sectors (for the high technology sectors J59-J60 and J62-63). The comparative analysis of high technology sectors is dedicated for Baltic region countries, those that have shorelines along the Baltic Sea: Denmark, Estonia, Latvia, Finland, Germany, Lithuania, Poland, and Sweden. Russia in this research was excluded due to the unavailable data for J59-J60, J62-J63 and M72 high technology sectors.

The analysis of high technology sectors dynamics was focused to upstream global value chain processes. Thus the mathematical framework was devoted to decomposition of total value added and total intermediate consumption into value added (VA) of the country and local intermediate consumption (LIC). These measures used to define vertical specialization and trade in value added components. The VA and LIC are the measures of vertical specialization of import side, thus the LIC evaluates the import content of intermediate consumption in high technology sectors and VA enables to compare the VA of high technology sectors that is generated domestically.

The LVA and LIC measures expressed in shares from total value added and total intermediate consumption of the distinct country. The available WIOD data is nonparametric therefore the emphasis was on descriptive

statistic, highlighting the differences of countries as well as high technology sectors. The prepared scatter diagram of share of LIC (SLIC) longitudinal data for each high technology sector and country expose the changes in the involvement into upstream global value chains (figure 1) and the box-plots of SLIC (figure 2) and share of VA (SVA) (figure 3) reveals the differences of value added origins in high technology sectors within Baltic countries. Kendall's rank correlation coefficient was evaluated to measure the statistical null hypothesis of LIC and LVA independence. The following null hypotheses were considered:

Hypothesis 1: There is a no relationship between LIC and LVA within high technology sectors in Baltic region countries;

Hypothesis 2: There is no relationship between LIC and LVA between distinct high technology sectors in Baltic region countries;

Hypothesis 3: There is no relationship between LIC and LVA between different Baltic region countries.

Results

The scatter diagrams of the SLIC dynamics in the Baltic region countries for the distinct high technology sectors within period 2000 -2014 reveals the different pattern of countries' involvement into upstream global value chains processes (figure 1).

Manufacturing of basic pharmaceutical products and pharmaceutical preparation (C21) faces the decrease of SLIC in the most of the Baltic region countries, except Estonia, with already the lowest SLIC 40.7 % in 2000 and average SLIC value 37.3 %. Only Sweden with a second lowest SLIC in 2000 60.4 % experienced increase from 2008 and shifted to higher value till 64.3 % in 2014. Although the exceptional average of SVA in the C21 sector within 2000 to 2014 period is depicted in Finland and estimate 91.1 % and mean 80.1 %.

The lowest SLIC in manufacturing of computer, electronic and optical products (C26) is in Estonia with mean 24.7 %, and Latvia with 30.3 % while the average of SLIC in other Baltic region countries values deviates from about 50% to 71%. C26 sector represent the highest level of involvement into upward internationalization processed, though the SVA indicates the lowest domestic added value proportions in high technology sectors with the average mean 39.3 % for all Baltic region countries.

The SLIC change in information and communication sections J59 to J63 comparing with other high technology sectors is relatively moderate. Sectors of motion picture, video and television programme production, sound recording and music publishing activities (J59) and programming and broadcasting activities (J60) have particularly low SLIC, though Lithuania with the highest rates of SLIC with deviation from 97.4 % to 94.1 % within period from 2000 till 2014, but the domestic SVA, is not high with the mean 48.8 %.

In telecommunications (J61) sector SLIC rate is the lowest in Poland with the mean 46.4 %, though the distinct rate of domestic SVA is in Lithuania with a mean 67.2 %.

The sectors of computer programming, consultancy and related activities and information service activities (J62) and information service activities (J63) possess quite similar SLIC in all the Baltic countries, except Lithuania with SLIC value drop from 80.1 % till 62.3 % in period from 2000 till 2014, though the SVA quite similar in all Baltic region countries, except Denmark with lowest SVA with the mean only 47.1 %.

The box plots of average SLIC (figure 2) and average SVA (figure 3) for the distinct high technology sectors in the Baltic region countries within period from 2000 -2014 highlight the differences of the high technology sectors.

The highest rate of upstream internalization is in the manufacturing sector C26. The values in distinct countries range from 9.6 % till 56.8% and mean in 2000 was 51.4 %, and in 2014 lowered till 38. %. Manufacturing sector C21 does not have distinctive upstream internationalization, though SLIC median decreased from 72.6 % till 64.4 % within period 2000 till 2014. Information and communication sectors J59-J63 has the lowest level of upstream internationalization and mean share of local intermediate consumption is 88.1 % with only 4.0% std. deviation for all Baltic region countries within 15 years. Only J61 sector faces changes with SLIC shifting from average 84.8 % to 80.5 %. So, the lowest rate of SLIC is in J59-J60 sectors and slightly lower in J61 and J62-J63. The sector of scientific research and development M72 in contrary to other knowledge intensive services encountered the perceptive variation of SLIC and SVA values with consistently lowered SLIC with a drop of the mean from 79.9 % to 72.7 %. The prominent decline of SLIC value in M72 sector depicted in Lithuanian from 74.7 % till 58.5 % though exceptional domestic SVA is in Latvia with average value 81.6 %.

The analysis of descriptive statistics indicates that the higher level of upstream internationalization or lower SLIC has no evident correlation with the domestic SVA. The correlation of the longitudinal SLIC and SVA data

for the period from 2010 till 2014 confirms this foresight from the descriptive data, with the value of correlation coefficient 0.066 (table 1) and thus variables SLIC and SVA has no linear relationship or a very weak linear but positive relationship. The correlation of SVA and SLIC values within distinct high technology sectors in the Baltic region countries also had no significant correlations (table 2), and only low level of positive correlation is depicted in C21 sector as well as the correlation between SVA and SLIC values for the countries also varies from negative and positive correlation though indicates very low level of correlation (table 3).

Conclusions

The analysis of contemporary literature dedicated to GVC paradigm indicates the growing interest from the researchers, though the uniqueness of this article is empirical investigation of the upstream processes in high technology sectors. It is observed that the value of SLIC average in Baltic region is decreasing in all of high technology sectors in period from 2000 till 2014 with a highest rate in high technology manufacturing C21 and C26 industries with 10% and 35% decline respectively. It is evident deviation within Baltic region countries in C21 and C26 sectors with exceptional Estonian lowest SLIC value in C21 sector about 40% and C26 sector about 20%.

The SLIC values in knowledge intensive services indicates lower level of upstream activities internationalization with an average deviation from about 75% till 80% with some exceptions. The controversial dynamic is depicted in M72 sector with about 10% decline in average of SLIC in Baltic region, though the unclear trends in different countries from 2008.

Although the domestically generated VA does not correlate with local intermediate consumption, thus with internationalization of upstream activities, though it enables positioning of high technology sectors and countries, and provides insight for national and regional public support system's design. Therefore next steps for the research would be an analysis of added value consumption. The highest rate of final consumption would indicate the involvement in to the downstream activities.

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Annex

Table 1. Relationship between LIC and LVA within high technology sectors in Baltic region countries

Kendall's tau_b	SVA	SLIC	
		Correlation Coefficient	0.066
		N	720

Correlation is significant at the 0.01 level (2-tailed).

Source: own calculations based on WIOT data (Timmer, Dietzenbacher, Los, Stehrer, & de Vries, 2015, pp. 575-605).

Table 2. The relationship between LIC and LVA between distinct high technology sectors in Baltic region

Kendall's tau_b correlations	C21_ SLIC	C26_ SLIC	J59_J60_ SLIC	J61_ SLIC	J62_J63_ SLIC	M72_ SLIC
C21_SVA	0.321					
C26_SVA		0.073				
J59_J60_SVA			0.018			
J61_SVA				0.057		
J62_J63_SVA					-0.046	
M72_SVA						-0.113

Correlation is significant at the 0.01 level (2-tailed).

Source: own calculations based on WIOT data (Timmer, Dietzenbacher, Los, Stehrer, & de Vries, 2015, pp. 575-605).

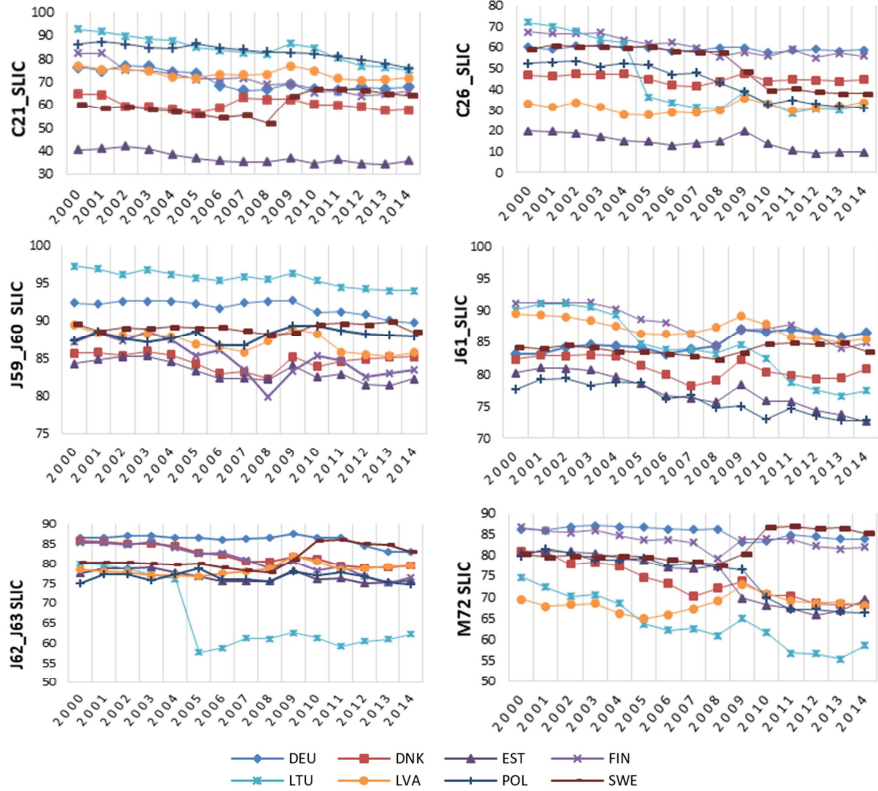
Table 3. The relationship between LIC and LVA between different Baltic region countries

Kendall's tau_b correlation	DEU_ SLIC	DNK_ SLIC	EST_ SLIC	FIN_ SLIC	LTU_ SLIC	LVA_ SLIC	POL_ SLIC	SWE_ SLIC
DEU_SVA	0.284							
DNK_SVA		-0.212						
EST_SVA			0.312					
FIN_SVA				-0.089				
LTU_SVA					-0.122			
LVA_SVA						0.014		
POL_SVA							0.058	
SWE_SVA								-0.075

Correlation is significant at the 0.01 level (2-tailed).

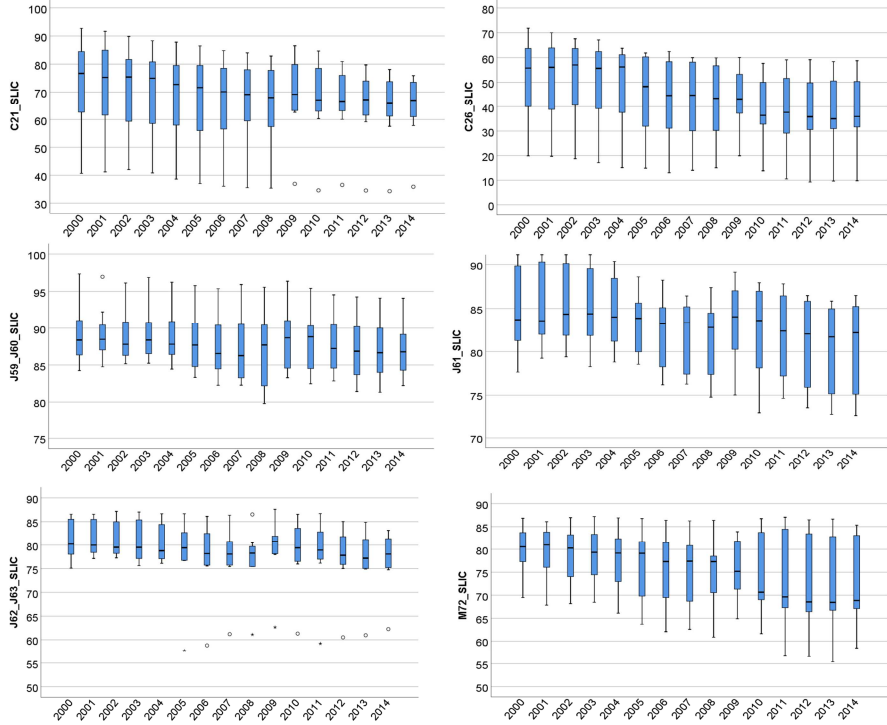
Source: own calculations based on WIOT data (Timmer, Dietzenbacher, Los, Stehrer, & de Vries, 2015, pp. 575-605).

Figure 1. The structure of share of local intermediate consumption (SLIC) of high technology sectors C21, C26, J59-J60, J61, J62-63, and M72 (share expressed in percentage) in different Baltic region countries.



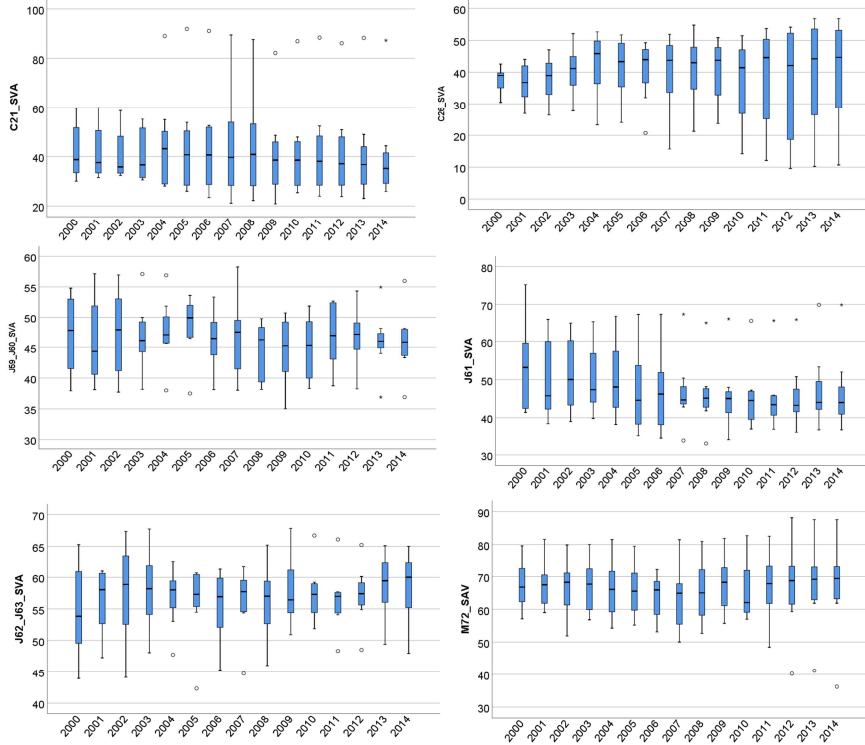
Source: own calculations based on WIOT data (Timmer, Dietzenbacher, Los, Stehrer, & de Vries, 2015, pp. 575-605).

Figure 2. The structure of the average share of local intermediate consumption (SLIC) expressed in percentage in different high technology sectors C21, C26, J59-J60, J61, J62-J63 in the Baltic region countries



Source: own calculations based on WIOT data (Timmer, Dietzenbacher, Los, Stehrer, & de Vries, 2015, pp. 575-605).

Figure 3. The structure of the average share of value added (SVA) expressed in percentage in different high technology sectors C21, C26, J59-J60, J61, J62-J63 in the Baltic region countries



Source: own calculations based on WIOT data (Timmer, Dietzenbacher, Los, Stehrer, & de Vries, 2015, pp. 575-605).

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Measuring pre-purchase risk intensions in online second-hand goods transactions using association rule mining technique

JEL Classification: *M3; M13; M31*

Keywords: *risk; second-hand goods, association rule, online transactions, Czech Republic*

Abstract

Research background: The risk in online transactions is inevitable given consumers' intension to shop online. Though, many studies have been authored about the risk components disclosed by pre-purchasers in e-shops. The search for risky components in online transactions continues unabated, even as many online services and features linger on. Whiles online transactions pose several risks to the consumer, the addition of second-hand goods intensifies the risks to the user. As the risk

factors brought about by online second-hand goods transactions persist, the magnitude of such risk inherent in the customer in question have not clearly emerged.

Purpose of article: This paper aims at eliciting the magnitude of risky components aligned with the tendency to connect via online in search of second-hand goods. Again, providing insight into demographic variables in relation to the pre-purchasing risk factors; averting customers to connect via online in search of second-hand goods stands as one of the key reason for this present study.

Methods: The research adopts a data mining algorithm, notably the Association rule mining to glean relevant patterns in the data accrued from the Czech Republic, premised on risk components governing online buying behaviour of second-hand goods. To this end, a simple random technique was adopted to gather data; with 321 out of 411 respondents eligible for our analysis.

Findings & Value added: The results of the association rule technique revealed that respondents within the gender frame are both adamant to hook-up via online in spite of the fact that, they have shopped online, yet do not think of looking at second-hand goods side because of some risky influence inherent in them, even if the respondent is a mere personal user of online transactions. In all these developments, the research concludes that second-hand industry needs to redesign their websites with much attention to reinforce stringent measures that will give a better assurance of the risk factors that will tend to avert the customer from connecting via online in pursuit of second-hand goods.

Introduction

The market for second-hand goods has become a recognized component in the Gross Domestic Products (GDP) computation in most economies around the world, be it developed or developing economy. For instance, in 2015, the second-hand goods market in Canada added a sum of \$36 billion to the economy (CBC, 2016) representing a 2.2% share of the annual GDP. Likewise, in the United States of America (USA), the market for second-hand goods produced an annual sales figure of \$9 billion in 2007 registering an increase of 20% from the figures recorded in 2002. In Europe, there continues to be a booming market for second-hand goods, particularly in the automobile, antiques, vintage items and electronic goods in general. For instance, a recent statistic of the online second-hand goods transactions showed that Spain has accrued a whooping sum of 28 billion euros as a boost to its economy in 2017 (Statista, 2018). In the Czech Republic, there continues to be an increasing market for second-hand goods. According to the reports from Czech Statistical Office (CSO), the total number of retail companies is recorded to be 127,117 in 2013 (Czech statistical Office, 2016). Out of these retail stores, there is an estimation of approximately over 32% operating basically on second-hand goods (Czech statistical Of-

fice, 2016). These figures can be explained by the advent of electronic commerce platforms that provide the medium for the sale of Second-hand goods.

Recently however, interest in second-hand online transactions has emerged and reached its peak for both vendors and customers alike as a result of how items fall out of vogue (B, 2016). Indeed, to most customers this is prompted with the overriding effect of the lesser price of such goods (Pazvakavambwa, 2018). This is welcoming, since customers within the small or medium income bracket can always connect via internet and look for some products or brands that ordinarily would have been difficult to acquire or purchase. The idea of second-hand vendors connecting via online to publicized their product to enhance daily sales is fast gaining momentum in developed economies as earlier elaborated. For instance, in the Czech Republic where the present study is undertaken, there are number of second-hand goods outlets that have transitioned to online platforms to boost their daily sales. Some of these websites in the Czech Republic that deals solely with the second-hand goods includes aukro.cz, Basoz.cz, chaleys.cz etc. It must be noted that, these websites are increasing at a constant pace across the length and breadth of Czech Republic, given the purported benefits attained by the second-hand vendors. This is true since the internet is not leaving anytime soon. In all these developments, we therefore argue in this paper, that while online transactions pose several risks to the consumer, the addition of second-hand goods, exacerbate the risks to the end-user. In spite of the several risk factors brought about by online second-hand goods transactions and the associated risk intentions to embark on online transaction of second-hand goods, a scientific research in the area is very limited. This paper is bent on generating more research and to elicit the magnitude of such risky intentions on or before the initiation of online transaction purposely on second-hand goods. In addition, scant knowledge is presently available on how online consumers perceive the second hand online transactions as been risky, and more so less is known about such associated risks towards buying second-hand via online. While some studies have sought to investigate some risky scenarios of second hand transactions purported on babies (see Waight, 2015) no studies have empirically measured the associated risk intentions reflecting on the tendency of the consumer attitudes geared towards second-hand goods transactions in the Czech Republic, that this study sought to reveal. Hence, this study aims to fill these gaps by addressing two research questions:

1. *What are the influence of perceived risk factors on the decision to purchase of second-hand goods online?*

2. *How are risk factors associated with the penchant to purchase second-hand goods online?*

The rest of the paper is organized as follows: First, State-of-the-art in online second-hand market and online transactions are provided. Second, the Association Rule Mining employed in this study is discussed, and the data collected analysed. Finally, the empirical results are presented with the conclusions of the study.

State-of-the-art in second-hand market and online transactions

The term second-hand goods as defined by Lane, Horne and Bicknell, (2009) are the one that is being purchased by or perhaps relocated to another user. A second-hand good is often attributed to a good that is not in the same shape as and when it was originally purchased before relating to the current user (Charbonneau, 2008). The second-hand market is made up of all consumers' durable neglected, sold or bartered with or without any transitional party, after discarding by the consumers (Stroecker and Antonides, 1997). On the contrary, the internet, as an influence on consumer behavior cannot be overlooked. This stems from the fact that the upsurge of internet penetration within the entire marketing arena in the past few decades have brought in its wake, the relentless desire of consumers to embark on transactions online. The extent and rate at which consumers are keen on purchasing online have been measured by previous studies. An outcome of one of such studies according to Lian and Lai (2002) has it that, the degree of consumer's passion to purchase online stems from the fact that customers are more likely to return to their respective websites of purchase within the next three months or during the year from the initial purchase, consequently growing or increasing their online purchase. Again, online shoppers stand the chance of enjoying multiple forms of convenience in the form of less physical effort, flexibility in terms of shopping, leniency in responding to promotions as well as advertisement, and finally accompanied by some user-friendly websites.

According to Corbitt et al., (2007) previous literature have, on the contrary, detailed that customers who embark on online purchasing are less likely to reduce the anxiety due to the risk of financial cost. Similarly, it was discovered by Gupta et al., (2004) that such customers are less likely to be risk averse more than the traditional brick and mortar customers. In all these developments, there has not been any robust tool or the methodology that will be adopted in this present study. The general consensus from re-

searchers alike governing the rampant outburst of second-hand market on the globe nowadays demands that researchers espouse on a technique to intrinsically find out the value proposition of customers in that business, more so when the business is bent on trading online. That is to climax that, the risky components inherent in the consumer must be unveiled to assist the growth of the second-hand industry. In the subsequent section, the theoretical underpinnings of the concept Association rule theory is described.

Methodology

Association rule mining and conceptual framework of the study

The massive volumes of user generated data recently have invigorated the zeal of businesses to elicit the value proposition of their respective customers. The generated transaction-type databases are mined with rigorous algorithm to find out the patterns of consumer buying behaviour. One such algorithm is the Association rule mining (ARM) which is seen under the umbrella of the Data mining algorithm. The main objective of the ARM is to identify items clustered in the transaction database with the view to tracking and digging out valuable associations as well as interesting relations embedded in such large datasets (Agarwal and Skrikant, 1994). In a broader sense, to learn more about the purchasing pattern of customers (Houstma and Swami, 1995). Put simply, the ARM takes the surge of ‘what goes with what effect’. Since the last two decades, this algorithm has been widely used by renowned researchers in academia and the industry in general, mostly in the field of marketing. Though, the full-blown application of ARM methodology could be attributed to Agrawal, Imielinski, and Swami (1993). The seminal works of Agrawal and Skrikant (1994) helped in fine-tuning the algorithm into a well-known concept for utilization in academia. We must emphasise that, other renowned scholars (Park, Chen and Yu, 1997; Dehase and Toivonen, 2001) cannot be left out as championing the cause of ARM methodology into the mainstream research seen today. The ARM has been designed in a suitable manner feasible for different datasets. By extension, this algorithm is made up of two stages before its application. The reliability, robustness, and strength of ARM produced in many research areas and academic disciplines give credibility to its significant and accurate usage in any research endeavour (Shmueli, Patel and Bruce, 2007). Over the last two decades and in line with its standard application, ARM analysis has been adopted for many academic disciplines in a variety of

areas within academia and industry as earlier indicated. For example, Khan, and Parkinson (2018) used ARM to convert event log entries into an object-based model which animatedly assisted in extracting an associative rule, Kwarteng et al, (2016) measured the associations in online shoppers' data in the Czech Republic whilst Domadiya and Rao (2019) also made use of ARM in a novel way to build the knowledge centre for disease prevention, which ease the healthcare provider as sequel to earlier treatment and stoppage. The following section explains the implementation and the data collection step as expatiated above. (see Figure 1)

Questionnaire design and data collection procedure

A questionnaire was adopted as a data collection instrument, prepared with the aid of Google docs application software. However, the distribution of questions was administered through the length and breadth of the Czech Republic. Yet, the biggest cities were the target of this present study, notably, Prague, Brno and Ostrava. Some selected students from the Tomas Bata University, Zlin, Czech Republic; mostly Bachelor students assisted in distributing the questionnaire to different regions in the Czech Republic as earlier stipulated. A token of reward was given to these students for their immense contributions in terms of data collection. As a matter of ascertaining a balance response rate devoid of bias as a representative of the entire population in the Czech Republic. A simple random technique was adopted for the study with 2 months range of time span used in collecting data for the study (Between November 2018 – January 2019).

A total of 411 questionnaires were distributed of which 321 were eligible to key-punched -into the (Google docs application software). We must emphasise that the entire questionnaire was prepared in two linguistic forms, thus English and Czech format. This was so because the researchers wanted to do away with unnecessary ambiguity of the questions. The questionnaire was however pilot tested with bachelor students in our Management I class, it was however revealed that some of the questions were not properly situated and hence turned to be repeated. As a matter of urgency, they were all corrected and pre-tested again with Advanced Management and Marketing Bachelor students. This time the error rate was meagre and even such error was attributed to the way and manner some students attempted to fill the questions, thus Some of them just filled some part and left the others unfilled, some respondents were also filling almost every section of the questionnaire. The RapidMiner studio 2.3 software aided with our analysis.

Association Rule mining Results

ARM naturally lends itself to many rules depending on the number of transactions in the database and the threshold set on some variable measures. However, to ensure the selection of interesting, potent and redoubtable rules from a set of all possible rules, certain constraints are often used as measures of significance. Largely, two of the best-known of these constraints are support and confidence, where minimum thresholds are set on their resulting values. The support is a fraction of transactions that contain both the antecedent and the consequent whereas confidence measures how often items in the consequent appear in transactions that contain the antecedent. Other metrics such as Lift, Laplace, Gain etc. are additional indicators that demonstrate the strength of the rules' relationships (Shmueli, Patel and Bruce, 2010). According to basic principles underlying the validity accuracy, completeness as well as the reliability of the Association rule mining technique, the technique is vouched or guaranteed with the magnitude (percentages) of the aforementioned metrics; thus, confidence, support, lift of the rules (Chena, Fenga, and Luo, 2016). The table 1 and 2, below present some key findings of association rules of the data set governing pre-purchasing risk intensions in online second-hand goods transactions.

As can be seen from above in both tables (Table 1 and 2), binary attributes automatically retrieved from the association centred on two specific consequents, namely: *Do risk factors influence the decision to purchase second-hand goods* and *the Type of online user*. It must be noted and with reference from the conceptual framework of the study (see Figure 1) that, in generating association rules, data with binary variables are deemed fit for efficient output interpretation. To do this, data was retrieved and saved as CSV in excel file. Missing data was quickly replaced with values, but as earlier indicated attributes with binary variables were selected from the entire data set to initiate and generate association between such variables in tandem with the objective of the present study. The rationale behind association rules is to foremost examine all salient rules embedded in a pool of dataset, specifically between items in an if-then format. In lieu of this and in respect of this present study, the generated rules seek to establish the antecedent and consequents of the data retrieved. It must be emphasized that one of the shortcoming of association rules is the utmost profusion of rules that are generated. Therefore, a need to reduce these rules to a small set of vital rules as have been done in this study by concentrating on rules with stronger rules.

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In line with the above explanation and from both table 1 and 2 above, it can be seen that for each of the rules generated, a confidence of more than 90% was ensured. The findings from this section shed more light on the association of risk factors as an influential decision for customers not to engage in online transactions precisely of used/second-hands goods and the type of online customer as both consequents of our analysis. The first#2 rule indicates that when a customer has shopped online before and has not attempted to purchase any used item or goods but with the inclination that this is so because there is an iota of risk factors averting him/her to embark on online for such used goods, then the overriding risk factor or reason of such customers' dwell on the premise of risk as an influence of that decision. This decision as a consequent is accompanied by (96%) confidence indicating a higher association between the antecedent and the consequent.

Again, Rule 1# of Table 1 shows that when a customer decides to abandon second-hand transactions online with the intentions geared towards, financial, psychological, security or health wise, then the overruling sense in this scenario is that indeed this type of customer is a personal user of the computer in the Czech Republic. This decision is supported by (9.1%) accompanying (97%) confidence that this rule is attested in the database. In the same vein, judging from rule #3 of the same table 2, when a Female Czech customer had bought a second –hand good online before but was careful with the type of such second–hand good even though she/he is not under the influence of any risk such as Financial, security etc. then, this type of customer is a personal user and not a business user. This rule, however, is associated with a higher confidence of (96%) with higher support of (24%). This implies that anytime a female Czech customer decides to buy second-hand goods online, then indeed this decision is borne out of no risk yet very circumspect with the kind of second-hand or particular second-hand good. This rule is given an indication to the second–hand vendors to redesign their website in a peculiar manner to meet and provide confidence in the customer. For instance, the websites of shopping sites of brand new goods should not be design the same like that of the second-hand ones, ranging from the information that will be present there, thus, assurance of other metrics that will lure the customer in those businesses should be initiated.

Alternatively, Rule 4# indicates that when a Male personal user in the Czech Republic has shunned the initiation of second-hand goods online due to the fact risk components influenced that type of second-hand good he/she intended to patronize, probably, books, vintages etc., then the superseding cause of this decision is highly attributed to influence of some risk factors occupying (100%) in the database. This means that, for a male

Czech personal user of the internet to disregard second-hand goods as a result of some types of such goods then indeed there is bit of risk in that decision of the customer in question. This is stemmed from the fact that some second-hand goods are likely to pose a higher risk to the customer, for instance second-hand garments are more than expected to put fear in the customer. This claim has been seconded by the works of Chipambwa, Sit-hole and Chisosa, (2016) even though their work was not premised on the risk of online second-hand transactions.

Conclusions

The ARM technique used in this study was meant to glean relevant information from the accrued data, so far as risk intentions of the customer is concerned. This approach broadly is swayed from the traditional deductive means of falsifying existing theories, hence bent on logically eliciting the magnitude of risk inherent and associated with the penchant of online customer to engage in second-hand goods transactions. The ARM technique did not only assist in mining patterns from the data but also provided us with the metrics of measuring the severity of such risks. The *consequent* or the *antecedent* in making justifiable decisions were accompanied by its associated metrics such as the *support*, *confidence* and *lifts*. In this respect, the research has provided insight into some factors such as; demographic variables in relation to the pre purchasing risk factors averting customers to connect via online in search of second-hand goods.

Additionally, in the academic literature, the adequate knowledge derived from the analyses would broaden the concept of online shopping and consumer behavior from marketing perspective. However, the limitation of the paper could be attributed to; the sample size as been small, taking into consideration the scope demography of the study. It appears that, the study has a narrow scope of results interpretation in that, the attention of the research theme was directed to only users or potential users of second hand goods in the online space. Future research direction could need more respondents of this kind of research. Comparative studies could be done to substantiate the same pre-purchase risk factors against un-used goods (new goods).

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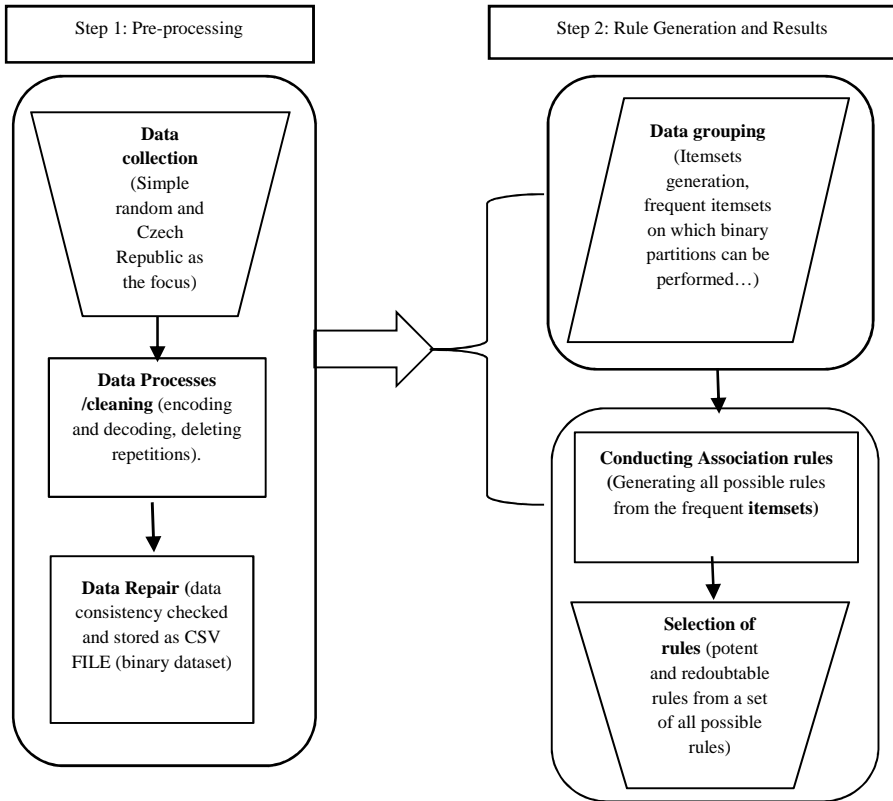
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Table 2. Binary attributes of the data set towards risk factors (intensions) influencing customer decision

<i>Rules</i>	<i>Antecedent (X)</i>	<i>Consequent (Y)</i>	<i>Support%</i>	<i>Confidence%</i>	<i>Lift%</i>
#1	{Type. Of. online. Customer=Personal user, second. hand. goods. Online. =No, Influence.the.type.of. second. Goods=Yes, Any.of.the.risk. factors. =Yes}	{Do. risk. factors. Influence=Yes}	7.9	100	1.3 9
#2	{shop. Online. =Yes, second. hand. goods. Online. =No, Any.of.the.risk.f actors.=Yes}		7.6	96	1.3 3
#3	{Type. Of. online. Customer=Personal user, second. hand. goods. Online. =No, Influence.the.type.of.second.goods=Yes}		7.2	97	1.3 3
#4	{shop. Online. =Yes, second. hand. goods. Online. =No, Influence.the. Type.of.second.goods=Yes}		7.5	95	1.3 7
#5	{Gender=Male, Type. Of. online. Customer=Personal user, second. Hand. Goods. online. =No, Influence.the. T ype.of.second.goods=Yes}		7.5	100	1.3 9
#6	{Gender=Male, shop. Online. =Yes, second. hand. goods. Online. =No Influence.the. Type.of.second.goods=Yes}		7.6	96	1.3 4
#7	{Gender=Female, shop. Online. =Yes, Type. Of. online. Customer=Personal user, second. Hand. Goods. online. =No, Influence.the. T ype.of.second.goods=Yes}		7.4	96	1.3 3

Source: Authors' computation.

Figure 1. Conceptual Framework for the study (Research Process)



Source: Authors.

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Food choice motives in the consumption of elderly population

JEL Classification: *M30*

Keywords: *health beliefs; health perception; food choice motives; healthy eating behavior; segment of elderly population.*

Abstract

Research background: The focus of the paper is the perception of ageing in senior's population and the role of health perceptions and health motives in individual consumption of elderly people.

Purpose of the article: The purpose of the article is to explore the impact of health perception and food choice factors on healthy food consumption among elderly and to indicate how different food choice motives influence the eating behavior of elderly population. In our research we explore several food choice factors and their manifestation in attitudes towards healthy consumption. By identifying older people's food-related goals, their food-choice motives and the relevance of these motives in achieving their goals, we can investigate the relationship between food-related goals, motives and healthy eating. The purpose of the exploration of health perception is to identify seniors' beliefs about food and health related aspects.

Methods: Empirical research is conducted on a random sample of 400 elderly participants aged above 60 years and living in their own flats. Non-probability sampling in the form of convenience sampling is employed. The relationship between health beliefs and attitudes towards healthy eating behavior is confirmed with employing multiple regression analysis.

Findings & Value added: We come to the conclusion that both health beliefs and food choice factors investigated in the research are important determinants of seniors' healthy consumption, however with different effect on healthy eating behavior.

Introduction

In analyzing the problems of aging, there is a growing recognition for a need to focus on individual perceptions of the quality of life. There has recently been a move away from considering old age to be a problem in itself and the focus has shifted towards older people's possibilities to improve their own quality of their life (Stremersch, 2008, 229-233). Successful ageing is described as decreasing the risk of diseases while maintaining physical and mental functioning and active engagement in societal participation. Nutrition is recognized as one of the major determinants of successful ageing, defined as the ability to maintain three key behaviors: low risk of disease and disease related disability, high mental and physical function, and active engagement of life (Kraft & Goodell, 1993; pp.18-25). Good and proper nutrition can significantly reduce the likelihood of developing a number of common chronic diseases and slow down their progression.

The meaning of health in the process of ageing has been addressed in a number of studies (Divine & Lepisto, 2005, pp.275-283), (Luomala et al., 2015, pp. 290-301) supporting the concept of health as a multidimensional construct, comprising a state of complete physical, mental and social well-being and not merely the absence of disease. We adopt this multidimensional perspective on health by considering the impact of several economic, psychological and social health motive dimensions.

People tend to have health related goals (physical well-being, emotional well-being, preventing diseases) that are relevant to their strongest motives (Papies et al., 2007, pp. 810-817). People who have the most congruent goals and motives, that is, motives that are relevant to their health goals, exhibit the highest subjective well-being. Dean et al. (2009) argue that successful adaptation to life events is likely to depend on choosing goals that can be accomplished with the most important motives that are possessed by an individual. Extrapolating from this to older people, it could be suggested that those with goal-related motives would have a higher level of satisfaction with life compared to those whose motives are not relevant to their goals or those who lack the motives to achieve their goals.

A scientific unity exists for a strong association between diet and risk of various diseases, particularly cardiovascular disease, obesity and certain types of cancer. Hence, need to adopt healthier diets are important in seniors' eating behavior (Keane & Willetts, 1994, pp. 15-17), (Dean et al., 2008, pp. 308-315).

In our research we explain the role of food choice motives between health-related beliefs and healthy eating behavior. Considering the specifics of the target segment it will be explored whether the behavior established in

early adulthood is likely to continue into the late life (Sparks et al., 2001, pp. 53-68), (Bower et al., 2003, pp. 65-74). Therefore, the objectives of the present study are to identify the relationships among health beliefs, food choice motives, and healthy eating behavior in elderly population. In particular, this research explores the role of food choice motives in intersection between health beliefs and healthy eating behavior.

Research methodology

The objectives of our research are threefold. First, the existence of two subgroups will be explored within elderly population for whom health goals and health beliefs have different distinct meaning (personal well-being vs preventing diseases). Second, these two resulting segments will be compared with respect to several food choice motives. The third objective lies in the analysis of the role which the food choice motives play in the intersection between health beliefs and healthy eating behavior.

The sampling frame for the empirical research was elderly people aged 65+. A total of 400 questionnaires was distributed randomly in daily clubs for seniors. The questionnaire consisted of questions exploring three areas: health beliefs, food choice motives and healthy eating behavior. To analyze the health beliefs, we used a modified scheme proposed by Kähkönen et al. (1996, pp. 87-94) and Kähkönen et al. (1997, pp. 125-130) and used 10 items linked to health. The purpose of the health beliefs scale was to reveal seniors' beliefs about health and food related aspects. The score of individual health belief items is presented in the Table 1.

In order to simplify the initial items, we conducted on the belief items factor analysis. The results of factor analysis determined two types of health beliefs: personal well being and preventing diseases with alpha coefficients of 0.85 and 0.81 respectively.

Food choice motives were measured by 19 items, adapted from Kraft and Goodell (1993, pp. 18-25) and Jayanti and Burns (1998, pp. 9-15). Respondents were asked to express the importance of their motives in the choice of foods on a 5-point Likert scale, where 1=very unimportant and 5=very important. To measure the attitudes towards healthy eating behavior, we applied a 3-item scale from Kearney et al. (2001, pp. 1117-1126). Respondents identified the extent of their agreement with three statements regarding their attitudes towards healthy eating behavior on a 5-point Likert scale, where 1=strongly disagree and 5=strongly agree. The items were: "I make conscious effort to try and eat a healthy diet"; "I eat to a healthy amount"; and "I don't need to make changes to my diet as it is healthy

enough". The research confirmed uni-dimensionality for attitudes towards healthy eating behavior.

To analyze the effect of the food choice motives as the mediating variables between health beliefs and food-choice behavior, the regression of the dependent variable on the independent variable, the regression of the mediator on the independent variable, and finally regression of the dependent variable on both the independent variable and the mediating variable was performed.

Results

As mentioned earlier, a PCFA (Principal Component Factor Analysis) was applied to the 23 items of the food choice motives in order to group the motives. As a result of this process, six factors were obtained: health, price, mood, familiarity, sensory appeal and weight control.

The first factor "Health" contains 5 items that are associated with health and the natural content of the foods. The second factor "Price" includes 3 items linked to the economic value of the food. The third factor "Mood" is related to physical and emotional well-being resulting from foods consumption. Items of "Familiarity" factor reflect their distinct relevance and applicability to older consumers. The fifth factor "Sensory appeal" comprised three items related to the principal senses related to taste and smell. Finally, the last sixth factor "Weight control" refers to two items and did not prove to be as important aspect as it may be in younger consumers' population.

In order to indicate the importance that each factor has in the choice of food, the average evaluation for each of the six identified factors was calculated (mean and standard deviation), presented in Table 2. As shown in Table 2, the most important factor for elderly people in choosing their food is "Price", achieving the score of 4.33 . The least valued aspect was the factor "Weight control", which scores 2.95 (out of 5), suggesting that elderly do not seem to be very concerned about putting on weight. The mean value of factor "Mood" (3.92) indicates that the mood plays an important role in eating behavior of elderly. The "Sensory appeal" is valued (3.80) slightly above the average value of "Mood", suggesting that seniors may identify good mood with tasty food. The "Familiarity" associated with the previous knowledge of the food proves to be important in the choice of a food, perhaps because seniors do not like to try new products and to taste new foods.

Factor "Health" obtained very similar results (4.19) to the value of factor "Price", which shows that seniors are aware of the importance of taking

care of their health with adequate nutrition, however they are also concerned and limited with their financial possibilities.

Table 2 shows the correlations among health beliefs variables, food choice motives factors, and attitudes toward healthy eating behavior. It was found that respondents had stronger health beliefs regarding personal well-being (4.12) than they had for preventing of diseases (4.02).

The analysis of interrelationships among variables was performed using regression equations. In the six equations, the health beliefs factors were considered as the independent variables and regressed on the six food choice motives. These six equations test the relationships between health beliefs factors and six food choice motive factors. Table 3 summarizes the results of these seven hierarchical regression equations.

In each of the first six equations, health belief of preventing diseases was statistically significant with all food choice motive factors, except of sensory appeal and mood, while health belief of personal well being was significantly associated with the food choice motive factors of health, sensory appeals, mood and familiarity. From all six food choice motives factors the best predictability from health belief factors had the motive "health" followed by mood and familiarity. Among six food choice motives factors health motive had the best predictability from health concern factors, followed by mood and familiarity motive factors. Sensory appeal and price had the least predictability from health concern factors. The seventh equation, regressing healthy eating behaviour as a function of two health beliefs factors and six food choice motives contained no multicollinearity.

Both health beliefs of personal well-being and preventing diseases were statistically associated with healthy behaviour and accounted for 28 % of the variance in attitudes toward healthy eating. Adding our six food choice motive factors to two health concern factors in predicting healthy eating behaviour resulted in a total of 41 % of the variance in attitudes toward healthy eating behaviour. At this stage, only health belief of personal well-being, food choice motives of health, mood, and price could significantly predict attitudes toward healthy eating behaviour. It indicates a full mediation of food choice motives between health belief of personal well-being and healthy eating behaviour and partial mediation of food choice motives between health belief of preventing diseases and healthy eating behaviour.

Conclusions

Two concepts were identified to be important for senior consumers, i.e. health is about personal well-being (life is enjoyable) and health is about

preventing diseases (energy and autonomy). This outcome is also in line with previous research (Ajzen & Fishbein, 1989).

As expected, health belief of personal well-being had the greatest effect on the “mood” motive followed by the health motive, familiarity and sensory appeal; while health belief of preventing diseases had the greatest effect on food choice motives of health, weight control, price and familiarity. Although the two health beliefs factors affected the food choice motive of “health”, as expected, they both also affected the food choice motive of familiarity. The findings suggest that individuals with higher health beliefs not only place more importance on choosing food that make them healthier, but also prefer familiar food.

The results of the research indicate that health belief of personal well-being has a greater effect on healthy eating behavior than did health belief of preventing diseases. The reason could be that seniors attach to the food only a limited role among the reasons of their diseases. Hence, seniors who represent health belief of personal well-being, exhibit eating behavior that is more cautious than it is by seniors exhibiting belief of preventing diseases.

The results indicate that seniors with different health beliefs (personal well-being vs preventing diseases) would have different food choice motives, and these result in a way how they form their healthy eating behavior.

As found, health beliefs did not affect all food choice motives and not all food choice motives were statistically associated with healthy eating behavior. The findings in our research suggest that health belief of preventing diseases statistically influenced all food choice motives, except of mood and sensory appeal. However, only three food choice factors were statistically associated with healthy eating behavior, namely, the health motive, the price motive, and the mood motive. Hence, we can conclude that seniors exhibiting belief of preventing diseases would place higher importance on health and price in food-related decisions and attitudes toward healthy eating.

On the other hand, seniors exhibiting higher beliefs of personal well-being put more emphasis on health, mood, sensory appeal and familiarity in their food-related decisions. However, among these food choice motives, only health and mood were significantly associated with healthy eating behavior. It means, that seniors’ belief for personal well-being would both directly influence their healthy eating behavior and indirectly influence this behavior via the food choice motives of health and price.

The results of our research indicate that food choice motives have independent and mediating impact on healthy eating behavior. The interrelations between beliefs, motives and behavior offer an interesting area for

future research. Especially, the variables mediating or moderating the effect of health beliefs on healthy eating behavior opens areas for future research. Our results indicate that health belief affects the food choice motives of familiarity, however, this motive does not affect healthy eating behavior in our study. Future research can further explore the possible effects of this motive and its manifestation in healthy eating behavior.

The findings of our research shed light on how seniors form their healthy eating behavior and could help in improving seniors-oriented food offerings, product positioning and marketing communication towards seniors in the category of foods.

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Annex

Table 1. Health belief items (HBI) scale

	<i>Belief items</i>	<i>Mean</i>	<i>SD</i>	<i>n</i>
HB1	Try to avoid foods that are high in cholesterol	3.61	0.74	400
HB12	Try to avoid foods that are high in fat	3.80	0.81	400
HB13	Try to avoid foods with a high salt content	3.21	0.93	400
HB14	Am concerned about how much sugar I eat	3.81	0.90	400
HB15	Nutrition information determines what I buy	3.66	0.75	400
HB16	I control my weight	4.2	0.59	400
HB17	I try to do physical activities, walking, exercise	4.11	0.54	400
HB18	I take active participation in my community	4.23	0.49	400
HB19	I attempt to avoid stressful situations	3.99	0.82	400
HB110	I choose foods on taste, smell and appearance	3.80	1.12	400

Source: own calculation.

Table 2. Means, standard deviations and intercorrelations of research variables

Variable	M	SD	1	2	3	4	5	6	7	8	9
1 Personal well-being	4.12	0.71	(0.85)								
2 Preventing diseases	4.2	0.64	0.68**	(0.81)							
3 Health	4.19	0.61	0.63**	0.58**	(0.87)						
4 Sensory appeals	3.80	0.84	0.36**	0.28**	0.29**	(0.80)					
5 Mood	3.92	0.81	0.56**	0.44**	0.58**	0.42**	(0.83)				
6 Weight control	2.95	0.86	0.16*	0.32**	0.41**	0.15**	0.31**	(0.74)			
7 Price	4.33	0.45	0.38**	0.30**	0.23**	0.21**	0.26**	0.19**	(0.90)		
8 Familiarity	3.75	0.99	0.29**	0.34**	0.29**	0.32**	0.30**	0.33**	0.38**	(0.79)	
9 Healthy eating attitudes	3.91	0.89	0.47**	0.45**	0.58**	0.32**	0.39**	0.27**	0.40**	0.32**	(0.84)

SoM = mean value of variables, SD = standard deviation of the mean.

Note: The numbers on the diagonal are the coefficients alphas.

Source: own calculation.

Table 3. Intercorrelations of research variables

	<i>Health</i>	<i>Sensory</i>	<i>Mood</i>	<i>Weight</i>	<i>Price</i>	<i>Fami-</i>	<u><i>Eating attitudes</i></u>	
	<i>appeal</i>			<i>control</i>		<i>liarity</i>	<i>FB</i>	<i>FB+FM</i>
<i>I. Health beliefs</i>								
Personal well-being	0.24***	0.13*	0.42***	0.29	0.36	0.23***	0.40***	0.29***
Preventing diseases	0.36***	0.20	0.40	0.18**	0.40*	0.18*	0.32***	0.18
<i>II. Food choice motives</i>								
Health								0.47***
Sensory appeal								0.09
Mood								0.14*
Weight control								-0.06
Price								0.23**
Familiarity								0.03
R ²	0.45	0.09	0.21	0.19	0.15	0.10	0.28	0.41

Source: own calculation.

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**Effectiveness of innovation and SME innovation strategies
in a peripheral region**

JEL Classification: *L11; L25; O31*

Keywords: *innovation strategy; SMEs; entrepreneurship; peripheral region*

Abstract

Research background: Many contemporary empirical studies and most economic growth theories recognize the importance of innovation as one of the most progressive determinants of socio-economic growth, in the regional and local perspective as well. However, much of the empirical literature has discussed the issue of effectiveness of innovation in the small and medium-sized enterprise sector without the significant results for small businesses, especially in peripheral regions.

Purpose of the article: The aim of this paper is to explore the effects of innovation strategy and implementation in a peripheral region. Based on the results of our survey, we propose classification of SMEs with reference to innovation, and test for any differences in innovation strategies: both objective (size, cooperation environment, external financial support, etc.) and subjective (cultural framework of the context of a less developed region).

Methods: Research was based on data drawn from CATIs carried out among 419 firms, therefore making a conceptual contribution to the knowledge on innovation strategy. The main statistical test for relationships and dependencies was the chi-square independence test. To arbitrate whether there were statistically significant differences between medians due to different factors among enterprises, analysis for variance (H Kruskal-Wallis' test for k independent samples) procedure was implemented.

Findings & Value added: The results of our research show that among SMEs in peripheral regions dominated those which we call ‘pragmatists’ and ‘imitators’ in context of their approach towards innovation. The significance of objective factors showed that there was a lack of enterprises that could play the role of ‘creators of innovation’ in the peripheral region.

Introduction

Studies on effectiveness of innovation in the small and medium-sized enterprise sector (SMEs) in peripheral regions are scarce (see Lejpras 2015; pp. 734-754; Inzelt & Szerb, 2006, pp. 279-299; Harris *et al.*, 2005, pp. 431-450). In particular there is a need to empirically test where differences occur across the spectrum of innovation activity. These studies are aimed at making sure that future government policy and support is effectively directed towards regional market activity (or inactivity). Similar studies to ours are carried out (compare Grillitsch & Nilsson, 2015, pp. 299-321; Eiriz *et al.*, 2013, pp. 97-111; Doloreux 2003, pp. 67-94), but there are no significant results for small firms. Moreover, their research was not conducted in a peripheral region, therefore we expected different results.

In the study quantitative a computer-assisted telephone interview (CATI) with key individuals in SMEs (419 firms) that introduced at least one innovation between 2004-2011 were used as a research technique.

The aim of this paper is to explore the effects of innovation strategy and implementation in a region that is considered dormant and less developed. Moreover, we investigate the effects of innovation activities not only among small and medium, but also micro firms which are not covered in official innovation surveys by the national statistical offices. Based on the results of our survey, we propose classification of SMEs with reference to innovation, and test for any differences in innovation strategies: both objective and subjective.

Research methodology

The key research questions addressed here are: how do the SMEs in Podkarpacie region judge the effectiveness of their innovations? Are there any differences in the innovation effectiveness evaluation because of small businesses, scale of activities and amount of money invested in innovation (we call them “hard” factors)? Does interest in research and development, cooperation with external R&D or other subjects of environment and insti-

tutional support in innovation (we call them “soft” factors) differentiate the perception of innovation effectiveness? Finally, how is the innovation effectiveness perceived in perspective of SMEs’ innovation strategies? Such concepts as “hard/soft” factors, their relation to specific types of innovation strategy, and types of innovation strategies themselves are explained in a further part of the article.

A major advantage of using such data is that the sample is statistically representative on a regional level. A computer-assisted telephone interview (CATI) was conducted among 419 firms that introduced at least one innovation between 2004-2011. Firms were selected in a random way, however within strata because micro-sized enterprises represent the vast majority in the structure of the SME sector in Poland. The maximum error for interpretations and conclusions is 5% (at confidence level $\alpha=0.95$ and 0.50 fraction – unknown distribution of characteristics).

The main statistical test for relationships and dependencies was the chi-square independence test. To arbitrate whether there were statistically significant differences between medians due to different factors among enterprises, analysis for variance (H Kruskal-Wallis’ test for k independent samples) procedure was implemented.

Results

By discussing how firms’ innovation decisions impact the effectiveness of innovation, we add to the literature on innovation and strategy by proposing a typology of innovation strategy. In this original contribution, innovation strategies are categorized in terms of the SME's innovation activities (scale of activities, value of investment, number of employees) and the SME's environment (engagement in R&D, cooperation, and institutional support) (see Lewandowska & Stopa, 2016, pp. 147-158; Eiriz *et al.*, 2013, pp. 97-111). We identify three innovation strategies: ‘creators,’ ‘pragmatists’ and ‘imitators.’

This typology is a result of a willingness to present a more complex picture of innovation: the definition includes both a patent solution and an imported, well known solution that is unique only in a local, usually peripheral context. Actually, this is the very core of our typology—peripheries are more likely to be the space where centres export their innovations than places where innovation is being developed (these are the basis of the definition of the peripheries). That is why it is so important to distinguish different types of innovation strategies, especially when innovation is the basis for growth and development policy.

‘Creators’ are firms that are interested in constantly creating new original innovations, based on internal R&D and/or cooperation with external R&D institutions. They also use external support of institutional system strengthening innovativeness. In theory, such firms are concentrated on the wider SME environment, changing relations with customers and cooperatives as well as with the institutional environment.

‘Imitators’ randomly use additional public financial support to introduce innovation(s) whose novelty applies only to the enterprise level. The quantity and quality of innovations are secondary characteristics. Financial support is usually used for purchasing innovations created by others. There is no ongoing cooperation with external R&D institutions and innovation itself is useful in categories of survival on the market. What is even more important, innovation is perceived in categories of additional costs.

Somewhere between these two extremes are ‘pragmatists,’ meaning firms that do not treat innovativeness as the main paradigm, but important enough to be developed and supported by occasional cooperation with external R&D institutions and using a utilitarian approach towards public financing of the innovation. The main difference between ‘pragmatists’ and ‘creators’ is that the former are not that interested in creating new interactions within wider surrounding of the enterprise (‘pragmatists’ are more focused on internal consequences of innovations).

According to the above considerations, it is possible to present the following theoretical model of innovation strategies concentrated on the main aspects of an enterprise’s functioning.

Among the 419 firms studied, we identified 86 possible ‘creators:’ enterprises that introduced numerous and original innovations (product and process) in the researched period of time. The word “possible” indicates that from a theoretical point of view there should also be statistical significance of the condition of the wide aspect of the enterprise’s strategy of innovation (as in the table 1).

The present analysis concentrates on answers to the question: “Please, indicate whether, due to investment between 2004-2011, the following events took place in your firm and (if yes) how they influenced the functioning of your firm”. The closed range of possible answers contained: “in large scale”, “in medium scale”, “in small scale”, “not revealed” and “don’t know”. There were 14 positive statements and 14 their opposites about the rank of a new/improved product/service, firm’s income, costs of new/improved products/services (depreciation, costs of production, costs of work, amount of materials and energy), change in the share of the market, gaining new market, change in a firm’s external network (cooperatives, subcontractors), safety and standards of work, change of new/improved

product/service environmental influence, change in the level of employment, customers' opinions on quality of new/improved products/services. The table 2 presents the assumed model of possible innovation effects.

All innovation consequences were presented in random order to respondents. It is worth noting once again that this question was asked only of these SMEs that implemented innovation between 2004 and 2011.

The answers were indexed for each respondent to receive the quantity scale of positive and negative consequences of innovation in the respondents' perspective: categories "large", "medium" and "small" were recoded into "revealed" with value 1, while categories "not revealed" and "don't know" were combined into "not revealed" (value 0), due to the focus on existing and noticed consequences. In other words, we were interested in these effects of innovation that had been noticed and valued somehow by the respondents.

Theoretical distribution of both Innovation Positive Effects Index (IPEI) and Innovation Negative Effects Index (INEI) is between 0 (no effects revealed) and 14 (each effect revealed), with a theoretical mean of 7. Table 3 presents the distribution of both indexes.

The most important information is that 2/3 of SMEs pointed out between 1 and 9 positive effects (however, 50% of them up to 5 positive effects) whilst 2/3 of the SMEs admitted to between 0 and 3 negative effects of innovations they had introduced in the firm (50% of them up to 1 negative effect). Nonetheless, 48 (11.5%) representatives of the researched SMEs could not point to either positive or negative effects of innovation in their firms.

In our opinion, a distribution of answers proves rather the weakness of SMEs' innovativeness in peripheral region. Categories describing wide innovation's potential influence on an enterprise's environment and relations with other market participants were rarely noticed by the respondents. At the same time respondents were concentrated mostly on new or improved product/services, noticing both positive and negative consequences of innovation.

In the next step of analysis, we decided to confront both indexes (IPEI and INEI) with independent factors that described the researched enterprises in two dimensions: on one hand the size of the enterprise (number of employees), its scale of activities (local vs. global) and the amount of money invested in 2011/2012 ("hard" factors), and on the other hand – engagement in research and development (whether the enterprise had any R&D cooperation, and if yes – if it was external institution(s) or internal department), cooperation index (the number of parties in research and development cooperation) and institutional support index (the number of institu-

tions supporting innovation in researched enterprises), which we called “soft” factors. As both IPEI and INEI indexes had chi-square distribution, H Kruskal-Wallis’ test for k independent samples was used to test whether there were any significant differences. The results are presented in Table 4.

The results show that the assessment of positive effects of innovation depended on objective characteristics of the enterprise – the bigger it was, the more it invested and the more international were its activities, the more positive effects of innovation were observed (the higher average rank). Institutional support was important too, having statistically significant influence on the innovation effects assessment.

On the other hand, enterprises that acted locally but across borders pointed to statistically more negative effects of the innovation, however if there had been institutional support, the scale of the dissatisfaction with the implemented innovation was smaller.

In the last step of analysis, we confronted enterprises identified as ‘possible creators’ (86) with all others to verify whether there was a statistically significant relation between number and originality of innovations and concentration on a wide perspective of innovation strategy (see table 5).

There was no statistically significant difference in assessment of innovation effectiveness on different levels between enterprises that introduced original innovations and those that introduced innovative product or service solutions already known to other enterprises.

Conclusions

We show the case where effectiveness of innovation had a different quantity depending on an SME's innovation strategies. The research was conducted in a peripheral region that a few years back was not only poor but also dormant in terms of innovation—now however the same region starts to be innovative.

This study finds evidence that pragmatists and imitators dominate among small businesses in peripheral regions. Generally, the examined firms focused mainly on the consequences of innovation for their products and services. They more often notice positive than negative aspects of introduced innovations, which is determined by the scale of the enterprise. Negative consequences are more often pointed out by smaller and locally focused enterprises. However, institutional support for innovation functions is a mitigating factor.

The significance of objective factors shows that there is a lack of enterprises (among SMEs) that may play the role of ‘creators’ in the peripheral

region. The conditions and costs of innovation process make it really hard to speak about a holistic vision of functioning by innovativeness. Innovations implemented in the researched enterprises have a character of immediate implementation of innovative products and services already existing elsewhere to improve the local competitiveness of the enterprise.

What is really important is that both the number of cooperators and the fact of R&D support do not affect innovation effectiveness assessment. In consequence, SME perspective generally concentrates on profitability of reducing costs, that is why possible sources of additional investment funds are so important. There is no room for 'creators' that independently from the scale of activity and the size have the vision of creating the environment, creating new market structures, developing new relations networks or educating clients. Such SMEs are able to exist only in strong centers, not in peripheries where only institutional support systems may mitigate the negative consequences of the peripheral localization of the enterprises.

In other words, specific innovation strategy has no influence on assessment of innovation effectiveness in peripheral region.

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Annex

Table 1. Theoretical model of innovation strategies vs. main aspects of enterprise's functioning

	Creators	Pragmatists	Imitators
SME's environment	focused on	rather not focused on	not focused on
SME's internal conditions	rather not focused on	focused on	not focused on
SME's product/service	not focused on	rather not focused on	focused on

Source: Own research based on analysis of CATI.

Table 2. The model of possible innovation effects

Scale of effects (SME's perspective)	Positive effects	Negative effects
SME's environment	Harm to health and the environment of the firm had decreased New market structures had been created SME's share of the market had increased SME had won new market SME had developed new sources of supply	Harm to health and the environment of the firm had increased SME had been supplanted by followers that had been able to promote products/services better SME's share of the market had decreased SME had not win new market SME's current suppliers had not been able to deliver changed materials and services
SME's internal conditions	Labour safety had increased Labour standards had been improved SME had employed new employees due to growing interest in new/improved product/service	Labour safety had decreased Labour standards had been worsened SME had laid off employees due to new maintenance-free machinery and equipment
SME's product/service	Rank of new/improved product/service had increased among other SME's products or services Customers had appreciated the higher quality of the new/improved product/service Flexibility of production had been improved Effectiveness of production had been improved Labour costs attributable to one product had been reduced Amount of materials and energy attributable to one product had decreased	Incomes had lowered due to denial of products from the market Prices of products/services had increased due to the depreciation costs of new equipment Customers had noticed poorer quality of new/improved product/service Flexibility of production had lowered Outages and failures related to inadequate support for new machinery and equipment had been more often Operating costs had increased

Source: Own research based on analysis of CATI.

Table 3. The distribution of IPEI and INEI

		IPEI	INEI
N	Valid	419	419
	Missing	0	0
Mean		5.59	1.47
Median		5.00	1.00
Mode		0	0
Std. Deviation		3.953	2.083
Skewness		.275	3.043
Kurtosis		-.901	12.847
Minimum		0	0
Maximum		14	14

Source: Own research based on analysis of CATI.

Table 4. P-value of H Kruskal-Wallis' test for k independent samples (p values)

		IPEI	INEI
"Hard" factors	range/scale of activities	.000	.023
	value of investment in 2011/2012	.008	.119
	number of employees in 2011/2012	.000	.102
"Soft" factors	engagement in R&D	.424	.405
	cooperation index	.241	.150
	institutional support	.012	.020

Source: Own research based on analysis of CATI.

Table 5. P-value of H Kruskal-Wallis' test for k independent samples: *creators* and other enterprises

	p values
environmental positive effects of innovations (IPEI for SME's environment)	.731
environmental negative effects of innovations (INEI for SME's environment)	.679
internal positive effects of innovations (IPEI for SME's internal conditions)	.547
internal negative effects of innovations (INEI for SME's internal conditions)	.168
product/service positive effects of innovations (IPEI for SME's product/service)	.937
product/service negative effects of innovations (INEI for SME's product/service)	.870

Source: Own research based on analysis of CATI.

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Regional innovation systems of Polish regions

JEL Classification: *R11; O30; C38*

Keywords: *regional innovation system, cluster analysis, regional development*

Abstract

Research background: Innovativeness is one of the factors which contributes to the economic growth of regions and helps to explain differences in the development of individual regions. Regions characterised by an imitative way of implementing innovations and regions where the transfer of already developed technology from outside dominates need different ways of supporting innovation activity and different innovation policies (Capello & Lenzi, 2013). The theoretical base of the research is the concept of a regional innovation system (e.g. Braczyk et al., 1998; Deloreux & Parto, 2005; Autio, 1998)

Purpose of the article: The identification of a group of regions characterised by a similar level of indicators covering the features of a regional innovation system. The identification of regions characterised by different types of innovation activity.

Methods: Clusters of regions with a similar level of indicators for the features of a regional innovation system were identified with the use of hierarchical clustering (Ward's method). Sixteen Polish regions are analysed in the years 2006–2013. Five components of a regional innovation system are included: human capital, social capital, innovation cooperation, innovation activity of enterprises, research and development (R&D) activity.

Findings & Value added: Based on the clustering results, four types of regional innovation systems in Polish regions can be identified: (1) public R&D based regions; (2) imitative regions, (3) private R&D based regions, (4) diversified innovation activity regions. Public R&D based regions are characterised by a low human capital level. Imitative regions are characterised by a low level of both human and social capital. Private R&D regions have a low human capital level, but compensate this with a very high social capital level. Diversified innovation activity regions are those where various innovation activities are undertaken.

Introduction

The theoretical base of the research is the concept of Regional Innovation Systems (RIS). The RIS concept is an analytical model of innovation activity in regions (Braczyk et al., 1998). An RIS is understood as a set of interacting private and public units, formal institutions and other organisations focused on the generation, use and diffusion of knowledge (Doloreux & Parto, 2004), or in a broader sense focused on production, import, modification, and diffusion of new technologies (Evangelista et al., 2002).

According to the RIS concept, innovation processes are interactive and there are many actors involved, among others: enterprises, universities, educational units and financial units. Additionally, communication and cooperation among actors is crucial. Moreover, innovation activity is seen as a geographically localised process, thus the socio-economic features of a regions should play an important role in that process (Todtling & Trippl, 2011; Nauwelaers, 2011). Auito (1998, p. 134) distinguished between two sub-systems in RISs, “the knowledge generation and diffusion sub-system and the knowledge application and exploitation sub-system”. The former consists of public research institutions, educational institutions, technology and workforce mediating institutions. The latter one consists of industrial companies and their customers, contractors, competitors and collaborators. Both sub-systems are embedded in the regional socio-economic and cultural settings. External forces which may influence the RIS are national innovation system institutions and policies, other RISs, international institutions and policies.

In the presented research, the following dimensions of RISs are measured:

- innovation activity of enterprises
- involvement of the public sector into research and development (R&D)
- human capital
- social capital, namely the social tendency to network
- innovation cooperation of enterprises with any public or private partner.

The first phase of the conducted research aims to identify the types of RISs in the Polish regions based on quantitative analysis of the abovementioned components of an innovation system.

Research methodology

The analysis was conducted for the years 2006, 2008, 2011, 2013 (the years of the analysis are based on the availability of social diagnosis data), and 16

Polish NUTS-2 regions: Łódzkie (PL11), Mazowieckie (PL12), Małopolskie (PL21), Śląskie (PL22), Lubelskie (PL31), Podkarpackie (PL32), Świętokrzyskie (PL33), Podlaskie (PL34), Wielkopolskie (PL41), Zachodniopomorskie (PL42), Lubuskie (PL43), Dolnośląskie (PL51), Opolskie (PL52), Kujawsko-Pomorskie (PL61), Warmińsko-Mazurskie (PL62), Pomorskie (PL63). The data used in the operationalisation of RIS components are presented in Table 1.

Clusters of regions with a similar level of indicators for the features of a regional innovation system were identified with the use of hierarchical clustering (Ward's method). Calculations were done in the R environment with the *stats* package (R Core Team, 2017). Using the *Ward2* command in the *stats* package the algorithm described by Kaufman and Rousseeuw (1990, cited in Murtagh & Legendre, 2014 s. 283) and Legendre and Legendre (2012, cited in Murtagh & Legendre, 2014 s. 283) is used and corresponds with the method described by Ward (1963, cited in Murtagh & Legendre, 2014 s. 283). The analysis was carried out for all the years covered by the study in order to present the changes taking place over time and to check whether the regions created new groups, and whether there are shifts of regions between groups. All indicators (Table 1) were normalised using the min-max normalisation method:

$$X_{nit} = \frac{x_{it} - \min(x_t)}{\max(x_t) - \min(x_t)} \quad (1)$$

where:

X_{nit} – normalised value of x -th indicator in i -th region in time t

x_{it} – value of x -th indicator in i -th region in time t ,

$\min(x_t)$ – minimum value of x -th indicator across all regions in time t

$\max(x_t)$ – maximum value of x -th indicator across all regions in time t

Results

Based on the clustering results, four types of RISs in Polish regions can be identified: (1) public R&D based regions; (2) imitative regions, (3) private R&D based regions, (4) diversified innovation activity regions (Table 2).

In groups III and IV, core regions can be identified (see bolded regions in Table A1 in the appendix). The Podkarpackie region (PL32) is the only one classified as a private R&D based region (purple on Map 1) over the entire period of the analysis. Similarly, the Mazowieckie (PL12), Małopolskie (PL21), Śląskie (PL22) and Dolnośląskie (PL51) regions are grouped as diversified innovation activity regions (green on Map 1) over the entire

period of the analysis. In the case of public R&D based regions (yellow on Map 1) and imitative regions (red on Map 1) transmission from one group to another, back and forth over time, can be noticed.

The Podkarpackie region is located in so-called “Eastern Poland” together with the Świętokrzyskie Lubuskie, Podlaskie and Warmińsko-Mazurskie regions. “Eastern Poland” accounted for regions with the lowest level GDP in euros per capita (below 20% of the EU average in 2004, and below 30% in 2013, Eurostat database)¹. However, the Podkarpackie region is characterised by a high level of private sector innovation activity in contrast to the high public sector engagement in the remaining “Eastern Poland” regions. The high level of private R&D expenditure is related to the localisation of the Aviation Valley in the region. The Aviation Valley can be perceived as a continuation of the arms industry located in the region since the beginning of the 20th century (compare Suwala & Micek, 2018). The Świętokrzyskie Lubuskie and Podlaskie regions are former Russian Partition regions with the highest level of employment in agriculture of 33%, 39% and 32% respectively (in the years 2010–2013, GUS database). It can be an explanation of the need for high support in R&D from the public sector.

In the group of regions with diversified innovation activity, Mazowieckie and Dolnośląskie are characterised by the highest level of enterprises with foreign capital per 10,000 inhabitants of 11.5 and 7 in 2004 to 19 and 8 in 2013 respectively (GUS database). Almost 45% of all new enterprises created in Poland each year are registered in the Mazowieckie, Małopolskie, Śląskie and Dolnośląskie regions (in the years 2009–2013, GUS database). It can be assumed that there is a positive relation between foreign investor activity, the creation of new firms and the innovation activity of enterprises. The question for further work is which other characteristics of a region play a role in the creation of a given type of RIS.

Conclusions

Regions vary in the types of innovation activity undertaken by innovative enterprises, but also in terms of the wider socio-economic environment in which innovation activity takes place. Elements of that environment such as

¹ The regions of “Eastern Poland” were supported with a specially dedicated operational programme, “Development of Eastern Poland” (for a description of the programme see https://ec.europa.eu/regional_policy/it/atlas/programmes/2007-2013/poland/operational-programme-development-of-eastern-poland)

human capital, social capital and the activity of foreign investors build the innovation system and can play a role in choosing a given type of innovation activity.

There was an assumption that for engagement in private R&D activity high levels of human and social capital are required. Although, the case of the Podkarpackie region shows that enterprises can still invest a lot in R&D activity, even with a lack of regional human capital, which is related to the high investment in research in the aviation sector. However, social capital and cooperation in the Podkarpackie region are high and can support innovation activity. In the case of imitative regions, the low level of both human and social capital can be noticed. Does this mean that increasing the level of human capital and fostering cooperation will stimulate companies to invest more in in-house R&D than in the acquisition of machinery and software?

In the further work, econometric techniques will be used to verify if there is a relation between the type of innovation activity undertaken by innovative enterprises and the features of an economic and social environment in the region in which enterprises operate.

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Annex

Table 1. Indicators used as quantitative measures of RIS components

RSI component	Indicator	Basic data name/label	Source [indicator code]
Human capital	K1	% of graduates (ISCED 1997 level 5) in physics, chemistry, biology, mathematics and computing, informatics, environmental protection, engineering, manufacturing and processing, architecture and construction, as a percentage of graduates of public and private higher education units in all fields	Central Statistical Office of Poland (GUS)
	K2	Scientists and engineers as a percentage of the active population	Eurostat [hrst_st_rcat]
Social capital	N1	Percentage of respondents who are members of one or more associations	Social Diagnosis (2016)
Cooperation	C1	Percentage of innovative enterprises (manufacturing sector) engaged in any type of cooperation	GUS
	C2	Percentage of PCT co-patent applications done within the region	OECD
Innovation activity of enterprises	IA1	Average rate of innovative enterprises in the total number of enterprises	GUS
	IA2	Expenditure of innovative enterprises on R&D as a percentage of total innovative activity expenditure	GUS
	IA3	Expenditure of innovative enterprises on acquisition of machinery, software and equipment as a percentage of total innovative activity expenditure	GUS
Research activity	RD1	Public sector (government + higher education) R&D expenditure as a percentage of total R&D expenditure	Eurostat [rd_e_gerdreg]
	RD2	R&D personnel and researchers in public (government + higher education) sector R&D as a percentage of total R&D personnel and researchers	Eurostat [rd_p_persreg]
	RD3	Patent applications to the EPO by priority year per million inhabitants	Eurostat [pat_ep_rtot]

Source: own elaboration.

Table A1. Analysis of the level of RSI indicators in the groups of regions

Group	Year	Regions	K1	K2	N1	C1	C2	IA1	IA2	IA3	RD 1	RD 2	RD 3
I	2006	-											
	2008	PL31	---	--	+++	+++				---		++	+++
		PL34	--		++	++				--			++
		PL52	+/-										
	2011	PL31	---	---	--				++	++		++	+++
		PL33	--	--	+/-				+/-	+/-			++
		PL34											
		PL41											
		PL52 PL61											
	2013	PL31	--	--	++	++	---			--	++	+++	+++
		PL33	+/-		+/-	+/-	--			+/-	+/-	++	++
		PL34											
PL52													
II	2006	PL11	+++	--		---	++	---	--	+/-		+++	
		PL41	++	+/-		--		--	+/-	--		++	
		PL42	+/-						+/-				+/-
		PL43											
		PL61											
		PL62											
	2008	PL11	--	---		---	++	--	--	+++			+++
		PL33	+/-	--		--	++			+/-	++		++
		PL41											
		PL42											
		PL45											
		PL61 PL62											
	2011	PL11	--	---		---	++	---	--	++			+++
		PL42				--		--		+/-			++
		PL43 PL62											
	2013	PL11	---	--		--	+++	---	--	+++			+++
		PL41	--	+/-		+/-	++	--		++			++
		PL61 PL62											
III	2006	PL31	--	--	+++	+++	++	+++	++	---			
		PL32		+/-	++	+/-	+/-	++	+/-	--			
		PL63											
	2008	PL32	--	--	++	++	++	++	++	--	--	---	
	2011	PL32	--	--	++	+++	+++	++	--	--	--	---	
2013	PL32	--	--	++	++		+/-	+++	--	---	---		
IV	2006	PL12	++	+++	+++		+++	+++	+++	+/-		++	+++
		PL21	+/-	++	++		++	++	+/-	++		+/-	++
		PL22		+/-			+/-	+/-	--	--			
		PL51											
		PL52											
	2008	PL12		+++	++		++	+++	+++	++		++	+++
		PL21		++	+/-			++	+/-	+/-		+/-	++
		PL22						+/-	--				+/-
		PL51											
		PL63											
	2011	PL12		+++	++		++	++	+++	---		++	+++
		PL21		++	+/-		+/-	+/-	++	--		++	++
		PL22							+/-	+/-			+/-
		PL51											
		PL63											
2013	PL12		+++	++		+++		++	+/-		++	+++	
	PL21		++	+/-		++		++	+/-	--		+/-	
	PL22					+/-							
	PL51												
	PL63												
V	2006	PL33	--					++	--	+++		+++	
		PL34	+/-							++		++	
	2008	-											
	2011	-											
	2013	PL42	--						+/-	---	---	++	+++
PL43											+/-	++	

+++ very high level (0.9–1), ++ high level (0.6–0.89), +/- moderate level (0.4–0.59), -- low level (0.1–0.39), --- very low level (0–0.09)

Source: own elaboration using *stats* package (R Core Team, 2017).

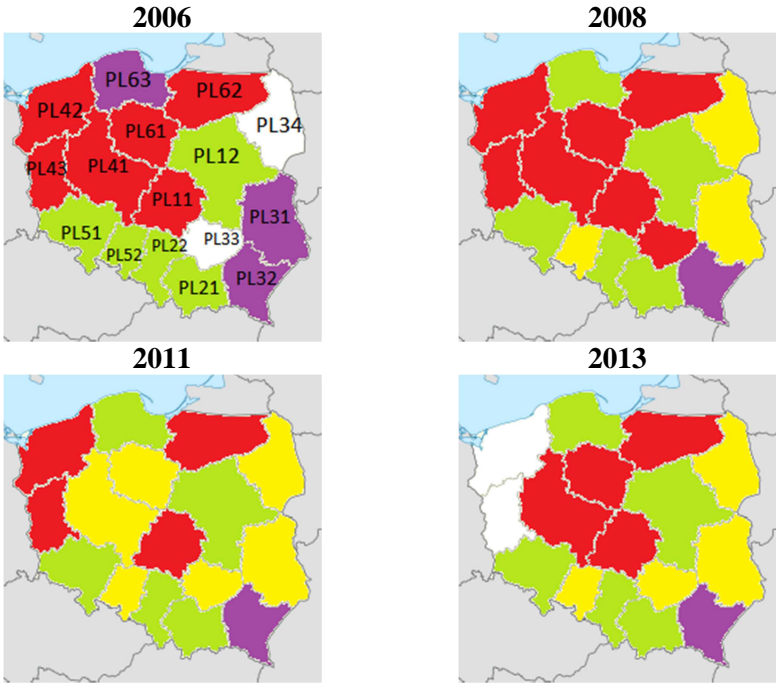
Table 2. Types of regional innovation systems

Group	Group characteristic
I – public R&D based regions	<ul style="list-style-type: none"> • Low or very low level of human capital* • High or moderate level of social capital • Low or very low level of business sector R&D expenditure • High or very high level of governmental R&D expenditure • High or very high level of public sector R&D personnel
II – imitative regions	<ul style="list-style-type: none"> • Low or very low level of human capital • Low or very low level of innovation cooperation • High or very high level of patenting cooperation • Low or very low rate of innovative enterprises • Low or moderate level of business sector R&D expenditure • High or very high level of business sector expenditure for acquisition of machinery, software and equipment • High or very high level of public sector R&D personnel
III – private R&D based regions	<ul style="list-style-type: none"> • Low or very low level of human capital • High or very high level of social capital • High or very high level of innovation cooperation • High or very high rate of innovation enterprises • High or very high level of business sector R&D expenditure • Low or very low level of business sector expenditure for acquisition of machinery, software and equipment • Low or very low level of governmental R&D expenditure • Very low level of public sector R&D personnel
IV – diversified innovation activity regions	<ul style="list-style-type: none"> • High or very high level of human capital • High or moderate level of social capital • High or very high level of patenting cooperation • High or moderate rate of innovation enterprises • Very high, high or moderate level of business sector R&D expenditure • Low or moderate level of business sector expenditure for acquisition of machinery, software and equipment • High or moderate level of public sector R&D personnel • Very high, high or moderate level of patenting activity
V – unspecific group	Regions which are not characterised by any specific pattern in a given year. In the remaining years they are grouped within one of the four identified groups.

*For analysis of the level of RSI indicators in the groups of regions see Table A1 in the appendix.

Source: own elaboration.

Map 1. Regional innovation systems in Polish regions



Yellow - public R&D based regions (I),
red - imitative regions (II),
purple - private R&D based regions (III),
green - diversified innovation activity regions (IV),
white - unspecific group (V)

Source: own elaboration.

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**Institutional and innovative factors of intellectualization as the basis
of competitiveness of the national economy of Ukraine in the conditions
of global informatization**

JEL Classification: *O11; O23; O30*

Keywords: *intellectualization; postindustrial society; institutional and innovation factors*

Abstract

Research background: At the stage of formation of post-industrial society, the problem of implementation of the strategy of transition to an intellectually oriented model of economic development, complex modernization of the socio-economic system of the state was updated, which is explained by the necessity of developing new approaches to ensuring the competitiveness of the national economy in the system of world economy.

Purpose of the article: This article is devoted to the substantiation of theoretical and methodological principles and the development of practical recommendations for the implementation of institutional and innovative factors of intellectualization in order to ensure the competitiveness of the national economy in the conditions of

global informatization.

Methods: In the process of research were used general scientific and special methods: synthesis and system analysis, statistical and economic analysis, comparative and indicative methods, the method of the main components, grouping, logical analysis, strategic management.

Findings & Value added: The article substantiates the methodical approach to the formation of the institutional and innovative factors of intellectualization as the basis of the competitiveness of the national economy by supplementing the existing institutional and economic, institutional and legal and institutional and organizational factors. It was defined a scientific approach to identifying threats to the process of intellectualization, which, unlike the others, are generated by the environment of an imperfect and unformed institutional environment. It has been developed the methodology for assessing the competitiveness of the national economy by expanding the traditional indicator approach by estimating the coefficients of determination of the competitiveness of the national economy and its innovation component.

Introduction

The complex digitalization and informatization of not only the public and social aspects of life, but also the system of economic relations, based on the use of information and communication technologies, is becoming more and more evident trend of both the world economic system and the economies of the leading countries of the world.

Ukraine possesses significant potential for scientific, technological and innovative development, but the level of use and commercialization of the results of research and development, leading to the release of new competitive products and services to the market in order to strengthen the competitiveness of actors in the real sector and the national economy as a whole, is insufficient.

The aim of the study is to justify the theoretical and methodological foundations and the development of practical recommendations for the implementation of institutional and innovative factors of intellectualization in order to ensure the competitiveness of the national economy in the context of global information development.

The theories of the post-industrial society by A. Toffler (2000), the new industrial society by J. K. Galbraith (1967), the formed industrial society by R. Aron (1966), the technetronic society by Z. Brzezinski (1970), post-capitalist society by Yu. Danilenko (2018), advanced industrial society by G. Marcuse (1964) became the significant scientific results of the study of the intellectualization of the economy.

An analysis of the works of abovementioned scientists has led to the conclusion that foreign and domestic scientists have made a significant contribution to the study of the problems of state regulation of the national economy intellectualization process and its correlation with ensuring the competitiveness of the national economy.

Research methodology

The author used general scientific and special methods in the process of research. Synthesis and system analysis were used to study the prerequisites and factors affecting the activation of the intellectualization process of the national economy; statistical and economic analysis and comparative methods were used to study the trends in the development of intellectual and innovation activities and the assessment of the effectiveness of state innovation policy; an indicative and principal component methods were used in assessing the level of competitiveness of the national economy by indicators of intellectual and innovative activities; method of grouping, logical analysis, strategic management were used during the substantiation of strategic priorities and the definition of institutional and innovative factors of the growth of the economy's intellectualization.

Results

The implementation of the intellectual-innovative model of the economic development of the state necessitates the formation of an appropriate institutional environment, the involvement of effective institutional factors of reproduction, development and use of scientific and technological and innovative potential, ensuring the active implementation of modern technologies in production, production and sale of new types of competitive goods (works, services), as well as technological solutions. The transformation of the economic system on the basis of innovation and technological development requires the intensification of state actions in the field of innovation management, improvement of the institutional factors of intellectualization as the basis for the competitiveness of the national economy, in particular, institutional and legal (improvement of the regulatory and legal field of innovative activity), institutional and economic (establishing the system of incentives and prerequisites for enhancing innovation activity), institutional and organizational (building an effective system for managing innovative development).

It should be noted that a significant potential for scientific, technological and innovative development remains in Ukraine, the implementation of which can accelerate the structural and technological modernization of the national economy and increase the country's international competitiveness, despite the complex of systemic problems and the destructive influence of hybrid aggression. In particular, Ukraine is one of eight countries of the world that have the necessary scientific and technological potential to create aerospace equipment, and one of the top ten shipbuilding countries of the world; ranks ninth among the largest exporters of weapons and the first in Europe in the IT-outsourcing. At the same time, low-tech "old industrial" industries still constitute the basis of the national economy, focused on manufacturing products of the third and fourth techno-economic paradigm and export structure with a predominantly raw character and a high share of low value added products. It proves the inefficiency of using the existing domestic innovative and intellectual potential and unformed new competitive innovative development drivers.

Using the method of principal components, the condition and dynamics of the integral index of the innovation component of the competitiveness of the national economy of Ukraine are determined, negative trends of which were observed in 2007-2016 and were caused by the deterioration of most of the indicators of the innovation sphere and they were in the critical zone (below the lower threshold value) during the entire study period (Table 1). In 2016, the innovation component of the national economy's competitiveness declined to a critically low level (0.127), which is explained by stressful transformations of the socio-economic and political environment in our country, which resulted in a sharp deterioration in the dynamics of the real economy development, a decrease in investment attractiveness and a decrease in investment in innovation processes.

In recent years, the laws on the State Budget of Ukraine have in fact blocked the potential for implementing the provisions of the legal acts of Ukraine regarding the financing of scientific-technical and innovation activities. In 2016, budget expenditures on scientific research are reduced to a historical minimum of 0.18% of GDP, which is almost ten times lower than the rate stipulated by the Law of Ukraine "On Scientific and Scientific-Technical Activity". Whereas, according to Eurostat, the share of expenditure on research and development in EU-28 GDP averaged 2.03%, in China - 2.08%, USA - 2.77%, Japan - 3.47%, South Korea - 4.15%. It should be noted that the dynamics of research expenditures in the EU and other developed countries in the past decade has been positive. For example, South Korea has almost doubled the share of expenditures over the past decade, from 2.35% to 4.15% of GDP. On the other hand, opposite trends are ob-

served in Ukraine: the share of expenditures on research has decreased from 1.06% of GDP in 2003 to 0.18% in 2016. The situation is complicated by the fact that the priority support for the country's defence in conditions of external aggression and the significant size of the budget deficit make it impossible in the near future to increase funding for innovation and scientific and technological activities, which leads to inefficient distribution of innovation costs, reduction of financing for innovation activity, decline in the science personnel skills and the quality of innovation, dependence on technology imports.

It has been established, using the method of strategic analysis, that the implementation of the priorities of the intellectualization development, as the basis for the competitiveness of Ukraine's national economy, should be carried out within the framework of institutional-economic, institutional-legal and institutional-organizational mechanisms (Fig. 3). Therefore, the concept of state policy of regulating the intellectualization process should focus on ensuring proper institutional transformations and effective economic incentives for combining the interests of all participants in the innovation process, from generating knowledge to selling innovative products in the domestic and foreign markets. It is not only about improving the functioning of state and non-governmental institutions to support and stimulate the development of innovative activity, but also about creating an institutional environment to stimulate the integration of scientific-research and production spheres, that involves the establishing of appropriate "rules of the game" (improving the business climate, intellectual property protection, simplification of patenting, etc.) and reducing transaction costs for searching for information on innovative developments, partners in technology and inventions commercialization.

The purpose of the implementation of the institutional and economic mechanism for ensuring the intellectualization of the national economy is the establishing of appropriate financial and economic incentives and motives for the subjects of innovation activity. To do so, it is necessary to implement the tools of fiscal and budgetary stimulation of innovative activity, attracting investment resources to innovative projects, fiscal incentives, and ensure the development of bank lending and venture capital funding of innovative activity.

The formation and implementation of the institutional and legal mechanism for ensuring the intellectualization of the national economy should be aimed at creating an effective public administration system that would have a regulating effect on the subjects of innovation activity, create incentives for enhancing innovation activity, systematizing legislation in the innovation sphere, levelling the negative effect of contradictory provisions of in-

dividual regulatory legal acts, structuring of the public control system in the innovation sphere, the formation of a proper information and analytical support for innovation activity at different levels of management.

Conclusions

At the modern post-industrial and informational stage of development of economic relations, competition for limited resources and markets for goods (works, services) is significantly intensified, and the traditional factors of production, such as capital and labour, play an ever smaller role in shaping the competitiveness of national economies, more and more being inferior to the formation and efficient use of intellectual and high-tech potential.

The following obstacles to the intellectualization of the Ukraine's national economy can be considered to be systemic: the unsystematic nature and the failure to comply with certain legal acts regulating intellectualization; the inefficiency of the state strategic planning of the development of the national economy on an innovative basis; permanent structural reorganization of the state agency for the development of innovation activity and changes in its departmental affiliation; permanent underfunding of science, technology and innovation activities from the state budget; misallocation of expenditures on the implementation of scientific and scientific-technical works; inconsistency of the investment structure with the priorities of the innovative development of the economy; widening the gap between the innovation sphere and financial and investment institutions; the inefficiency of state regulation of the protection of intellectual property rights; lack of domestic market of innovation products; low level of competition in the domestic market.

The use of system-structural analysis allowed to justify the strategic priorities of the intellectualization development as the basis for the competitiveness of the national economy of Ukraine by the basic directions of state policy in this area. These are a full strategic planning of intellectualization, the formation of a public administration system for the process of intellectualization, an effective patent and licensing policy (institutional and legal area); sufficient fiscal stimulation of innovation activity, venture financial and investment support, bank lending of innovation activity, stimulating depreciation policy (institutional and economic area); the formation of a system of information and analytical support for intellectualization, supervision and assessment of innovation activity, the development of a full-fledged and efficient innovation infrastructure, improvement of intellectual

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and personnel support, the use of the benefits of international scientific and technological cooperation (institutional and organizational area).

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Annex

Table 1. Indicators of innovation activity in Ukraine in 2005, 2007, 2010, 2014-2016

Indicators	Year						Absolute variation (+/-) 2016 to	
	2005	2007	2010	2014	2015	2016	2005	2015
The level of expenditures on scientific and technical works,% of GDP	1.17	0.85	0.83	0.66	0.62	0.48	-0.69	-0.14
The level of financing innovation activities,% of GDP	1.31	1.51	0.74	0.49	0.69	0.97	-0.34	+0.28
The share of specialists performing scientific and technical work, people per 1000 employees,%	0.51	0.46	0.44	0.50	0.50	0.39	-0.12	-0.11
Share of enterprises engaged in innovation activity in the total number of industrial enterprises,%	11.87	14.23	13.78	16.07	17.23	18.86	+6.99	+1.63
Share of enterprises that introduced innovations in the total number of industrial enterprises,%	8.06	11.46	11.47	12.07	15.17	16.63	+8.57	+1.46
The share of enterprises that sold innovative products in the total number of industrial enterprises,%	10.17	10.01	9.09	9.04	11.96	14.31	+4.14	+2.35
The share of sold innovative products in the total volume of sold industrial products,%	6.5	6.7	3.8	2.5	1.4	1.9	-4.60	+0.50

Source: own estimation based on State statistics service of Ukraine (2016).

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**The evaluation of the impact of higher education funding models on
access to higher education in European Union member states:
methodological approach**

JEL Classification: *I20; I22; I23; I24; I28*

Keywords: *higher education funding model; impact evaluation; methodology; higher education access; tuition fees; grants.*

Research background: Higher education (HE) funding with regard to the problem of accessibility to HE is widely investigated topic in scientific researches. The practical situation across European Union (EU) member states shows that HE is financed according to the four different HE funding models, which rely on the tuition fees and public financial support for students (i.e., “*Minor fees-minor grants*”, “*Minor fees-major grants*”, “*Major fees-major grants*” and “*Major fees-minor grants*”). The results of scientific research confirm the fact, that HE funding models has an impact on access to HE. The practical situation shows that HE funding models are significantly different among EU member states. Therefore, it is important to determine how four different modes of funding influence the results of student’s access to HE in EU member states.

Purpose of the article: The purpose of this article is to review the scientific literature and to determine the main methodological approaches, methods/models for the future research. The article deals with the methodological issues on the question “*how to evaluate the impact of funding models on access to HE*”. Firstly, the previous research methodologies, methods are analysed. Secondly – the most appropriate research methods and models for cross-country analyses within EU member states are presented.

Methods: review and generalization of the newest scientific literature, systemic analysis, comparative analysis.

Findings & Value added: The most appropriate research methods of the evaluation of HE funding models impact on access to HE is presented. These methods are applicable in further research in order to evaluate the impact of HE funding models on access to HE in EU comparative analyses.

Introduction

Higher education (HE) funding models and their impact on access to HE in different countries is topical issue in the scientific literature. The main results of scientific works confirms the fact that HE funding, especially that part of funding, which embrace student finance – influences the access to HE. The interest of scientists has increased due to the question – why countries, which has the similar goal to expand HE systems, apply different types of HE funding models? Although the topic is actual, there is no scientific researches that investigate the impact of HE funding models on access to HE within EU member states in comparative perspective. Therefore, it is important and useful to develop the methodology, which allows evaluating the scale of impact of HE funding models on access to HE among European Union (EU) member states.

The aim of this research is to review the scientific literature and to determine the main methodological approaches (*research designs, methods, models*) for the future study in order to evaluate the impact of HE funding models on access to HE within EU member state in comparative perspective.

The methods of the research: review and generalization of the newest scientific literature, systemic analysis, comparative analysis.

The content of article. The review of methodological approaches, occurring in scientific literature, the research designs, methods are described in the section “*Research methodology*”. The main findings and results of reviewed methods and the most appropriate methods for cross-country analyses in EU member states are presented in the section “*Result*” and “*Conclusion*”.

Research methodology

The most current comparative studies of the impact of HE funding on access are descriptive or theoretical in nature, and many adopt qualitative

approaches such as interviews and grounded theory. Yang (2011, p. 9) noted, that these analyses are mostly suggestive, rather than definitive, as to how these factors affect access; among the very few comparative studies using quantitative methods, descriptive data analyses are dominant, which neither allows researchers to simultaneously examine the effects of many factors, nor controls for time effects.

According to the scientific literature, two levels of evaluation of the impact of HE funding on access can be distinguished: *national* and *regional level*. Due to these levels, the methods/models that are applicable for research differ as well. Therefore, the impact of funding on access to HE can be investigated within the country, comparing HE funding impact on access *before* and *after* national HE funding reform. In the case of regional level – the impact of HE funding on access to HE is estimated among different countries, regions or cities (i.e. OECD, US, UK, *etc.*).

With regard to the topic, two main objects are taken into account: *HE funding model* and *access to HE*. According to the “*Four Worlds of Student Finance*”, which were suggested by Garritzmann J.L. (2015), there are four types of HE funding models: “Minor fees-minor grants”, “Minor fees-major grants”, “Major fees-major grants” and “Major fees-minor grants”. These models has two main dimensions – first is *tuition fees*, and second – *public financial support* (PFS). PFS consists of *non-repayable forms of PFS* – means all kinds of grants (e.g., merit-based, need-based, universal, *etc.*). Non-repayable form of PFS exist in all EU HE systems, except England (no grants left from 2016). *Repayable form of PFS* includes all kinds of publicly subsidised loans (e.g., central, regional or local governments subsidised, *etc.*) – exist in around two-thirds of all EU HE systems. However, in a number of EU member states, *study loans* are not very widely used. The proportion of these dimensions (*tuition fees, grants, loans*) in HE funding models makes different impact on access to HE.

Concerning HE access, it should be noted, that the term *access* has not been clearly defined in comparative HE research. Although, *access* can be described as an opportunity of and pathway to HE that may be facilitated or impeded by students’ sociodemographic characteristics and educational system factors such as, but not limited to, students’ social/class origins, family income, ethnicity, gender, geographic location, and school factors (Yang, 2011, p. 12). However, the *gross enrolment rate, entry rate, participation rate* – are used to be the most common indicators that represent the situation of HE access. A set of cross-country time-series international indicators has been generated by some international agencies (e.g., UNESCO, OECD), problems with data and interpretation arise when these indicators are used in research (Yang, 2011). According to the specific groups of pop-

ulation, the indicators such as *parental education level (which represents students' social-economic background)*, *sex*, *region of residence*, *age* are widely used in researches.

Considering reviewed scientific literature on how students react on changes in tuition fees and PFS (public financial support) – the typical finding is that rising annual tuition fees, for instance, with 1000 EUR or reducing student aid in non-repayable form with 1000 EUR – decreases enrolment in HE by about 5 percentage points (Falch, Oosterbeek, 2011, p. 2). Hübner (2009) uses data on all high school graduates qualified for university studies in Germany and employs a *difference-in-difference strategy*. The strategy takes into account all factors of each *Länder* that do not change over time. He finds that the probability to enrol in HE declined by 2.7 percentage points in the states introducing the fee. This is the relevant effect for the country, but is a lower bond for the *Ländern* since the high school students could choose to enrol in non-fee states (Falch, Oosterbeek, 2011, p. 19). From the perspective of both classical human capital theory and sociological rational action theory, we may expect that higher costs may decrease enrolment and increase inequality (Geven, 2015, p. 484). If tuition fees go up, this may present a barrier for the marginal student who may not consider HE a worthy investment; everything else being equal, then, we may expect higher prices to lead to lower demand, and thus lower enrolment levels for those affected by higher prices (Geven, 2015, p. 484).

Concerning inequality, quite a few studies argue that tuition fee hikes disproportionately affect students from lower social backgrounds. From the perspective of Rational Action Theory, one can expect that students from lower social classes are more risk averse than students from higher status families (Geven, 2015, p. 484). Geven (2015) also applies the *difference-in-difference design* (pseudo-experimental research design). Author choose the dependent variable – '*number of new enrolments*', while the independent variables are '*Treatment*', which is a dummy indicating whether the region is treated or control, and '*Post-period*', which is a dummy indicating the time *pre-* or *post-*treatment as well as the '*interaction between treatment and post-period*' as the difference-in-differences estimator. Deven (2015, p. 491) applies Poisson regression models, which are developed to analyse count-data (such as in this case, the number of students).

PFS lowers the cost of HE. PFS (non-repayable forms) schemes are therefore expected to have exactly the opposite effect as tuition fees (Falch & Oosterbeek, 2011, p. 19). Baumgartner & Steiner (2006) use a *difference-in-difference strategy* on data from the German Socio-Economic Panel Study to estimate the enrolment response to the reform. The authors find a positive but statistically insignificant effect of the reform. Steiner &

Wrolich (2008) use the same data source, but relate the educational choice to the predicted student aid based on parents' income. They find a significantly positive effect on enrolment into university of the same size as the US evidence. Thus, the evidence indicates that students' responses to tuition fees and aid are similar with opposite signs (Falch & Oosterbeek, 2011, p. 20).

Dearden L. *et al.* (2011, pp. 1-30) benchmark the effects of both grants and fees, and furthermore, researchers do this on a representative sample of individuals, using a *pseudo panel data* set constructed from 16 years of data on first-year university participation, the results authors present, suggest an important role for tuition fees and grants in university participation decisions. Authors find robust evidence that a £1000 increase in tuition fees reduces university participation by 3.9 percentage points, while a £1000 increase in maintenance grants increases participation by 2.6 percentage points. These results are in line with those estimated in the US in a number of studies (*see also* Dynarski (2003), Hemelt & Marcotte (2008)).

It should be noted, that advanced analytical approaches, including statistical methods to evaluate the effects of HE funding on access, have been best developed and widely used in the US. Some advanced statistical methods or econometric methods, such as *fixed* and *random-effects models*, allow researchers to focus on the impact of one indicator or a set of indicators on access while simultaneously controlling for many other indicators in the same model. St. John (2006) adopts *fixed-effects models* to analyse state indicators and examine the relationship between the adoption of new education policies and related outcomes (e.g., college-going rates) across the 50 states in the US. If cross-sectional time-series data on the 50 states in the US can be used to discern how state finance policies link to state enrolment rates, then these methods can be adapted to use international indicators to examine economic factors associated with enrolment rates across nations (Yang, 2011, p. 10).

Authors used different research methods, models to evaluate the impact of tuition fees and financial aid on access to HE (*participation, enrolment and etc.*) (*see* Table 1). For example, *difference-in-difference strategy (design)* – a *pseudo-experimental research design* that has become popular in policy studies. The intuition behind these designs is that it is possible to identify a *causal effect* by comparing trends *before* and *after* a policy has been implemented, using another region where that policy has not been implemented as a control group (*see* Baumgartner & Steiner, 2006, Hübner, 2009; Geven, 2015). It should be noted, that this design was applied in both – national and regional level of research. This design could be applicable for comparative cross-country analyses in order to estimate the causal

effect by comparing trends before and after HE funding model is implemented in EU member state. *Pseudo-experimental research design* identifies the causal effect of price changes on student enrolment, using treatment and control groups (Dynarski, 2003; Geven, 2015).

Yang (2011, p. 11) noted, that the financial aid factors in existing research and their theoretical foundations, demand-supply theories are primarily micro-economically oriented. Therefore, they overlook or underestimate other economic factors at the macro level, such as public expenditure on education as a percentage of GDP, which may, themselves, influence access. The findings of quantitative cross-countries studies may seem readily generalizable to individual countries within a data set, but this may not be the case due, to distinctive features of a nation's HE system that are not taken into account in the macro analyses.

Results

The previous research efforts of scholars can serve as valuable templates for cross-country comparisons within EU member states. According to scientific literature, the main models of evaluation of HE funding impact on access to HE can be highlighted as follows: fixed-effects models, cross-sectional time-series data models, panel data models, taking into account semi-experimental research design, difference-in-difference research strategy (see Table 2).

In our view, these methods, models are the most suitable to cross-country analyses within EU member states. They will allow investigating HE funding models' as well as HE access indicators in short or long periods. Although, it should be taken into account, that comparative research must be framed around multi-causal understandings of varying factors and how they interact.

Conclusions

The analyses of HE funding models impact on access to HE methodological approaches, allows to pursue future researches, according to the most appropriate research methods and econometric models. The treatment of the EU member states and time effects will be one of the significant features of the research.

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Annex

Table 1. Research methodologies on evaluation of impact of HE funding models on access to HE

Author, year	Methods	Description	Results/findings	Level of research (national/regional), time
Baumgartner, Steiner (2006)	<i>Discrete-time hazard rate model</i>	In order to estimate the causal effect on enrolment rates into HE.	The Reform had a small positive, but statistically insignificant effect on enrolment rates.	National
	<i>Natural experiment</i>	Introduces an exogenous variation in the entitlement to student aid, which authors use to identify the “causal” effect of this reform on enrolment rate into HE.		Germany (2004 reform)
St. John (2006).	<i>Fixed-effects models</i>	Author analyses state indicators and examine the relationship between the adoption of new education policies and related outcomes across the states in the US.		Regional US (50 states)
	<i>Cross-sectional time-series data model</i>	Used to discern how state finance policies link to state enrolment rates.		
Dearden <i>et al.</i> (2011)	<i>Pseudo panel data</i>	Authors create the pseudo-panel data of university participation of cohorts defined by sex, region of residence, family background. Pseudo panel data deals with problems of multicollinearity and endogeneity.	Researchers benchmark the effects of both grants and fees on a representative sample of individuals.	Regional UK (2012 reform)
Yang (2011)	<i>Panel data models</i>	Author use panel data models in data analyses of international indicators and examine the association between education finance and access among high-income OECD countries and among a wider country group	The study finds that scholarships and grants as well as student loans do not have an impact on HE access, whereas public expenditure per student bears a statistically significant but negative association with enrolment, after controlling for national economy, population characteristics and basic education.	Regional 27 OECD; 92 countries (1998-2006)
Geven (2015)	<i>Poisson regression models</i>	Author carried out three main robustness checks: using more years for the pre- and post-period, using ‘new enrolments as a percentage of the population’ as a dependent variable, and using Poisson regression models.	It has investigated four main effects, namely, on general enrolment patterns, on enrolment patterns of specific age groups, on different social classes and different ethnic groups. It has found that enrolments have declined substantially after the marketization, particularly for older students and those from the middle and service class.	Regional UK and other countries (12 treatment and 10 control groups)
	<i>Semi-experimental research design</i>	Researchers are using semi-experimental designs to identify the causal effect of price changes on student enrolment.		(2012/13 reform)

Source: prepared by authors.

Table 2. The research methods and models of evaluation of HE funding impact on access to HE

Research method/model/design/strategy	Purpose for research method/model/design/strategy application
<i>Difference-in-difference research strategy</i>	In order to identify a <i>causal effect</i> by comparing trends <i>before</i> and <i>after</i> a model has been implemented, using another region where that model has not been implemented as a control (within one category of HE funding model).
<i>Fixed-effects models</i>	In order to examine the relationship between the change of HE funding models and related outcomes (e.g., entry, participation, enrolment rates) across the EU member states.
<i>Panel data models</i>	In order to examine the association between funding model and access among EU member states.
<i>Cross-sectional time-series data model</i>	In order to discern how state HE funding models link to state enrolment rates.
<i>Semi-experimental research design</i>	In order to identify the causal effect of tuition fees/grant changes on student enrolment.

Source: prepared by authors.

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The full harmonization of the protection against unfair commercial practices in the Central Europe in the light of the top casuistics

JEL Classification: *D18; K13; M38; O34*

Keywords: *Unfair Commercial Practices Directive; harmonization; legislation; case law; misleading*

Abstract

Research background: Modern European integration focuses on competition in the internal single market embracing both competitiveness and consumer protection. The hallmark, the Unfair Commercial Practices Directive (UCPD) was intended to overcome national particularities by a full harmonization. Has this been achieved in Central Europe according to the message conveyed by the case law of the top judiciary authority, the Court of Justice of EU (CJ EU)?

Purpose of the article: The purpose is to study the case law of the highest judicial authority for UCPD issues, CJ EU, and explore the message that it conveys about harmonization of the protection against unfair commercial practices in Central Europe.

Methods: The cross-disciplinary and multi-jurisdictional nature of this paper, and its purposes, implies the use of Meta-Analysis, of various interpretation techniques, of a critical comparison and of a holistic assessment. Case law is explored, the dominating qualitative research and data are complemented by the quantitative research and data.

Findings & Value added: Although the UCPD is legislative transposed, the exploration pursuant to the purpose suggests that this ambitious project is embraced with varying degrees of commitment by judges. Consequently, the fully harmonized UCPD regime is not a reality for the judiciary in certain Central European jurisdictions.

Introduction

The Directive 2005/29/EC concerning unfair business-to-consumer commercial practices in the internal market, i.e. Unfair Commercial Practices Directive (“UCPD”) is a full harmonization meant to fight against unfair business-to-consumer commercial practices within the single internal market of the EU (MacGregor Pelikánová, 2019a). It is highly relevant to study the case law of the highest judicial authority for UCPD issues, the CJ EU, and explore the message that it conveys about this fully harmonized UCPD regime in Central Europe. This investigation demands the exploration of judiciary and other sources while focusing on both qualitative and quantitative aspects. The need to overcome this fragmentation and diversification leads to the selection of the holistic approach and Meta-Analysis.

A literature review will be offered, then the methodology will be described. The generated results will be comparatively presented and critically discussed. The propositions will culminate in conclusions exploring the message conveyed by the case law of the CJ EU about the UCPD. The exploration centered on this purpose and related hypothesis suggests that the UCPD is an ambitious project, embraced with varying degrees of commitment by Central European judges.

Literature review

The modern European integration mixes supranational and intergovernmental approaches (MacGregor Pelikánová, 2014). At its center is the single internal market and the smart, sustainable and inclusive growth proclaimed by the current one decade strategy Europe 2020. Indeed, Europe 2020 should take advantage of the technological and other potentialities of the European economy (Balcerzak, 2016a), and make out of the EU the world leader while decreasing divergences between EU member states (Balcerzak, 2016b). However, it appears that the Europe 2020 setting and its application are far from perfect (MacGregor Pelikánová, 2019b). and that insufficient efforts are made, especially by the most important EU institutions and EU member states (Balcerzak, 2015).

EU member states, their businesses and individuals share and follow different social, legal, political and economic traditions (MacGregor Pelikánová, 2014) particularly regarding the issue of (un)restrained and (un)fair competition (MacGregor Pelikánová, 2017; MacGregor Pelikánová 2019a). Continental law jurisdictions are rather formalistic and inclined to directly legislate, either via codes or special Acts, to protect against unfair

competition, while common law jurisdictions do not perceive unfair competition as a special matter and address it by general protection mechanisms, e.g. torts, or via near legal mechanisms such as passing off and misrepresentation (MacGregor Pelikánová, 2014; MacGregor Pelikánová 2017; MacGregor Pelikánová 2019c). The EU law penetrates into national laws, but still its reach and effect are not absolute. Unfair competition practices signify that the EU has limited competencies and capacities (Teasuro & Russo, 2008). The UCPD was adopted to contribute to the proper functioning of the internal single market and to achieve a high level of consumer protection by approximating laws (Art.1 UCPD) by a full harmonization (Art.4 UCPD) (MacGregor Pelikánová, 2017). It is argued that UCPD conflicts with strong conceptual disparities in EU member state's laws and is undermined by the ambiguity of its purposes (MacGregor Pelikánová et al., 2017).

Research methodology

The cross-disciplinary and multi-jurisdictional nature of this paper results in the use of Meta-Analysis. Since legal aspects are pivotal, it focuses more on qualitative data and methods than quantitative, and includes deductive and inductive aspects of legal thinking, as legal theoretic orientation reflects legal science which is argumentative, not axiomatic. The processed information is refreshed by Socratic questioning and glossing (MacGregor Pelikánová, 2017).

The purpose is to study the case law of the highest judicial authority for UCPD issues, CJ EU, and explore the message that it conveys about the fully harmonized UCPD regime in Central Europe. The underlying hypothesis is that the fully harmonized UCPD regime is legislatively set and nationally transposed, but still it partially clashes with national particularities as testified by the top case law. All judges in the EU have to apply the UCPD regime and the ultimate authority is the CJ EU, to which, as a matter of fact, national judges submit their requests for preliminary rulings in EU law matters, such as about interpretations and applications of the UCPD regime. Hence the CJ EU database of case law available via curia.eu is explored while using the key word identifying UCPD "2005/29".

The principal strength of the paper is its forensic assessment of the case law of the CJ EU. The principal weakness is linked to the feasibility and broadness of the data reach and objectivity of the assessment. It is to be followed by work with hundreds of other law cases.

Results and Discussion

Rules protecting the fairness of competition belong merely to the shared conferred competencies of the EU and they are legislated by both EU and EU member states (MacGregor Pelikánová, 2019a). The UCPD came about in 2005 to change previous approaches by having a multitude of purposes and objectives (MacGregor Pelikánová et al., 2017) and took effect in 2007 (Art.19 UCPD). Consequently, for over ten years all judges in the EU have had to apply the fully harmonized regime and, when in doubt, they have to ask the CJ EU via a request for preliminary rulings. This fully harmonized regime (Art.4 UCPD) prohibits unfair business-to-consumer commercial practices (Art.3 and 5 UCPD), especially if they are misleading or aggressive (Art.5 UCPD) (MacGregor Pelikánová, 2017). Certain practices are considered to be always unfair and thus in breach of the UCPD and such practices are included in the blacklist, i.e. Annex I of the UCPD (Teasuro & Russo, 2008).

Central European jurisdictions belong to the continental family and consequently share similar traditions. Their legal regimes protecting against unfair competition have foundations in Codes from the 19th century and often as well in *leges speciales*. The emergence of the UCPD has manifestly shaken the *status quo* and has led to various types of legislative revolutions. Some central European states perceived the UCPD as an impulse to change their *lex specialis* and a few other Acts, possibly to issue new Acts (Germany, Austria, Poland, Slovakia), while other states moved to make a massive inventory of their statutes leading to a legislative update of many of them (Czech Republic, Hungary).

Regardless of the manner of transposition, national judges have to interpret and apply the fully harmonized UCPD regime in the light of the CJ EU case law. Do they really ask the CJ EU for preliminary rulings about UCPD and what message is conveyed by the pertinent case law?

Pursuant to the underlying hypothesis, although the fully harmonized UCPD regime is legislatively set and nationally transposed, but still it partially clashes with national particularities as testified by the top case law. In order to confirm or reject this hypothesis, the search thru CJ EU case law is critical by using the search mask indicating the time span 2009-2019 and the key word referring to UCPD „2005/29” resulting into 113 closed cases and 24 of them were referred from the Central European jurisdictions, see Table 1.

All of these 24 closed cases were based on a request for preliminary rulings linked to the UCPD and the majority of them came from Germany and had as one party of the litigation, a German entity engaging in the protec-

tion against unfair competition, i.e. *Zentrale zur Bekämpfung unlauteren Wettbewerbs eV*, *Verein für lauterer Wettbewerb eV*, *Verband Sozialer Wettbewerb eV*. Even more interestingly, five of the 10 German cases dealt specifically and predominantly with particular UCPD issues, see Table 2.

The CJ EU has so far completed proceedings regarding 6 requests for preliminary ruling touching UCPD from the Austrian Court. In total, 3 of these 6 dealt specifically and predominantly with particular UCPD issues, see Table 3.

The CJ EU has, so far, completed proceedings regarding 5 requests for preliminary rulings touching UCPD from Slovakian courts. Only one of them dealt specifically and predominantly with particular UCPD issues, see Table 4.

The CJ EU has so far completed proceedings regarding 2 requests for preliminary rulings touching UCPD from Hungarian courts. One of them dealt specifically and predominantly with particular UCPD issues, see Table 5.

The CJ EU has so far completed proceedings regarding 1 request for preliminary ruling touching UCPD from Polish courts, see Table 6.

Despite the high number of UCPD national cases in the Czech Republic, including 11 closed cases from the Czech Supreme Court, Czech judges have not seen it as needed or useful to ask the CJ EU for an advice.

In sum, the case law of CJ EU indicates that even the judiciary from EU jurisdictions with very similar traditions (i) can have a dramatically different commitment and drive vis-à-vis the fully harmonized UCPD regime and (ii) can perceive other UCPD challenges. Germany and Austria took a lean legislative approach and their judges are committed to go even beyond the UCPD regime, keep asking especially about general marketing and advertising issues and the CJ EU wants them to be less strict. In contrast, other jurisdictions went for a complex legislation and their judges either totally skip the opportunity of preliminary ruling requests (Czech Republic) or use it merely sporadically for cases linked to deals in the telecommunication and financial sector (Slovakia, Poland, Hungary), which the CJ EU finds in the breach of the UCPD .

Conclusions

The full harmonization of the protection against misleading commercial practices is legislatively accomplished in the entire EU, including Central Europe, where, despite similar legal traditions, dramatically different legislative approaches regarding the UCPD were employed. Although the

UCPD is fully transposed, the CJ EU case law confirms the hypothesis that the UCPD regime partially clashes with national particularities. In particular, it indicates that the highly committed German and Austrian judiciary are especially concerned about the harmonized protection against misleading advertisement practices and that their drive for an en bloc prohibition is corrected by the CJ EU's command for a more case by case approach. However, the judiciary from other Central European jurisdictions are much less inclined to double check their approach, understanding, interpretation and application of the UCPD regime by the CJ EU and once they do it, the CJ EU confirms that the presented cases with manipulative commercial practices from the financial and telecommunications fields are definitely misleading and so prohibited. In sum, the CJ EU wants German and Austrian judiciary to be less strict regarding general alluring advertisement practices and other judges to be stricter regarding manipulative practices entailing a direct omission or lying about the goods or services which are purchased by the consumer, especially from the financial and telecommunications sector.

This message conveyed by the case law of the CJ EU deals clearly with the tip of the iceberg, see the Czech approach. Nevertheless, even this limited extent suggests clearly that German and Austrian lean legislation and active judges should be followed by other legislatively Byzantine jurisdictions and their rather passive judges. The full harmonization means that a "no more no less" regime has to be applied in the entire EU and if in doubt, the CJ EU has to be asked for advice. This is a clear rule for everybody in the EU, including for parties and judges dealing with unfair competition issues in Central Europe. Otherwise, the UCPD is counterproductive and the single internal market a fiction for consumers.

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Annex

Table 1. UCPD transposition – 2009-2019 CJ EU closed case “2005/29” of 113

State	Austria	Czech Rep	Germany	Hungary	Poland	Slovakia
Cases	6	0	10	2	1	5

Source: Prepared by the author based on curia.eu.

Table 2. UCPD transposition – 2009-2019 – 5 CJ EU closed “German” cases

CJ EU case (issue)	UCPD	Preliminary ruling
<i>C-146/16 - Verband Sozialer Wettbewerb v. DHL (Advertisement in a print medium — Omission of material information — information via the website)</i>	Art.7(4)(b)	<i>Article 7(4)(b) of Directive 2005/29/EC ..must be interpreted as meaning that an advertisement, ..., which falls within the definition of an ‘invitation to purchase’ within the meaning of that directive, may satisfy the obligation regarding information laid down in that provision. It is for the referring court to examine, on a case-by-case basis,</i>
<i>C-476/14 - Citroën Commerce (Advertisement containing an indication of price)</i>	Art.7(4)(c)	<i>... costs in connection with the transfer of a motor vehicle from the manufacturer to the dealer, ..., must be included in the selling price of that vehicle indicated in an advertisement made by the trader when, having regard to all the features of that advertisement, in the eyes of the consumer it sets out an offer concerning that vehicle.</i>
<i>C-391/12 - RLVŠ (Misleading omissions in advertorials — publication for remuneration not identified by the term ‘advertisement’ (‘Anzeige’) - Complete harmonisation — Stricter measures)</i>	Art.7	<i>...directive must be interpreted as not precluding the application of a national provision under which those publishers are required to identify specifically, in this case through the use of the term ‘advertisement’ (‘Anzeige’), any publication in their periodicals for which they receive remuneration, unless it is already evident from the arrangement and layout of the publication that it is an advertisement...</i>
<i>C-59/12 - Zentrale zur Bekämpfung unlauteren Wettbewerbs (Misleading information circulated by a health insurance fund/)</i>	Art.6(1)	<i>...a public law body charged with a task of public interest, such as the management of a statutory health insurance fund, falls within the persons covered by the directive.</i>
<i>C-304/08 - Plus Warenhandels-gesellschaft (a prohibition - participation of consumers in a lottery conditional on the purchase of goods or the use of services)</i>	Art.6, Art.7, Annex I	<i>... precluding national legislation, , which provides for a prohibition in principle, without taking account of the specific circumstances of individual cases, of commercial practices under which the participation of consumers in a prize competition or lottery is made conditional on the purchase of goods or the use of services</i>

Source: Prepared by the author based on curia.eu.

Table 3. UCPD transposition – 2009-2019 – 3 CJ EU closed “Austrian” cases

CJ EU case (issue)	UCPD	Preliminary ruling
<i>C-453/11 CHS Tour v. Team4 Travel (sales brochure with false information)</i>	Art.6(1)	<i>Directive 2005/29/EC ...must be interpreted as meaning that, if a commercial practice satisfies all the criteria specified in Article 6(1) of that directive for being categorised as a misleading practice in relation to the consumer, it is not necessary to determine whether such a practice is also contrary to the requirements of professional diligence as referred to in Article 5(2)(a) ...</i>
<i>C-206/11 – Köck (the announcement by Mr Köck of a ‘clearance sale’ without the necessary prior administrative authorisation.</i>	Art.5- Art.9	<i>... must be interpreted as precluding a national court from ordering the cessation of a commercial practice not covered by Annex I to that directive on the sole ground that the practice has not been the subject of prior authorization by the competent administrative authority,</i>
<i>C-540/08 C-540/08 - Mediaprint Zeitungs- und Zeitschriftenverlag (Commercial practices making the offer of bonuses to consumers subject to the purchase of goods or services)</i>	Art.5(2)	<i>.... The possibility of participating in a prize competition, linked to the purchase of a newspaper, does not constitute an unfair commercial practice within the meaning of Article 5(2) of Directive 2005/29, simply on the ground that, for at least some of the consumers concerned, that possibility of participating in a competition represents the factor which determines them to buy that newspaper.</i>

Source: Prepared by the author based on curia.eu.

Table 4. UCPD transposition – 2009-2019 – 1 CJ EU closed “Slovakian” case

CJ EU case (issue)	UCPD	Preliminary ruling
<i>C-453/10 - Pereničová and Perenič (Consumer credit agreement — Incorrect statement of annual percentage rate of charge)</i>	Art.6(1)	<i>A commercial practice which consists in indicating in a credit agreement an annual percentage rate of charge lower than the real rate must be regarded as ‘misleading’ within the meaning of Article 6(1) of Directive 2005/29/EC ... in so far as it causes or is likely to cause the average consumer to take a transactional decision that he would not have taken otherwise.</i>

Source: Prepared by the author based on curia.eu.

Table 5. UCPD transposition – 2009-2019 – 1 CJ EU closed “Hungarian” case

CJ EU case (issue)	UCPD	Preliminary ruling
<i>C-388/13 - UPC Magyarország (Erroneous information provided by a telecommunications undertaking to one of its subscribers which has resulted in additional costs for the latter)</i>	Art.(2), Art.6(1)	<i>Directive 2005/29/EC ...must be interpreted as meaning that the communication, by a professional to a consumer, of erroneous information, ..., must be classified as a ‘misleading commercial practice’... even though that information concerned only one single consumer.... Directive 2005/29 must be interpreted as meaning that, if a commercial practice meets all of the criteria specified in Article 6(1) of that directive for classification as a misleading practice in relation to the consumer, it is not necessary further to determine whether such a practice is also contrary to the requirements of professional diligence, as referred to in Article 5(2)(a) ...</i>

Source: Prepared by the author based on curia.eu.

Table 6. UCPD transposition – 2009-2019 – 1 CJ EU closed “Polish” case

CJ EU case (issue)	UCPD	Preliminary ruling
<i>C-522/08 - Telekomunikacja Polska (Making the conclusion of a contract for the provision of services contingent on the conclusion of a contract for the supply of other services – Prohibition – Broadband internet</i>	Art.5, Art.6	<i>Directive 2005/29/EC ... must be interpreted as precluding national legislation which, with certain exceptions, and without taking account of the specific circumstances, imposes a general prohibition of combined offers made by a vendor to a consumer.</i>

Source: Prepared by the author based on curia.eu.

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Intention to move and its determinants. Evidence from Poland

JEL Classification: *O15; O18; R23*

Keywords: *migration, housing satisfaction, regional development, Poland*

Abstract

Research background: Migration and residential mobility affects the spatial structure of cities and urban development intensity (e.g. patterns of commuting, using urban infrastructure). Residential mobility is also both a determinant and a result of the housing market situation. Longer-distance migration – interregional and international – has, in turn, many additional implications and affect demographic situation of a region as well as regional growth prospects.

The literature on interregional and especially international migration regards housing conditions as being at least of secondary importance. More attention to the aspects of quality of life, and particularly housing issues, is given in research on residential migration. In a seminal paper of Speare (1974), residential satisfaction was found to be the best predictor of the wish to move. However, determinants of decision to move are strongly country-specific.

Purpose of the article: We answer following research questions: 1) What is the scale and selectivity of the intention to move among city residents? 2) Do housing satisfaction, urban safety and financial situation explain variation in the intention to migrate?

Methods: The data is derived from the cyclical PAPI survey on life quality in Lublin (sample: 1101 residents). Firstly, we present the frequency distribution analysis and apply tests on statistical significance. Secondly, we build regression models explaining residents' declarations regarding different types of migration

(urban migration, suburbanisation, interregional and international migration) with housing satisfaction, urban safety and financial situation.

Findings & Value added: The propensity to migrate was declared by approx. 15-30% of respondents, depending on the type of migration. We also confirm, that the intention to move is highly selective. The estimated regression model explaining the intention to move is statistically significant, though housing satisfaction and urban safety appear to be poor predictors of intention to move in Poland.

Introduction

Research on migration and residential mobility has both scientific and practical significance. Residential mobility, which we interpret as a short-distance migration, precisely intra-urban migration and migration to suburbs, affects the spatial structure of cities and urban development intensity, with many implications for city planning and management. As an example, residential migration changes patterns of commuting and exerts pressure on urban infrastructure. From a theoretical perspective, the processes of intra-urban migration and suburbanisation are important or even constitutive elements of many concepts and approaches in urban geography, such as city life cycles, urban sprawl, locational analysis, theories of systems of cities or neighbourhood effects, to mention just a few. Residential mobility is also both a determinant and a result of the housing market situation, and as such it remains in the centre of housing economics. Longer-distance migration – interregional and international – has, in turn, many additional implications and affect demographic situation of a region as well as regional growth prospects. For example, as migration is a selective phenomenon, the outflows of young and well-educated population (often labelled as brain drain) decrease the stock of human capital in the sending region and therefore dampen its economic growth.

In the literature, several approaches to the determinants of both residential mobility and longer-distance voluntary migration, deserve attention. Starting from the latter, labour market conditions, i.e. high unemployment and low wages in the origin country or region as well as accessible jobs, and above all high wages in the migration destination, have been traditionally perceived as the most important determinants of migration (Arrango, 2000, p. 284-286). The development of research on migration resulted in extending the catalogue of its determinants to migration costs, self-selection, the impact of migration policy, skills transferability, social security, network effects, household composition, or income inequalities. Since the paper of Liu (1975), there has been growing attention to the role of various aspects of life quality, such as safety, environmental quality, quality

of education and healthcare, consumer amenities, sense of community, as well as housing prices and conditions. Nonetheless, the literature on inter-regional and especially international migration usually regards housing conditions as being at least of secondary importance. The most common stylised facts were that relatively low house prices in the receiving region or country may encourage to move and that house owners are characterised by lower geographical mobility (Rabe & Taylor, 2012, p. 21-23).

Much more attention to the factors shaping the quality of life, and particularly housing issues, is given in research on residential migration. Traditionally, residential mobility process has been divided into two stages: firstly people become dissatisfied with their present housing situation, which leads them to search for a better alternative on the housing market (Brown & Moore, 1970, p. 1-12). Several empirical studies were devoted to the first stage of mobility process. In a seminal paper of Speare (1974, p. 186), residential satisfaction was found to be the best predictor of the wish to move. Landale & Guest (1985, p. 216-218) found that, although satisfaction is the strongest predictor of thoughts of moving, several structural factors (age, change in the household size, income, tenure, and the proportion of friends in both areas) also have strong independent effects. Recent research focuses more on events in the life careers of household members that trigger residential mobility rather than on gradually increasing housing dissatisfaction. It is argued that residential mobility depends on a person's stage in a life course, career development determining propensity to move, and family-related issues (Coulter *et. al.*, 2016, p. 353-362). These events in the life cycle might, of course, trigger housing dissatisfaction and a growing intention to move.

It is worth adding that approaches to analyse residential mobility might be grounded on both stated preference and actual behaviour. According to an empirical work of Lu (1998, p. 1492-1493), residential satisfaction and mobility intentions are important antecedents of actual migration decisions. However, structural variables such as tenure, income, age, race, household type and gender have significant direct effects on migration over and above their indirect effects channelled through attitudinal variables. Hence, the correspondence between mobility intention and behaviour is less than perfect.

Finally, research results on the determinants of the decision to move are strongly country- or even regional-specific, as the decision-making process is determined by many local or country-specific attributes. Such factors include housing accessibility and turnover rates in local housing markets, accessibility of schools or other services, neighbourhood characteristics, regimes of intervention in housing markets, mortgage lending practices,

city size, commuting costs, demographic structure or cultural factors (Dieleman, 2001, p. 249-262, Haas & Osland, 2014, p. 464-472).

With these multiple contexts in mind, we used data from a PAPI survey carried out on a quota sample of 1101 adults – Lublin residents – to answer two research questions:

- What is the scale and selectivity of the intention to move among Lublin residents?
- Do housing satisfaction, urban safety and financial situation explain variation in the intention to migrate?

Our paper contributes to the existing literature in several ways. It covers and compares in one study both short- and long-distance migration plans and their selected determinants. While analysing the determinants of migration intentions, we gave preference not to wage expectations or job accessibility, but to much more specific, though inherent elements of life quality as housing satisfaction and urban safety, accompanied by household financial situation. Finally, our paper presents the distribution of the intention to move among the residents of a very specific area on the EU map. Poland is experiencing both dynamic and violent processes of suburbanisation and massive international emigration. The survey has been conducted in Lublin – the medium-sized capital of a peripheral Polish region, characterised by a relatively low level of economic development, dynamic suburbanisation processes and large migration outflows. At the same time, the housing market in Poland seems exceptional, marked by one of the highest homeownership rates in the EU, and dynamic growth of housing investments despite high housing prices in relation to wages. Last but not least, our results might be valuable in designing targeted policy responses to depopulation in the EU peripheral regions and cities.

Research design

The data is derived from the 2018 edition of the cyclical PAPI survey on life quality in Lublin. 1101 adults were interviewed in five resident service offices during March and April. In order to reduce bias stemming from non-random sample selection, quota selection has been applied, allowing to adjust the sample composition in terms of sex, district of residence and status on the labour market (i.e. student, person in employment, unemployed, not working – housekeeping, pensioner) according to data from Statistics Poland. As labour market status is strongly correlated with age, the sample age structure eventually reflects that in the general population, as well.

Five survey questions form the basis for further analysis in this paper:

Q1: *Do you consider moving to: (a) another district in Lublin, (b) other municipalities close to Lublin, (c) a city outside the voivodship, (d) another country?*

Q2: *How do you evaluate your own flat or house in terms of: (a) area, (b) technical conditions, (c) location, (d) housing costs, (e) neighbourhood?*

Q3: *Do you feel safe in: (a) your own flat/house, (b) in your neighbourhood during the daytime, (c) in your neighbourhood at night?*

Q4: *How often do the following problems appear in your neighbourhood: (a) apartment burglaries, (b) auto burglaries, (c) street thefts or robberies (d) acts of vandalism, (e) drunkenness (f) nuisance behaviours by neighbours (g) antics of aggressive youth?*

Q5: *How do you assess your financial situation?*

We also exploit metrics questions regarding age, sex, district of residence, marital status and labour market status. We assign values to responses and sum up all the individual answers to construct indices, which we subsequently treat as quantitative variables when investigating cause-effect relationships. As non-response answers ('I don't know' or 'hard to say') of respondents would result in understated values of indices, individuals giving nonresponse answers were excluded from further analysis. We thus have received three independent variables for further analysis: the housing satisfaction, the sense of urban safety and the financial situation, which we further apply to the regression model.

Survey results: scale and selectivity of the intention to move

In general, the survey results confirmed many stylised facts on migration selectivity appearing in the literature, though shedding some new light on the propensity for migration as well. The propensity to migrate (answers 'definitely yes' and 'rather yes') have been declared by approx. 15-30% of respondents, with intra-urban migration being selected more often than moving to suburbs and to cities in other regions, whereas international migration was the least frequent choice (figure 1). However, the disparity

between the positive answers to the question concerning various types of migration seems quite narrow.

The intention to move is also a highly selective phenomenon. Not surprisingly, this is the youth who are most likely to migrate (figure 2a). Furthermore, the intention to move is declared more often by men (regardless of the distance of migration) and singles (with the exception of moving to suburbs) (figure 2b and 2c). Finally, the respondents' situation on the labour market also differentiates their intention to move (figure 2d). Students were confirmed to be the most mobile part of the society, which might be linked either to a change of rented flats (intra-urban migration) or the willingness to migrate after the completion of education (interregional and international migration), which is presumably motivated by economic reasons. The self-employed are most likely to move to the city suburbs. Inactive pensioners are characterized by the lowest mobility, therefore welfare migration seems still a rare phenomenon. As far as the unemployed are concerned, we observe a relatively high propensity for international migration and, what is more surprising, for intra-urban migration. The distribution of the intention to move among respondents who differently assess their financial situation is perhaps the most concerning (fig. 2e). Not surprisingly, those assessing their situation as 'very good' were more willing to migrate within the city and to the city suburbs. Nonetheless, high propensity to interregional and international migration seems more unusual for this group. Another rather unexpected result is the relatively high propensity to intra-urban migration and suburbanisation of those who assess their financial situation as 'bad' or 'very bad'. A possible explanation is that their intention to migrate is involuntary, as they consider selling a house due to a deteriorating household financial situation. Low diversity of the willingness to migrate abroad is also remarkable. Such distribution of answers might suggest that, at least among city residents, international migration is not already driven primarily by poor household financial situation, but rather the willingness to increase one's living standards or non-economic reasons.

Explaining the intention to move: a model

In this section we build a model in order to verify the relationship between four types of migration declarations as a dependent variable, and three independent variables: the urban safety, the housing satisfaction and the financial situation. We analyse four types of migration: intra-urban migration (Q1a), city-to-suburbs migration (Q1b), migration to other cities (Q1c) and

international migration (Q1d), leaving the independent variables unchanged.

We first analyse a regression model explaining the willingness to intra-urban migration (table 1, Q1a). The value of the coefficient of determination R^2 indicates, that only about 6% of the overall variability of the variable Q1a can be explained by the model. Coefficients for subsequent models are even lower, therefore the explanatory power of the model is even lesser than that for intra-urban migration. We test the significance of the model consecutive types of migration using the value of the F statistic as well as the significance of the independent variables included in the model. The results (table 1) suggest, that all models are statistically significant. A variable representing housing satisfaction is statistically significant regardless the type of migration, urban safety appears to be insignificant in all cases, whereas the financial situation is significant in models capturing all types of migration but the international one (table 2).

Conclusions

The analysis reveals, that the propensity to migrate was declared by approx. 15-30% of respondents, with intra-urban migration being selected more often than moving to suburbs and to cities in other regions, whereas international migration was the least frequent choice. The intention to move is also highly selective: it is expressed relatively more frequently by the youth, men, singles, and those who tended to give extreme assessments of their financial situation.

In our attempt to pursue the determinants of intention to move we have also built the regression model with the housing satisfaction, urban safety and financial situation as dependent variables. The estimated model is statistically significant, though very low values of coefficients of determination indicate, that the housing satisfaction seems a very poor predictor of intention to move in Poland, and the urban safety is even the worse one. We might conclude that intention to move seems to be determined more by the turning points in a life cycle rather than the dissatisfaction with present housing or neighbourhood safety. We also assume, referring to the pull-push theory of migration, that future research on the determinants of intention to move should pay more attention to pull factors regarding the quality of life in receiving destination rather than the dissatisfaction with the sending location. Finally, local development measures focusing solely on improving housing conditions might be insufficient to diminish depopulation processes.

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Annex

Table 1. Summary of regression results

Dependent variable	Q1a	Q1b	Q1c	Q1d
Multiple R	0.237	0.151	0.156	0.150
Multiple R ²	0.056	0.023	0.024	0.023
Adjusted R ²	0.053	0.020	0.022	0.020
F(3,1052)	20.97	8.197	8.862	8.057
p	0	0	0	0
Standard error of estimate	1.03	0.902	0.945	0.860

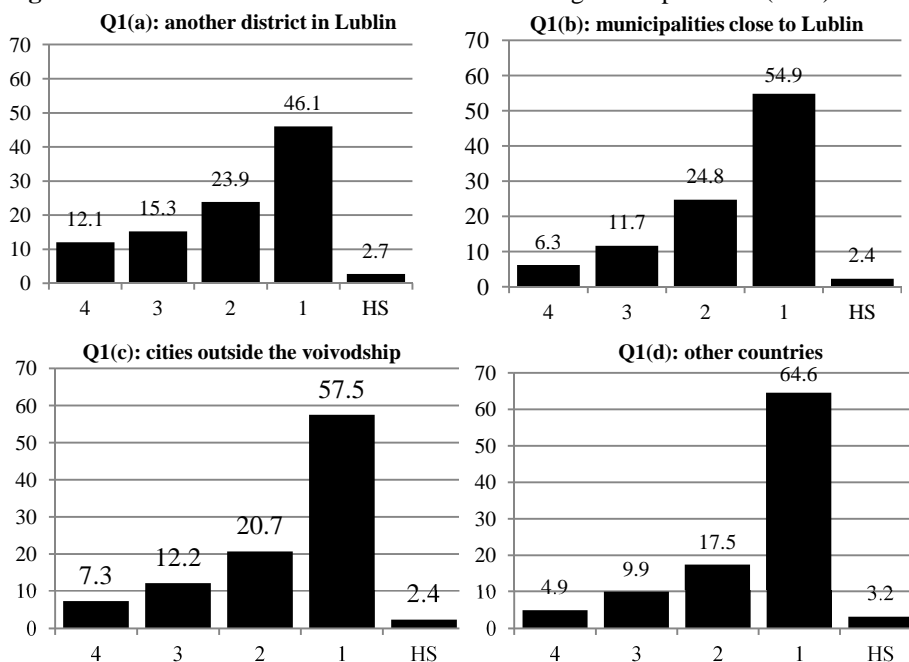
Source: own calculations.

Table 2. Summary of regression for intra-urban migration (Q1a) – model coefficients

	b*	Stand. error b*	b	Stand. error b	t(1052)	p
intra-urban migration (Q1a)						
Intercept	-	-	2.860	0.231	12.354	0.000
Urban safety	-0.017	0.031	-0.002	0.005	-0.557	0.577
Housing satisfaction	-0.235	0.032	-0.092	0.013	-7.233	0.000
Financial situation	0.135	0.031	0.175	0.041	4.262	0.000
sub-urban migration (Q1b)						
Intercept	-	-	2.060	0.202	10.178	0.000
Urban safety	-0.030	0.032	-0.004	0.004	-0.929	0.353
Housing satisfaction	-0.128	0.033	-0.043	0.011	-3.871	0.000
Financial situation	0.114	0.032	0.128	0.036	3.576	0.000
interregional migration (Q1c)						
Intercept	-	-	1.972	0.213	9.254	0.000
Urban safety	-0.023	0.032	-0.003	0.004	-0.713	0.476
Housing satisfaction	-0.126	0.033	-0.045	0.011	-3.832	0.000
Financial situation	0.130	0.032	0.153	0.037	4.080	0.000
international migration (Q1d)						
Intercept	-	-	2.177	0.192	11.338	0.000
Urban safety	-0.032	0.032	-0.004	0.004	-0.976	0.329
Housing satisfaction	-0.143	0.033	-0.045	0.010	-4.322	0.000
Financial situation	0.057	0.032	0.061	0.034	1.792	0.073

Source: own calculations.

Figure 1. Distribution of the intention to move among the respondents (in %)



Explanations: 4-definitely yes, 3-probably yes, 2-probably no, 1-definitely no, HS-hard to say.

Source: own calculations.

Figure 2. Migration propensity and age (a), sex (b), marital status (c) labour market status (d) and financial situation (e)

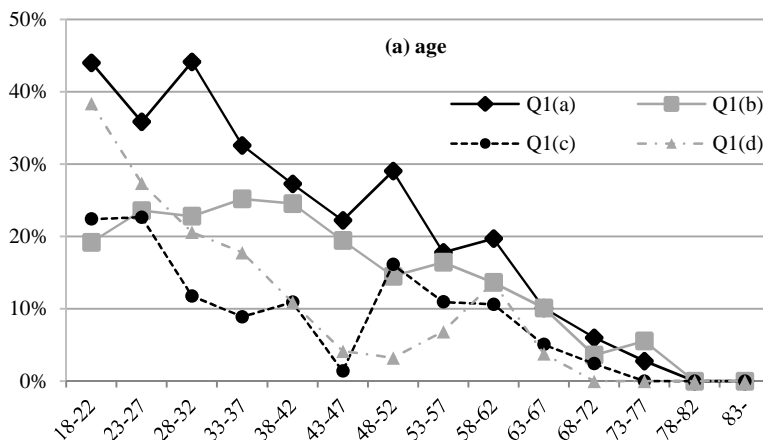


Figure 2. Continued

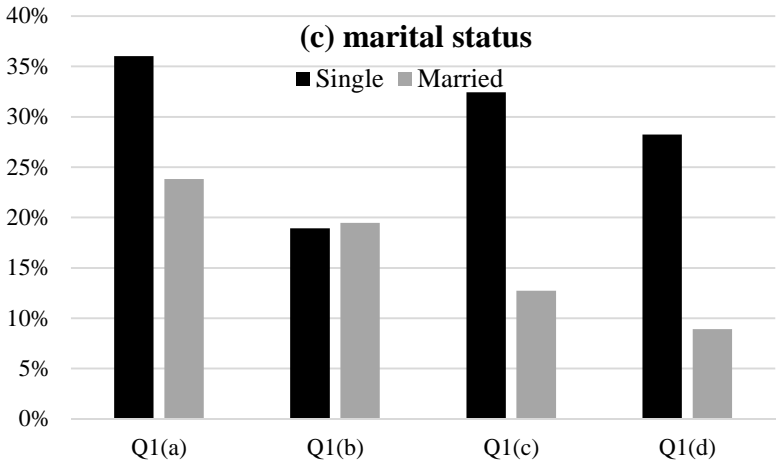
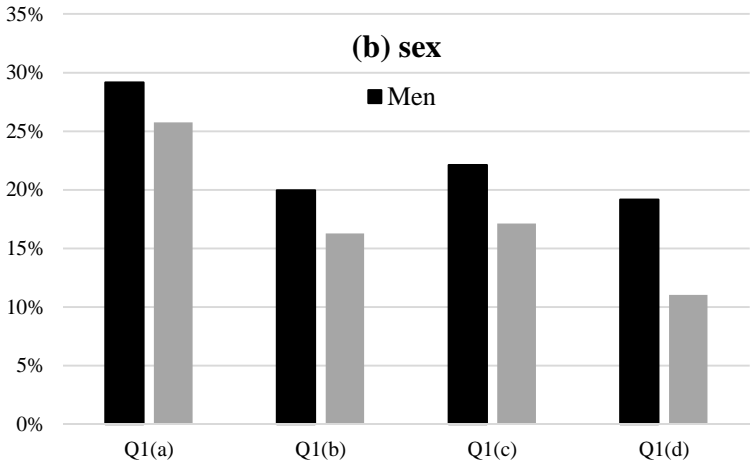
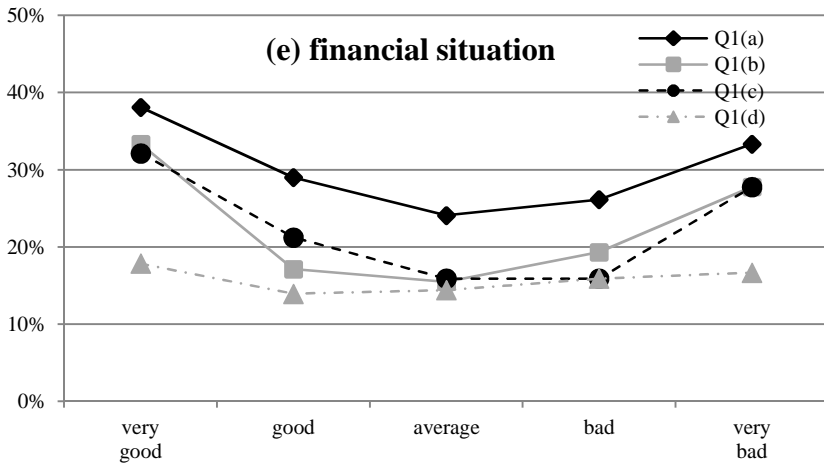
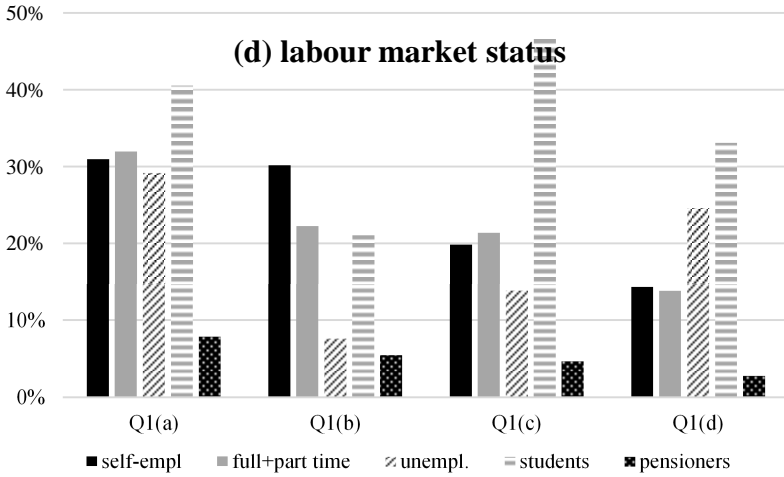


Figure 2. Continued



Explanations: see part 1 (Research design) for the full text of questions.
 Source: own calculations.

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Assessment of technological competitiveness of Ukraine in terms of association with the EU

JEL Classification C150, F130, F170, O140, O240, O520, O570

Keywords: *technological competitiveness; Global Innovation Index; high-tech products; comparative advantages; EU-28 and Ukraine*

Abstract

Research background: The paper accounts for the problem of assessing the factors of the formation of Ukraine's technological competitiveness in the face of new challenges for the state in the process of developing relations with the EU.

Purpose of the article: The aim of the report is to assess the level of technological competitiveness of the Ukrainian economy and determine the most important factors for its further development in the conditions of association with the EU.

Methods: The article presents the scheme of research of technological competitiveness of the Ukraine on the basis of qualitative and economic-statistical analysis, analysis of comparative advantages, cluster and correlation-regression analysis.

Findings & Value added: The analysis of world rankings has shown that technological competitiveness of Ukraine determines comparative factor advantages in coverage of higher education, availability of scientific staff and quality of research institutions, but low state support, lack of stability and problems in institutional development hamper the country's innovative potential. The identification of competitive advantages in trade in high-tech products demonstrates that Ukraine remains an importer of high-tech products; relatively small comparative competitive advantages among the high-tech products of Ukraine has only products of the aerospace industry. Cluster analysis showed that Ukraine is in the same cluster with Poland, Bulgaria and Romania, which have not yet fully consistent with the level of technological competitiveness of EU leaders; among the strengths of Ukraine are the development of human resources and labor effect. The correlation analysis between the components of the Global Innovation Index and the factors of increasing Ukraine's competitiveness indicates a moderate link between the development of clusters, the ratio of expenditures on R&D to GDP and the export of ICT services. In order to increase the level of technological competitiveness of Ukraine: to increase both foreign investments and state financing; improvement of regulatory acts, reduction of corruption, institutional improvement; support of technologies through of regional cluster programs or "smart specialization"; integration into the European Research Area.

Introduction

Fierce competition is a distinctive feature of today's highly globalized world. That means that long-term well-being of any country depends on its willingness to welcome technological change and innovation in every sector of its economy. Given the fact that Ukraine seems to be still lagging behind in developing its high-tech industries, there is a *problem* with assessing the technological factors of Ukraine's international competitiveness.

Many contemporary economists studied the impact of industrial revolutions and technological change on international competitiveness, including O. Bavyko (2018), L. Liu (2016), K. Schwab (2016), K. Shkarupa (2018), J. Yoon (2017), I. Matyushenko (2017) and M. Loktionova (2017). However, the potential factors of Ukraine's international competitiveness in the conditions of Industry 4.0 and implementation of EU-Ukraine Association Agreement need further study.

The aim of this article is to assess Ukraine's current technological competitiveness and identify the most influential factors for its development in conditions of Industry 4.0 and the EU-Ukraine Association Agreement.

Research methodology

This article's methodical approach of studying technological competitiveness of the country consists of the following steps:

I. Qualitative analysis of the World Economic Forum's Global Competitiveness Index (GCI WEF), i.e. indicator of technological readiness (9th pillar: Technological readiness) and indicator of innovation (12th pillar: Innovation); the Institute of Management Development's World Competitiveness Ranking (IMD WCR), i.e. indicator of infrastructure; the Institute of Management Development's World Digital Competitiveness Ranking (IMD WDCR) to assess the country's ability to put new technologies to use; the Global Innovation Index (GII) to study the innovation activities in the country;

II. Comparative advantages of Ukraine's high-tech exports identification through the following indicators:

- 1) high-tech exports (E_{HT})' share in the country's GDP\$
- 2) the share of science and engineering employees in the total workforce;
- 3) the R&D spending in the country's GDP;
- 4) comparative advantage of the country in the export of a particular commodity group:

$$CA_{ij} = \ln [(Ex_{ij}/Im_{ij}) / (Ex_i/Im_i)] \quad (1)$$

where:

CA_{ij} is comparative advantage of the i -th country in the j -th commodity indicator;

Ex_i , Im_i – exports and imports of the country;

Ex_{ij} , Im_{ij} – exports and imports of j -th commodity of the country;

III. Cluster analysis to find the place of Ukraine in the European competitive environment;

IV. Regression and correlation analysis to model the relationship between different factors of country's technological competitiveness.

Results

Higher education coverage, number of scientists and quality of research institutions positively impact Ukraine's technological competitiveness, but lack of stability, low state support, and institutional development problems decrease the country's innovative potential.

It was found through the analysis of the ranking of Ukraine in the above-mentioned indices that Ukraine still is predominantly an importer of high-tech products, the share of them in total exports remains low due to low R&D spending, outdated production structure. But ICT service exports in Ukraine amounted to 4.7bln dollars and, as forecast data suggests, will continue growing. Ukraine has comparative advantages in production of such high-tech products, as aircrafts, spacecrafts and their parts (Figure 1).

The results of the cluster analysis show that EU-28 states can be divided into 4 groups (Figure 2). The 1st consists of Denmark, Finland, Luxembourg, the Netherlands, Sweden and the United Kingdom, which innovation indicators are significantly higher than the EU average. They are "innovative leaders" Austria, Belgium, France, Germany, Ireland and Slovenia belong to the 2nd cluster and are "active innovators" Their innovation indicators are close to the EU average. Indicators of Croatia, Cyprus, Czech Republic, Estonia, Greece, Hungary, Italy, Latvia, Lithuania, Malta, Poland, Portugal, Slovakia and Spain are below the EU-28 average. These countries belong to the 3rd cluster and are "moderate innovators. Bulgaria and Romania, which are in the 4th cluster, can be called "emerging innovators" with the indicators significantly lower than the EU average. Ukraine also belongs to the 4th cluster.

Cluster 4 is far behind the others, particularly in "Financing and Support" and "Innovators". If the EU average equaled 100, then these indicators for the cluster 4 would be 22 and 9 respectively. This cluster's countries, including Ukraine, have only some advantages in "Human Resources" (76.6) and "Employment Effect" (61).

To assess the impact of innovation development factors on the indices that determine Ukraine's technological competitiveness, we employ regression and correlation analysis on the basis of the GCI WEF (particularly "Innovation" and "Technological readiness") the GII, the IMD WDCR, and our own calculations.

The factors (independent variables X1-X12) we have chosen for the analysis can be divided into the following groups:

1. Institutional and educational capacity, which includes education spending (X1), the number science and engineering graduates (X2), research institutions' quality (X3), the share of scientific and technical staff in workforce (X4);
2. Innovation financing, which includes the ratio of R&D spending to GDP (X5) and FDI (X6);
3. Development of innovative infrastructure, which includes such indicators, as ICT availability (X7) and cluster development (X8);

4. The economic impact of innovation, which includes the ratio of high-tech exports to industrial exports (X9), ICT service exports (X10), the number of patents (X11), revenues created by the usage of intellectual property (X12).

As dependent variables (Y1-Y5) we have chosen the indices that reflect Ukraine's technological competitiveness, i.e. the GCI WEF (Y1) and its sub-indices, such as "Technological readiness"(Y2) and "Innovation"(Y3); the GII (Y4) and the IMD WDCR (Y5).

The results of the regression and correlation analysis, presented in Table 1, indicate that the GCI WEF of Ukraine is almost not affected by the education spending, the research institutions' quality, the ratio of R&D spending to GDP, the number of patents, and revenues created by the usage of intellectual property. The GCI WEF depends on the development of clusters (0.76), while ICT availability, ICT service exports and the ratio of science and engineering employees in the total workforce do not influence it at all.

The impact of chosen by us factors on technological competitiveness is weak or moderate. GCI WEF is linked to the number of science and engineering graduates (0.80), revenues created by the usage of intellectual property (-0.66) and the ratio of high-tech exports in total manufactured exports (-0.63).

The relationship between the innovation potential and the chosen factors is either very tight or almost absent. The quality of scientific research institutions has a strong impact (0,94) on Ukraine's innovative potential, as well as revenues created by the usage of intellectual property (-0.90) and access to the ICT (0.80).

The results of the conducted correlation analysis of the GII and the chosen indicate predominantly moderate or tight connection between them. The development of clusters (0.80), the ratio of R&D spending to GDP (-0.77) and ICT service exports (0.66) are the most influential factors.

The IMD WDCR is closely linked to such indicators as FDI (0.79), the ratio of high-tech exports to manufactured exports (-0.72), the number of patents (0.75).

The modelling and forecast of the main technological competitiveness indicators dynamics allowed us to establish the following:

1. If the number of science and engineering graduates increases by 1%, the technology development sub-index of the GCI WEF will rise by 0.24;
2. If the quality of research institutions improves by 1 point, the innovation index of the GCI WEF will increase by 0.36. At the same time, if the revenues created by the usage of intellectual property increases by 1mln dollars, it will reduce the innovation index by 0.002;

3. If the level of development of clusters improves by 1 point, the GII will rise by 0.20;
4. If FDI increases by 1% of GDP, the IMD WDCR will rise by 2.27. An increase in the ratio of high-tech exports to manufactured exports by 1% will raise the IMD WDCR by 3.80, while a growth in the number of patents will raise the IMD WDCR by 0.28 points.

Conclusions

The qualitative analysis has shown that technological competitiveness of Ukraine is defined by comparative advantages in higher education coverage, scientific staff availability and research institutions' quality of, on the one hand, and lack of stability, low state support, and institutional development problems in, on the other hand.

Ukraine is an importer of high-tech products, because the share of these products in total exports remains low. Ukraine has comparative advantages in production of parts of spacecrafts and aircrafts.

The cluster analysis suggests that Ukraine belongs to the 4th sector, as well as Romania and Bulgaria, which are still lagging behind the innovative leaders. Among the strengths of Ukraine is its human resources and employment effect.

The conducted regression and correlation analysis allowed the authors to provide the following recommendations for Ukraine's technological competitiveness improvement:

1. Establishment and improvement of research centers within universities is required to raise the number of science and engineering graduates;
2. The quality of existing research institutions should be estimated to develop strategies for their improvement and achieve adequate level of the R&D spending. The Ukraine's intellectual property legislation needs improving, as regards to small and medium businesses, which are the drivers of each country's innovation activity;
3. A program of innovative industrial clusters should be developed, which will provide a complex of incentives for participants improve the mechanisms of cluster development state financial support;
4. Ukraine's investment climate should be improved. The state financing is required for the high-tech production development and growth of the country's high-tech exports. It is necessary for Ukraine to increase R&D spending (grants, patents, etc.).

Consequently, to increase Ukraine's technological competitiveness it is necessary to: (1) raise FDI and R&D spending through improving the coun-

try's investment climate and credit resources availability for high-tech enterprises; (2) reform Ukraine's governance and basic institutions, corruption control policies and the national judicial system; (3) improve the state support for small and medium enterprises, implementing technologies based on the regional cluster improvement programs and/or "smart specialization"; (4) introduce technology exchange programs in Ukraine within the framework of the EU (e.g. Horizon 2020, European programs Research Area 2020).

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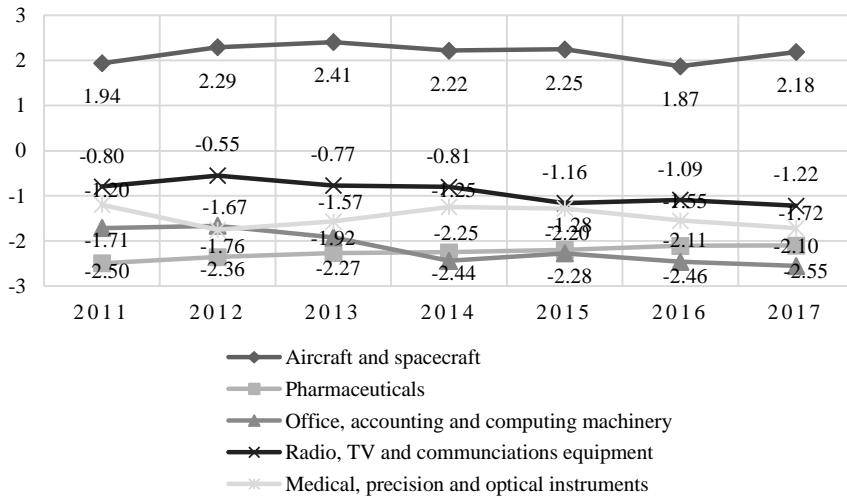
Annex

Table 1. The results of the regression and correlation analysis of factors of Ukraine's technological competitiveness

	The Global Competitiveness Index	Technological readiness (GCI)	Innovation (GCI)	Global Innovation Index	World Digital Competitiveness Ranking
Education spending, % of GDP	0.12	-0.58	0.08	0.13	-0.54
Science and engineering graduates, %	0.34	0.80	-0.09	0.34	0.39
Scientific research institutions quality	-0.29	0.01	0.94	0.32	0.65
The ratio of science and engineering staff to the total workforce, %	-0.02	-0.17	-0.76	-0.66	-0.70
The ratio of R&D spending to GDP, %	-0.18	-0.27	-0.69	-0.77	-0.35
The ratio of FDI to GDP (% of GDP)	-0.44	0.26	0.06	-0.48	0.79
The ICT availability	0.02	0.08	0.80	0.66	0.54
Cluster development	0.76	0.18	0.37	0.80	0.33
The ratio of high-tech exports to manufactured exports, %	0.42	-0.63	-0.46	-0.22	-0.72
The ICT service exports, % of total exports of services	0.07	0.05	0.79	0.69	0.48
The number of patent applications/million pop.	0.16	-0.31	0.64	0.64	0.75
Revenues created by the usage of intellectual property, mln \$	0.21	-0.66	-0.90	-0.39	-0.70

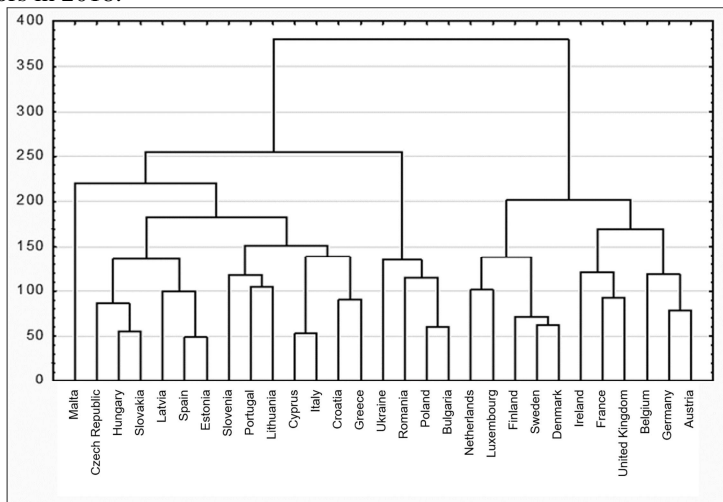
Source: autor's calculations based on GCI WEF (2011-2017), GII (2011-2017), IMD WDCR (2017-2018).

Figure 1. Ukraine's comparative advantages in high-tech production, 2011-2017



Source: author's calculations based on Loktionova (2017), United Nations Commodity Trade Statistics Database (2011-2017)

Figure 2. Dendrogram of the EU countries and Ukraine according to the EIS indicators in 2018.



Source: author's calculations based on EIS (2018).

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Barriers for young people in Poland to purchase their first apartment

JEL Classification: *D12; D14; R31*

Keywords: *personal finance, housing market, financial decision, credits, young generation*

Abstract

Research background: Housing choices that current generations face are vastly different compared to the previous one in Poland. This is continuously made more difficult due to changing legal and economic environment, in likes of introduction of “own contribution” to mortgage.

Purpose of the article: The goal of the paper is to show that one of the main barriers for young people to purchase their own apartment is lack of knowledge about mortgage and real estate market.

Methods: The article contains primary research conducted on students from University of Szczecin (n=878).

Findings & Value added: The article highlights some of the most imminent concerns of young people in relation to housing in Poland. It is the ground for discussion about solutions or programs aimed at supporting young people housing situation.

Introduction

The housing situation of the Polish society has undergone significant changes over the past few decades. Generation Y - young people aged 18-34, made their decisions about buying own real estate in the last years. For some of them, this is related to the decision to start a family or to have children. A new phenomenon is an ownership of a real estate by young lonely people, so-called singles. Housing needs of young people have increased

both in terms of the number of properties they own, as well as their size, architecture and location. At the same time housing opportunities of young people are increasingly constrained due to increasing prices on housing market, mortgage reforms and low young's people income. Demand for the first real estate should lead to special treatment of the young generation. Providing them with a chance to live can be a factor counteracting the emigration of educated people or positively affect procreation, ensuring population stability.

The aim of the paper is shows lack of knowledge about mortgage as a barrier for young people to purchase their first apartment and significant role of parents in housing purchase. For this study, it was of interest to investigate housing situation and preferences of students from University of Szczecin (n=878).

Research methodology

This study used a survey designed to assess housing choices of a sample of young people. The questionnaire has been administered to selected undergraduate of stationary studies classes at University of Szczecin (N = 879). The sample has been divided into a subsets from ten faculties of the University according to the percentage share of faculty's students in general number of University's students (Faculty of Humanities, N = 218; Faculty of Mathematics and Physics, N = 13; Faculty of Economics and Management, N = 120; Faculty of Biology, N = 29; Faculty of Law and Administration, N = 150; Faculty of Management and Economics of Services, N = 99; Faculty of Theology, N = 30; Faculty of Geosciences, N = 33; Faculty of Philology, N = 160; Faculty of Physical Education and Health Promotion, N = 27).

The sample was heterogeneous with respect to age (most of the respondents (89%) were between 20-25 years old), gender (65% women, 33% men), field of study (about 50 different field of study) and place of living (45% of respondents were from outside of Szczecin).

I cannot deny the presence of some sample selection biases because the sample only include students from one university. The results can be different for non-students and for students from different region. However, there are trends in the data to suggest that described problems concern also other groups of young people in Poland.

Results

Most of the study participants live in a rented apartment (38%) or in a dorm (15%). Over one third of respondents live with their parents (34%) or other family members (2%), while only 10% live in their own apartment. Such a large percentage of people living in a rented place is probably due to the fact that almost half of the respondents are students from outside of Szczecin.

Almost one fifth of respondents (18%) indicated that they own a property. Of these people, as many as 31% acquired it through inheritance, and 27% received it as a gift. Other people purchased the property using their savings and incurring liabilities in banks, loan institutions or family. Few, because only 3% of people who have a property have indicated that they have used government programs, i.e. 'Mieszkanie na swoim'.

Most respondents admitted to lack of knowledge about required 'own contribution' for mortgage (see figure 1). Only 35% of respondents who stated that they have knowledge about their own contribution have been able to correctly answer the question: How much of your own contribution should you have when you purchase a real estate worth PLN 300,000.00?

The survey shows that only 30% of respondents save for the purchase of real estate in the future. Over 15% have been saving for just a year. Comparing this to the question regarding the desire to own property, as many as 50% of the respondents want to own the property, but do not save for this purpose. It should be noted that the lack of savings is one of the biggest barriers to buying a real estate by young people in Poland, which will be discussed in more detail later in the article.

Asked about barriers in having their own apartment, respondents most often indicated low income, lack of savings, as well as the financial situation of parents - lack of financial support from parents for the purchase of their own real estate. It is worth noting that due to wealth and income inequalities in an older generation, at the very beginning inequalities among young people are very large and have increased in recent years.

Discussion

The results demonstrate three things. Firstly, young people have lack of knowledge about housing market, especially about the housing prices and possibility of getting mortgage.

Secondly, the research shows that young people don't have savings and unfortunately most of them don't save at all. This implicit that they don't

have money for the own contribution. In our example, they need PLN 60,000.00. If we assume they start to save half of the average income (it is probably possible for those who live with parents), they need to save for 3 years and 4 months. However, more realistic assumption will be that young person earns PLN 2,000 and saves PLN 500. In this case they need 10 years to gather money for their own contribution. Low income and lack of savings and lack of saving habits are the barriers to save for the real estate purchase. One of barriers to having own apartment is the low income of young people, what has also been pointed in other research (Hoolachan *et al.*, 2016, pp. 63-78, Clapham *et al.*, 2012; Cribb and Simpson, 2018, pp. 279-310).

Thirdly, many of young people live with their parents, because they cannot afford their own place to live. This result ties well with previous studies (Green, 2017, pp. 63-77). More and more young people inherit or are donated real estate, mainly from their parents, while the rest of them struggle with many barriers in buying their own property. Parental assistance in their adult children's home buying is nowadays interesting problem among many scholars (Lee *et al.*, 2018; Holstenbach, 2018, pp. 689-708; Li & Hung, 2019, pp. 219-233; Galster & Wessel, 2019, pp. 119-136; Öst, 2012, pp. 2137-2152).

Conclusions

The analysis leads to the following conclusions:

- young people show lack of knowledge about housing market, especially about the prices and possibility of getting mortgage;
- low income, lack of savings and lack of saving habits are the main barriers for young people regarding house purchase;
- many of young people live with their parents, because they cannot afford their own place to live;

Future studies should aim to replicate results in a larger and more differentiated group of young people, including non-students. Moreover, the research shows that most of young homeowners get support from their parents. It would be interesting for future research to examine how financial support from parents in buying first home influence inequality among young people in Poland.

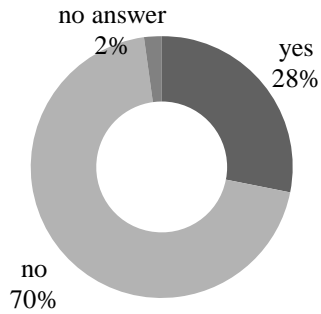
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Annex

Figure 1. Respondents knowledge about mortgage own contribution

Do you know how much you currently need to have savings as your own contribution when taking out a mortgage?



Source: own elaboration.

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Effects of the integration into global value chains on the labour standards in Central and Eastern Europe countries

JEL Classification: *F16; F66; J81*

Keywords: *working conditions, Global Value Chains, wellbeing of workers, employment contact*

Abstract

Research background: In the era of globalization there is a need to address decent work deficits in Global Value Chains (GVCs). The relations between GVC on labour standards are not often analysed. Similarly, the linkage between non-standard types of employment and the GVC are not widely discussed in the literature.

Purpose of the article: This paper investigates how involvement in GVCs affects labour standards. In particular, we assess how the integration into GVCs impact the probability of having indefinite type of employment contract, which stands for one of the decent work indicator. Moreover, we draw individual and firm-level characteristics determining the type of employment contract.

Methods: We use linked employer-employee data from the Structure of Earnings Survey merged with industry-level statistics on GVCs based on World Input-Output Database - the sample is composed of over 5 million workers from 10 Central and Eastern Europe countries (CEEC) observed in 2014. The involvement into GVCs is measured using a novel approach based on the concepts of global import intensity (GII). We employ logistic regression with robust standard errors.

Findings & Value added: Controlling for individual and firm-level characteristics (sex, age, education level, length of service in enterprise, size of the enterprise) we

find mixed evidence on the relation between GVC and employment type across CEE countries.

Introduction

The recent decades has brought an increasing evidence on the role of proliferation of Global Value Chains (GVCs) in shaping the employment relations. The bulk of research analyse the impact of involvement into Global Value Chains on wages and other working conditions related indicators. Reviewing the relevant literature, it turns out, however, that the majority of research on GVC and working conditions concern low income countries, while the studies on European countries are rather rare.

In this study we compile two streams of literature which rarely has been analysed together: the phenomenon of temporary employment and Global Value Chains. Despite the enormous research on non-standard forms of employment only few of them identify a linkage between involvement in global production processes and the type of employment contract (Görg & Görlich, 2015, pp. 533-554; Presbitero *et al.*, 2015, pp.81–93; Lee & Lee, 2015, pp. 555–587).

The main aim of this study is to examine how the sector's involvement into GVCs impacts the workers' labour standards. In particular we employ type of employment contract as one of the factors creating the well-being of workers and test how the GVCs may influence the probability of being a temporary worker. To do this a rich employee-employer data set derived from Structure of Earnings Survey is used. Our sample covers 10 Central and Eastern Europe countries (Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic and Slovenia) resulting in over 5,000,000 observations. We focus on the countries from central and eastern Europe, due to the high share of temporary workers in these countries. We use logistic regression with robust standard errors in order to find the determinants influencing the probability of having temporary type of employment contact. We find that individual characteristics of a worker, as well as a presence of collective pay agreements, are significant for determining the extent of a threat of temporary contract. The effect of participation in GVCs on type of contract is also significant, but heterogeneous across different countries and sectors.

The structure of this paper is as follows: section 1 is an introduction itself, in section 2 we provide short literature review on the previous evidence on temporary employment and their relationships with the global production fragmentation processes. Section 3 describes the data used as

well as explains the methodology. In section 4 we signalise the results of econometric analysis. Section 5 concludes.

Literature review

The relations between GVC on labour standards in European countries are not often analysed. Similarly, the linkage between non-standard types of employment and the GVC are not widely discussed in the literature. Among rare studies, Presbitero et al. (2015, pp. 81–93) using Italian firm level data report no relationship between the share of temporary workers in given firm and their propensity to offshore. Görg and Görlich (2015, pp. 533–554) analyse the impact of offshoring on wages for German workers, broken down into temporary and permanent workers and find no difference of this impact. However, only few studies focus on the possible impact of GVC on employment type. Predominantly, it is argued that the greater involvement into GVC may be related to the increasing flexibility and therefore higher share of temporary workers and lower level of employment stability (Lakhani *et al.*, 2013, pp. 440–472). Moreover, given supply chain pressures which results from compulsion to maintain the delivery schedules but also to reduce costs, involvement into global production fragmentation process may imply worse labour standards (Plank *et al.*, 2012, pp. 1-28). Similarly, temporary type of employment may also emerge because of the low task complexity in the suppliers firms and high substitutability of employees (Lakhani *et al.*, 2013, pp. 440–472). Burgoon and Raes (2009, pp. 554–575) using representative sample of German enterprises find that increase in foreign direct investment (FDI), trade, and export orientation (share of foreign sales) has positive effect on the incidence of temporary and fixed-contract work.

Having in mind the above, a further research on the impact of GVC on labour standards (among others the type of employment contact) is needed. In this paper we fill the research gap on the response of global production fragmentation processes on the employment relations among European workers.

Research methodology

The analysis in this paper is based on the employee-employer data derived from Structure of Earnings Survey (SES). We use a last available wave from 2014 covering 5,236,674 observations for 10 CEE countries. In order

to examine the linkages between the involvement into GVC and the probability of temporary employment type, we merge¹ the SES data with industry level statistics from WIOD (World Input-Output Database) release 2016. In this way we are able to assess how the global production links influence the individual worker's well-being, simplified by the type of employment contract. The main hypothesis therefore is formulated as follows: "*Workers employed in sectors more involved in GVC expose a higher probability to have a temporary type of employment contact*". Moreover, we assume that temporary type of employment is more prevalent among "marginalised" workers like: younger, less educated people, with lower occupational experience. To verify this assumptions we use logistic regression analysis with robust standard errors. As the response variable we employ binary outcome variable which is 1 for temporary type of employment contact and 0 if indefinite.

Among explanatory variables we include the characteristics of workers like sex, length of service in enterprise, age, education level as well as company level factors (size of the enterprise and type of collective pay agreement). As we are especially interested in the impact of GVC on our outcome variable, we use Global Import Intensity (GII), proposed by Timmer *et al.* (2016, pp. 1-65), as an indication for GVC involvement. This new approach overcomes the weaknesses of e.g. traditional offshoring measures, in which only the imports needed on the last stage of production are taken into account. On the contrary, the formula proposed by Timmer *et al.* (2016, pp. 1-65) traces imports of intermediates needed on all of the stages of production along the production chain. GII takes values between 0 and 1, where greater values mean greater involvement into production fragmentation processes, either through participation in more fragmented chains or chains with larger values of imports needed at any stages of production. The calculations of GII are performed on a country-industry level on the full WIOD table, covering 56 industries and 43 countries, using the R implementation by Szymczak *et al.* (2019, 1-50). Into our model we employ a relative change in GII between 2004 and 2014.

Results and discussion

To examine the linkages between the globalization and the probability of having temporary contract of employment we run several regressions. Based on the model for pooled data, we find determinants which may in-

¹ A detailed description of merging rules is available upon request.

crease the probability of having temporary type of employment contract. Our results are in line with initial expectations and show that greater probability of having temporary type of employment contract is typical for women, younger, less educated workers and with fewer years of occupational experience what confirms the assumption that whose type of employment is predominant among people with lower chances on the labour market (Reichelt, 2014, pp. 558–572). We also find that whose working in bigger companies and covering with national or industry collective agreement scheme are more probably to work on temporary basis. This result is in line with the previous evidence existing in the literature: collective bargaining, through implementation of the concept of flexicurity, spread the adoption of non-standard forms of employment (Ibsen & Mailand, 2011, pp. 161–180). Turning into the GVC related determinant, we report, that workers from sectors which are less involved in global production fragmentation process expose higher probability to work temporary. In this way, we do not find that greater links with globalisation are associated with higher temporary employment probability.

However, if we look into analysed countries separately, we report different effect for different economies. As we focus on the impact of globalisation on the probability of having temporary employment contract, we compare the impact of ΔGII on the outcome variable across countries. The negative effect for ΔGII is maintained for Estonia, Hungary, Romania, Bulgaria and Czech Republic, while for Poland, Lithuania and Slovak Republic the greater involvement of given sector in GVCs is reflected in greater probability of temporary employment of workers. For Latvia and Slovenia the coefficient for ΔGII is not statistically significant. Moreover, considering the impact of collective pay agreements on the probability of temporary employment, no one-way pattern may be observed. However, for most countries, the lack of any type of collective pay agreements are related to the lower chance to have a temporary contract (Burgoon & Raess, 2009, pp. 554–575; Ibsen & Mailand, 2011, pp. 161–180)

Having in mind the ambiguous impact of GVCs on the employment type in particular countries, we provide some extensions of our basic estimations in order to check the reliability of our results. We run for separate estimations for tradable and non-tradable sectors, which present different level of integration with international trade. We find that the impact of greater involvement into GVCs resulted in lower chance for temporary employment is mainly materialised in non-tradable sectors, while in tradable sectors the relation is reversed.

Based on the above results some conclusions regarding the impact of GVCs on the employment type may be drawn. First of all, the influence of

integration into global production fragmentation processes on workers' labour conditions varies across countries. For most of the CEE countries (except for Poland, Lithuania and Slovak Republic) the higher involvement in GVC results in lower probability of having temporary type of employment contract. For these countries, the international fragmentation of production do not favour in an increase of probability of temporary employment. However, if we look deeper into this pattern by splitting workers according to the type of the sectors of employment (tradable vs. non-tradable) the analysis reveals diversity in line with our expectations. In particular, in tradable sectors there is a higher chance that temporality of employment may be a consequence of deeper links with globalisation processes, while in non-tradable sectors the relation is not sustained. Moreover, if we compare the structure of sectors in Poland, Lithuania and Slovak Republic taking into account the tradability, we find that that the majority of workers is employed in tradable sectors, what may provide an explanation of positive relation between ΔGII and probability of temporary employment in these countries. In this way, we claim that however the impact of GVCs on employment type varies across countries, the higher involvement in global production fragmentation processes may lead to the greater probability of non indefinite employment contract. As previous studies predominantly confirm a positive relation between GVC involvement and temporary employment share, our evidence is partially in line with those results. Workers from sectors more integrated into international trade (tradable sectors) are more exposed to the impact of GVCs on employment type, what is also postulated in the literature (Burgoon & Raess, 2009, pp. 554–575).

Conclusions

In this paper we examine the determinants of the temporary employment, with the main focus on the impact of the involvement into GVCs. Indeed, we employ employment type as one of the indicator of the labour standards, and therefore we investigate the relationship between GVCs and the social upgrading of workers. Existing studies are mainly devoted to the developing and low income countries, while research for European countries are rare. To the best of our knowledge there is no studies on the impact of global production fragmentation on the working conditions including temporary employment among European countries.

In particular, we use over 5,000,000 observations coming from employee-employer data, for 10 CEE countries, for the year 2014. Our main aim

is to examine how the involvement in GVCs influence the labour standards, simplified by the type of employment contact. Based on the previous literature, we assume the temporary employment as the worse employment type, with less security and social protection. As the implications of global production fragmentation processes may have diversified impact on working conditions, we test the hypothesis on the positive relation between sector's involvement in GVC and the probability to work temporary.

Our results reveals a significant relations between involvement into GVC and the employment type. We find that a greater intensification of global production links may be connected with the higher probability of temporary work. This pattern is most visible in tradable sectors, and in countries with a greater share of tradable sectors (Poland, Lithuania and Slovak Republic). For remaining countries as well as for non-tradable sectors the higher Δ GII does not result in higher probability of temporary employment. These modified effects may be also results of presence or lack of different collective agreements, working as a catalysts for globalization impact.

Our key contribution is the examination of the effect of globalisation on the situation of individual workers. It is extremely important to analyse the benefits from global trends not only regarding the economic effects but also social ones. The involvement of CEE countries into global production process is growing, what may be reflected in the working conditions. We provide a cross-country empirical study which helps to understand the globalisation effects on the labour market. Other dimensions of working conditions may designate the future research directions.

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The influence of non-price factors on the market with new building - case study for Warsaw

JEL Classification: *R21; R31; C23*

Keywords: *New residence building; Granger causality; Determinants; Multiple regression; GDP*

Abstract

Research background: The real estate market is one of the often common areas. Current procedures, however, directly assess the market equilibrium or focus on predicting further developments concerning rising real estate prices. However, the offer page contains a factor that has not yet been part of the solved models. This factor is the number of building permits. If the demand for new housing is increasing, the number of building permits is a factor that allows for an increase in the supply.

Purpose of the article: The purpose of this article is to identify the factors influencing the number of building permits in the capital city of Warsaw. The influence of macroeconomic, microeconomic and demographic factors is examined.

Methods: This study uses secondary data from the Polish Statistical Office and the Polish National Bank. Other data is taken from EUROSTAT. General scientific methods are Granger causality and multifactor regression.

Findings & Value added: The correlation results brings those results. Statistically, the significant variable is not Consumer Price Index and The Number of Inhabit-

ants. Other variables showed a statistically significant correlation. The variable The Number of Inhabitants shows the negative value of correlation, but it is not statistically significant. Defined hypotheses have the following evaluation:

H1. For growth in the supply of residential housing is a significant factor in GDP. GDP has the most substantial influence. According to the metric used, 1% of GDP means increase in building permits about 26 pieces. Other variables reach a maximum of 0.7%. The second statistically significant variable is population growth. It is only half the strength of GDP and is significant at 5% level alpha. This hypothesis was confirmed, for the variable GDP was identified most robust statistical significance both at the 5% level and at the level of 1% for case of WARSAW. H2. Average wage growth is not a statistically significant variable. The average wage is not a statistically significant variable. Compared to the other but has a powerful influence. Since the most crucial factor of GDP differs by only 0.3%, it is a decisive factor, which average wage growth also means growth in building permits issued. The average wage also affects the result, but not statistically significant.

Introduction

Houses are generally taken as a safe investment, not only for the satisfaction of basic needs of life but also as an investment tool. The real estate market for the whole economy is significant. The growth of the real estate market and construction affect economic growth. Over the past few years, however, significantly increased the price of real estate and thus the price of residential housing. The media often refer to "the growth of price bubble." This bubble, in the long run, has a major impact on macroeconomic indicators, namely GDP. Adonis (Adonis, 2011) states that the decline reaches up four years, against a decline after the bursting of the "bubble equity" is less than half. For entrepreneurs in the development of construction, it is, therefore, the identification of factors that influence the market necessarily. Most models are built, but that evaluates the development of the market as a whole. Contemporary trends in any market segments, however, are based on the increasing differentiation of the product.

Moreover, it is for housing the pressure on the specific adaptation of housing units. Also, this is only possible with a new housing development. Reconstruction of the existing housing stock is possible. Comparison the reconstruction with the new construction is more expensive, or perhaps it is possible only for a small number of residential units. New residential construction is possible only after legislative approval, which is an indicator of new building permits issued for housing construction. A view of the market development only in terms of non-price factors on the supply side is not too frequent. Therefore, the authors focus on the impact of other factors on the

number of building permits issued in the selected location. So it is for housing the pressure on a unique adaptation of housing units. Also, this is only possible with a new housing development. Reconstruction of the existing housing stock is possible. The reconstruction is more expensive than a new building. New residential construction is possible only after legislative approval, which is an indicator of new building permits issued for housing construction. A view of the market development only in terms of non-price factors on the supply side is not too frequent. Therefore, the authors focus on the impact of other factors on the number of building permits issued in the selected location. So it is for housing the pressure on a unique adaptation of housing units.

Moreover, this is only possible with a new housing development. Reconstruction of the existing housing stock is possible. The reconstruction is mostly more expensive than a new building. New residential construction is possible only after legislative approval, which is an indicator of new building permits issued for housing construction. A view of the market development only in terms of non-price factors on the supply side is not too frequent. Therefore, the authors focus on the impact of other factors on the number of building permits issued in the selected location, alternatively, perhaps only a small number of residential units. New residential construction is possible only after legislative approval, which is an indicator of new building permits issued for housing construction. A view of the market development only in terms of non-price factors on the supply side is not too frequent. Therefore, the authors focus on the impact of other factors on the number of building permits issued in the selected location. Alternatively, perhaps only a small number of residential units. New residential construction is possible only after legislative approval, which is an indicator of new building permits issued for housing construction. A view of the market development only in terms of non-price factors on the supply side is not too frequent. Therefore, the authors focus on the impact of other factors on the number of building permits issued in the selected location.

Research methodology

This study aims to quantify the effect of non-price factors in the development of new residential housing construction. Only one is chosen market segment and region of the capital city of Warsaw. This choice was made for several reasons. The first is the highest increase in property prices from the perspective of other regions. The second reason is that the capital city has long stable trends than other parts of the state. The capital city general-

ly long retains a similar social structure of the population, which in other parts of the country is not a rule. The last reason is that earlier studies have taken as a reference is always the market situation in the capital. Compared to the traditional concept of factors examined here is the objective of examining the factors not entirely similar conventional models. The determining factor in new construction is just the number of building permits issued.

For the research part formulated the following hypotheses:

H1. *For growth in the supply of residential housing is a statistically significant factor change GDP.*

H2. *Average wage growth is not a statistically significant factor.*

The first chapter deals with the situation in the real estate market in different countries and provides a summary of known results of theoretical concepts and solutions. For comparison is selected situations in different European countries. The second chapter explains the creation of the database and edits data for further calculations — the actual numerical assessment of the importance of the factors mentioned in the third chapter.

To solve these tools were used. Granger causal relationship and Kendall Tau correlation relationship between the variables. Multi-factor linear regression by inspection of the data stationarity, autocorrelation, and multicollinearity, multifactorial nonlinear regression to compare the results.

Literature review

Market situation in Poland, particularly in the Lower Silesia province describes Brzenicki et al. (Brzenicki,2018) Their solution is primarily based on solving the contradiction between supply and demand in the property market in Wroclaw. The authors summarize the factors affecting market development. First, summarize findings similar to the previous case of the Czech Republic, namely that demographic, and economic indicators influence the market trend. However, the results of the article show that a significant factor in the development of the market behavior of participants in both the supply side and the demand side. The results presented analyzes confirm that the information cascade plays a vital role in market processes. The problem is that the general decision-making actors such schemes. Financial markets are not applicable in this situation. The literature in the Cascades was often providing the context of the capital market, but shares

are bought for other purposes than residential property. Information cascades also suggest that market participants act rationally and react to the market situation. However, their behavior undermines the balance of the entire market on a global scale. Behavior that seems irrational in other markets can be considered rational in the property market because the concept of rationality in the housing market is shaped based on a set of other criteria.

Like in Poland and neighboring Lithuania was solved a similar problem real estate bubble. Simanavičien (Simanavičien, 2013) for evaluation uses the following variables. GDP, inflation, average wage growth and a rise in real estate prices. Like other variables must be taken into account and the number of "speculators" in the market and further price substitute, i.e., rental housing. Factor that is cited as the least important is the increase in the cost of construction components. In contrast, required more profit owners of construction companies is a crucial factor. The experience of Lithuania and Poland agree in terms of rational behavior of market players, but that, in the long run, leads to growth imbalances.

The issue of balance or imbalance is addressed from the perspective of the Czech Republic. The comprehensive study compiled in 2010 Hlaváček and Komárek. (Hlaváček & Komárek, 2011) Their view is slightly different from the focus of the article, namely the goal of their research was the discovery of market imbalances in terms of the classical microeconomic model of the balance of supply and demand sides. Article significant market factors development can identify this distinction. For the City of Prague is the price of land, demographic developments in terms of population growth and the latter case, the increasing share of foreign investment. The whole Czech Republic but has a slightly different value. The price of land is not a significant variable but instead appears to be a significant factor in the average monthly wage and interest mortgages.

Materials

Due to the previous analysis of the literature for further investigation were selected following explanatory variables. Macroeconomic indicators present GDP and Consumer Price Index. The demographic factor is the number of inhabitants and unemployment rate.. The microeconomic factor is represented by the value of the Average Wage Index and Housing Prices. Interval investigation is from 1.1. 30. 9. 2010 to 2018. For the same size input values are converted to values of basic indices, the benchmark is al-

ways the average for all four quarters of 2010. The response variable is then the number of building permits granted for residential units.

The reasons for selecting these variables are as follows. GDP is among the frequently selected indicators determining economic development. The Index of Housing Prices is a description of the effects of other non-price factors on selected markets. Consumer Price Index captures both available balances consumer and partly rational consumer behavior from the perspective of saving, e.g., investment in housing. Population demonstrates the demographic factor. Data for the whole of Poland are selected because the demand for housing in the capital do not include only residents of Warsaw and the surrounding regions, but residents of the country. For the capital city is typical, that the trend increase in the number of inhabitants of Warsaw, which since 1990 around 1% per annum. That will be examined the impact on the number of building permits and not the number of bytes as a whole is given by that in terms of the increase in the offer is made possible through an extension developers construction. Is typically And due to the saturation of the market is its further development is possible thanks to the increasing number of residential units. The Basic statistical description provides the table 1.

For further exploration will be of interest mainly the value of kurtosis and skewness because these values are essential for normality of data distribution. The relatively small standard deviation to the average file is suitable predictive models.

Statistical evaluation

In the first step will be tested Granger causality. Granger causality is not causality in the ordinary sense. It represents the only measure linear prediction and explains if something happened earlier than the status quo. The very existence of Granger causality does not mean automatically correlated variables (Seth, 20017). If two variables are correlated, this fact indicates direct causality. The existence of Granger causality and instead explains the delay factor of one variable. The results are shown in Table 2. P-value of 0.05 is chosen by default. To test was chosen may be a delay of 2 years. Values lower than the critical value are in italics.

Granger causality does not apply to the variable Housing Prices and Consumer Price Index. In reverse order, but these series of causal relationship explained. Given that all variables showed a causal relationship to the above exceptions, will further calculations calculate with all variables.

The next step is to assess the Kendall tau correlation between variables. Statistically, the significant variable is not Consumer Price Index and The Number of Inhabitants. Other variables showed a statistically significant correlation, confirming the previous results of Granger causality.

The correlation coefficient is not in one case greater than 0.65, indicating only moderate dependency relationship between variables. An exciting feature is the typical negative value of the correlation coefficient in the population; a shrinking population thus has a positive effect on growth in the number of building permits. This fact, however, given the fact that there is a population of selected aggregate quantity, while the number of building permission is only for the capital city. Therefore, despite the depression population prevails the pressure on the demand for housing in Warsaw. Similar explanations can also use variables unemployment, which also shows a negative correlation, but it is statistically significant.

Another test is to verify the stationarity of data. For the response, the variable will be used standard Kwiatkowski-Phillips-Schmidt-Shin test. Given the results of Granger causality will be used in this assay a maximum delay of 3 periods. The choice of 3-time delay is chosen because of different tests for Granger causality. For some variables, the 5-time delay was used for the test, but only for two variables out of six, and therefore the weighted average of the four variables from the tested delay two periods and two variables with a delay of five periods are three periods. Results are as follows:

P-values result means that the test comprises a series of stationarity and thus can be used to create multi-factor regression model data without modification.

Another test is a test for normality of the input data. For the evaluation is used Shapiro Wilk test and Liliefors test. The results are shown in Table 5.

Two variables from the sample data do not meet the condition of normality 2. Visual inspection data using PP graph that here but given the limited range is not listed, it showed the only partial violation of data normality. Some authors recommend continuing the development of a model without the conditions of normality (Mankiw, 1990). It will, therefore, be in a calculation of all variables used without reduction for those that do not meet the condition of homoscedasticity.

The final step is to calculate the parameters of the model itself. The general shape of the model is:

$$Y = a + b_1 * X_1 + b_2 * X_2 + \dots + b_p * X_p$$

The values of each parameter in the table 6. Statistically significant are GDP variables and population. GDP is statistically significant at both 5% and 1%. The adjusted determination coefficient reaches 80%, which indicates a relatively good model. Durbin's statistics reach 1,298. Critical table values for 35 cases and seven variables are 0.8 - 1.847. Thus, the proposed model does not show autocorrelation.

Conclusions

The present model provides a different approach to the assessment of development changes in supply real estate market in Warsaw. A key variable is selected identification number of building permits. By this process differs from the previously presented model because it describes just a part of the real estate market. However, as shown by the literature search parameters offered new housing units are always an essential factor in the rise in prices on the real estate market. Selected Variables respect the primary division of demographic, macroeconomic and microeconomic. A decisive factor is the macroeconomic indicators and GDP.

Similarly, the indicator is a definite change in the average wage, in this case, but came out statistically significant. Negative relationships with the number of building permits show the indices of housing prices and the consumer price index. Explanations would mean that rising consumer price index reduces disposable household resources for investment in housing. Defined hypotheses have the following evaluation:

H1. For growth in the supply of residential housing is a significant factor in GDP. Of all the variables selected, GDP has the most substantial influence. According to the metric used, 1% of GDP means a 1% increase in building permits. Other variables reach a maximum of 0.7%. The second statistically significant variable is population growth. It is only half the strength of GDP and is only significant at 5%.

This hypothesis was confirmed, for the variable GDP was identified most robust statistical significance both at the 5% level and at the level of 1%.

H2. Average wage growth is not a statistically significant variable.

The average wage is not a statistically significant variable. Compared to the other but has a powerful influence. Since the most crucial factor of GDP differs by only 0.3%, it is a decisive factor, which average wage growth also means growth in building permits issued. The average wage also affects the result, but not statistically significant.

These results encounter several potential limitations. The first of these may be unsatisfactory choice variables. Although previous research work drew on similar indicators, the absence of real causality can never be dismissed. The second problem is the limited number of units of databases. For econometric models, it is useful to have data samples are hundreds of cases. Not all variables used but are measured monthly.

For this reason, it had to be used only quarterly frequency. The last limitation is strict application conditions multifactor regression as indicated in the previous text. Certain conditions have not been met entirely. Control calculation but showed that the deletion of variables without homoscedasticity would admittedly simplify the model, but its coefficient of determination would be shifted to 99%, which is the incorrect procedure.

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Annex

Table 1. The descriptive statistics data file

Variable	Descriptive statistics						
	N valid	Diameter	Minimum	Maximum	Std. Deviation	skewness	Sharpness
Number of building permits	35	529.6571	129.0000	1289.000	309.2588	0.72061	0.11386
GDP	35	112.8600	92.6000	141.700	11.8447	0.48199	-0.27845
Housing Prices Index	35	97.7457	87.3333	104.100	4.4802	-1.09141	0.35673
Consumer Price Index	35	99.2076	91.7667	102.667	2.9020	-1.40820	1.02824
Unemployment rate	35	8.0280	3.7700	10.570	2.2658	-0.64159	-1.08491
The Number of Inhabitants	35	99.8980	99.7162	100.062	0.1129	-0.06788	-1.53872
Average Wage Index	35	117.1829	98.8292	141.451	12.1265	0.39036	-0.71844

Source: Own calculations based on <https://stat.gov.pl/en/>, <https://ec.europa.eu/eurostat> (2019).

Table 2. Granger causality

Order	relationship variables		p-value	F statistics
Y = f (X)	Number of building permits	GDP	3.1789764636975e-10	52.7630370922218
X = f (Y)	GDP	Number of building permits	1.16529054837308e-08	37.6192042647748
Y = f (X)	Number of building permits	Housing Prices Index	0.280438598136679	1.33091916365276
X = f (Y)	Housing Prices Index	Number of building permits	0.023269086063629	4.31414529176679
Y = f (X)	Number of building permits	Consumer Price Index	0.353653535703482	1.07899731706356
X = f (Y)	Consumer Price Index	Number of building permits	0.00025275987856226	11.2974912514297
Y = f (X)	Number of building permits	Unemployment rate	1.81884905242966e-05	16.5290991010302
X = f (Y)	Unemployment rate	Number of building permits	0.656577203563593	0.427100262382415
Y = f (X)	Number of building permits	The Number of Inhabitants	7.84751210889864e-05	13.501821859543
X = f (Y)	The Number of Inhabitants	Number of building permits	.0071907260469540	5.91662273175331
Y = f (X)	Number of building permits	Average Wage Index	.0012324147940847	8.59077416436894
X = f (Y)	Average Wage Index	Number of building permits	5.77308193159309e-08	32.0437133297795

Source: Own calculations in R.

Table 3. Kendall Tau Correlation

Variable	Descriptive statistics						
	Number of building permits	GDP	Housing Prices Index	Consumer Price Index	Unemployment rate	The Number of Inhabitants	Average Wage Index
Number of building permits	1.0000	0.6134*	0.2898*	0.1618	-0.3687*	-0.2269	0.3345*
GDP	0.6134*	1.0000	0.6099*	0.4246*	-0.4966*	-0.4454*	0.6538*
Housing Prices Index	0.2898*	0.6099*	1.0000	0.6537*	-0.5637*	-0.6504*	0.8896*
Consumer Price Index	0.1618	0.4246*	0.6537*	1.0000	-0.3004*	-0.4145*	0.6201*
Unemployment rate	-	-	-	-0.3004*	1.0000	0.6953*	-
The Number of Inhabitants	-0.2269	-	-	-0.4145*	0.6953*	1.0000	-
Average Wage Index	0.3345*	0.6538*	0.8896*	0.6201*	-0.6616*	-0.7445*	1.0000

Source: Own calculations in STATISTICA 12.

Table 4. KPSS test

number of observations	35
Parameter order of delay	3
test statistics	0.223057
critical values	10% 5% 1%
	0.122 0.149 0.211
Interpolated p-value	0.0015

Source: Own calculations in GRETLM.

Table 5. Homoskedasticity test

variable	Shapiro Wilk test		Liliefors test	
	Test result	p-value	Test result	p-value
Number of building permits	0.9384	0.0502	0.0575	0.53
GDP	0.9756	0.5959	0.0866	0.72
Housing Prices Index	0.0860	0.0004	0.2201	0
Consumer Price Index	0.8057	$2.64 \cdot 10^{-5}$	0.2771	0
Unemployment rate	0.8654	0.0005	0.2094	0
The Number of Inhabitants	0.9088	0.0001	0.030	0.04
Average Wage Index	0.9598	0.2261	0.0967	0.55

Source: Own calculations in STATISTICA 12.

Table 6. Multiple regression result

	b*	Std. Deviation b*	b	Std. Deviation b*	t - statistic	p-value
Constant			-166186.39*	65670.8187*	-2.5306*	0.0173*
GDP	1.0290*	0.1314*	26.8677*	3.4303*	7.8323*	0.0000*
Housing Prices Index	0.0720	0.7273	4.9674	50.2009	0.0990	0.9219
Consumer Price Index	-0.6308	0.6060	-67.2243	64.5821	-1.0409	0.3068
Unemployment rate	0.0404	0.5471	5.5087	74.6737	0.0738	0.9417
The Number of Inhabitants	0.6121*	0.2422*	1677.2864*	663.8008*	2.5268*	0.0174*
Average Wage Index	0.7581	0.8253	19.3342	21.0462	0.9187	0.3661

Source: Own calculations in STATISTICA 12.

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**Relationships between technological innovation and labour
market – results of literature studies**

JEL Classification: *J01; J50; J64; M10; M11; M51*

Keywords: *labour market; technological innovations; mutual relationships*

Abstract

Research background: Labour is a primary factor of production. The economic growth cannot be explained only by the increasing application of factors of production. Specifically, per capita GDP cannot grow in the long run unless it is assumed that productivity also grows, which Solow refers to as “technical progress”. The first association with technical progress is that technological innovations exert impact on the demand for work and the nature of tasks performed by employees. However, there are more different relationships between technological innovations and labour market.

Purpose of the article: The purpose of the article is to present the relationships between the implementation of technological innovations and changes on the labour market through answering the following research questions:

- 1) What is the dominating nature of the “technological innovation - labour market” relationships presented in the subject literature?
- 2) Has this problem been covered in the publications from the recent ten years?
- 3) Has this problem been presented in regard to Poland?

Methods: We used literature studies related to economics and management sciences.

Findings & Value added: Publications from the recent ten years cover problems of the analysed relationship, however, not with reference to the specificity of Po-

land. These publications, more often than the previously published literature, focus on a positive approach to these relationships. The article presents not only the results of literature studies but also directions for further empirical research and an original typology of relationships between technological innovations and labour market which can be used in further studies.

Introduction

Labour in economy is understood as the aggregate of all human physical and mental effort used in the creation of goods and services. Labour is a primary factor of production.

The importance of work for a human being primarily consists in satisfying his/her material and immaterial needs. Work has accompanied people forever. However, it was not until the nineteenth century, along with the development of the industrial society, that the term work and worker became, for the first time, the subject of interest for scientists.

Labour market, in economic terms, represents one of many markets existing in the economy and is, just as they are, governed by its own laws. It covers all issues related to influencing labour supply and demand. Labour purchase and labour sales transactions take place on the labour market. Demand is represented by employers offering jobs, while supply is represented by jobseekers.

Labour market is the subject of interest covered by the researchers representing not only economics, but also psychology, sociology and management. Specialists in economics and sociology are interested in the so-called external labour market, whereas specialists in management (also taking advantage of the output in psychology) approach it from the perspective of an enterprise, its internal labour market and even an individual – i.e. an employee.

The authors who have studied factors contributing to economic growth have shown that economic growth cannot be explained only by the increasing application of factors of production, viz., capital and labour. Specifically, per capita GDP cannot grow in the long run unless it is assumed that productivity also grows, which Solow (1956, pp. 65–94) refers to as “technical progress”. Technological innovations exert impact on the demand for work and the nature of tasks performed by employees. However, there are more different relationships between technological innovations and labour market.

Generally, J. Schumpeter identified innovations with introducing new products, new production methods, entering new markets, obtaining new

sources of raw materials and implementing new industry organization. Different definitions of innovations were created, some approaching innovation as an absolute novelty, other – as the implementation of a solution developed by another entity. Currently the latter approach dominates in the subject literature.

Since the term “technological” appears in the name of the analysed type of innovations, it is worth explaining what technology itself is all about. Technologies are “principles and ideas which direct the way goods and services are produced” (Kemeny, 2010, pp. 1543-1554), however, technological innovations are not clearly defined. For example, the Oslo Manual distinguishes technological and non-technological innovation. The first are associated with a product and a process, whereas the second – with marketing and organization. Some authors – following the OECD guidelines – identify these innovations with technologically innovative products. Others perceive them through the prism of manufacturing processes and refer to them as process innovations. In order to facilitate that, the authors will use the following definition of technological innovation: technological innovation results from the application of knowledge and results in technology through innovations in the production process, it is a new combination of production means and a change in production factors (input) used to manufacture products (output).

The purpose of the article is to present the relationships which occur between the implementation of technological innovations and changes on the labour market. The article adopts a holistic approach towards analysing the identified relationships, i.e. combining the perspective of economics with the one of management. In particular, an attempt was made to answer the following research questions:

1. What is the dominating nature of the “technological innovation - labour market” relationships presented in the subject literature?
2. Has this problem been covered in the publications from the recent ten years?
3. Has this problem been presented in regard to Poland?

In order to answer the above question we used the subject literature studies. The first part of the article provides brief characteristics of the research methodology. The problems discussed in the publications indexed, within the last ten years, in the Web of Science and Scopus databases were analysed in the second part of the article. The same part of the article discusses the results of literature studies as well as presents directions for further research and an original typology of relationships between technological innovation and labour market.

Research methodology

As indicated earlier, the analysis of scientific publication databases (Web of Science and Scopus) was used to answer the research question. The following key words were used: “process innovation”, “technological innovation” in connection with “labour market”. We were primarily interested in publications from the recent ten years. The statistics of these publications are presented in Table 1.

Results

From the industrial revolution in Great Britain to the discussion on technological unemployment in the USA in the 1930s, many questioned the benefits of machines and refused the introduction of new technologies in industry. The next wave of discussions appeared in the sixties and focused on the phenomenon of introducing production machines. For example, the production automation described by K. Marx was associated with technological unemployment and depriving people of their distinguished status of labor entities performing key functions for the system. A worker was perceived as an addition to a machine. At the same time, production machines imposed new form of discipline on employees. A worker was subordinated to the pace dictated by machines (see MacKenzie, 1998, p. 36). Some authors claim that technological unemployment it is only temporary, often reducing this phenomenon to frictional unemployment or the one of micro-economic nature. In their opinion, the introduction of new machines and organization systems actually results in dismissing people from work. They believe, however, that the laid-offs are simultaneously reabsorbed as a result of compensation. The second group of authors presents the opinion that a full compensation is impossible, which may, in the near future, bring about the collapse of labour markets and the spectre of the end-of-work society.

The third debate, which took place in the 1970s, predominantly in Europe, was caused by the emergence of microelectronic technologies. The fourth debate, the most globalized one, is held nowadays and is focused on communication and information technologies as well as their impact on employment and living standards (Klimczuk & Klimczuk-Kochańska, 2015, pp. 1510-1511).

The analysis results of journal databases (see Table 1) indicate that the creation of demand for labour is the most frequently discussed problem, combining the innovations of our interest with the labour market. Publications often list innovations as one of many factors influencing the demand

for labour (other factors include e.g.: labour market flexibility, company organization and culture, sector). Other subjects of interest cover education, preparation of employees for new challenges related to the implemented innovations and for cooperation between a worker and machines. The respective publications do not deal with the problem of relationship between technological innovations and the labour market in Poland.

For example, such authors as R. Capello and C. Lenzi (2013, pp. 322-353) and H. Izumi and K. Takahashi (2010, pp. 342-346) analyse the relationship between innovation and higher employment rate. According to the latter authors, these innovations, although having a positive impact on the condition of enterprises, depending on their type, may have a positive or negative impact on the entire economy in the form of increasing or reducing the needed working time (by increasing or reducing the time-consuming processes). M. Ugur *et al.* (2018, pp. 50-82) also discussed the correlation of innovation on employment, showing that the impact of innovation on employment growth is positive, however, small and highly non-uniform.

L. Ilie and I. Bondrea (2016, pp. 80-87) analysed the impact of economic changes, including the implementation of technological innovations, on the availability of jobs and the requirements regarding skills of an employee of the future. In turn, P. Trompisch (2017, pp. 370-373) rules out the possibility of an overall work automation, resulting from the implementation of technological innovations, and poses a question about the best model of cooperation between people and machines.

In accordance with the research results conducted by E. Wachsen and K. Blind (2016, pp. 941-950) the impact of labour market flexibility on innovation is not clear-cut and also depends on the type of innovation and the characteristics of an enterprise. T.C. Oliveira and S. Holland (2017, pp. 89-107) present a different approach to labour market flexibility, pointing out that high innovation can also be achieved in the situation of low flexibility.

As presented above, the authors of early scientific publications focused mainly on the problem of technological unemployment. The analysis of publications from the last ten years indicates greater diversification of the issues referring to the relationship between innovation and labour market. The publications are dominated by a more positive research optics. Innovations are discussed in the context of challenges rather than threats. The results of research on positive – although small – impact of innovations on the demand for labour are interesting. At this point it is worth noting that the research results presented in the publications are occasionally quite divergent. It refers, for example, to the impact of labour market flexibility on the innovation of enterprises.

Taking into account the considerations presented above we can say that it is worth conducting research related to the situation in Poland.

The publications available on economic portals presenting statistical data provided by the Central Statistical Office in Poland offer significant information on the labour market indicators as well as analyses of this market. Polish labour market faces problems related to the absence of people willing to take up employment. At the end of the first quarter of 2018, the number of vacancies in companies employing at least one person exceeded 152 thousand. Among the important reasons for insufficient workforce resources in Poland the following are listed: large scale of economic emigration to Western European countries and higher labour costs. Despite the fact that the level of labour costs in Poland remains one of the lowest in Europe, their dynamics is high. In 2017, the total employment costs in EUR increased in the European Union by 2,3% against the previous year, whereas in Poland by 6%. The situation of declining number of workforce is also intensified by the continuously growing demand from foreign companies investing in Poland.

At this point it is worth emphasizing that there are surveys conducted on the methods for data collection by production plants in Poland and the level of knowledge in the idea of Industry 4.0. They show that in the dominant group of companies data are manually entered into the system, many respondents still collect data manually on paper and have never come across the idea of Industry 4.0. Polish companies are characterized by lower technological advancement comparing to those from Western European countries. The Third Industrial Revolution is a challenge for the management of Polish production plants. Polish industry still has space for mastering innovation. Innovation increase of Polish enterprises depends on the quality of knowledge diffusion about the possibilities offered by the idea of the Fourth Industrial Revolution.

Taking into account the above presented information about Polish labour market and Polish industry it would be interesting to answer such research questions as following:

1. What do the analysed relationships look like from employees' perspective in Poland?
2. What are the analysed relationships like from the perspective of industrial enterprises on Polish labour market?

Further research should be focused on different mutual relationships between technological innovations and the labour market (including both quantitative and qualitative impact). Moreover, we should take into account that labour market can be divided into segments as a result the following aspects are taken into account, e.g.: work availability for jobseekers, the

nature of employment and the social and professional structure of workers. There is a concept which divides labour market into an internal (company) segment and an external one. Therefore we have developed a typology of relationships between technological innovations and the labour market (see Table 2).

Conclusions

The article attempts to answer questions about the nature of relationship between technological innovation and labour market presented in the subject literature. Summing up the discussion, it should be stated that publications from the recent ten years cover problems of the relationship between technological innovation and labour market, however, not with reference to the specificity of Poland. These publications, more often than the previously published literature, focus on a positive approach to the analysed relationships. Not much attention is devoted to the problem of technological unemployment.

Therefore, as part of the discussion on the research results, the directions for further empirical research were mentioned. The typology of relationships “technological innovation-labour market” presented in the article can serve as the basis for further – more in-depth – qualitative or quantitative research.

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Annex

Table 1. The statistics of publications discussing the analysed problem in the recent ten years

Key words and database	Year of publication									
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Process innovation + labour market (WoS)	1	2	1	2	2	2	9	1	3	3
Process innovation + labour market (Scopus)	6	4	4	7	9	12	6	8	12	9
Technological innovation + labour market (WoS)	5	7	8	4	3	1	10	14	11	15
Technological innovation + labour market (Scopus)	11	16	22	16	12	19	20	22	22	25

Source: authors' compilation.

Table 2. Types of relationships between technological innovations and the labour market

Independent variable	Dependent variable	Quantitative impact	Qualitative impact
Technological innovations	Internal labour market	negative: technological innovations result in employment reduction in an enterprise	positive: technological innovations result in changes in employees' competences (affect the modification of knowledge, skills)
		neutral: technological innovations do not change employment size in an enterprise	neutral: technological innovations do not change employees' competences
		positive: technological innovations increase employment in an enterprise	
Technological innovations	External labour market	negative: technological innovations result in higher unemployment on the labour market	positive: technological innovations impose changes in the competences of candidates for the job (retraining)
		neutral: technological innovations do not affect the size of unemployment	neutral: technological innovations do not change the competences of candidates for the job
		positive: technological innovations reduce the number of unemployed people on the labour market	
External labour market	Technological innovations	positive: quantitative changes on the labour market impose the implementation of innovations in enterprises	positive: competences of candidates for the job (quality of labour supply) have impact on the nature of innovations in enterprises
		neutral: quantitative changes on the labour market do not impose the implementation of innovations in enterprises	neutral: competences of candidates for the job (quality of labour supply) do not affect the nature of innovations in enterprises

Table 2. Continued

Independent variable	Dependent variable	Quantitative impact	Qualitative impact
Internal labour market	Technological innovations	positive: quantitative changes on the internal labour market (termination of employment contract by employees) result in the need of implementing innovations in enterprises	positive: current competences of employees have impact on the nature of innovations implemented in enterprises
		neutral: quantitative changes on the internal labour market (termination of employment contract by employees) do not result in the need of implementing innovations in enterprises	neutral: current competences of employees do not have impact on the nature of innovations implemented in enterprises

Source: authors' compilation.

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Importance of clusters' performance evaluation with regard to the circular economy

JEL Classification: *Q55; R11*

Keywords: *clusters; circular economy; resource efficiency; performance evaluation; knowledge transfer*

Abstract

Research background: In this study, clusters are identified as enablers of the circular economy and resource efficiency for the value of clusters in developing advanced technological products and services as well as promoting regional growth is acknowledged by many policymakers and researchers (Lee, Ho, & Niu, 2012). The aim of companies is to enhance competencies and create competitive advantages in global competition and this can be achieved through pulling from a common and accessible pool of resources, information and demand for innovation which means that companies can profit from belonging to a cluster.

Purpose of the article: The main aim of the article is to overview the scientific literature that addresses the circular economy, identify clusters and their role in the circular economy and suggest how small and medium enterprises could engage in a circular economy through clusters' performance development.

Methods: Bibliometric literature analysis enables identifying the latest trends in scientific articles regarding a circular economy and clusters.

Findings & Value added: The findings suggest that clusters can work as enablers of a circular economy for small and medium enterprises gaining a competitive advantage at the same time. Clusters can encourage and provide conditions in which SMEs would turn to a circular economy. The proposed scheme of Cluster's competitive advantage can help cluster's coordinators, policy makers and all the concerned parties to verify the importance of clusters' involvement in the circular economy.

Introduction

Human development determined the use of natural resources rapid growth during the last century. The extraction of global resources increases due to economic development in all the parts of the world making people think of reusing benefits and turning to a circular economy (Fomina, Berduygina, & Shatsky, 2018). Resource efficiency is viewed as one of the elements that can help to control resource extraction and economic growth (Blomsma & Brennan, 2017). The transition to the circular economy is a complex task that should be planned and encouraged by governments in long term implementation. The European Commission (European Commission, 2018) has introduced a new ambitious Circular Economy Package to encourage shifting from a linear economy to a more circular to ensure sustainable use of resources. Recycling and re-use are promoted to bring benefits for the environment and the economy through proposed actions.

The circular economy is viewed as an industrial system designed to be restorative and regenerative by its definition (Haas, Krausmann, Wiedenhofer, & Heinz, 2015). It started being promoted and encouraged by Global corporations, NGOs, scholars long before the European Commission with its action plan for the circular economy. Even though global corporations can implement these actions and promote sustainability, this is not so easy to achieve for small and medium enterprises (SMEs) for they lack many components that bigger companies have (Ghența & Matei, 2018).

Clusters as a unit involve different organizations, SMEs, educational institutions, research institutes, companies. Belonging to a cluster gives many advantages through increased competitiveness because of a common pool of resources, innovations, research and development (R&D) and other common cluster activities (Raudeliūnienė, Davidavičienė, & Jakubavičius, 2018). Clusters naturally form in geographical areas or can be structured by the companies in different regions, adding to regional development through their activity (Žižka, Valentová, Pelloneová, & Štichhauerová, 2018).

The purpose of this study is to review scientific literature in a circular economy, to identify the latest trends and find out in the interest in this area is growing, define clusters and how they work in circular economy, provide clusters' performance development scheme which would enable SMEs detecting their role in circular economy through belonging to a cluster. SMEs have limited abilities to be involved in circular economy activities in most of the cases for they lack knowledge, resources, capabilities. Here clusters can play a huge role by connecting all the interested parties and linking to necessary resources. Gaining competitive advantage is highlight-

ed in this study and a scheme of clusters competitive advantage is suggested, involving elements of a circular economy and clusters performance. Bibliometric analysis technique was applied in literature analysis and the analytical hierarchy process (AHP) method was used to compose the scheme.

The article is structured in the following way. The introductory part provides the research background and defines the originality of the paper. The second part informs about the research methodology. The third part provides the research results where the scheme of clusters' competitive advantage is explained in detail. The last part presents the conclusions that summarize the whole research.

Research methodology

The material was selected from the Web of Science platform which suggests providing world-class research literature. This platform allows selecting Web of Science Core Collection the main advantages of which are the fully indexed and searchable publications, search across all authors and all author affiliations, Citation alerts which allow citation track, Citation report enables graphical representation of citation activity and trends, trends and publication patterns can be identified.

The basic search was initiated with the keywords *circular economy* for search by topic. This gave 3370 results with publications starting since 1991 the number of which during the last 5 years' doubles almost every year since 2014 reaching 1006 in 2018. The growth of interest in a circular economy is evident as the total number of publications reaches 3100, one-third of which is published during the last year.

Further steps included refining search results according to Web of Science categories: environmental sciences, green sustainable science technology, engineering environmental, environmental studies, engineering industrial, engineering manufacturing, engineering mechanical, economics, agricultural economics policy, business. This research includes 50 articles published in the last 5 years selected using these criteria of search by keywords, Web of Science categories and publication years.

The traditional bibliographic analysis was chosen for it enables tracking the latest trends in the scientific literature regarding the circular economy. In this case, a limited number of articles was selected disregarding the articles which were highly cited but did not fall into one of the Web of Science categories selected in this research. From this perspective, the research method can be applied in further analysis taking into account different Web

of Science categories or varying between the number of selected articles.

The multi-criteria decision-making methods are applied when researchers face complex situations, usually including qualitative and quantitative criteria in the decision-making process (Boutkhoum, Hanine, Boukhriss, Agouti, & Tikniouine, 2016). One of the methods of the unique approach of synthesis is AHP. This method allows hierarchically structuring a multi-period and multi-criteria problem to facilitate the solutions. Here, AHP is used to make a hierarchical structure to organize criteria in clusters' competitive advantage scheme.

Results

The literature analysis revealed the importance of a circular economy in gaining competitive advantage, especially for SMEs. Clusters work as a unit consisting of different companies, organizations, educational research institutions. In most of the cases, SMEs form the basis of a cluster. There are several issues that encourage SMEs to join a cluster, such as a common pool of knowledge, innovations, participation in various events, the possibility to enter new markets, work as one unit in different situations. Competitive advantage is one of the advantages that are indicated in joining a cluster.

The suggested scheme of cluster's competitive advantage (Figure 1) includes two groups of components: the first group consists of clusters' performance criteria and the second group respectively of circular economy performance measures. The first group is unquestionably important in order to measure the cluster's performance and see how it links to competitive advantage as well as enables to detect areas that need to be developed for better performance of the cluster. The second group suggests measures of circular economy which may add to the competitiveness of the cluster if they are implemented in cluster activities.

In the previous research (Razminienė, Tvaronavičienė, & Zemlickienė, 2016) the importance of clusters' performance evaluation was emphasized and the possible methodology of clusters' performance evaluation suggested. The methodology includes clusters' performance evaluation criteria. AHP method was used to structure the criteria for further processing.

Clusters' performance includes three components: activities, processes, and resources. The first two components are further divided into communication activities, marketing activities (includes 10 indicators per each sub-component), international processes (includes 8 indicators), human resources management processes (HRM) (includes 9 indicators). Resources

include relatively few indicators (includes 7 indicators per component) which leaves this component undivided into smaller categories.

Communication activities include indicators that can help cluster members to share their knowledge, create interpersonal relations, communicate through different channels. Regular meetings of cluster members can be arranged according to the need. In this case, it is very important to indicate how often the members should meet in person to ensure that they are seeing each other often enough. These regular meetings can include personal visits of the cluster coordinator to the cluster member. There should be indicated if there are any cluster integration events and how often they take place. A common communication platform would enable fluent information flow for all members and help easier access to the common pool of information. There can be different cluster publications released, such as booklets, newsletters, and others. Other important activities are co-operation while creating new products or technologies and while creating innovations. Innovations can be organizational, marketing and others. Cluster members can also participate in training, workshops, conferences, internships to uphold their interpersonal relations while raising qualifications. Smooth knowledge transfer can be ensured by a common database and informal sharing of knowledge and experience. In addition, technology transfer must be ensured in a cluster as well.

Marketing activities include indicators which enable promotion of the cluster in the society. This can be achieved through common supply and ordering schemes, as well as distribution channels. External clients can be reached through tenders which are made up by cluster members. Common market information should be exchanged between cluster members to help identifying companies as belonging to the same unit. Leaflets, media and other means of communication should be used for cluster advertisement. Exhibitions and fairs can work as a suitable means for cluster promotion with the participation of cluster members as representatives. Lobbying as a seek to influence a cluster by a politician or public official may help to identify cluster activities. The common internet site can help in informing the public about the cluster and promoting visibility. A common logo or brand as visual identification means helps cluster to be easily recognizable in any context. Advertising can work on different channels, although the image in mass media should be highlighted and contacts maintained.

International processes indicate how active the cluster is in the market regarding financial records. These processes include products or goods sold in both, the internal and external markets by a cluster. It is very important if new members have joined a cluster to see if it is attractive and available for further expansion. Start-ups should be indicated if any of them were initiat-

ed in a cluster. The number of foreign markets where members of cluster work can help to measure the possible extent to foreign markets. The part of export in total cluster sales clearly characterizes how international a cluster is. Official co-operation agreements if they are signed with foreign entities are valuable in the internationalization of a cluster. International exhibitions and sales offices should be attended and the record during the last two years submitted for evaluation.

HRM processes indicate the qualification of personnel in a cluster, what kind of training they get, how the cluster is coordinated and other basic information. The indicators include the increase of employees in member companies during the last two years to indicate the growth, the number of employees that participated in the internal cluster training during the same period, the number of training organized by the cluster in two years. It needs to be indicated how many employees have upgraded their qualifications in the last two years. The number of university graduates working at cluster companies helps to indicate the qualification of personnel. Was there an increase in direct employment in cluster innovative activities and how many employees work for R&D activities? The structure of cluster members should be clear, naming companies, R&D subjects, supporting organizations, educational institutions and the number of clusters coordinating members should be provided.

Resources are composed to include indicators that determine financial information about cluster initiatives. The number of common cluster projects should be indicated. Cluster initiatives co-financing is crucial in cluster development which asks to provide the number of such financed cluster projects in two years. External financing should be stated as cluster initiatives in the same period. The part of R&D expenses in the same period needs to be provided in common. Submitted and funded the European Union Structural Funds (EU SF) projects need to be indicated as well as international Research and Development (R&D) projects prepared by cluster members having another foundation, except the EU SF. How many cluster members have invested in cluster initiatives in the last two years?

These cluster's performance criteria give information which can be evaluated using other methods. They can be supplemented or decreased according to the need, although the attention should be paid to the importance of every criterion in order not to deteriorate the quality of the survey.

Extensive literature analysis regarding the circular economy gave crucial results as well. Scientists emphasize the importance of a circular economy for SMEs, whereas, the circular economy criteria were selected ac-

ording to their observations. Clusters are identified as enablers of SMEs in involving to a circular economy and turning to resource efficiency.

Circular economy criteria were organized using the AHP method as well. The circular economy includes four components which are further divided into criteria: environmental performance (includes 4 indicators), operational performance (includes 4 indicators), organizational performance (includes 4 indicators), economic/financial performance (includes 3 indicators). These components include relatively fewer criteria than the cluster's performance. The circular economy components are supplementary, adding to the cluster's competitiveness, while those of the cluster's performance is viewed as giving the main information about a cluster.

Environmental performance includes indicators that determine the statistical information on how the cluster is treating the environment. Usage of alternative energy sources questions if there are any companies in the cluster that use alternative energy sources and how many. Solid waste, as well as liquid or water waste, should be submitted in percent to allow evaluating the soiling. Recycled or reused materials should be provided in percent as well. These indicators are used to gather basic information about the cluster's environmental performance.

Economic or financial performance criteria indicate the financial outcomes of turning to a circular economy. Labor cost per hour can be related to HRM processes from the cluster's performance indicators for it reflects these criteria. Moreover, it indicates circular economy performance as well. Green products give profit which should be presented on average. Companies need to invest in green profits which give the return, indicated on average.

Operational performance defines how the circular economy is incorporated in the production. The use of recyclable and recycled materials in production needs to be provided. Another important issue is customers and how companies cooperate with them for green production. Companies should indicate if life cycle assessment is present in their schedule.

Organizational performance includes sharing information about the circular economy. Green initiatives and eco-service need to be assessed. The common website is one of the marketing activities which should be supplemented and updated on environmental issues to turn to a circular economy. More than that, trading partners should be sharing information promptly and accurately on these issues. After sales service performance needs to be provided by companies in a cluster that works on production.

The information for circular economy indicators is complicated to collect and measure. A cluster is composed of several components, such as companies, organizations, educational or research centers and others. They

can be enrolled in circular economy activities on different degrees and through various activities. Hence, the numbers would vary depending on the activities that companies are engaged in. Needless to say, the engagement in a circular economy is highly dependent on the sector in which a cluster operates.

Composing these two groups of components – cluster's performance criteria and circular economy criteria – would enable to gain cluster's competitive advantage.

Conclusions

Clusters are gaining interest through the last century for they provide access to foreign markets, global knowledge networks, a common pool of resources, access to shared knowledge, innovations. SMEs usually aim at these advantages when decide to be connected with other companies in one unit to gain a competitive advantage. Clusters are a complex form of organization where a co-operative, as well as competitive density, is formed by social ties, productive networks of local companies and institutions. Clusters are characteristic in local environments, although their function is to create a competitive advantage for cluster members on a larger scale – nationally and internationally.

Clusters are identified as enablers of a circular economy in this research for SMEs can use up the advantages of being members of clusters through provided conditions of a unit. Clusters can encourage SMEs to turn to a circular economy. Involvement in the circular economy adds to clusters' competitive advantage complementing the clusters' performance criteria. The proposed scheme of cluster's competitive advantage can help cluster's coordinators, policy makers and all the concerned parties to verify the importance of clusters' involvement in the circular economy.

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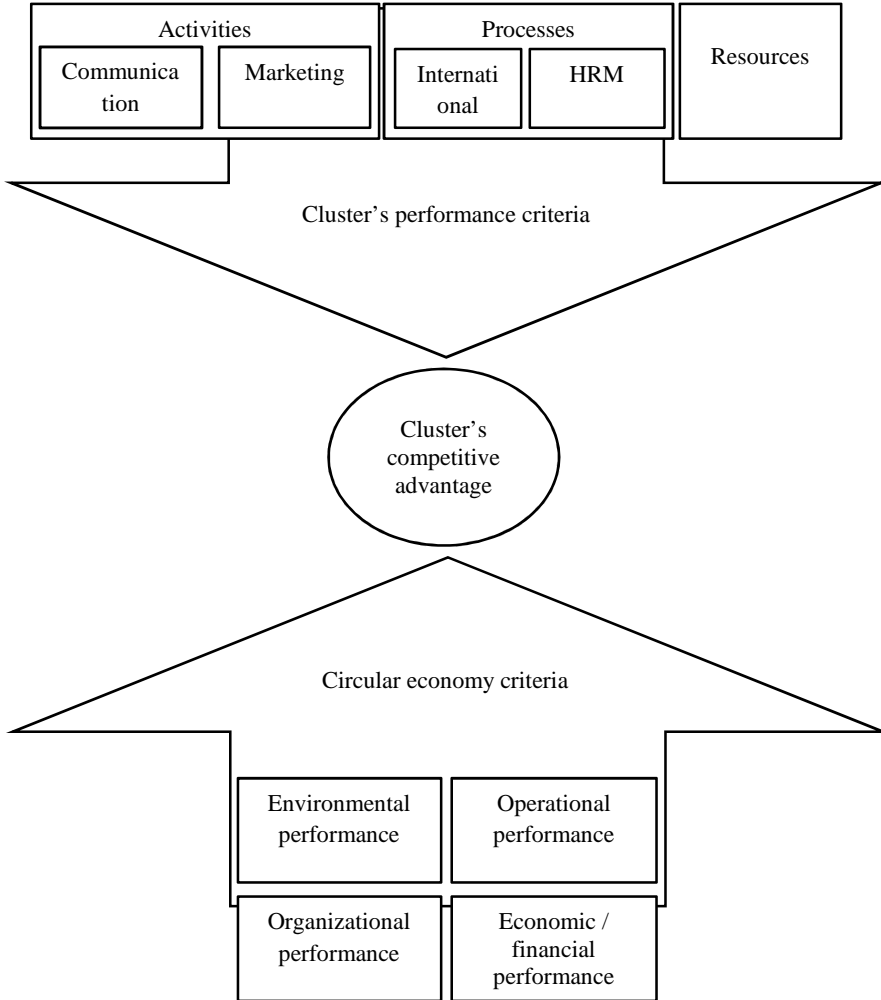
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Annex

Figure 1. The scheme of cluster's competitive advantage



Source: author's compilation.

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Level of public finances decentralization in European Union countries

JEL Classification: *H71; E62; H50*

Keywords: *decentralization; public finances; public expenditure; European Union; fiscal decentralization*

Abstract

Research background: Despite of the universality of the implementation in democratic countries the principle of decentralization resulting from the belief that it is an instrument to improve the efficiency of public funds management, both the scope of public services and the level of decentralization in individual countries are not identical.

Purpose of the article: Comparison the scope of fiscal decentralization in the countries of the European Union; identification the features of countries in which the average level of decentralization from the years 2013-2016 is similar.

Methods: Cluster analysis method; hierarchical agglomeration method using full binding and Euclidean distance; measure of central tendency - arithmetic mean; data was obtained from Eurostat.

Findings & Value added: It was found that in the European Union countries the level of the decentralization index is diversified. Its average value over the period considered (2013-2016) ranged from 0.55% (Malta) to 35.13% (Denmark). The research method used initially (cluster analysis) did not allow achieving the goal: the distances between bonds did not differ significantly, groups of objects could not be separated and grouped into clusters, therefore the dendrograms were not unambiguous. The creation of groups was possible thanks to the use of the second research method - the central tendency. After assuming that the distances between groups must be at least 1 percentage point, 4 groups of countries were created: low,

medium, high and the highest degree of decentralization, with group II being the most numerous, with 17 countries with decentralization levels within the borders 6-12%. This group includes all federal states - EU members and most of the countries that joined the EU in 2004 or later. One of the exceptions is Poland - assigned to group III.

Introduction

At present, it can be seen that the transfer of political and economic power to local governments is a global trend in fiscal policy reform (Mauro et al., 2018, p. 874) persisting in many democratic countries, despite existing differences between them related to their political systems. This trend has its sources in fiscal decentralization concepts coming from the second half of the last century. Implementation of the principle has had slightly different sources in different parts of Europe. While in most Western European countries decentralisation was a response to political pressure and changing economic conditions as well, in Eastern Europe the demand for local autonomy was one of the elements of political reform at the turn of the 1980s and 1990s (Devas, 1997, pp. 351-352).

There are many reasons to spread the process of delegating tasks at lower levels in the structure. Those of great importance include bringing power closer to the electorate, increasing knowledge about the needs of society and the resulting opportunity to satisfy them more quickly and fully (Bulut & Abdow, 2018, p. 183).

Explanation of the notion of decentralisation is relatively well presented in literature. It means self-limitation of central authorities in favour of other entities with regard to performance of tasks, disposal of public assets and management of public funds. Its application does not preclude the centralising of performance of certain tasks. The dynamics and scope of decentralisation carried out in a country depend, among other things, on political, demographic, geographical, economic and cultural factors. With regard to political conditions, decentralisation is possible in countries with a democratic system. There is a positive correlation between demographic and geographical conditions: countries with a large population and countries with a larger area have greater capacity to decentralise their authorities. It is also fostered by the liberal economic model and by multiculturalism and multinationalism. Historical conditions may be added to the aforementioned factors, including mainly the current directions in creating a political system of a state.

From a substance point of view, decentralisation to lower governance levels always involves delegation of tasks. Most often it refers to state structures and concerns the assignment of tasks to local government, however, it needs to be stressed that tasks can also be transferred within private organisations (Poitevin, 2000, p. 878), and in the case of the public sector - the transfer does not necessarily have to take place in the relationship: government sub-sector - local government sub-sector, because tasks can be transferred to an institutionally separated part of state administration, e.g. to special offices representing a subjectively separate part of state administration. The delegation of tasks according to the above scheme is referred to as sectoral decentralisation, as opposed to territorial decentralisation, which is much more common in the case of local government.

The main effect of the decentralization of tasks and public finances should be to increase economic and social effectiveness of the public sector, and as a result to achieve higher economic growth rates, which will bring about an improvement in the standard of living and quality of life of society.

Although, from the theoretical point of view, the above objective of decentralisation of tasks is often emphasised, a review of empirical studies dedicated to this issue indicates that apart from those which indicate positive economic effects of decentralisation, it is also observed that there is a lack of such effects, or in fact there are negative ones occurring (Mauro et al., 2018, p. 873), and with regard to poverty reduction opportunities, it is noted that decentralisation itself, without strengthening and expanding mechanisms of responsibility at a local and national level will not bring results beneficial to poor parts of society (Crook, 2003, p. 77).

The above statement emphasises that the delegation of tasks alone does not exhaust the notion of decentralisation. The definition covers three issues:

- the aforementioned delegation of tasks from a central to local level,
- the use of assets and powers guaranteeing independence and ability to decide on matters relating to a particular area by the authorities at this level,
- local authorities having the appropriate means to implement their own policies.

Measurement of decentralisation

As has already been pointed out, there are no fully decentralised democratic states. There are areas of centralisation in all of them. However, studies have shown that it is possible to determine in which country the level of decentralisation is greater and in which it is less.

In line with the 3 aspects of territorial decentralisation shown in Figure 1, indicators for measuring decentralisation are divided into 3 groups, i.e. the indicators for decentralisation of public finances, administrative and political decentralisation.

Apart from assigning the indicators to one of the three aspects of decentralisation, they can be divided into those which are qualitative (descriptive) variables, e.g. a list of competences of particular levels of local government in a country, and those which are quantitative variables, e.g. the relationship of local government sector expenditure to global public expenditure.

The indicators of the first group, i.e. the decentralisation of public finances, provide information on the division of powers between the central government and the lower level entities of territorial division within the financial economy, especially on competences in collecting and shaping revenues, directions and the volume of their disbursement or powers related to incurring liabilities. Quantitative information can be obtained by calculating, among others, the following indicators – the share of:

- local government sub-sector revenue in total public revenue,
- tax revenue of the local government sub-sector in tax revenue of the state budget,
- own revenue in the total revenue of the local government sub-sector (Sanogo, 2019, p. 218),
- local government sub-sector revenue in relation to the GDP (gross domestic product),
- local government expenditure in total public expenditure,
- local government sub-sector expenditure in government sub-sector expenditure (Stein, 1999, p. 370),
- local government sub-sector expenditure in relation to GDP (Guziejewska, 2018, p. 110).

A comprehensive assessment for the level of decentralisation of public finances would require the use of these indicators. The survey has to be complemented by an analysis of qualitative variables. Due to the complexity of this procedure, only one indicator, the latter, is more commonly used. The share of expenditures of local government entities in

relation to GDP is considered to be a measure which comprehensively shows the process of decentralisation. It allows for the determination of the size and dynamics of decentralisation.

Research methodology

Cluster analysis is a general name for various mathematical methods that can be applied to find out which objects in a set are similar. Objects with similar characteristics are mathematically clustered in the same cluster (Romesburg, 2004, p. 5).

Cluster analysis is a multidimensional technique used to sort data and place similar observations and objects in the same group called a cluster. Both the number of clusters and the number of observations in each cluster are unknown (Migdał-Najman & Najman, 2013, pp. 179-194). There are two types of approaches in cluster analysis: hierarchical and non-hierarchical grouping (Alkarkhi & Alqaraghuli, 2019, pp. 177-186), the first of which was used in the article. Within its framework, agglomeration techniques can be applied, as was the case in the studies presented, and dividing techniques as well. The principle of joining objects can be done according to the nearest or farthest neighborhood (Kaufman & Rousseeuw, 1990, pp. 44, 47). The first method was used in the presented calculations.

In a hierarchical agglomeration cluster analysis, dendrogram diagrams are used to visualize how clusters are formed. A dendrogram is also called a tree diagram. The tree diagram visualization consists in showing all objects that are gradually aggregated into larger clusters. On the horizontal axis of the dendrogram you can read the distance at which appropriate elements form a new cluster. On the vertical axis all objects taken into account in the analysis are shown.

A quantitative description of similarities or dissimilarities of two data points or two clusters requires a prior decision as to the choice of distance and similarity in the cluster analysis (Anderberg, 1973, pp. 131-155). The distance of Czybyszew, urban, Euclidean or Euclidean to a square can be used to create dendrograms. The third of the mentioned, otherwise geometric distance in multidimensional space, is most often used in cluster analysis. It is calculated on the basis of raw data and not on the basis of standardized data.

Results and findings

The main objective of the research was to determine the extent of decentralisation in EU states and to identify characteristics of countries with a similar level to it. Data were subjected to statistical analysis - hierarchical grouping. For this purpose, the cluster analysis module of the software Statistica was used. A clustering procedure consists in connecting closely neighbouring objects (single linkage) using the measurement of Euclidean distance. The results are presented in table 1. On their basis dendrograms have been created - each for one year in which the analysis was performed (Figures 2, 3, 4, 5).

After the calculations and dendrograms had been performed, it turned out that differences between the distances of linkages were not large enough to clearly distinguish groups of countries similar to each other and to combine them into clusters on the basis of the statistical programme. As the method used did not allow clusters to be distinguished, they were created based on the results of the average decentralisation for the period 2013-2016, assigning countries to one of the four groups on the assumption that there must be a difference of at least 1 p.p. between the groups. As a result, the countries were divided into groups with a low, medium, high and highest level of decentralisation, with numbers I-IV assigned to them respectively.

The first group consists of 5 countries with an average level of decentralisation not exceeding 5%. Due to such a low level it is reasonable to say that they are centralised countries. Their characteristic feature is a relatively small area and small population, hence it seems that the central distribution of public funds does not slow down the management of a country to a significant extent.

The second group is the most numerous, consisting of 17 countries, which accounts for nearly 2/3 of all analysed countries (61% to be precise), hence it should be concluded that this level, ranging from 6 to 12%, dominates in the EU countries and is a certain standard in force in the European Union. This group includes all federal member states of the EU, i.e. Austria, Belgium and Germany (their indicator is relatively stable at a similar level of 7-8%), as well as Spain which is not a federal state, but where finances of the Spanish autonomous regions are separated from those of its local government.

The remaining 6 countries were assigned to two groups, where Poland also belongs to the third group, with a high level of decentralisation. The last bracket includes Scandinavian countries with a very high level of decentralisation - within the limits of 1/4-1/3 (23.4-35.1% exactly).

The proposed grouping fits quite well into the model of J. Loughlin, who, describing relations between local government and government powers, distinguished 4 types of states: federal and 3 unitary - regional, decentralised and centralised. Comparing the results obtained in the article with the Loughlin classification propositions (Loughlin, 2000, p. 26) it has to be stated that, with a few exceptions, centralised states correspond to group I, decentralised states belong to group IV, federal states and most of the countries that joined the EU in 2004 or later - to group II, and regional states to group III. In addition, the results are in line with earlier studies, according to which countries with a very high level of decentralisation, e.g. Finland, are characterised by a high degree of autonomy of local governments and a broad spectrum of their own resources (Sekula & Smiechowicz, 2016, p. 731).

Conclusions

On the basis of the analysis carried out, it can be concluded that there is a varying level of decentralisation in the European Union states. The dominant level is 6-12%, which occurs in 61% of countries. This means that such a part of the GDP makes up the expenditure of the local government sub-sector. The 3 countries where it is highest are Sweden, Finland and Denmark.

In addition, it has been found that minor variations in the indicator occur in all countries over the 4 years covered by the survey.

At the same time, the presented study examined usefulness of the cluster analysis method in a hierarchical form (agglomeration method) with the use of full linkage and Euclidean distance to determine the possibility of joining EU countries into clusters with regard to the level of decentralisation occurring in them. The use of agglomeration by means of simple connections showed the fact that the objects form clusters joined together in a "rope", creating long connections and long chains. It is not possible to clearly distinguish groups of objects, because the distance of linkages from clusters does not differ significantly. Therefore, it was concluded that the originally applied agglomeration method of statistical analysis of a single linkage does not seem useful to perform this type of analysis due to the tendency to create poorly defined clusters with the structure of long "chains". In order to verify the above statement in the future, one should consider broadening the study horizon or adding a second measure, e.g. local government sub-sector revenue in relation to GDP.

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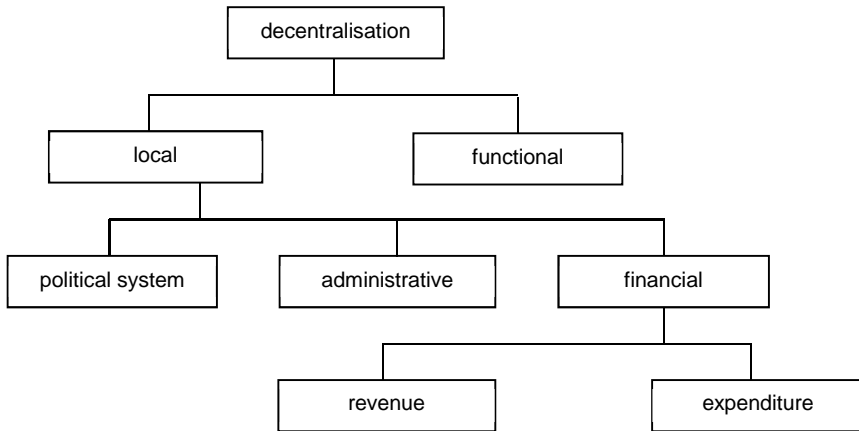
Annex

Table 1. Local government sub-sector expenditure to GDP in EU countries in 2013-2016 (%).

State	2013	2014	2015	2016	average	group
Malta	0,7	0,6	0,5	0,4	0,55	I
Cyprus	1,5	1,6	1,6	1,4	1,53	I
Ireland	3,6	2,8	2,2	2	2,65	I
Greece	3,6	3,3	3,5	3,5	3,48	I
Luxemburg	5	4,8	4,5	4,9	4,8	I
Spain	5,9	6,1	6	5,8	5,95	II
Portugal	6,6	6	5,9	5,7	6,05	II
Slovakia	6,4	6,7	7,4	6,6	6,78	II
Hungary	7,5	7,8	7,8	6	7,28	II
Belgium	7,6	7,4	7,2	7,1	7,33	II
Germany	7,7	7,8	7,8	8	7,83	II
Lithuania	8,3	7,9	7,8	7,8	7,95	II
Austria	8,5	8,5	8,6	8,5	8,53	II
Bulgaria	7,9	9	10,4	6,9	8,55	II
Slovenia	9,7	9,8	8,9	8,2	9,15	II
Romania	9,2	9	9,7	9	9,23	II
Estonia	9,9	9,3	9,4	9,4	9,5	II
Latvia	10,2	10	9,3	9,5	9,75	II
Great Britain	11,1	10,7	10,5	10,1	10,6	II
Czechia	11,4	11,5	11,3	10,2	11,1	II
France	11,9	11,8	11,4	11,1	11,55	II
Croatia	12	12,6	12,1	11,5	12,05	II
Poland	13,1	13,3	12,8	12,9	13,03	III
Holland	13,8	13,9	14,3	13,8	13,95	III
Italy	15	14,7	14,5	14,3	14,63	III
Finland	23,8	23,8	23,2	22,6	23,35	IV
Sweden	24,9	24,9	24,6	25	24,85	IV
Denmark	35,5	35,3	34,9	34,8	35,13	IV

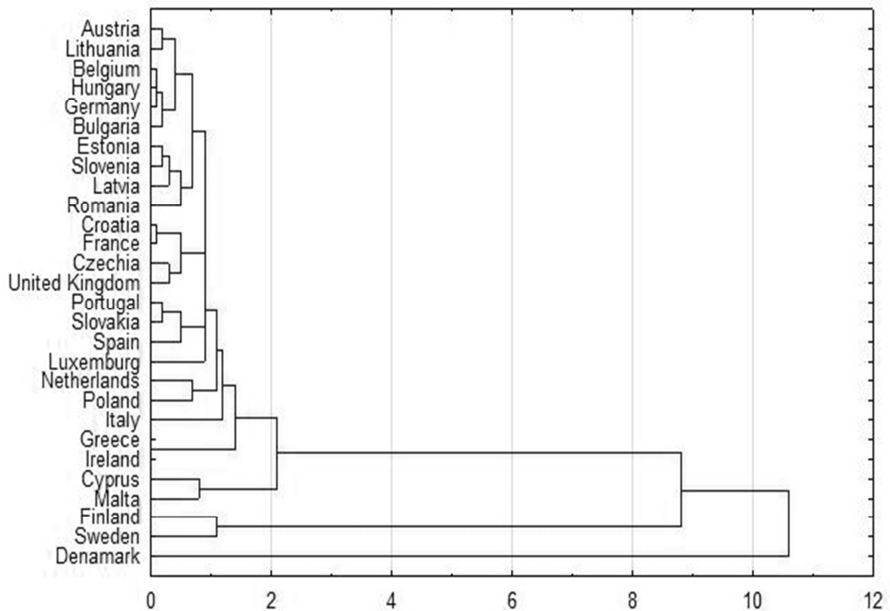
Source: Own elaboration based on Eurostat data: epp.eurostat.ec.europa.eu.

Figure 1. Types of decentralisation



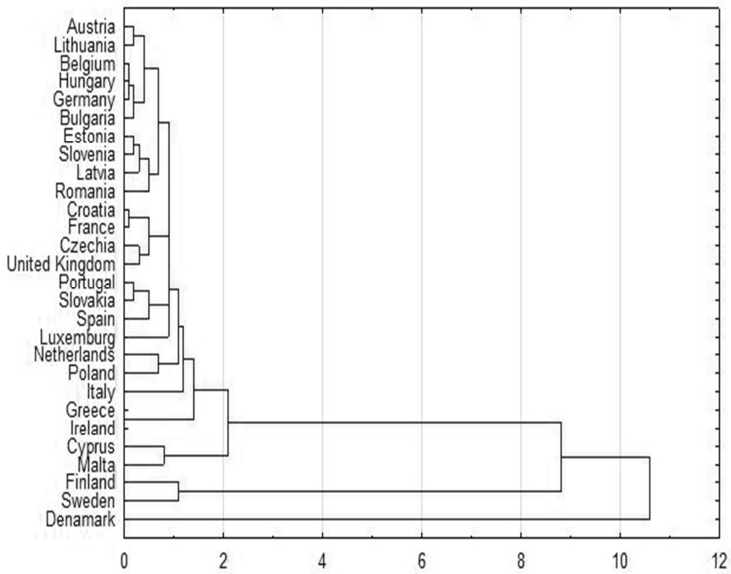
Source: own study.

Figure 2. Dendrogram: Decentralisation of public expenditure in EU countries - 2013.



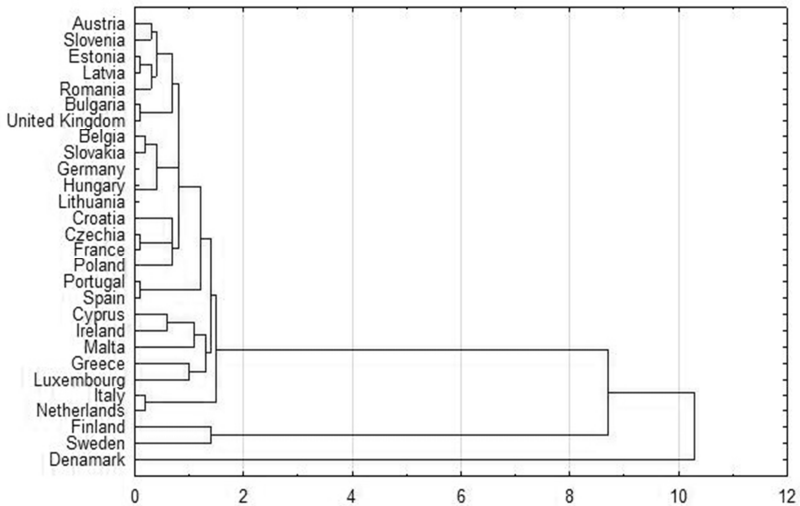
Source: Own elaboration in the Statistica software on the basis of Eurostat data: epp.eurostat.ec.europa.eu.

Figure 3. Dendrogram: Decentralisation of public expenditure in EU countries – 2014.



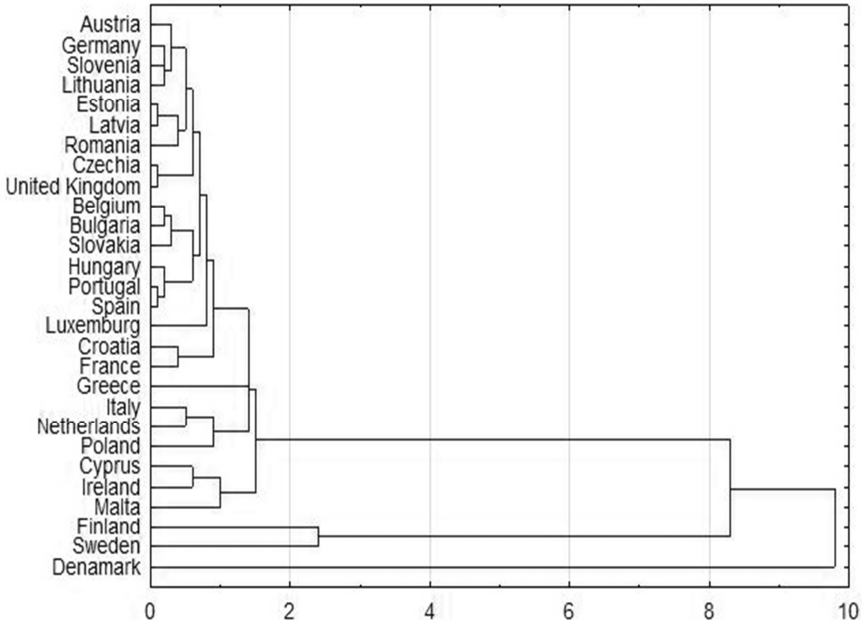
Source: Own elaboration in the Statistica software on the basis of Eurostat data: epp.eurostat.ec.europa.eu.

Figure 4. Dendrogram: Decentralisation of public expenditure in EU countries – 2015



Source: Own elaboration in the Statistica software on the basis of Eurostat data: epp.eurostat.ec.europa.eu.

Figure 5. Dendrogram: Decentralisation of public expenditure in EU countries – 2016.



Source: Own elaboration in the Statistica software on the basis of Eurostat data: epp.eurostat.ec.europa.eu.

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Current figures and perspectives of Latvian medical devices industry

JEL Classification: *I11; L69*

Keywords: *medical devices; medical devices market; net turnover; profit; normative regulation of the market*

Abstract

Research background: Due to ageing of the population in developed countries and increase of the demand for the healthcare worldwide, medical devices (MD) industry becomes one of the fast growing businesses, experienced growth more than 4%. Medical device industry is a good choice for countries that are not rich in natural resources, but able to educate high-quality professionals. The need in human capital is not high as well. Mainly, European enterprises in MD field are small and medium enterprises. From the other hand, MD industry is one most regulated, therefore special attention have to be paid while developing innovation strategy in MD sector.

Purpose of the article: The aim of the paper is to provide a first insight into MD sector in Latvia to evaluate present situation and outline some perspectives for future development.

Methods: The data for survey were selected from the public database of the Registry of Enterprises of Latvia and Medical Devices Catalogue, provided by State Agency of Medicines of the Republic of Latvia. Author analysed number of enterprises in the sector, its net turnover and profit for the period from 1996 to 2017.

Findings & Value added: Totally, 779 Latvian enterprises in the field of medicine and pharmacy were analysed. Out of this, 142 enterprises were registered in medical equipment, instruments and devices sector, but only 29 companies are Latvian manufacturers. The total turnover of the whole sector in since 2013 up to 2017 was at the level of ~ 243.6 mil. EUR with the net profit ~10%. Generally, development of MD industry in Latvia followed world tendency with steady growth with a drop in 2008 due to financial recession.

Introduction

The aging of the population in developed countries gave rise to the need to extend the time span of the active human life, which, in turn, stimulated growing demand for health care. This makes the medical device (MD) industry one of the most attractive and profit - promising. The European market of medical devices showed growth even during the recession of 2007–2009, gaining average growth 4.2% over the period 2008–2013 (Maresova *et al.*, 2015).

Although attractive, the medical devices sector demonstrates quite high level of complexity. On the one hand, the production of medical devices does not require large investments in natural resources, therefore the development of such production can stimulate the economy of small countries with low levels of natural resources, one of which is Latvia. The diversity of medical devices is wide, the demand is high, therefore medium and small enterprises can easily co-exist with large ones at the market. For example, in China medical devices manufacturers mainly are small companies that employ up to 50 people. A similar situation is observed in Europe, where most of companies in the field of medical device manufacturing are small and medium enterprises.

On the other hand, the production and clinical use of medical devices are among the most strictly regulated fields in the world (Altenstetter, 2012). Often, manufacturer has to carry out clinical studies to put the device on the market. Clinical trials could be very time consuming, therefore it is not always possible achieve the desired result quickly. Another factor hindering the launch of new products on the market is complicated regulation for medical tests on animals.

Despite all the difficulties, the medical device market is one of the most innovative. Consequently, enterprises need highly qualified specialists in biomedical engineering with knowledge of state and international regulations and sound competencies in innovation process management. This entails the need for a sufficiently large investment in human resources, in addition to investments in medical research itself. Due to the above factors commercialization of innovative medical products takes 5 to 10 years.

The aim of the paper is to provide first insight into MD sector in Latvia to evaluate present situation and outline some perspectives for future development. To achieve the objective, the research includes:

- review of the literature on medical device industry;
- review of national legislation, regulating medical device sector in Latvia;
- analysis of current situation on Latvian MD market.

Literature review

Medical devices industry produces high added value product, but does not require sound material resources. This gives a good opportunity for small countries to become internationally recognised players on the world MD market, Netherlands, Switzerland, and Ireland are good examples. In Latvia, MD market tripled from nearly 10 MEUR in 2005 up to 27 MEUR in 2015 (Semjonova, 2017), that coincides with world tendencies. Researchers foresee continuous moderate growth of the worldwide MD industry in future as well (Maresova *et al.*, 2015).

From the other hand, introduction of new product in MD industry needs noticeable financial investment because MD sector is highly regulated area. Innovations in the field of MD require entrepreneur to be well acknowledged on regulative requirements that significantly differ from country to country. Due to legal regulations, the time and resources, required to put new medical device to the market, are significant, although less than ones typical to pharmaceutical industries. For the case of Latvia, the process is even more complicated due to imperfection of legislation, which often does not meet modern economic needs.

Except of the problem of strict regulation, researchers worldwide point out number of issues, specific for the MD field. One of such issues is evaluation of the efficacy and effectiveness of the medical devices. From the point of the enterprise – developer of the new MD technology, - the attention should be paid to continuous evaluation of the competitiveness of the developed product at all developing stages, as well as to close contact to the potential users and stakeholders. Lack of such communication could become the critical issue, jeopardizing product success (Markiewicz *et al.*, 2017). Question of concurrence in MD field becomes especially actual in recent years due to appearance of budget – class products that provides basic functionality and buyers' tendency to prefer such products.

Although some papers, concerning financing opportunities for MD project could be found (Mas *et al.*, 2017), there is lack of publications, that provide generalization of the relationships between above factors (i.e. regulation requirements, model of healthcare financing, efficacy of communication with stakeholders, level of technological development etc) on the potential success of innovation in MD field. Such generalization would help both developers and investors to assess perspectives and risks of the MD projects.

Research methodology

The study is based on the analysis of public available data from the Enterprise Register of Latvia (Firmas.lv, 2019) and the catalog of medical devices provided by the State Agency of Medicines (ZVA, 2019)

To assess business efficiency in the MD industry sector, the industry average profit margin ratio was calculated by dividing net income by net sales.

The author encountered number of difficulties while processing the information from databases. First of all, some companies, especially those, manufacturing clothing, underwear, shoes, and goods for sport, produce both medical devices and general-purpose goods. This makes difficult isolation of income received due to sales of medical devices from the general turnover of the enterprise. To adjust for possible distortion and bring information closer to the real situation, the author applied following assumption:

1. turnover and profit of the “Lauma” company, internationally recognised underwear manufacturer, was reduced by $\frac{3}{4}$, assuming $\frac{1}{4}$ of the turnover is related to the sales of MD-classified compressive underwear;
2. turnover and profit of “Rīgas farmaceitiskā fabrika” (Riga pharmacy factory) due to sales of medical devices (not pharmacies) was estimated as 0.1% from the total turnover, because company manufacture only one narrow purpose medical device (pocket nebulizer) out of more than 200 products that includes popular food supplements and herbal teas;
3. Two enterprises are excluded, because manufacturing take place in Lithuania. Concern “Olainfarm” is excluded, as it manufacture only one medical device with negligible total sales;
4. Data on 5 enterprises are censored after 2016, since companies stopped manufacturing and now are dealing entirely with distribution and retail;
5. Two enterprises are excluded, as they acquired licence for MD distribution in Latvia in the middle of 2018 only.

Results

Latvian medical device market is supervised by two state authorities: The State Agency of Medicines and the Health Inspectorate, both are under auspice of the Ministry of Health of the Republic of Latvia. The Medicines Agency issues the approvals for the “CE” mark labelling of devices – procedure, that is mandatory for manufacturers to comply with EU directives 93/42/EEC, 90/385/EEC and 98/79/EC. Alongside, the Agency maintains

national Register of Medical Devices (ZVA, 2019, Directives or Regulations and Standards, 2019, MK, 2019). Monitoring and supervision over the commissioning, production, distribution and operation of devices is provided by the Health Inspectorate (VI, 2019, MK, 2019).

At 15 March 2019, the Register of Medical Devices contains records of 2806 MD, registered for distribution at Latvian market. Out of 2806 MD, only 69 were produced in Latvia. In turn, no any single device out of 5095 in vitro diagnostic devices was manufactured in Latvia.

From September 2008, only two new MD manufacturers appeared on the market, besides in both case enterprises had share of German capital.

Analysing the composition of Latvian MD market by countries of MD manufacturing, one can say 52 states are represented. There are five countries, that overcome 5% barrier. i.e. share more than 5% of the total MD turnover in Latvia (Fig.1). The leader is the United States, nevertheless such relatively small state as Switzerland has overcome 5% barrier, too.

In total, there are 779 enterprises, registered in the sector of medicine and pharmaceutic industry in Latvia. Out of total 779 companies, 142 enterprises are registered in the field of medical equipment, instruments and devices. In 2017, the net turnover of these companies amounted to 243.6 million euros with a net profit of 19 million euros. The number of people employed in this field was 1.651, which corresponds to an average of 12 people per enterprise. It corresponds to the world trends for small and medium enterprises operating in the MD sector. Most of the 142 companies at the Latvian market of medical equipment and devices are mainly engaged in the purchase and distribution of medical equipment and devices manufactured abroad. It should be noted that this trend remains unchanged starting from 2015.

Following data from State Agency of Medicines on March 2019, there are only 29 companies - local manufacturers of medical devices whose products are registered in the Latvian Register of Medical Devices. In addition, 11 of these companies appear in other databases as well as manufacturers in other areas, such as the production of clothing (underwear and shoes) or the production of sport goods. This introduces bias in analysis of the net turnover of MD industry, since it is rather difficult to identify revenues from the sale of medical devices from the general turnover of the enterprise. To compensate such a bias, author used set of assumption, described in detail in Research methodology section.

In general, the development of the medical devices market in Latvia followed European trend and showed steady growth with a drop in 2008 due to the financial crisis (Fig. 2a). Profit remained at a level of 2–3 million euros per year since 2011 (Fig. 2b).

Figure 2 indicates that the growth rate of this industry has declined from 2013, and after a drop of turnover on 4.4% in 2015, growth is stabilized at only 1.0% per year. Despite new MDs, constantly appearing in Latvia, the market remains virtually unchanged. It should be noted that the does not request entrepreneurs to remove obsolete MD, that are not in demand as out-dated, from the Register.

In turn, the profit growth rate has changed greatly form year to year. For example, in 2013 and 2014, the average drop or the profit in comparison with previous year comprises 24%. In contrast, in 2015 and 2016, the profit increased on average by 44% per year. In 2017, profit volume decreased by 62% to € 1.6 million. Analysing the annual reports of each enterprise individually, one could note that the reasons for such a recession were enterprise – specific and it is impossible to find single particular reason for the MD market as whole.

The same tendencies could be seen on the MD market profitability chart (Fig. 3). Since 2011, the profit margin ranged from 5% to 15%. A particularly sharp drop of profitability was observed in 2017 and amounted 9 percentage points relative to 2016. When analysing each enterprise individually, it was found that 3 enterprises ended the year with losses, and another 2 with almost zero profit.

Analysis of the number of people employed in the production of MD demonstrated an annual decrease in the number of workers since 2013 (Fig. 4). Such findings are rather natural, bearing in mind some enterprises have stopped production of MD and are censored form the study. During the reported period, the total decrease in the number of employees was 10.4%.

Discussion

Until now, no thorough analysis of Latvian MD industry sector and its development perspectives have been carried out. Presented results is the first systematic review of the economic indicators of the MD sector. Although Bloomberg database provides figures for top 500 companies, operating in MD sector, the author failed to find any detailed review concerning involvement of small and medium enterprises. This make impossible comparison of the obtained data with MD market dynamics of other countries.

Obtained data demonstrates reasonable behaviour, considering depopulation of Latvia and reduction in population purchasing power, especially for retired people due to insufficient indexation of state pensions. Lack of information on state – reimbursed medical devices could play a certain role,

too. In Latvia, people generally rely on state financed healthcare, rarely spending money on medical devices, that are not financed from the state budget. In such a situation, the demand mainly is formed by state-reimbursed healthcare institutions, and obviously have to demonstrate tendency for saturation.

From the other hand, Latvia obviously does not use their potential in development of competitive, export – oriented MD business. Development of the Latvian economy needs professionals that are able to develop and commercialise new products with high added value. There is necessary to raise entrepreneurship skill of the young professionals, educated in the field of MD, providing roadmap for implementation of MD projects. Still, there is no single concentrated knowledge base, that could assist new entrepreneurs enter highly regulated area of MD industry. Development of such database could facilitate creation of new start-up companies, contributes to increment of the role of MD industry in the structure of Latvian economics an export.

Conclusions

The paper analysed economic indicators of the MD industry sector in Latvia. In 2019, Latvian Register of Medical Devices contains records of 2806 MD, only 69 were produced in Latvia. Latvia imports medical devices from 52 countries, USA is the main importer.

From 779 enterprises, registered in the sector of medicine and pharmaceutical industry in Latvia, only 142 enterprises are registered in the field of medical equipment, instruments and devices. In 2017, the net turnover of MD market in Latvia was 243.6 million euros with a net profit of 19 million euros. The number of employees in MD sector was 1.651 (12 people per enterprise on average). Only 29 companies out of 149 are local manufacturers of medical devices.

Generally, the development of ME industry in Latvia faced some stagnation with the annual average increase of turnovers by just 1%. The profitability of the sector oscillates from year to year around average of 10%.

The present research does not discover some single reason for such recession on net turnover, the reasons seems to be enterprise – specific. The future research has to explore individual indicators of enterprises in greatest details, as well as provide comparison with the situation in other countries.

Author has a strong opinion that Latvia does not use their full potential in development of export – oriented MD business. To help new entrepreneurs enter MD industry sector, methodology for commercialization of

medical devices, suitable for the SME could be developed.

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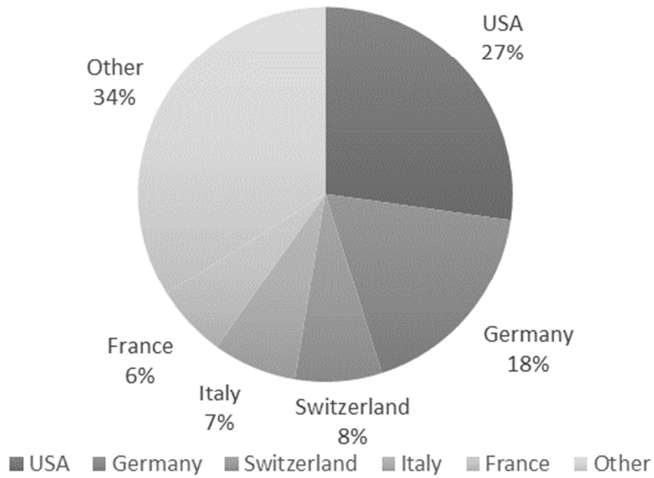
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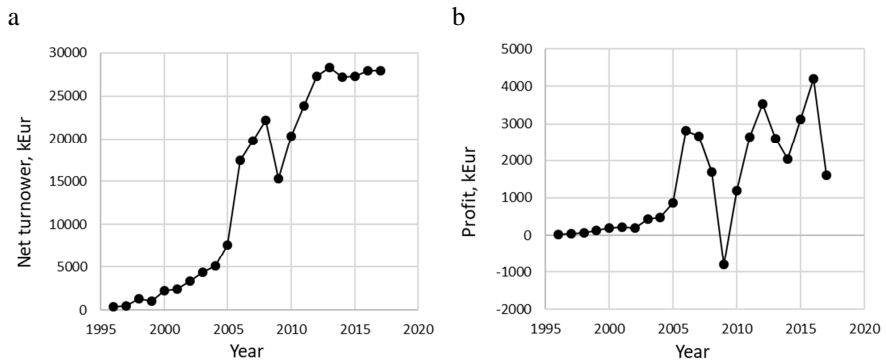
Annex

Figure 1. Distribution of MD suppliers in Latvia by countries



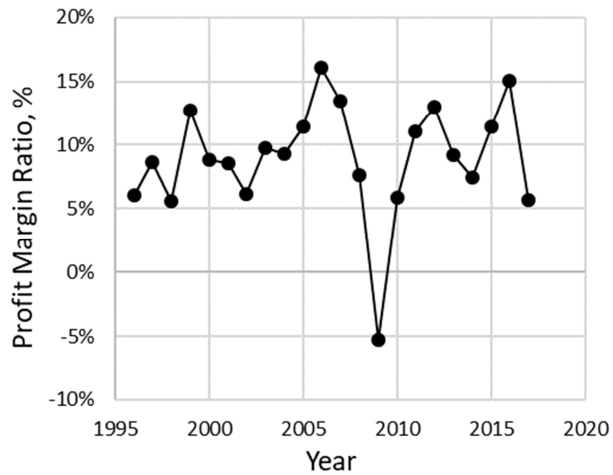
Source: own calculations based on ZVA data (2019).

Figure 2. Net turnover and profit of MD industry sector in Latvia



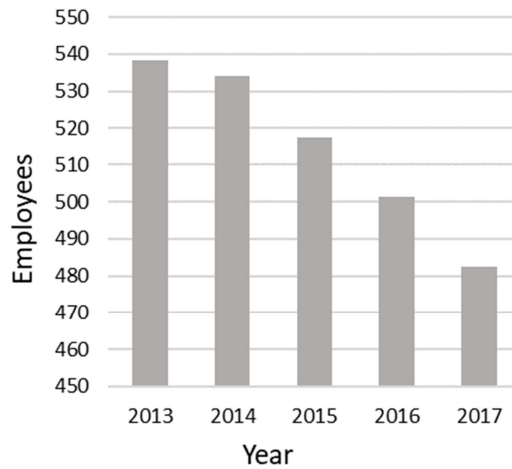
Source: own calculations based on Firmas.lv data (2019).

Figure 3. Profit Margin Ratio of MD industry sector in Latvia



Source: own calculations based on Firmas.lv data (2019).

Figure 4. Number of employees in MD industry sector in Latvia



Source: own calculations based on Firmas.lv data (2019).

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Technological conditions for building the potential of creative capital in the municipalities of the Podkarpackie Province

JEL Classification: *R11; R12; R5*

Keywords: *technology; creative capital; municipality; Podkarpacie*

Abstract

Research background: Both technology and talent as well as tolerance are factors that affect local development but, in accordance with the concept by R. Florida, they also stimulate the development of creative class that is an example of creative capital.

Purpose of the article: The aim of the paper is to identify technological conditions in building the potential of creative capital in Podkarpacie municipalities.

Methods: In pursuit of the adopted goal, the data obtained by means of a diagnostic survey among two groups of respondents: inhabitants and officials of Podkarpacie municipalities were used. The tests were performed using PAPI and CAWI methods.

Findings & Value added: In the research approach the original modification of the Florida methodology related to one of the criteria, i.e. technology was applied. It was assumed that technology was not only a determinant of local development but also creative capital at the local level.

The assessment made with the use of indirect measures by respondents shows that technological conditions in municipalities are important, which indirectly indicates predispositions for the development of creative capital. The technological predispositions of municipalities for building creative capital are demonstrated by an ability to use specialist knowledge by people in the municipality at work and in personal life. The comparison of the assessments of both groups of respondents shows that the opportunities for the development of creative capital through the prism of features describing the technology were assessed by the inhabitants of municipalities rather than by civil servants. Municipalities were also better rated.

Introduction

The concept of creative capital results from the theory by R. Florida who defines them by presenting some assumptions of the creative class. This author states that this class draws its identity from the role of creativity suppliers (Florida, 2010, p. 21). He indicates the economy transformation towards a knowledge-based economy including innovation. He promotes a "new" form of development based on a model that uses creativity. Representatives of the creative class settle where there is tolerance, talent and technology. The mutual interactions between "3T", as abbreviated by R. Florida, are to form the basis for economic development. The slightly controversial three criteria in economic development, referred to by this author to a soft feature of which creativity is recognized, were applied in spatial research and sector comparisons. These comparisons refer to regions, countries and cities, which may indicate that these factors were considered important not only at the global level.

Both technology, as well as talent and tolerance are factors that, in line with the above-mentioned concept, stimulate the development of creative capital. Therefore, the aim of the paper was to identify the technological conditions in building the potential of creative capital in Podkarpacie municipalities.

Measurement of creative capital

The creative class, which is the basis of the theory by Florida, most often evaluated according to the criterion of performed professions, is an example of the definition of creative capital in a narrow perspective. The author assumed that creative capital was a broader concept than the creative class and proposed defining it as a resource appropriate to people who cooperate and function in all, including new conditions, using their creativity.

Florida proposes to measure the development of creative class using the following indices - the main index of creativity is the Global Creativity Index, high technology, the number of gays (referred to tolerance) and measures of creative class (a number of people performing creative competitions to the total number of employees - the talent measurer) (Florida, 2010, p 343 - 344, Class 2012 , p: 86-87).

High technology index is based on two variables – a percentage share of production of high technology sector from a given region in the total production of the entire high technology sector in the country and the percent-

age share of regional production from high-tech industry in the total income of a given region (country).

The innovation index means the number of patents in a given region in a given year in relation to the number of inhabitants. The talent index (also referred to as the human capital index) presents the share of people with a bachelor's and higher diploma in the entire population of a given region. These indices were modified by different authors due to the lack of comparable basic data (see Szara 2017) and used to assess the intensity of the creative class in the countries or regions. The results of these studies indicated the development in the area of talent, technology, tolerance described in the "3T" model, conditioning at the same time the correlation between the creative class and economic development.

The proposed indicators are used to assess countries, regions or cities, while there is no analogical data at the local level, i.e. in our case, the municipality. Technology in this theory is one of the measurement criteria. Of course, there are indications in the literature about measuring technology through other measures. Technology can be measured by implemented innovations, which is proposed, for example, by Godecki (2008, pp. 27-50), or Harasyn, Pater, Skica (2018, pp. 64-76).

Technology is an embodiment and, consequently, the embodiment of human ideas in matter. The effects of technology are used in human life, which modifies them, creating more and more complex solutions. Below, the measurement is proposed. It is not based on quantitative variables from public statistics but from own research.

Methodology

In the case of a spatial unit such as a municipality, there is no possibility of aggregating data used in the methodology by Florida, including a number of professions incorporated in creative class. Searching for features that describe 3T categories, the descriptions of indices and the basic meaning of these concepts presented in the literature were used. The assessment was based on features describing particular categories which indirectly show the possibilities of developing creative capital.

In the article the original proposal for the analysis of the "3T" criteria based on a diagnostic survey, limited to one criterion (technology) was discussed. The choice for the analysis of the Podkarpackie Province resulted from its inclusion in the group of contenders in the development of creative capital in comparison to other Polish provinces (Szara, 2017: 164).

Due to the role of the local government unit indicated in the local development, a full study was set up among all 160 offices of the Podkarpackie municipalities. The survey was conducted using the CAWI method and it was preceded by telephone contact informing about the research assumption and the request to complete the questionnaire. From the original population of 480 respondents, 453 questionnaires were returned. The analyzed municipalities constitute 6.2% of municipalities in Poland.

The next group of respondents were residents of the Podkarpackie municipalities. The survey was carried out using the PAPI method in a random selection. A sample size of 385 questionnaires was selected, which was increased due to the different completeness of feedback questionnaires in the survey and the lack of reliable information on creative capital in municipalities. The data from 418 complete questionnaires were used for the analysis. The assessment was made in a 7-point Likert scale, where 1 meant a very unimportant criterion (feature) of the impact on the development of the municipality and creative capital, existing in a low degree, the lowest value, 7 a very important criterion, in a very large, high degree with the highest impact¹. The following methods were used to develop the obtained data: deduction, analysis and synthesis. This article is a part of a broader analysis aimed at identifying factors related to the activation of creative capital at the local level.

Research results and discussion

Among the surveyed inhabitants of Podkarpackie, the majority are young people, aged 18-24, which accounted for 69,62% of the respondents. As for the gender the Podkarpackie population was represented by women 69,14% and men accounted for 30, 86%. As many as 64,11% of respondents represented the rural area.

Most of the surveyed officials were also women (61,81%). Out of all respondents representing municipal offices, the largest group were people aged 25-35 (35,32% of respondents). In turn, 30,68% were people from the age between 36 and 45 years old.

The features that describe the technology and which were evaluated by respondents on the basis of literature on the subject include: dominance of high-tech enterprises, the importance of small entrepreneurship, an ability to use specialist knowledge by people in the municipality at work and in

¹ 1 very low influence, 2 low, 3 poor, 4 average, 5 good, 6 very good, 7 very high influence, the relevant significance

personal life, implementing innovations in enterprises, openness to new technological solutions.

Residents of municipalities living in the local community have knowledge whether there are enterprises which base their manufacturing processes on advanced technological solutions. Often, these enterprises are place of work for local residents. Hence, this feature was adopted in the assessment by the respondents. This feature was assessed the highest by representatives of municipalities (4,18). The weighted average answers were similar for the other two municipalities (3,89 for urban-rural municipalities and 3,69 for rural ones).

The existence, dominance of high-tech enterprises in municipalities was assessed at a good level by 2249% of respondents and very good and high by over 17% of residents. As much as 14,60% considered the impact of this feature as average, giving the note of 4, 21,05% as weak (note 3), the others considered it low and very low.

The analysis of the data shows that men rated slightly better than women the technological potential described by the dominance of high-tech enterprises in municipalities. Disproportions in assessments can also be seen between respondents living in the city and in the countryside. The weighted average result of the answer to the above question was at the level of 3,88.

Employees of municipal offices assessed the domination of high-tech enterprises definitely lower, as many as 82,87% of responses were those with the lowest "1 and 2" rankings indicating a non-significant feature, very low or low existing in rural municipalities.

Small entrepreneurship is important in the development of technology. The weighted average of the assessment of this characteristic for all municipalities was over 4. The highest 4,57 was characterized by rural municipalities. The dominance of small enterprises in the Podkarpackie municipalities was assessed by the residents at the good level at 26,8%. In 18,41% of cases, residents recognized this feature as an average impact on development. The least, because only 2,64% were responses at a very low impact level. The weighted average answer to the above question in the group of inhabitants was at the level of 4,38.

Employees of municipal offices assessed the dominance of small enterprises in 27,81% at the medium level (note 4). A similar percentage of respondents representing rural municipalities assessed this feature similarly. However, the highest percentage of average assessments 33,33% was recorded for urban municipalities.

The ability to use specialist knowledge by people in the municipality at work and in personal life was rated the highest by residents of urban-rural

municipalities (4,60). A similar average was recorded for urban (4,48) and rural (4,40) municipalities.

The openness of people to new technological solutions, which was rated the highest by officials from municipalities (4,86), is important in the assessment of technology. The average score for urban-rural municipalities was slightly lower in this group of respondents (4,74) as in the case of rural municipalities (4,45).

The residents assessed the ability to use specialist knowledge mostly at a good level (26,07% of indications). A slightly smaller percentage of respondents assessed the use of knowledge at the low level of 22,72%. At the very good level there were 14,83% of respondents' answers, high 13,4%. They assessed the use of knowledge of people aged 35-44 very low.

The ability to use specialist knowledge was most often assessed by employees of municipal offices at the medium level (41,06%). The next most frequently provided responses were grades of good (quite high) and poor use of knowledge (24,94% and 17,66%, respectively). Specialist knowledge is a value appreciated by employers, as indicated in research, for example, Bouckenooghe, Menguc (2018) or Comunian, Jewell (2018, pp. 205-230).

The technological advancement is demonstrated by an implementation of innovations in enterprises in a municipality. Often, these new technological solutions are used by residents who in the case of municipalities assessed this feature at an average level of 4,72. For the other two municipalities, the average grade was the same at 4,56. The answers indicate that the features describing the technology in the municipality were assessed at the medium level (note 4). Slightly higher notes were characteristic for urban municipalities.

According to officials an implementation of innovations in enterprises in municipalities was also assessed at the medium level (32,89% , note 4). According to 29,58% of respondents, the scale of the phenomenon was considered poor, and 14,79% assessed it at a low level. The employees of municipal offices living in the city (3,92) rated this feature significantly higher, compared to the village residents (3,33).

Residents indicated that they were open to new technological solutions. This feature was rated at the good level of 23,92%. Over 30% of respondents stated that people's openness to technology transfer was both very good and high. The weighted average result of the answers to the above question was at 4,64. The presented data on the impression of innovation do not differ from the results regarding the introduction of innovative solutions in the literature on the subject (Hollanders, Cruysen, 2009, p.7).

Openness of people to new technological solutions in the opinion of officials was assessed similarly at the medium level (32,45%). The highest number of such notes was recorded for 33,96% of rural municipalities. Respondents representing municipalities indicated 38,46% of the responses above note 4, which meant the validity of the feature. In the case of the respondents of these municipalities, the lowest percentage of responses indicating the low, small significance of this feature was observed (33,33%). The highest percentage of negative assessments (note 1 and 2) was chosen by rural municipality respondents 51,09%.

The obtained results confirm that one should bear in mind the natural regularity expressed in the considerable diversity of municipalities in many respects. Openness to new technologies is a future feature related to the learning of "handling" technical novelties (Batabyal, Beldi 2018, pp. 214 - 219).

The obtained research results most often indicate the assessment of the technological potential of municipalities at the medium level. There are evaluations that predestine municipalities, but also rural municipalities have technological potential. Higher preferences for the development of creative capital in urban areas assessed by the catalog of features describing the technology correspond with the results of other authors (Michael, Michael 2017, pp. 831-852). The obtained results show the technological potential of the Podkarpacie municipalities, which means in the case of reference to the theory by Florida favorable conditions within this criterion for the development of creative capital. Reliance on only one criterion does not disqualify municipalities and indicates the possibilities of comparisons in the area of talent and tolerance categories.

Conclusions

1. A new approach to research is the author's modification of the methodology by Florida related to one of the criteria mentioned in the evaluation, i.e. technology. This involved an adoption of other variables to assess technology at the local level. The presented approach may give rise to a discussion in the area of the lack of proof of relationships between persons included in creative capital (which were not identified in this paper, but presented in another work (Szara 2017)) and technology.
2. Only soft features are included in the study. They describe local conditions, and at the same time they are reflected in the attitudes of residents, which translates into their lives as well as the development of municipalities.

3. In the assessment of features describing technology in municipalities, an ability to use specialist knowledge by people in the commune at work and in personal life is the most important. This is mainly related to the absorption of knowledge about technological novelties and their use.
4. The second most-rated feature is the development of entrepreneurship. In the respondents' opinion, it testifies about the conditions for business development in the municipalities where they live. Entrepreneurs are creators of their own businesses as well as representatives of creative capital. The comparison of both groups of respondents shows that the potential for the development of creative capital through the prism of technology was assessed higher by the residents of municipalities than by the officials.
5. Technological conditions make the Podkarpacie municipalities to be best suited to build creative capital at the medium level. According to respondents urban municipalities have better conditions, but other types of municipalities should not be disqualified. The surveyed residents may be potential representatives of creative capital due to openness to technological novelties and entrepreneurs, and due to good assessment of small enterprises in municipalities.
6. The presented conclusions are subjective and they are based only on one criterion describing creative capital in the methodology by Florida, namely technology. They are confirmed by the results of research by other authors. This is also not an obstacle to further detailed research both on talent, tolerance and the analysis of the creative capital structure at the local level.

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**Directions for improvement of competitive capacity of the products
of domestic and Polish milk-processing enterprises at the market
of Ukraine**

JEL Classification: *M31; L15; L66*

Keywords: *market of dairy products; competitive capacity of products; import of products; products quality*

Abstract

Research background: Intensification of competition at the market of food products forces producers to use the instruments to keep the existing consumers and attract new ones. They look for the opportunities to strengthen competitive capacity of their commodities by means of their specification among the analogues. Low level of competitive capacity of the goods of domestic producers at the national and world markets endangers the state economic safety, makes preconditions for growth of import products come into Ukraine. Thus, Ukrainian producers should analyze the level of competitive capacity of their products and the products of competitive enterprises, including foreign ones, and determine directions for its

strengthening. Dairy products belong to the goods of everyday use and are essential for people's life. Ukraine has great perspectives to increase demand for the goods. However, growth of the amounts of sale of the products of domestic enterprises requires rising of the products' competitive capacity. The issue confirms relevancy of the present research.

Purpose of the article: The aim of the article is to analyze the market of dairy products in Ukraine and to study competitive capacity of dairy products of domestic and Polish milk-processing enterprises at the market of Ukraine.

Methods: To achieve the goal of the research the following methods were used, particularly empiric investigation (to study the tendencies of development of dairy products market in Ukraine); economic and mathematic methods and models (to determine competitive capacity of some kinds of dairy products).

Findings & Value added: The article describes tendencies of development of dairy products market in Ukraine and principal parameters of competitive capacity, using the function of consumer benefit for some kinds of dairy products of domestic and Polish producers. It argued the directions for the competitive capacity improvement.

Introduction

Intensification of competition at the market of food products forces producers to use the instruments to keep the existing consumers and attract new ones. They look for a new direction to strengthen their competitive capacity. In the present research, particular attention is paid to the issue of competitive capacity. However, the concept can be considered at different levels, depending on the defined subjects of competitive capacity, particularly, a mega level – competitive capacity of a group of countries, macro level – competitive capacity of one country, meso level – competitive capacity of a sector, branch or region; micro level – competitive capacity of an enterprise or organization, micro-micro level – competitive capacity of a commodity or a service (Kubrak al., 2013).

Analysis of published works on the issue suggests that considerable attention is paid to assessment of competitive capacity of enterprises generally. The scientists propose to use different methods to study the issue. Particularly, there is an interesting research, which expects application of multi-dimensional comparative analysis of competitive capacity of the EU enterprises and distinguishes 17 parameters, which are necessary for the analysis. (Cheba & Szopik-Deczyńska, 2017, pp. 487-504). Other authors propose to measure competitive capacity with consideration of the method Perkal, which is based on 14 indicators. According to the results of their evaluation, one can define the level of competitive capacity and innova-

tions. The authors also recommend using of the method at the national and regional levels (Kruk & Waśniewska, 2017, pp. 337–352). DEA - analysis (Data envelopment analysis) is another method for assessment of competitive capacity of enterprises, which estimates efficiency of their production processes and introduction of innovations at those enterprises.

Some authors, having examined above 600 Polish enterprises, propose to use comparative analysis for assessment of the level of competitive capacity of an enterprise among competitive enterprises and to consider creative potential of its staff, which is to be applied while developing competitive parameters of goods (Głód & Flak, 2017, pp. 601-619).

A great number of researches is devoted to analysis of the impact of different factors on competitive capacity. The factors include quality and speed of economic reforms in the country, political stability in it, possibilities to accumulate personal capital (Kordalska & Olczyk, 2016, pp. 121-142).

However, the factors of competitive capacity assessment greatly depend on peculiarities of the products, which are proposed by an enterprise at the market. For producers of food products, including dairy ones, consumers' awareness about its production and products is one of the factors of competitive capacity of an enterprise. The tasks can be solved by marketing policy of communication of milk-processing enterprises. The policy can be changed by a sufficient impact of modern information technologies. Thus, (Krykavskiy & Stets, 2016, pp. 39-48) studies impact of social networks on development of consumer favor of dairy products of a definite producer.

Analysis of scientific works demonstrates that they pay little attention to the issue of assessment of competitive capacity of goods, produced by enterprises. It is the reason why producers cannot develop the measures for its increase, considering the existing conjuncture of the market in their respect. It is of particular importance for dairy products, which take a sufficient position in people's diet and nutrients supply.

Research methodology

Marketing, which is focused on maximum satisfaction of consumers' needs, should apply the function of consumer benefit for making assessment of their parameters and features (Choudhury, 1999). To measure competitive capacity of commodities, the authors of the work propose to use the function of consumer benefit

$$f = \frac{1}{e^x \sqrt{e}}, \quad (1)$$

where:

x – a corrected value of the parameter of competitive capacity of a commodity.

The function f is determined in the range $[0;1]$ and is used as a scale for assessment of the levels of competitive capacity of the objects' parameters.

To secure the possibility to use the function of consumer benefit for assessment of competitive capacity of different dimension, the researchers correct parameters of the sample of a commodity p referring to the values of the corrected parameter x of the function of consumer benefit.

Therefore, having the values x and p , one builds a linear function of approximation on the edge of the intervals of the function of consumer benefit

$$x = a \cdot p + b \quad (2)$$

and defines its parameters.

Basing on the obtained estimates of some parameters of competitive capacity, it is possible to measure competitive capacity of a commodity by a consolidated function of consumer benefit F , which is calculated by the formula:

$$F = \sqrt[n]{f_1 \cdot f_2 \cdot \dots \cdot f_n}, \quad (3)$$

where:

f_i – the value of the function of consumer benefit for i parameter of competitive capacity of a commodity;

n – the number of parameters of competitive capacity of a sample.

Comparing values of the function of consumer benefit of different goods, one can define a commodity, which has the best complex of consumer properties. The commodity gets the highest value of the consolidated function of consumer benefit.

Results

In Ukraine, market of dairy products is characterized by rather changeable tendencies in the field of production that is argued by analysis of the Table 1.

Dynamics of the amount of consumption of milk and dairy products in 2010-2013 had the tendency to growth, and in 2014-2017 – to reduction (Fig. 1). The tendency was negative for development of milk-processing enterprises of Ukraine.

At the market of Ukraine, Polish enterprises make great competition for Ukrainian producers of dairy products.

Production of yogurts supplies great opportunities for diversification of products and introduction of innovations at milk-processing enterprises. In the structure of such products production, one can distinguish natural yogurts, drink yogurts, breakfast yogurts, fruit yogurts and hybrid yogurts (Chadrzynski, 2013, pp. 158-164). In the process of their production, producers can increase the output by changing the principal product in the content (for example, by adding ecologically clean fruits and vegetable, fruit mousses, cereals, chocolate etc.) to improve their value and expand the sphere of consumption, functional characteristics and to concern environmental factors and benefit of the product. Marketing approach expects focus of consumers' attention on medical properties of the product (introduction of probiotics to improve immunity) and its importance for healthy life of people generally and some segments of the market particularly (young people, men, women, active people, weight-conscious consumers etc.). The approach is also very interesting.

Nowadays, intensification of the tendencies to healthy diets causes popularity of white yogurts without any biological supplements and tastes. Thus, the authors of the work have chosen those products for the further research.

For comparison, the experiment took a plain yogurt in a plastic cup of Ukrainian producers, particularly brands "Halychyna", "Molokiia" and Polish producer "Mlekovita" – Table 2.

Using the function of consumer benefit, the authors of the work measure competitive capacity of the yogurt "Mlekovita" and compare it to the similar product of the brand "Molokiia". Figures of the parameters of competitive capacity of those products in the nodes of the function of consumer benefit are presented in the Table 3.

Table 4 supplies results of the calculation of the function of consumer benefit for the yogurts "Molokiia" and "Mlekovita". The consolidated figure of the function of consumer benefit for the yogurt of the brand "Molokiia".

$$F_{\text{Molokiia}} = \sqrt[10]{0.568 \cdot 0.322 \cdot 0.206 \cdot 0.529 \cdot 0.355 \cdot 0.343 \cdot 0.303 \cdot 0.483 \cdot 0.502 \cdot 0.26} = 0,369.$$

The consolidated figure of the function of consumer benefit for the yogurt of the brand “Mlekovita”

$$F_{\text{Mlekovita}} = \sqrt[10]{0.429 \cdot 0.576 \cdot 0.448 \cdot 0.199 \cdot 0.602 \cdot 0.568 \cdot 0.303 \cdot 0.192 \cdot 0.257 \cdot 0.595} = 0.382.$$

Thus, the yogurt of the brand “Mlekovita” is of higher competitive capacity than the yogurt of the brand “Molokiia”.

Using the function of consumer benefit, the authors of the article measure competitive capacity of the yogurt of the brand “Mlekovita”, and compare it to the similar product of the brand “Halychyna”. Figures of the parameter of competitive capacity of those products in the nodes of the function of consumer benefit are presented in the Table 5.

Table 6 supplies results of the calculation of the function of consumer benefit for the yogurt of the brand “Halychyna” and for the yogurt of the brand “Mlekovita”. The consolidated figure of the function of consumer benefit for the yogurt of the brand “Halychyna”

$$F_{\text{Halychyna}} = \sqrt[10]{0.348 \cdot 0.55 \cdot 0.43 \cdot 0.635 \cdot 0.294 \cdot 0.303 \cdot 0.528 \cdot 0.483 \cdot 0.502 \cdot 0.157} = 0.395.$$

The consolidated figure of the function of consumer benefit for the yogurt of the brand “Mlekovita”.

$$F_{\text{Mlekovita}} = \sqrt[10]{0.585 \cdot 0.345 \cdot 0.43 \cdot 0.389 \cdot 0.55 \cdot 0.528 \cdot 0.303 \cdot 0.198 \cdot 0.257 \cdot 0.578} = 0.393.$$

According to the calculations, the yogurt of the brand “Mlekovita” has lower indicators of the function of consumer benefit than the yogurt of the brand “Halychyna”.

One should stress that for calculations of the figures of the function of consumer benefit for yogurts the researchers used quantitative parameters of competitive capacity, which excluded the possibility of a subjective impact. However, weight coefficients of the parameters of competitive capacity were not considered in the calculations. Such fact degrades credibility of the assessment.

Conclusions

The carried analysis of competitive capacity of the yogurts without supplements in a plastic cup, produced by such Ukrainian brands as

“Halychyna”, “Molokiiia” and the Polish producer “Mlekovita”, suggests the following recommendations concerning improvement of competitive capacity of those products:

- for domestic producers: to supply dairy products without supplements, which are not particular for that product; to supply information for consumers concerning shelf life of the product and date of its production; to activate searches for the reserves to bring the price down;
- for Polish producers: to supply consumers with the information concerning shelf life and date of production; to take marketing communication measures to improve awareness of Ukrainian consumers about Polish producers and their products; to extend sale of the products by attraction of new retail networks to cooperation.

These days, plastic is the most often used for packaging of yogurts. From the position of marketing, the innovation, which can improve competitive capacity of the product at a market, expects use of biodegradable plastic for packaging. Such transformation in the approach to packaging can attract new segments of consumers.

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Annex

Table 1. Dynamics of the rates of production of some kinds of dairy products in Ukraine for the period 2012-2018 (in relation to the previous year), %

Kinds of products	2012	2013	2014	2015	2016	2017	2018
Milk and non-concentrated cream with the fat content under 1%	113.0	104.6	141.2	89.7	101.3	99.4	94.0
Milk and non-concentrated cream with the fat content above 1%, but under 6%	94.6	107.3	94.3	92.2	98.1	103.2	102.0
Milk and non-concentrated cream with the fat content above 21 %	114.7	154.5	141.6	88.1	103.7	90.0	85.8
Sweat butter with the fat content under 85 %	115.6	106.6	120.3	89.4	101.0	105.9	96.8
Milk and coagulated cream, yogurt, kefir, sour cream and other fermented products	101.4	103.8	89.2	88.1	98.7	92.8	100.9
Drink yogurt and fermented flavored milk	109.2	124.0	96.4	100.0	108.5	100.9	108.7
Fresh non-fermented farmer cheese	103.3	105.9	89.2	90.8	103.5	97.0	105.6
Curd cheese	91.3	95.9	74.5	92.0	89.5	109.0	101.8
Whizzed cheese	125.7	112.1	105.4	106.3	97.0	103.4	105.5
Non-fat dry milk	118.1	82.3	141.2	97.7	94.7	98.1	79.0

Source: completed on the basis of Output and sales of industrial products by types (annual data)

Table 2. Initial data for assesment of competitive capacity of some yougurt-producing brands in Lviv region

Indicators for assessment of competitive capacity	Brand “Halychyna”	Brand “Molokiiia”	Brand “Mlekovita”
1. Consumption parameters of yogurts			
1.1. Protein content in 100 g, g	3.5	4.2	3.9
1.2. Carbohydrate content in 100 g, g	6.0	4.3	5.3
1.3. Fat content in 100 g, g	3.0	1.6	3.0
1.4. Caloric content, ccal/100 g	65	48	64
1.5. Weight, g	280	330	350
1.6. Product naturality, points	7 (milk, gelatin, pectin, milk protein, dry milk, ferment)	8 (milk, milk protein, dry milk, ferment)	9 (milk, ferment)
1.7. Available information about the date of production and expiration date, points	9 (information about shelf life and expiration date)	7 (information about expiration date)	7 (information about expiration date)
1.8. Brand recognition, points	9 (widely known)	9 (widely known)	5 (a small circle of interested consumers)
1.9. Availability of products for consumers, points	9 (in all retail networks)	9 (in all retail network)	6 (one retail network)
2. The average retail price in Lviv city in 2019, UAH	19.54	18.33	16.20

Table 3. Figures of the parameters of competitive capacity of products in the nodes of the function of consumer benefit for the brands “Molokiiia” and “Mlekovita”

Parameters of competitive capacity	Figure f					
	0.00	0.20	0.37	0.63	0.80	1.00
Appropriate values of the corrected parameter x	-2.5	-0.48	0.01	0.77	1.5	0.00
Protein content in 100 g, g	0.1	3.9	3.97	4.09	4.2	4.5
Carbohydrate content in 100 g, g	0.1	4.3	4.55	4.93	5.3	6.5
Fat content in 100 g, g	0.1	1.6	1.95	2.48	3.0	3.2
Caloric content, ccal/100 g	80	64	60.04	53.9	48	40
Weight, g	100	330	334.95	342.63	350	400
Product naturality, points	1	8	8.24	8.63	9	10
Available information about the date of production and expiration date, points	1	7	7.5	8.26	9	10
Brand recognition, points	1	5	5.99	7.53	9	10
Availability of products for consumers, points	1	6	6.74	7.89	9	10
The average retail price in Lviv city in 2019, UAH	22	18.33	17.8	16.99	16.2	12

Table 4. Calculation of the function of consumer benefit for yogurts of the brands “Molokiiia” and “Mlekovita”

Parameter of competitive capacity	Figures for the brand “Molokiiia”					Figures for the brand “Mlekovita”				
	p_i	a_i	b_i	x_i	f_i	p_i	a_i	b_i	x_i	f_i
Protein content in 100 g, g	4.2	-1.89	8.45	0.56	0.568	3.9	0.65	-2.56	0.16	0.429
Carbohydrate content in 100 g, g	4.3	0.56	-2.56	-0.13	0.322	5.3	-0.49	3.19	0.59	0.576
Fat content in 100 g, g	1.6	1.36	-2.64	-0.46	0.206	3.0	-1.07	3.42	0.21	0.448
Caloric content, ccal/100 g	48	0.06	-2.22	0.44	0.529	64	-0.13	7.56	-0.49	0.199
Weight, g	330	0.01	-3.57	-0.04	0.355	350	-0.01	5.37	0.67	0.602
Product naturality, points	8	0.35	-2.85	-0.07	0.343	9	-0.56	5.62	0.56	0.568
Available information about the date of production and expiration date, points	7	0.39	-2.89	-0.18	0.303	7	0.39	-2.89	-0.18	0.303
Brand recognition, points	9	-0.31	3.12	0.31	0.483	5	0.50	-3.00	-0.49	0.192
Availability of products for consumers, points	9	-0.37	3.65	0.36	0.502	6	0.44	-2.94	-0.31	0.257
The average retail price in Lviv city in 2019, UAH	18.33	-0.60	10.65	-0.31	0.260	16.2	0.15	-1.85	0.648	0.595

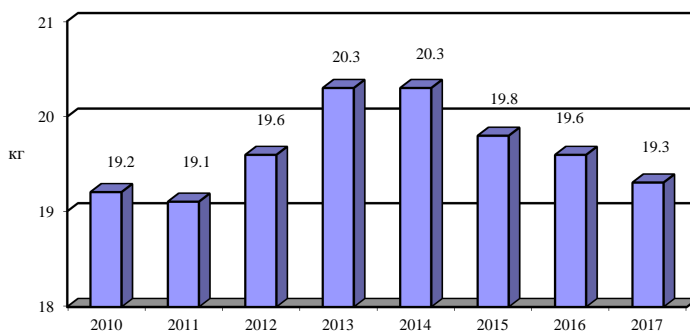
Table 5. Figures of the parameters of competitive capacity of products in the nodes of the function of consumer benefit for the brands “Halychyna” and “Mlekovita”

Parameters of competitive capacity	Figure f					
	0.00	0.20	0.37	0.63	0.80	1.00
Appropriate values of the corrected parameter x	-2.5	-0.48	0.01	0.77	1.5	0.00
Protein content in 100 g, g	0.1	3.5	3.6	3.75	3.9	4.5
Carbohydrate content in 100 g, g	0.1	5.3	5.47	5.74	6.0	6.5
Fat content in 100 g, g	0.1	1	1.5	2.26	3	3.2
Caloric content, ccal/100 g	80	64	64.25	64.63	65	40
Weight, g	100	280	297.32	324.19	350	400
Product naturality, points	1	7	7.5	8.26	9	10
Available information about the date of production and expiration date, points	1	7	7.5	8.26	9	10
Brand recognition, points	1	5	5.99	7.53	9	10
Availability of products for consumers, points	1	6	6.74	7.89	9	10
The average retail price in Lviv city in 2019, UAH	22	19.54	18.71	17.43	16.20	12

Table 6. Calculation of the function of consumer benefit for yogurts of the brands “Halychyna” and “Mlekovita”

Parameter of competitive capacity	Figures for the brand “Halychyna”					Figures for the brand “Mlekovita”				
	p_i	a_i	b_i	x_i	f_i	p_i	a_i	b_i	x_i	f_i
Protein content in 100 g, g	3.5	0.72	-2.57	-0.06	0.348	3.9	-1.03	4.62	0.62	0.585
Carbohydrate content in 100 g, g	6.0	-1.03	6.57	0.51	0.55	5.3	0.47	-2.55	-0.07	0.345
Fat content in 100 g, g	3.0	-0.82	2.62	0.16	0.43	3.0	-0.82	2.62	0.16	0.43
Caloric content, ccal/100 g	65	0.03	-1.25	0.78	0.635	64	-0.16	10.25	0.05	0.389
Weight, g	280	0.01	-3.77	-0.21	0.294	350	-0.01	4.06	0.51	0.55
Product naturality, points	7	0.39	-2.89	-0.18	0.303	9	-0.44	4.43	0.44	0.528
Available information about the date of production and expiration date, points	9	-0.44	4.42	0.44	0.528	7	0.39	-2.89	-0.18	0.303
Brand recognition, points	9	-0.31	3.12	0.31	0.483	5	0.50	-3.00	-0.49	0.198
Availability of products for consumers, points	9	-0.37	3.65	0.36	0.502	6	0.44	-2.94	-0.31	0.257
The average retail price in Lviv city in 2019, UAH	19.54	-0.76	14.28	-0.62	0.157	16.20	0.14	-1.70	0.60	0.578

Figure 1. Consumption of milk and dairy products per one person calculated as the amount of milk consumed monthly



Source: completed on the basis of Income and living conditions.

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An assessment of China's exchange rate policy in 1990-2018

JEL Classification: *F31, F32, F40, N25, O24*

Keywords: *exchange rate policy, export-led growth strategy, trade competitiveness, global imbalances, renminbi internationalization*

Abstract

Research background: China's currency policy has significantly changed since the beginning of the market transformation at the end of 1970s. As part of the export-led growth strategy, the exchange rate was used to support exports. After four decades of very successful reforms, China has become one of the largest economies in the world, which has created opportunities for the internationalisation of the renminbi.

Purpose of the article: The aim of the article is to analyze China's exchange rate policy from the perspective of the dilemma of choosing between using this policy to support export competitiveness and striving to internationalise the renminbi.

Methods: The study is based on empirical research and contains descriptive analysis of statistical data, i.a. official exchange rate, REER, accumulation of foreign exchange reserves, current account balance, index of global payment imbalances, inflation, GDP growth, currencies' shares on the foreign exchange market, in official foreign reserves and in international payments.

Findings & Value added: For many years China's exchange rate policy has been focused on supporting economic growth by improving export competitiveness, resulting in both increasing internal imbalances and difficulties in stabilising inflation, as well as the accumulation of global payments imbalances. Since 2005 China has made its currency more flexible, so that the underestimation of the renminbi's exchange rate has decreased. In recent years, China has intensified its efforts to support the internationalisation of the renminbi, which should have a positive impact on the stability of global financial relations.

Introduction

The importance of China's exchange rate policy is related to the growing role of the Middle Kingdom in the world economy and the influence exerted on economies of other countries, such as by contributing to the creation of global imbalances. The fixed exchange rate system, which has been maintained for years, has favoured the development of Chinese trade not only by eliminating the exchange rate risk, but in particular by maintaining the undervalued renminbi rate through significant, systemic and one-way currency market interventions of the People's Bank of China. The exchange rate policy was used as an instrument to implement the export-led growth strategy.

The significance of the China's economy and policy has encouraged the author to undertake research, the aim of which is to analyze China's exchange rate policy from the perspective of the dilemma of choosing between using this policy to support export competitiveness and striving to internationalise the renminbi. Moreover, the author assesses the consequences of this policy for China's economy and for the world economy.

Research methodology

In order to achieve the main objective of the article, which is to assess China's exchange rate policy, the author carried out theoretical considerations on the impact of the exchange rate on the national economy and the benefits of having an international currency, as well as empirical research. Theoretical analyses are based on the rich literature. Moreover, descriptive analysis was used in empirical studies. The period of analysis is 1990-2018. The data used in the article were obtained from the following databases: World Bank, International Monetary Fund, COFER, UNCTAD, SWIFT, Bank of International Settlements.

The author formulated the following research hypothesis: The main objective of China's exchange rate policy was to improve export competitiveness, but China's growing economic openness contributes to making the renminbi exchange rate more flexible and to making efforts to support the internationalisation of the Chinese currency.

Evolution of China's exchange rate policy

China's monetary policy has significantly changed since the beginning of the market transformation in 1978. Between 1979 and 1993, the renminbi was an inconvertible currency and there was a dual exchange rate arrangements¹, and the value of exchange rates was established arbitrarily. In 1985 the dual rate system was replaced with an unified exchange rate and between 1986 and 1994 a regime of managed float with a narrow band was in force (Cardoso, 2017, p. 872). In 1994 China decided to index the value of its currency to the US dollar and renminbi was maintained at a relatively stable level over the following years. The exchange rate was set at 8.7 USD/RMB, which was a significant nominal devaluation, as the renminbi exchange rate was 5.8 USD/RMB before the devaluation (Cheung *et al.*, 2016, p. 2). Such a large scale of devaluation can be explained by very high inflation in China in 1993-1995. By 1996, the possibility for current account transactions was also introduced, making the renminbi a convertible currency according to the standard set out in Article VIII of the IMF Statute. However, with the outbreak of the Asian crisis in 1997, the Chinese monetary authorities decided to fix the exchange rate against the dollar and the official exchange rate was revalued to 8,28 USD/RMB. It was maintained at that level for the next 7 years – until July 2005.

Since the late 1990s, charges from the US that the renminbi exchange rate is underestimated have intensified, and in 2005 the US Congress attempted to apply customs protectionism against Chinese imports on the basis of accusations that exchange rate policy was being used as an instrument to support exports. In the face of external pressure, China has decided to reform its exchange rate policy. On 21st July 2005 the People's Bank of China revalued the renminbi against the dollar from 8.28 USD/RMB to 8.11 and announced an introduction of the managed floating exchange rate regime based on market demand and supply, and with reference to a basket of currencies (Cardoso, 2017, p. 870-893). However, the structure of the basket was not precisely defined. The People's Bank of China specified the currency composition of the basket, but did not specify the weights of the particular currencies making up the basket (Funke & Gronwald, 2008, p. 1583).²

¹ The official exchange rates were two: one related to non-commercial transactions and the other related to commercial transactions.

² According to the PBoC, the US dollar (USD), the Japanese yen (JPY), the euro (EUR) and the South Korean won (KRW) have the largest weights, but the basket also includes the currencies of Australia (AUD), Canada (CAD), Great Britain (GBP), Malaysia (MYR), Russia (RUB), Singapore (SQD), and Thailand (THB).

During the crisis, when demand for exports fell, China sought to limit the appreciation of the renminbi in order to support exports. Therefore from July 2008 to June 2010 China resorted to a stable exchange rate policy, that maintained the value of the renminbi quite close to the level of RMB 6,83 against one US dollar. Exchange rate policy became part of the stimulus package. After the crisis symptoms have disappeared and exports have returned to a growth path, China announced on June 19, 2010 further reforms to its exchange rate formation mechanism based on measures taken in 2005. Peoples Bank of China repeated the 2005 declared policy of managing the RMB against a basket of currencies with an acceptable fluctuation band around the parity of $\pm 0.5\%$ (Cheung *et al.*, 2016, p. 3). A more flexible exchange rate policy resulted in an appreciation of the renminbi against the dollar and this trend continued until mid-2014. Furthermore, the renminbi has had an offshore and onshore (CNY) exchange rate (CNH) since 8 October 2010. The offshore rate is subject to less intervention, and, thus, better reflects market information (Cheung *et al.*, 2018, p. 166). On 11 August 2015, China changed its procedure for setting the official central parity of the renminbi against the US dollar. The central bank claimed that the new formation mechanism would give market forces a greater role in setting the daily official rate, also known as the fixing rate, by referring to the previous day's closing rate of the renminbi, market demand and supply, and the valuation of other major currencies (Cheung *et al.*, 2018, p. 164-165).

Despite the negative market reception, the IMF Executive Board in November 2015 reiterated its endorsement of China's endeavors at reforming its exchange rate policy by making the renminbi the fifth currency of the Special Drawing Rights (SDR) currency basket along with the US dollar, the euro, the Japanese yen and the pound sterling (Harrison & Xiao, 2018, p. 47). The inclusion of the renminbi in the SDR basket should promote the internationalisation of China's currency, but this was not the case because China, in the face of capital outflow and weakening economic growth introduced in 2016 a capital controls, which reduced the use of renminbi as a currency for global international payments. Therefore, the Chinese currency is still not fully convertible, not least after the temporary reintroduction of capital controls in China in 2016 which, since then, have been gradually lifted (ECB, 2018, p. 9-11).

China's exchange rate policy and export-led growth strategy

Since the mid-1990s, the importance of exports has been growing in the economic growth of China, which pursued the export-led growth strategy. China was becoming an increasingly open economy, and trade liberalisation accelerated especially after China joined the World Trade Organization in 2001, resulting in a rapid increase in exports in the early 2000s. China's exchange rate policy was also conducive to its export-led growth strategy. The devaluation of the renminbi in 1994 from 5.8 USD/RMB to 8.7 USD/RMB improved the competitiveness of Chinese exports, which resulted in a growing surplus in the current account (CA) (fig. 1). Rapid export growth and surpluses on CA contributed to a high GDP growth. Many studies concerning that period indicated that the renminbi exchange rate was significantly undervalued (20-30%) (Cardoso, 2017, p. 875). Pressure from other countries, in particular the US, led China to make the exchange rate system more flexible in 2005, resulting in an appreciation of the renminbi. The appreciation trend continued in the period of July 2005 - July 2008 (Cheung *et al.*, 2016, p. 3), but the renminbi was still underestimated, which resulted in a further increase in the surplus on CA.

Maintaining the undervalued renminbi required the Chinese monetary authorities to intervene in the foreign exchange market, which resulted in a high rate of accumulation of foreign exchange reserves (fig. 2).

The global financial and economic crisis has led to a decline in demand for Chinese exports and, as a result, a slowdown in GDP growth, which has highlighted the significant dependence of Chinese economic growth on foreign demand. In order to support exports, China had once again fixed its currency against the dollar (from July 2008 to June 2010). However, China's trade surplus declined during the crisis.

The problems related to export-led growth strategy, which materialised during the crisis, encouraged China to change its development strategy. Since then, more and more emphasis has been placed on stimulating domestic demand (Su *et al.*, 2018, p. 2). In addition, the depreciation of the US dollar during the crisis has meant that China has suffered a significant impairment of its foreign exchange reserves, of which US dollar assets account for a significant share. In these circumstances, China has begun to see the opportunities that may arise from the internationalisation of its currency.

China's exchange rate policy has been a source of significant costs for the Chinese economy and has jeopardised financial stability. In order to maintain the exchange rate at the desired level, the monetary authorities of China intervene in the exchange market by buying foreign currencies and

increasing the supply of the renminbi. To prevent an excessive increase in money supply as a result of currency market interventions, the central bank of China sterilises these interventions through the use of open market operations in the form of the issuance of short-term money bills. However, these interventions are not fully sterilized (Zhang, 2012, p. 41-58), and as a result the amount of money in the economy is increasing, which is accompanied by rising inflation. (fig. 3). In general, price levels in China were characterised by high volatility, which shows that the central bank of China prioritised maintaining the exchange rate at the desired level, resulting in large fluctuations in price levels.

The rise in prices has been a major challenge for economic policy in China, as inflation increases the real exchange rate, which means a deterioration in the price competitiveness of exports. The analysis of the data presented in figure 4 shows that the periods of appreciation of the real effective exchange rate (REER) were accompanied by a decrease in the current account surplus, while the increase in the CA surplus occurred in the periods of depreciation of REER.

It should be noted that the export-led growth strategy pursued over the years, which included exchange rate policy, contributed on the one hand to China's high GDP growth, but its implementation was also a source of growing external and internal imbalances. In addition, this policy also had an impact on the global economy. The use of exchange rate policies as an instrument of export promotion contributed to an increase in the current account deficits in countries importing from China, and in particular the United States. Such a policy also affected the interests of some EU countries (Mucha-Leszko & Twarowska, 2016, p. 34-35). As a result, the global payment imbalances³ were growing (fig. 5).

The United States and China are the largest contributors to the creation of imbalances, but these countries are on the opposite sides, i.e. the USA has a permanent deficit, mainly in trade with China, and China has surpluses. China's share in the global payment imbalances has been increasing rapidly since the beginning of the 2000s, when it was around 2% and reached 12.5% in 2008, and then, during the crisis, it started to decline and reached 4.7% in 2011. The financial and economic crisis has hindered the accumulation of global payment imbalances. The reduction of the imbalance was mainly due to cyclical factors, so that with the improvement of the global economic situation, the global imbalance increased again and

³ Global payment imbalances are measured as the sum of the absolute value of world current account balances divided by world GDP.

China's share in the creation of the global payment imbalance increased to 11.1% in 2015, but in 2017 China's share dropped to 6.5%.

Global payment imbalances, which are largely the result of China's exchange rate policy, jeopardise the financial stability of the world economy and pose a risk of a global crisis.

Evaluation of the renminbi as an international currency and prospects

The significant costs to both the Chinese and global economy of China's strategy to support GDP growth by improving export competitiveness have led to changes in China's exchange rate policy. In addition, China's important position in the global economy has allowed it to aspire to become a country whose currency plays the role of an international currency. Influenced by the global financial and economic crisis (2008-2009), China has taken steps towards the internationalisation of the renminbi, which could lead to the evolution of the international monetary system towards a multi-polar system.

As a result of actions taken by China to promote the renminbi and the growing position of China's economy, the use of renminbi in the international currency functions has increased. Renminbi has a particularly good chance of gaining an important position among international currencies in functions related to international trade (Twarowska, 2018, p. 6056-6057). For several years renminbi kept its position as the eight most active currency for international payments, with a share of 1.26% in August 2018 (fig. 6).

On the foreign exchange market, the renminbi position is significantly improving. In 2016, the renminbi was already ranked eighth with a share of 4% (tab. 1).

A factor that encouraged foreign entities to use the renminbi in international transactions was also the inclusion by the IMF of China's currency in the SDR basket. However, despite many reasons to keep foreign exchange reserves in the renminbi, it is still not a key reserve currency. Chinese currency accounted for 1.22% of global foreign exchange reserves in 2017, and 1.84% at the end of the second quarter of 2018 (tab. 2). However, it is worth noting that central bank reserve managers are increasingly confident about the role of the renminbi as a reserve currency. As many as 29 reserve managers contributing to the survey expected the Chinese currency to account for 10-20% of their portfolios by 2020 (ECB, 2018).

A necessary condition for the renminbi to function as an international currency is the existence of a developed and open capital market in China. China has also made significant progress in this area. Generally, since early 2016, China has been on a deliberate policy path to open up its financial markets to overseas institutional investors. Quota-free access, currency convertibility, new hedging flexibility and Bond Connect are examples of some of these significant developments, which have provided favourable conditions for further internationalisation of the renminbi. Another opportunity for the growth of the use of the renminbi in the functions of the international currency may be the announcement, that in April 2019 Chinese bonds will begin joining the main global bond index, the Bloomberg Barclays Global Aggregate Index, meaning they will be widely held by international investors.

Conclusions

China's exchange rate policy has been active and has for years remained one of the key elements of export-led growth strategy. Changing the growth model and reorienting it on domestic demand and consumption reduces the importance of exchange rate policy, which is becoming more passive. Moreover, in recent years, China has intensified its efforts to support the internationalisation of the renminbi, which should have a positive impact on the stability of global financial relations.

However, the renminbi is not yet in rivalry with the US dollar as the dominant international currency, although the Chinese currency's share as an international currency is increasing. China is becoming an increasingly open economy over the years and has become the world's largest economy in terms of GDP in PPP, as well as the world's largest exporter, but many factors limit the internationalisation of the renminbi. These barriers are mainly related to the weak development of China's financial market and the existence of obstacles to the capital flow. Moreover, the exchange rate system is also a barrier to further currency internationalisation. The introduction of a floating exchange rate regime for the renminbi can be expected to increase the use of China's currency as an international currency. An opportunity for further internationalisation of the renminbi has become the introduction of China's currency into the SDR basket, but in the coming years we should not expect significant changes in the hierarchy of international currencies and replacement of the dollar by another currency.

Further challenges for internationalisation of the renminbi are related to the policy pursued by the United States, and in particular to the increase in

protectionism in trade policy. The threat of a trade war between China and the United States may contribute to slowing down reforms in China, which will have a negative impact on the internationalisation of the renminbi.

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Annex

Table 1. Currency distribution of OTC foreign exchange turnover (in %)

Currency	2001		2010		2016	
	Share (%)	Rank	Share (%)	Rank	Share (%)	Rank
USD	89.9	1	84.9	1	87.6	1
EUR	37.9	2	39.1	2	31.3	2
JPY	23.5	3	19.0	3	21.6	3
GBP	13.0	4	12.9	4	12.8	4
AUD	4.3	7	7.6	5	6.9	5
CAD	4.5	6	5.3	7	5.1	6
CHF	6.0	5	6.3	6	4.8	7
CNY	0.0	35	0.9	17	4.0	8

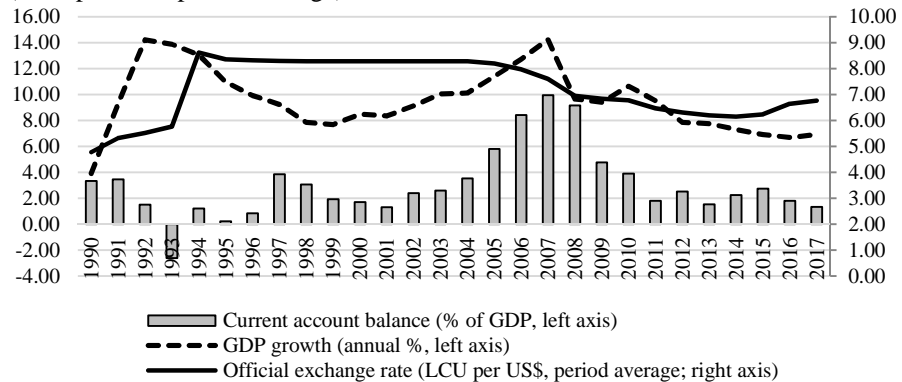
Source: BIS (2016).

Table 2. Currency composition of official foreign reserves (in %)

Shares of	1995	2011	2016	2018Q2
US dollars	58.96	62.59	65.34	62.25
euros	-	24.40	19.13	20.26
Japanese yen	6.77	3.61	3.95	4.97
pounds sterling	2.11	3.83	4.34	4.48
Canadian dollars	-	-	1.94	1.91
Chinese renminbi	-	-	1.08	1.84

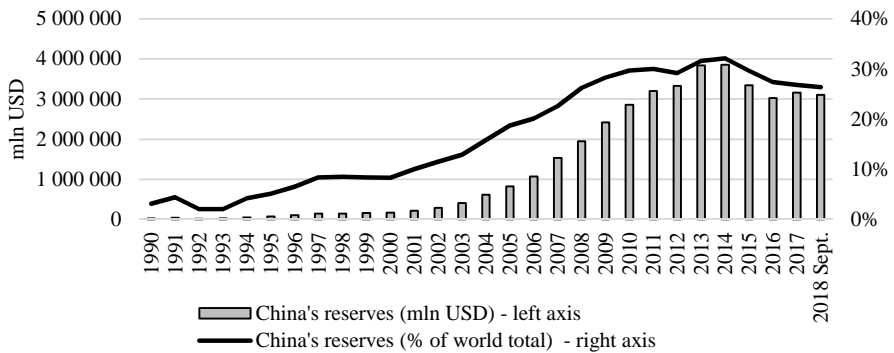
Source: COFER (2018).

Figure 1. GDP growth, current account balance and official exchange rate in China (LCU per US\$, period average) in 1985-2017



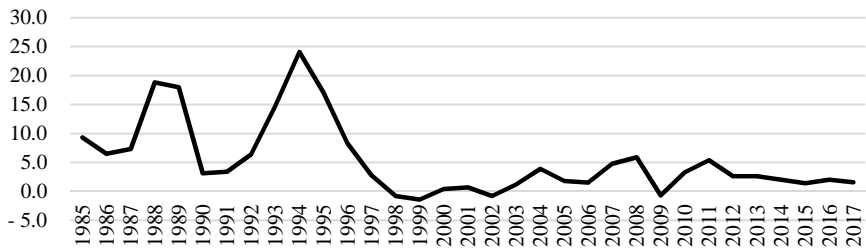
Source: World Bank (2018).

Figure 2. China's total reserves excluding gold (mln USD and % of world reserves)



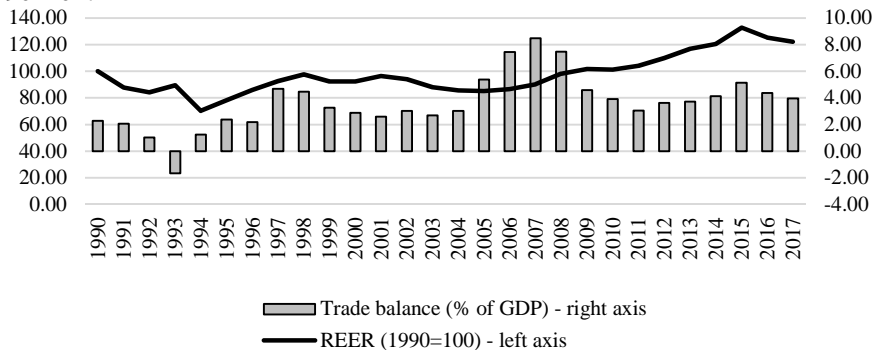
Source: IMF (2018).

Figure 3. Inflation CPI in China (percentage change on the same period of the previous year) in 1985-2017



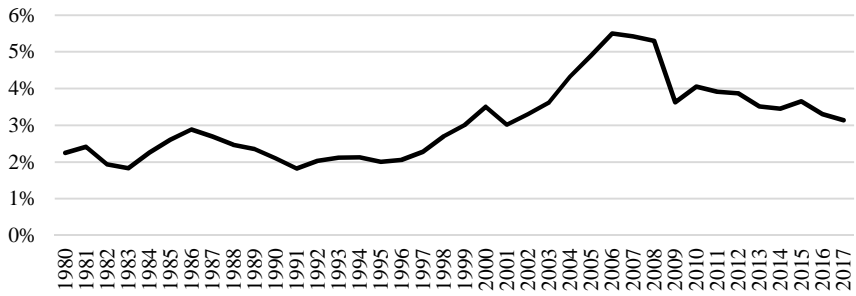
Source: OECD (2018).

Figure 4. Real Effective Exchange Rate (CPI) and balance of trade in China in 1990–2017



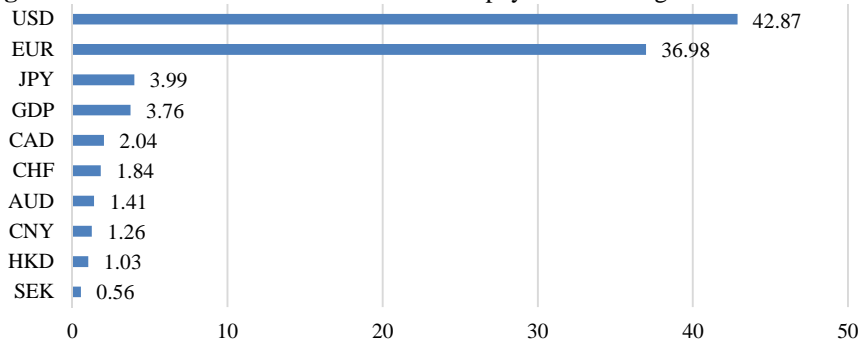
Source: IMF (2018), UNCTAD (2018).

Figure 5. Index of global payment imbalances in 1980-2017



Source: own calculations based on UNCTAD (2018).

Figure 6. Renminbi's share as an international payments in August 2018



Source: SWIFT (2018, p. 3-4).

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Real estate market in the Czech Republic and its specifics

JEL Classification: *G11; R31*

Keywords: *real estate; price of the flats; interest rate, regression*

Abstract

Research background: The real estate market is determined by many factors. It can be described according to the development of these factors. Among the most important factors belong flat prices, interest rate of the mortgages, rent prices, average wage and of course annual number of new flats. When the households want to invest in the residential real estate market they have to be able to understand the development of these factors. First of all they have to be able to understand development of the prices and rent prices in this market. The real estate's prices are the most important. The investors and households have to watch where the prices go – increasing or decreasing? Are the prices on the real level, or without the market? The investors have to buy some real estate when the market is down or it begins to go higher. It is important never buy the real estate when the market went to the top price level in long time. People are willing to respect higher price of their flat or house when the quality of the real estate is reaching higher standard only. But we can ask: Is there a real model that relevantly describes real situation on the real estate market in the Czech Republic? We can try to find it.

Purpose of the article: The main goal of this article will be to describe based on current data the development and the actual situation in the real estate market in the Czech Republic and with the using regression analysis find a regression model that will be able to describe its future development in real estate in the Czech Republic. This article will be first parts of the presentation of results of the PhD project which autor solves with the financial support of the J. E. Purkyně University in Ústí nad Labem.

Method: The regression model of the development of the flat prices.

Findings & Value added: The people in the Czech republic make decision about investment in the real estate market first of all about actual development of the real estate prices. We confirm, the relevant factors which influence the flat prices in the

real estate market in the Czech Republic are average net wages and number of new flats.

Introduction

The people in the Czech Republic have a lot possibilities how to invest their special money. The investment market is on the some level which old EU countries have. Regulation and control mechanisms of the market is good quality. Also the people in the Czech Republic must to solve common question, what is the best investment strategy for their special money? May they invest money to shares, bonds, or in other stock? May they vote rather the investments to real estate or may they invest more to gold? Of course each person votes investment strategy about his preferences. The people in the Czech Republic invest your money first of all for to rich secure old age. We can say, they want to have special money next their pension. A lot Czech people still have wrong experiences with communist regime and this experiences influence their preferences and investment behavior still today. They prefer first of all certainty, after that profit. And this every advisors must respect. Very important is the question how the people understand different investment possibilities. The people rather vote the investments which they understand. In the Czech Republic we can find typical situation, the people vote investments which they understand and which have little risk. Among those investments belong investments to real estate. Also in the Czech Republic a lot investors give their special money to real estate.

A lot people want to know - when and where their investment to real estate may to do? First of all, they want to buy flats or apartments when it price are low and when in the real estate market are not the prices bubbles which signalize problems on the market (Gevorgyan, K. 2015, pp. 45 - 63). And this rule is correct to for other real estate market in EU (Grum, Govekar, 2016, pp.597 – 604). Also the people want to know how the flats prices develop. Because than they can they buying of the flats (it means residential real estate) correctly timing. Watching of the development of the price of the flats or apartment is also very important.

We are going to try in this article to find one regression model of the development of the flat prices in the Czech real estate market.

Research methodology

The regression model of the development of the flat prices we will find on the basis of the development of the five indicators which describe and are most important for the actual and future situation on the real estate market.

On the basis of the development of these indicators will be our goal to find a function in the form:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + e$$

where:

X_1, X_2, X_3, X_4, X_5 - value of the factors (X_1 average net wages, X_2 annual number of the newly built flats, X_3 mortgage rates, X_4 average net cost of the household and X_5 average price of the rent)

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ - parameters of our function (coefficients of the variables)

β_0 - a constant

e - a mistake of our estimate (we suppose it is 0)

Y - a regressand (dependent variable, average flat prices)

It is correct to write that there exist more indicators which have a real impact on real estate prices, for example (Hromada, 2017, pp. 32 - 37)

For the regression we will use the method of the least squares approximation.

Dependent variable will be average flat prices. Independent variables (regressors) will be average price of the rent, annual number of the newly built flats, mortgage rates, average net wages, and average net cost of the household.

Now it is time to introduce data of each factor (indicators). The best serious data we can find on official websites of the Czech statistical office and the Czech banks association.

The development of flat prices and other indicators in the period 2000 to 2016 we will use as the data for regression analysis. We can see it in the table number 1. The graphs and more information about the development of these indicators is possible to find in some other articles, e.g. in one author's article (Uhman, 2019, pp. 240 – 248), it is not necessary to give it more space in this article.

By looking at the individual data we can assume (estimate) the already well-known, proven assumptions of our model. E.g. sign assumption. Specifically, for the explanatory variable - the average rate of mortgages - we can expect a negative sign of the coefficient (indirect dependence). For other explanatory variables - the number of completed dwellings, the aver-

age net wage, net money expenditure of households, rent - then we expect a positive sign (direct dependence). This situation we can see in the table 2.

Test of normality

Before searching for the regression model, it is necessary to test the assumptions of the model, or some data behaviour. First and foremost, it is to test whether the individual groups of data follow a normal distribution, that is, to perform a normality test. Testing can be done graphically or by using a suitable test. For example, a histogram is used from a graphical representation. The tests can be used eg Kolmogorov - Smirnov's test or Shapiro-Wilk's test (Hebák, 2004). While the number of values of our order is more appropriate to choose Shapiro - Wilk's test. Results of the test of normality, we assume $\alpha = 0,05$, we can find in the table number 3.

According to the results of the Shapiro-Wilk test, we can conclude that five variables (price of apartments, average net wage, number of new dwellings, mortgage interest rate and average rental price) exceeded the critical p - value of 0.05 and thus confirmed the normal distribution. However, the results are not strong, because only the mortgage interest rate and the average net wage are closer to one. The other two values passed the test with only a slight overcoming of the critical p-value. For average household expenditure, it was found that these quantities do not follow the normal distribution. Therefore, in the case of the model to be searched for and the absence of the variable in it, it is necessary to determine the critical value at a higher significance level, $\alpha = 0.1$.

In the second step we must verify the correlation between variables. This test show the table number 4.

On this results we can see that some groups of the variables are very strong interdependent. Also we must respect that our model can be incorrect. But it is not problem to try this model to find.

Finding of regression model

First of all we must repeat. We want to find a regression model in this sharp:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + e$$

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where:

X_1, X_2, X_3, X_4, X_5 - value of the factors (X_1 average net wages, X_2 annual number of the newly built flats, X_3 mortgage rates, X_4 average net cost of the household and X_5 average price of the rent),

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ - parameters our function (coefficients of the variables),

β_0 - a constant,

e - a mistake of our estimate (we suppose it is 0),

Y - a regresand (dependent variable, average flat prices).

Least squares method was used to estimate numerical values for individual parameters for individual indicators (regressors, independent variables in regression function). The basic principle of this method is to find a model whose sum of the deviations of the model values from the real values to the second, the so-called sum of the second residues, is as small as possible. It is from this approach that the procedure is called the least squares method. At the same time, the linear relationship between the explained and explained variables will be considered.

To find the above model and its characteristics, programs Excel and "Statistica" were used. The results are documented in Table 5.

Found model has the resulting shape:

$$Y = -16\,855,411 + 1,493 \times X_1 + 0,347 \times X_2 + 181,605 \times X_3 - 0,003 \times X_4 + 0,114 \times X_5$$

Testing of model quality, model verification

We need to verify the quality of our model now. We will do economic and statistic verification.

Economic verification

From the expected economic relations between the individual indicators affecting the real estate market and the observed development of the average price of apartments, as well as from the comparison of graphs, it was possible to expect certain relations between quantities (economic variables). These relations were expressed by the expected signs for the individual coefficients for the regression function sought. A consensus of reality and expectation can be seen in Table 6.

The results show that for most indicators the sign was correctly estimated and the economists assumed the relationships between the indicators and the variables explained were confirmed by the model. Only the assumption of the relationship between the average price of apartments and the average mortgage rate was not confirmed. However, the reason may be a greater time lag in the reaction of apartment prices to interest rate changes.

Statistical verification

In Table 4 we can also find out which factors are statistically significant in the model found and which are not. The table can be consulted on the t-share and p-values relating to the individual model variables. If we work with the significance level $\alpha = 0.1$, we can conclude that based on the results of p - value (yellow colored column), only the average net wage and completed flats can be marked statistically significant. Other variables are evaluated as statistically insignificant. In this respect, our model does not have too much explanatory value, so it would be advisable to choose a model of two, the above-mentioned, independent variables. According to the model found, the price of flats is thus significantly influenced by the average net wage and the number of newly completed flats.

Next, it is possible to verify the explanatory power of the whole found model, without identifying individual variables. Also, to verify, for example, the tightness of the estimated values (based on the model) and the actual development of the average price of apartments in the Czech Republic. This fact can be accessed on the basis of the result of the regression statistics, namely on the result of the determination index and the F - test based on the analysis of variance, ie the ANOVA test.

a) Determination index

The regression statistics results are shown in Table 6, which is the result of data processing in the Statistics program. According to the calculated determination index values (multiple R), namely 0.9823, it can be argued that the found model very strongly describes the data behavior explained by the variable "average price of apartments". Thus, the more than 98% found model describes the variability of data.

b) Testing the suitability of the model, ANOVA

To test the suitability of a model, we can also compare whether the sum of squares of values is greater than the sum of residual squares. It is true

that the greater the (greater) the difference, the more appropriate our model is to describe the characteristic. This test is known in the statistics as an F-test, based on ANOVA. The H₀ hypothesis tested is then chosen as follows:

H₀: The function dependency between dependent and independent variables does not exist.

Table 8 shows the results of the ANOVA test performed by the "Statistica" program.

The test criterion value is obtained by the ratio of the aforementioned square sums, ie MS regression and MS residue: $F = 87757447,66 / 1449233,332 = 60,5544$. We compare this value with the critical value for 5 and 11 degrees of freedom F of the distribution at the 5% significance level, which is 3, 204 (Eckschlager K., Horsák I., Kodejš Z., 1980). The value of the test criterion "fell" significantly into the critical domain (overcame the critical value of 3, 204) and thus reject the null hypothesis H₀, so we reject that the dependence between the variables does not exist. Thus, the model describes the dependence between variables and is a strongly representative model of the dependency.

Step regression, "backward selection" method

The step regression method (specifically, the backward selection method) was further developed because of the small significance (or insignificance) of some factors in the model - factors such as average mortgage rate, net household money, and rent.

The calculations were again performed in the "Statistica" software. The first step (see the results of the first table of this chapter, tab. 8) is already mentioned in the text and the search for this model in full form is described. It is possible to see the above-mentioned non-confirmation of the significance of the above indicators. The least significant factor of these are, according to the results of p - value, net money expenditure of households.

Therefore, in the second step of searching for a "cleansed" model, the factor will be omitted. The results of the second step of multiple regression are shown in Table 10.

By looking at the results, we can conclude that there are two minor (insignificant) factors in the model - the average mortgage rate and the rent, with the rent being a significantly less significant factor. Therefore, in the

next regression step, this factor will be omitted. The results of the third step of the procedure are shown again in the table, this time No. 11.

After the third regression step, the last insignificant factor remained, the average mortgage rate. The remaining two factors are already quite significant, even significant for the 1% significance level. In the fourth step of step regression, we eliminate the last insignificant factor, the average rate of mortgages - see Table 12.

Results

In the final model, after the removal of insignificant factors by the backward selection step regression, two important factors remain that significantly affect the behaviour of the average apartment price. The resulting function is as follows:

$$Y = -15\,093,8 + 1,4 \times X_1 + 0,4 \times X_2$$

Based on the knowledge of the development of two factors that significantly affect the average price of apartments, this model allows to estimate the average price of apartments in the Czech Republic. For example, if the average net wage in the Czech Republic would reach 20 thousand CZK and the number of newly completed dwellings would be 30 thousand apartments, it is possible to expect (estimate) the average price of apartments in the Czech Republic:

$$Y = -15\,093,8 + 1,4 \times 20\,000 + 0,4 \times 30\,000 = \underline{\underline{24\,906,2\ CZK}}$$

Conclusions

The people in the Czech Republic make decision about investment in the real estate market first of all about actual development of the real estate prices. We tried to find the model which will be able to describe the development of flat prices independent on selected factors which the authors consider relevant to the market. We can confirm, the relevant factors which influence the flat prices in the real estate market in the Czech Republic are average net wages and number of new flats. When both factors grow the flat prices go grow to. It means growth of number of new flats leads not the prices low but on the contrary – leads it to higher. That means the builders built new flats when its prices go higher. That means to second significant

findings. Average net wages growth precedes the rise in property prices and the number of new flats. When the people can invest their extra money to real estate in the Czech Republic they must do their decision in the period when the net wages in the Czech Republic go down.

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Annex

Table 1. Data for regression analysis

Year	Flat price	Average Net wage (CZK)	Annual number of the newly built flats	Mortgage rate (CZK)	Average net cost (CZK)	Average price of the rent (CZK)
2000	7,484	8889.7775	25,207	8.79	79,625	2,911
2001	7326	9669.205	24,758	7.97	84,288	3,121
2002	8015	10439.89	27,291	6.73	86,874	3,312
2003	11,489	11049.175	27,127	5.00	91,365	3,608
2004	12,474	11745.885	32,268	4.74	94,098	3,745
2005	13,731	12336.34	32,863	3.98	99,165	4,136
2006	14,674	13144.685	30,190	4.36	107,585	4,040
2007	18,693	14093.5825	41,649	5.34	120,208	4,439
2008	22,342	15193.12	38,380	5.69	123,955	4,988
2009	21,807	16084.016	38,473	5.61	128,622	5,660
2010	20,373	16396.133	36,442	4.23	130,019	6,316
2011	20,485	16622.814	28,630	3.56	132,215	6,659
2012	19,662	17294.589	29,467	3.17	134,374	6,674
2013	19,129	18352.893	25,238	3.06	133,279	6,796
2014	18,113	17601.194	23,954	2.37	135,153	7,062
2015	19,840	18235.763	25,095	2.06	134,538	7,232
2016	22,552	19008.821	27,322	1.77	125,947	7,342

Source: The Czech Statistical Office – own data processing.

Table 2. The expected type of dependence

Designation of indicators	Indicators in the function	Mark
X ₁	Average net cost	+
X ₂	Annual number of the newly built flats	+ (-)
X ₃	Mortgage rate	-
X ₄	Net money expenditure of households	+
X ₅	Flat price	+

Source: Own data processing.

Table 3. Tests of normality

Test of normality		
Sig.	Sig.	Sig.
<u>Flat price (CZK/m2)</u>	<u>Flat price (CZK/m2)</u>	<u>Flat price (CZK/m2)</u>
<u>Average net wage</u>	<u>Average net wage</u>	<u>Average net wage</u>
<u>Annual number of the newly built flats</u>	<u>Annual number of the newly built flats</u>	<u>Annual number of the newly built flats</u>
<u>Mortgage rate (%)</u>	<u>Mortgage rate (%)</u>	<u>Mortgage rate (%)</u>
<u>Average household expenditure</u>	<u>Average household expenditure</u>	<u>Average household expenditure</u>
<u>Average price of the rent</u>	<u>Average price of the rent</u>	<u>Average price of the rent</u>

Source: The Czech Statistical Office – own data processing.

Table 4. Correlation test

	<u>Flat prices (CZK/m2)</u>	<i>Average net wages</i>	Number of the new build flats	Mortgages rate (%)	Average price of the rent
<u>Flat prices (CZK/m2)</u>	1				
Average net wages	0,911627794	1			
Number of the newly built flats	0,411529401	0,052332266	1		
Mortgage rates (%)	-0,698325633	-0,849876177	0,119074251	1	
Average price of the rent	0,844817955	0,978950621	-0,082994082	-0,84427235	1

Source: The Czech Statistical Office – own data processing.

Table 5. Regression coefficient

	<i>Coefficient</i>	<i>Mean value</i>	<i>t Stat</i>	<i>Hodnota P</i>
Limit	-16855.410	3916.87995	-4.303274747	0.001249101
Annual number of the newly built flats	1.492	0.701811496	2.127139138	0.056861266
Mortgage rate (v%)	0.34680608	0.09117192	3.803869421	0.002923627
Net money expenditure of households	181.604598	321.3486339	0.565132627	0.583325596
Average price of the rent	-0.00277487	0.073	-0.038005559	0.970364226
Annual number of the newly built flats	0.11377139	1.284	0.088579657	0.9310081

Source: The Czech Statistical Office – own data processing, program Statistica and Excel.

Table 6. Expected and actual (found) signs for indicator parameters

Marking the indicator in function	Description of indicator	Mark, expectation	Mark, reality
X ₁	Average net wage	+	+
X ₂	Annual number of the newly built flats	+ (-)	+
X ₃	Mortgage rate	-	+
X ₄	Net money expenditure of households	+	+
X ₅	Average price of the rent	+	+

Source: Own data processing.

Table 7. Regression statistics

<i>Regression statistics</i>	
Multiple R	0.98231497
Reliability value R	0.96494269
Set the reliability value R	0.94900756
Mistake of mean value	1203.84107
Observation	17

Source: Own data processing, program Statistica and Excel.

Table 8. Test ANOVA

	<i>Difference</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	5	438787238.3	87757447.66	60.55439501	1.2481E-07
Res.	11	15941566.65	1449233.332		
Total	16	454728804.9			

Source: Own data processing, program Statistica and Excel.

Table 9. Multiple regression – 1 step

Regression Summary for Dependent Variable: Average purchase price of flats (CZK/m²)						
N=17	R= ,98231497 R²= ,96494269					
	p<,00000					
	b*	Std.Err.	b	Std.Err.	t(11)	p-value
Intercept			-16855.4	3916.880	-4.30327	0.001249
Average net wage	0.926405	0.435517	1.5	0.702	2.12714	0.056861
Annual number of the newly built flats (number)	0.360057	0.094656	0.3	0.091	3.80387	0.002924
Mortgage rate (v %)	0.066999	0.118555	181.6	321.349	0.56513	0.583326
Net money expenditure of households	-0.010658	0.280422	0.0	0.073	-0.03801	0.970364
Average price of the rent	0.034313	0.387367	0.1	1.284	0.08858	0.931008

Source: Own data processing, program Statistica.

Table 10. Multiple regression – 2 step

		Regression Summary for Dependent Variable: Average purchase price of flats (CZK/m²)				
N=17		R= ,98231262 R²= ,96493809				
		p<,00000				
	b*	Std.Err.	b	Std.Err.	t(12)	p-value
Intercept			-16860.3	3748.323	-4.49810	0.000729
Average net wage	0.919348	0.377205	1.5	0.608	2.43726	0.031314
Annual number of the newly built flats (number)	0.358085	0.075788	0.3	0.073	4.72482	0.000493
Mortgage rate (v%)	0.065713	0.108789	178.1	294.879	0.60404	0.557067
Average price of the rent	0.030020	0.354784	0.1	1.176	0.08462	0.933962

Source: Own data processing, program Statistica.

Table 11. Multiple regression – 3 step

		Regression Summary for Dependent Variable: Průměrná kupní cena bytů (CZK/m²)				
N=17		R= ,98230198 R²= ,96491717				
		p<,00000				
	b*	Std.Err.	b	Std.Err.	t(13)	p-value
Intercept			-16950.1	3455.193	-4.90568	0.000287
Average net wage	0.949947	0.103117	1.5	0.166	9.21233	0.000000
Annual number of the newly built flats (number)	0.353853	0.054730	0.3	0.053	6.46541	0.000021
Mortgage rate (v%)	0.066877	0.103714	181.3	281.120	0.64482	0.530259

Source: Own data processing, program Statistica.

Table 12. Multiple regression – 4. step

		Regression Summary for Dependent Variable: Average purchase price of flats (CZK/m²)				
N=17		R= ,98173065 R²= ,96379508				
		p<,00000				
	b*	Std.Err.	b	Std.Err.	t(14)	p-value
Intercept			-15093.8	1870.515	-8.06932	0.000001
Average net wage	0.892536	0.050923	1.4	0.082	17.52711	0.000000
Annual number of the newly built flats (number)	0.364821	0.050923	0.4	0.049	7.16415	0.000005

Source: Own data processing, program Statistica and Excel.

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Assessing the impact of air pollution on the labor market in the European area

JEL Classification: *Q51; Q56; J21; I15*

Keywords: *Air pollution, Labor Market, Labor Productivity*

Abstract

Purpose of the article: The aim of the paper is to determine the impact of air pollution (AP) on wage levels, labor productivity and total labor cost within EU and EEA countries during 2004-2016. Determining these AP impacts on the labor market will help to determine the level of social costs associated with the AP (the human capital method) and the determination of wage elasticity (compared with the situation without AP) using different methods.

Research background: Research background: The number of workers with AP-related illnesses was determined via dose-response analyses. Similar approach was used for estimation of the hours worked by these employees. We have approached the problem as a supply-side shock on the labor market offer (a situation with no AP vs. AP situation) assuming full employment, unchanged production, and unchanged savings.

Methods: The method (generalized linear models) reflect the longitudinal nature of the data.

Findings & Value added: The expected average wage decrease (in the AP scenario) of the EU countries as a whole was 0.0495%, assuming a reduction in productivity by 0.0041% and a reduction in hours worked by 0.1023%, led to an increase in total work costs by 0.0257%. Such a low decline in aggregate wages is associated with a proportionally low number of people suffering from AP disease. Determining the impact height of the AP helps to optimize the environmental tax and determination of economic optimal pollution. At the same time, it will help to optimize the costs of the subjects, respectively maximize their profit.

Introduction

The issue of social costs related to business is recently highly important. In order to be able to think and deal with them, it is necessary to identify and quantify these externalities emerging on the market. Consequently, some measures (e.g. additional taxation) can be adopted to support the economic optimization of damages arising from the business of such entities. This paper discusses the impact of environmental pollution, namely air pollution (AP) on the labor market (LM).

The main objective of the contribution is to determine the impact of the existence of AP on the expected changes in the total aggregate wage (we consider them in the form of Cost of employees, which take into account the total labor costs) to the expected changes in labor productivity (resulting from loss of hours worked due to AP-related illnesses), resulting in a change in the total labor costs (considering changing the amount of the payment and changing the number of employees - changing the number of hours worked).

Literature review, framework and research methodology

The economic quantification of the AP's negative impact in the LM context is addressed only by an authors mentioned below. In the case of Hanna & Oliva (2015, pp. 68-79), the problem has been raised through air quality modelling as a utility function argument, which influences the boundary utility of consumption and hours worked, and hence work productivity. The elasticity of the number of hours with different levels of pollutants considered within different phases of the production cycle was presented by Chay & Greenstone (2003, pp. 1121-1167). Graff Zivin & Neidell (2012, pp. 3652-3673) approaches the issue of maximizing worker output when as-

suming output is given by function of effort and pollution levels. We follow these dose-response analyses, with mortality data due to AP were available through the OECD database, and therefore there was no need to determine the expected number of deaths due to AP.

The probability rate of respiratory diseases (RD), resp. cardiovascular diseases (CVD) due to AP, was determined via dose-response analyses performed by several authors, like Chapman *et al.* (1996), Schwartz *et al.* (1999, pp. 17-22), Künzli *et al.* (2000, pp. 795-801), Zanobetti *et al.* (2000, pp. 1071), Samet *et al.* (2000, pp. 5-79), Atkinson *et al.* (2001, pp. 1860-1866), Le Tertre *et al.* (2002, pp. 773-779), Ayres *et al.* (2006), Ballester *et al.* (2006, pp. 328-336), Pope III & Dockery (2006, pp. 709-742), Dominici *et al.* (2006, pp. 1127-1134), Larrieu *et al.* (2007, pp. 105-112), Peng *et al.* (2008, pp. 2172-2179) or Brook *et al.* (2010, pp. 2331-2378), which we aggregated into one value.

In the case of workers suffering from some of the diseases, we considered absenteeism, but also presentism. The expected level of labor reduction due to presentism was determined by the work of Goetzel *et al.* (2004, pp. 398-412), which assess the impact of individual RDs or CVDs. We aggregated them into a single predicted value for both groups of diseases, the weights representing the proportional incidence of the disease in the group and the accuracy of the analysis. The values are captured in Table 2.

Then the coefficients of decrease of the number of hours worked due to RD, resp. CVD associated with AP is as follows:

$$k_{ctj} = \frac{100-hl_j}{100} * \frac{365-d_{ctj}}{365} \quad (2)$$

where absenteeism and presentism associated with CVD (index j denote as v) and RD (index j denote r), hl is characterized as (average) hour loss, d determines the number of days spent by employees as work incapacitated (or hospitalized) in due to the disease, the index c specifies the country and the index t indicates the year.

We considered the CES production function as determined by Arrow *et al.* (1961):

$$Y = C[\alpha K^{-\rho} + (1 - \alpha)L^{-\rho}]^{-1/\rho} \quad (3)$$

, where Y represents the aggregate production of the country, K is characterized as a capital demand, L represents the demand for work, ρ is a substitution parameter, α presents a bounded distribution parameter and the efficiency parameter is called C , assuming neutrality in terms of Hicks.

However, given the above-mentioned losses in the number of hours worked (equation 2), we will consider the following relationship:

$$H_{ctn} = \frac{TEAP_{ct} * H_{cte}}{M_{ctn} + M_{ctra} * k_r + M_{ctva} * k_v}; H_{ctra} = H_{ctn} * k_r; H_{ctva} = H_{ctn} * k_v \quad (4)$$

where H is perceived as the number of hours worked by workers, $TEAP$ is the total economically active population, M is characterized by the number of non-APs (index n) and the number of inhabitants affected by AP (index r represents the population suffering from RD due to AP or CVD for index v), index a presents the state after inclusion of the AP effect on LM, index n expresses data before counting the AP coupled shock, the index e records the data associated with the current state (taking into account the population affected by the AP and the non-affected population).

Based on the abovementioned relationships, we are able to determine the hourly productivity of non-AP affected staff (PL_{ctn}) or average output per hour worked by AP affected employees (PL_{cta}):

$$PL_{ctn} = \frac{Y_{ctn}}{(M_{ctn} + M_{ctra} + M_{ctva}) * H_{ctn}} \quad (5)$$

$$PL_{cta} = \frac{Y_{cta} - (M_{ctn} * H_{ctn} * PL_{ctn})}{M_{ctra} * H_{ctra} + M_{ctva} * H_{ctva}} \quad (6)$$

, where we consider Y_{cta} as aggregate country production as well as proportionally affected population due to AP (real data), Y_{ctn} represents increase in aggregate production due to a change in price level¹ in the absence of AP. We consider this condition (or state) on the basis of the assumption of a fall in labor productivity (due to lower hours worked), which implies a reduction in wages and a drop in the price level in the country.

In this case, based on Jackson and Victor (2011, pp. 101-108) we consider factor L , as:

$$L_{cta} = H_{cte} * er_{cta} * TEAP_{ct} \quad (7)$$

where er_{cta} represents employment rate. The production function (Eq.3) is:

$$Y_{cta} = PL_{cta} * H_{cte} * er_{cta} * TEAP_{ct} \quad (8)$$

¹ we assume the condition of an unchanged amount of aggregate country production

If we assume an increased number of economically active population F (we consider the absence of population mortality due to AP), the employment rate is defined as follows:

$$er_{ctn} = \frac{Y_{ctn}}{PL_{ctn} * H_{ctn} * (TEAP_{ct} + MDEA_{ct})} \quad (9)$$

where $MDEA$ determines mortality due to exposure to AP. Thus, when we change PL, we can only achieve full employment if the volume of aggregate production in the country changes proportionately. Then, the working factor assuming the non-existence of AP L_{ctn} is determined as follows:

$$L_{ctn} = H_{ctn} * er_{ctn} * (TEAP_{ct} + MDEA_{ct}) \quad (10)$$

In view of the fact that such a loss of workforce and its productivity causes a slight shock on the supply side of LM, we proceeded according to Borjas & Monras (2017, pp. 361-413) who considered the supply shock of LM as a result of migration. Based on the CES production function, or maximizing profits, we can determine the salary paid to the employees as follows:

$$\log(w_{cta}) = \log(p_{cta}) + \log(\alpha_{cta}) + \eta \log(Y_{cta}) - \eta \log(L_{cta}) \quad (11)$$

or

$$\log(w_{ctn}) = \log(p_{ctn}) + \log(\alpha_{ctn}) + \eta \log(Y_{ctn}) - \eta \log(L_{cta} + M_{ct}) \quad (12)$$

where index c represents the country, the index t represents time, w represents the average wage of employees, p captures the price level in the region, the variable a specifies the weights assigned to the intended groups of employees (as time changes, inter alia due to technological changes, so we consider it as PL), η ($\eta=1/\sigma$) is perceived as wage elasticity, L indicates the number of employees before calculating the supply shock associated with AP and M is understood as the expected change on the supply side of LM (due to mortality and reduced PL).

When changing the price level, we considered the condition of unchanged quantity of landscape aggregated production, i.e. the change in the price level Δp_{ct} can be expressed as follows:

$$\Delta p_{ct} = \frac{Y_{ctn} - Y_{cta}}{Y_{cta}} * p_{cta} \quad (13)$$

The data base is of a longitudinal nature, where 31 countries² were monitored during 2004-2016. We have also set models for the EU, respectively EA as a whole. The variables derived from the available databases used to estimate the variables listed above and also needed to perform the analyses are summarized in Table 3.

We used the Generalized linear models (Nelder & Wedderburn, 1972, pp. 370-384) using the logarithmic link function at gamma distribution to create the above model. Due to fewer country-specific observations, clusters were created based on a cluster analysis using the Euclidean distance using the Ward Aggregation Criterion (Ward 1963, pp. 236-244).

Results

From the maximization of profit based on the equation (11) determining the aggregate wage costs (we considered them in the form of CoE), respectively their relationship to relevant predictors is presented in Table 4. The GLM model was used for the analysis using the logarithmic link function at Gamma distribution.

The results showed that there was a statistically significant elasticity in the EU countries, the value of which suggests that the percentage change on the LM supply side was proportionally lower than in the case of the percentage change in wages. This points to the weaker impact of wage levels on a given LM supply, which is mainly related to the fact that we are considering multiple states with different wage levels within the EU. This has also resulted from the free movement of workers, which is at the same time helping to reduce regional disparities between EU countries to the detriment of its older members. Inflation, respectively the change in the price level at 1%, according to the findings, indicates a wage increase of 0.1291%, while a 1% increase in labor productivity is expected to increase wages by 0.7252%.

Based on the analysis, we were able to determine the expected w wage level in the case of an AP with respect to Equation 13. Similarly, we determined the expected change in labor productivity of the total labor force of PL in the country through Eq. 5. The results of the expected changes in the LC wage cost in case of non-consideration with AP are presented in Table 5.

² EU member countries (28 countries), Iceland, Norway & Switzerland

Conclusions

As part of this contribution, we were considering analyzing the impact of AP on LM within the EU and the EEA. Through the changes in the number of hours worked from the dose-response analyses, we determined the expected changes in the level of wages across countries. Based on changes in both these factors, we were able to determine the overall change in wage costs associated with AP.

Based on the results of the profit maximization analysis, we determined that the expected average wage increase in case of non-AP situation during the reference period (2004-2016) is 0.0495% within EU and EEA countries, however wage per hour of healthy employee is lower than wage per hour of employee with disease related to AP (discrepancy resulted from work hour loss). These claims for PA wage increases are consistent with Hanna & Oliva's findings (2015), but in this case, this increase was proportionally lower (about 11 times), which can be resulting from the locality (EU + EEC vs. Mexico City) and also the different state of LM (macroeconomic indicators) and the degree of pollution (even with respect to the size of the area observed).

In addition, we determined the expected change in labor productivity of the total workforce in the country and the overall expected change in wage costs associated with AP. These reflect the results of Graff Zivin & Neidell (2012, pp. 3652-3673). However, in our case, the expected average change in work productivity of the population suffering from CVD or RD due to AP was 4 times higher. However, given the relatively small proportion of people suffering from AP-related illnesses, this effect on aggregated data has only been marginal. While the average expected cost increase was in our case proportionally lower. These differences consist in focusing the above-mentioned study only on the agrarian sector.

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Annex

Table 1. Aggregation of health outcomes with relative risks of hospital admission

Diseases	Exposure	Percentage increase	CI_low	CI_high
<i>RD</i>	10 $\mu\text{g m}^{-3}$ PM2.5	1.28%	0.41%	2.04%
<i>CVD</i>	10 $\mu\text{g m}^{-3}$ PM2.5	1.63%	0.98%	2.30%

Source: own processing based on above mentioned studies.

Table 2. Expected relative hour lost per day

Disease	Average loss	Low loss	High loss
<i>RD</i>	14.38%	10.00%	17.50%
<i>CVD</i>	6.88%	0.00%	11.88%

Source: own processing based on Goetzel et al. (2004, pp. 398-412).

Table 3. List of variables

Variable	Description	Source
$MEtAP_{ct}$	Mean exposure to AP (only PM2.5) [$\mu\text{g m}^{-3}$]	<i>OECD</i>
RD_{ct}	Hospital admissions of respiratory disease [number]	<i>OECD</i>
CVD_{ct}	Hospital admissions of cardiovascular disease [number]	<i>OECD</i>
d_{ctj}	Average number day in hospital due to AP [days]	<i>OECD</i>
H_{cte}	Hours at work [hours]	<i>OECD</i>
$TEAP_{ct}$	Total economic active population [inhabitants]	<i>Eurostat</i>
Y_{cta}	Gross domestic product [euro]	<i>Eurostat</i>
PL_{cte}	Labor productivity per hour [euro hour ⁻¹]	<i>Eurostat</i>
er_{cta}	Employment rate [%]	<i>Eurostat</i>
$MDEA_{ct}$	Mortality due to exposure of AP [inhabitants]	<i>OECD</i>
w_{cta}	Wages (as Cost of employee) [euro]	<i>Eurostat</i>
p_{cta}	Prices (as HICP) [index, base = 2015]	<i>Eurostat</i>

Table 4. Results of profit maximalization expressed by aggregated wages

(Intercept)	P_{cta}	u_{cta}	Y_{cta}	L_{cta}
4.5029	0.1297	0.7262	0.6642	-0.6642
0.3858	0.0630	0.1026	0.1131	0.1131
[< 2e-16] ***	[0.0397] **	[1.5e-12] ***	[4.4e-09] ***	[4.4e-09] ***
AIC	985.2458	BIC	1005.9240	

*, **, *** - significance at 10%, 5% and 1% respectively

Source: own processing.

Table 5. Expected percentage change of LM indicators due to exposure to AP

Unit	MEtAP [$\mu\text{g m}^{-3}$]	Average values of observed time period			
		% Δ w	% Δ H	% Δ PL	% Δ LC
<i>European Union</i>	15.1490	-0.0495% (46.71%)	-0.1518% (-11.26%)	-0.0041% (-34.64%)	0.0257% (35.42%)
<i>Euro area</i>	14.1796	-0.0489% (47.83%)	-0.1435% (-11.21%)	-0.0038% (-35.10%)	0.0240% (36.62%)

Values in brackets represents percentual change (healthy employee vs. employee with disease related to AP) of wage per hour, worked hours per employee, productivity per hour and labor cost per employee respectively

Source: own processing.

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Evaluation of changes in the economic structure of small towns on the basis of the shift-share analysis

JEL Classification: *O18; R19*

Keywords: *economic structure; small cities; shift-share analysis; Kruskal-Wallis non-parametric test*

Abstract

Research background: The issue of small towns from the point of view of their role in the national and regional settlement systems is expressed both in governmental strategic documents and in scientific publications. Small cities constitute an important element of the spatial structure of the country and an intermediate stage on the axis of the city-village continuum. For this reason, detailed knowledge of the processes taking place there is extremely important.

Purpose of the article: The aim of the paper is to evaluate changes in the economic structure of small towns in Poland in 2009-2017.

Methods: The analysis is based on secondary data originating from the Local Data Bank. The empirical material collected was subject to calculations using a classical shift-share analysis and a Kruskal-Wallis non-parametric test. The former procedure made it possible to perform a detailed analysis concerning changes in the number of enterprises operating in small towns in 2009-2017 with reference to the processes occurring in other urban system units, while the latter was used to determine the statistical significance of the observed differences.

Findings & Value added: The obtained results permitted a positive evaluation of the hypothesis that there were statistically significant differences in the economic structure of small towns and other urban system units in Poland. Additionally, they demonstrated that the most favourable situation was found in section R (activity related to culture, entertainment and recreation) and in combined sections S and T (other service activities; households as employers; goods-producing activities of private households for own use), which were the only sections (out of 21 sections of the Polish Classification of Business Activities) that developed faster in small

towns than in their counterparts at the urban system level, additionally demonstrating higher competitiveness.

Introduction

The aim of the paper is to evaluate changes in the economic structure of small towns in Poland in 2009-2017. The analysis was of a comparative nature, with other units of the urban system (defined as the set of all 923 cities in Poland) providing a point of reference for the situation present in the analysed group. The typology of towns referring to their size (small, medium and large) applied in the paper is based on the population criterion. The research applied the most common, three-step approach, according to which small towns are inhabited by up to 20,000 persons, while in medium towns this number ranges from 20,000 to 100,000 and in large towns it exceeds the population of 100,000. The towns were classified into individual types according to the population data for 2017.

Research methodology

The accomplishment of the research objective was based on verifying the hypothesis that there were statistically significant differences between small towns and other urban units in Poland in terms of the changes in the number of enterprises in 2009-2017. The hypothesis could be tested by applying secondary data originating from the Local Data Bank. The number of business units in individual sections of the Polish Classification of Business Activities (PKD) was used to define the notion of “economic structure”, while the term “change in the economic structure” was understood as a difference determined for two moments in time, i.e. the base year (2009) and the end year (2017).

In order to verify the research hypothesis, the collected empirical material was calculated using a classical shift-share method and the Kruskal-Wallis non-parametric test.

The first procedure made it possible to perform a detailed analysis of changes in the number of enterprises operating in small towns in 2009-2017, with regards to processes occurring in other urban system units. This permitted decomposition of the entire growth of the examined variable ($TS_{2017/2009}$) into three components, i.e. (Dinc, 2002, pp. 4-9; Dinc, 2015, pp. 100-104; Le Gallo & Kamarianakis, 2011, pp. 126; Artige & Van Neuss, 2014, pp. 669-671; Erkuş-Öztürk & Terhorst, 2015, pp. 7-8; Otsuka,

2016, pp. 2-3; Martin *et al.*, 2016, pp. 571-527):

1. national growth effect (national component, national share) (NG) – this component referred to this part of the increase/decrease in the number of economic entities in small towns, which was caused by the general situation in the set of 923 Polish towns (treated as a referential set). The value of this component provided information about the changes which could occur if the small towns developed at the same rate as the entire urban system;
2. industrial mix effect (structural component, compositional effect) (IM) – this component made it possible to evaluate the growth in the number of enterprises in small towns with reference to growing/declining trends in individual PKD section for the referential set, determined each time with regard to the total growth indicator for the urban system. The positive result of IM meant that a given PKD section in small towns developed faster than its counterpart in the referential area, while a negative result demonstrated that the rate of this development was lower;
3. regional competitiveness effect (regional share, differential component) (RC) – this component indicated differences between the growth index for the number of enterprises in small towns and the growth index for the number of enterprises in the referential set (in individual PKD sections). A positive value of the RC component meant that in the period under analysis, a given PKD section in small towns recorded a higher growth in competitiveness than in the referential set and a negative value indicated lower growth. In the literature, this component is considered to be the most important, as it results from the specific situation of the examined area (e.g. its wealth, effects of regional policy, etc.). However, its deficiency consists in the fact that it does not provide detailed explanations for emerging differences.

In order to determine the statistical significance of differences in the economic structure changes of small towns and other urban system units in Poland, the Kruskal-Wallis non-parametric test was used. The main criterion for selecting the method of analysis was the number of compared groups (three) as well as the fact that distributions of growth in the number of enterprises in all PKD sections ($TS_{PKD\ 2017/2009}$) did not satisfy the condition of the normality of distribution¹. The decision concerning the significance of differences was based on the value of H statistics, which basically represents the variance of the ranks among groups, with an adjustment for the

¹ Normal distribution was tested separately for each group of towns, based on the Shapiro-Wilk test (for sets smaller than 100 items) or the Kolmogorov-Smirnov test (for samples larger than 100 cases).

number of ties. The test statistic H is approximately χ^2 distributed, with the degrees of freedom equal to the number of groups k minus 1 (Van Hecke, 2012, pp. 242). All calculations were supported with the computer programme SPSS 25 (Field, 2009, pp. 562-566).

Changes in the economic structure of small towns in years 2009-2017

In 2017, there were 557,512 enterprises conducting business activity in small towns, which accounted for 17.8% of the total business entities located in Polish towns. Almost half of those units were concentrated in three (out of twenty-one) sections of the Polish Classification of Business Activities (PKD), i.e. section G² (25.9%), section F (12.0%) and section C (9.1%). The highest number of enterprises (4,130) was found for Łomianki (Masovia Province) – a town with 16,875 inhabitants, and the lowest (85), was for Suraż, with a population of 992 (Podlaskie Province).

In 2009-2017, the number of business entities in small towns increased by 5.4% (i.e. by 28,435 units). The highest growth index (71.4%) was recorded in section D and the lowest (-21.1%) was in section A. Following a unit approach, the leader on the list was Karpacz (Lower Silesia Province), in which the number of enterprises increased by 2,821 units, i.e. 271.3% in relation to the base year. In turn, the last position in the ranking was occupied by the town of Dobrzany (West Pomerania Province), which recorded the lowest value of the growth index (-21.8%), and in absolute values – by Ustka (Pomerania Province), in which a decrease of -321 enterprises was found.

A detailed analysis of changes concerning the structure of the economic structure in small towns applied the shift-share method (Tab. 2), which showed an increase in the number of enterprises in three aspects, i.e. 1) in relation to the total rate of changes in the entire set of Polish towns, 2) in relation to the economic structure of the urban system, 3) from the perspective of competitiveness of the area under analysis.

The first component (national growth effect – NG) provided information about an increase in the overall number of enterprises in total and in individual PKD sections, with the assumption that the economy in small towns developed at the same rate as the urban system. As results from the research, if this condition had been satisfied, the number of business units in the analysed area would have been higher at the end of the year by 58.695 units than in the initial state, while the actual growth amounted to only

² Full names of the sections are provided in Table 1.

27.613³. Despite the unfavourable general results, the economic structure of small towns included 11 sections that developed faster than the referential area. Applying the absolute approach, the best result was recorded for section L, in which 5,454 more enterprises emerged as compared to the situation that would have happened if this section had demonstrated the same growth dynamic as the urban system. An equally favourable situation was observed in section M and in combined sections S and T, in which a surplus of 4,412 and 4,171 enterprises, respectively, was recorded. The comparison referring the results to the size of the sectors was slightly different. In this approach, section D was ranked the highest, with a surplus of TS over NG (amounting to 328 units) amounting to 35.2% of the 2017 sector size, followed by sections J and B. In their case, an advantage of the actual increase in the number of enterprises (TS) over the forecasted increase under the analysis of share shift (NG) amounted to 2,878 and 130 units, respectively, which accounted for 26.3% of total enterprises in section J and 25.5% in section B. On the other hand, the economic structure of small towns also included eight sections that developed at a slower rate than the urban system and actually had the highest impact on the final result. In the absolute approach, section G decreased by 16,951 units over the period under analysis, while it should have expanded by at least 17,843 units. In turn, following a relative approach, the least favourable situation was found in section A, in which the difference between TS and NG was almost a half (40.9%) of the sector size for 2017. A similar relation (31.8%) occurred in section K, which decreased by 2,491 entities, while it should have increased by at least 1,755 units.

The second component (industrial mix effect – IM) made it possible to analyse changes in the economic structure of small towns through the prism of the situation in PKD sections of the referential system (specified each time in the context of the total urban system growth rate). A negative sum of amounts determined for all PKD sections (-11,390) implied the prevalence of “shrinking” sectors in the economic structure. There were eight such sectors in total, while the largest value (-30,880) was observed in section G. This number should be interpreted as a pool of enterprises which could have been formed in this section (in small towns) if it had developed at the same level at its counterpart in the referential area. In other words, this is a lost opportunity caused by slower development of that sector or its deeper depression in comparison to the urban system. Favourable develop-

³ Differences in the growth rates concerning the number of enterprises in 2009-2017 determined from the sums of changes in individual PKD sections and for total amounts resulting from circumstances described in Table 2.

mental trends that emerged in other 12 sections were not able to balance the negative phenomena observed in the IM component. Two sections came to the fore in this group, namely L and M, in which, due to the fact that their growth factor was higher than their counterparts in the referential area, 7,166 and 7,521 additional entities were formed, respectively.

The third component (regional competitiveness effect – RC) indicated an increase or a decrease in the number of enterprises, caused by the competitive position of a given sector. Unlike two previous analyses (i.e. NG and IM), this component is endogenous and is considered to reflect strengths or weaknesses of the economy in the examined area. A positive value of RC proving higher competitiveness of a sector in small towns concerned only four sections, i.e. F, H, R and S, combined with T. Comparison of the obtained results with IM components showed that the most favourable situation was observed in section R and combined sections S and T, which were the only ones that reached positive values for both components. This means that in the period under analysis, those industries developed faster in small towns than their equivalents at the urban system level, additionally demonstrating higher competitiveness. Unfortunately, the strength and the scale of positive values were not able to balance the deficits, which were revealed in the 16 other sectors. In effect, the total amount of RC determined from values calculated for individual PKD sections was negative (-19,656) and clearly demonstrated lower competitiveness of small towns in relation to the referential area.

To establish the statistical significance of the differences between small towns and other units of the urban system in Poland in terms of changes in the number of enterprises in 2009-2017, the Kruskal-Wallis non-parametric test was applied. Its results ($H(2, 923) = 90.31; p < 0.01$) for the distribution of increases in the number of total enterprises provided the basis to reject the null hypothesis (assuming an absence of differences) and permitted the performance of post-hoc tests. Multiple comparisons demonstrated statistically significant differences between all analysed groups of towns, i.e. small, medium and large. In order to provide more detailed results, similar calculations were performed for each PKD section. Also this time, the test results (for $p < 0.05$) provided the basis to reject the null hypothesis and permitted performance of post-hoc tests. Multiple comparisons demonstrated an absence of statistically significant differences only in five PKD sections – in three of them (C, I, U sections) there was the similarity of an increase in the number of enterprises between small and medium towns, and in two subsequent (sections A and O) – between small and large towns (Tab. 3).

The results of conducted tests permit to positively verify the hypothesis of the occurrence of statistically significant differences in changes occurring in the economic structure of small towns and other urban system units in Poland.

Conclusions

The analysis presented in this paper focused on the evaluation of changes occurring in the economic structure of small towns (in 2009-2017) at the background of processes occurring in other units of the urban system in Poland. The analysis was based on the increase in the number of business entities in individual PKD sections, and the study demonstrated the existence of statistically significant differences in index values between all types of towns (i.e. small, medium and large). Over the period under analysis, the number of business units in towns increased by 11.1% and against this background, the situation in small units could be described as not too positive. Although the growth index determined for this group was 1.4 percentage points higher than the index calculated for medium towns, at the same time it was 11.8 percentage points lower than the index for large units. Similar relations also emerged in individual PKD sections. In most cases (9 sections), the growth rate concerning the difference in the number of enterprises between the base and end year placed small towns slightly higher than medium towns, but definitely lower than large towns. Two sectors (i.e. H and S with T) proved to be exceptional in this regard, as the changes occurring in small towns were the highest for those sectors. Small and medium towns lost the competition with large towns also in terms of the number of sectors developing faster than their counterparts at the urban system level, while demonstrating higher competitiveness. In large towns, there were up to 12 such sections, while in small and medium towns there were only two in each type of town.

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Annex

Table 1. Full names of PKD sections

PKD sections (abbreviation)	PKD sections (full name)
Section A	agriculture, forestry, hunting and fishing
Section B	mining and quarrying
Section C	manufacturing
Section D	electricity, gas, steam and air conditioning manufacturing and supply
Section E	water supply, sewerage, waste management and remediation activities
Section F	construction
Section G	wholesale and retail trade, repair of motor vehicles including motorcycles
Section H	transport and storage
Section I	accommodation and food service activities
Section J	information and communication
Section K	financial and insurance activities
Section L	real estate activities
Section M	professional, scientific and technical activities
Section N	administrative and support service activities
Section O	public administration and defence, compulsory social security
Section P	education
Section Q	human health and social work activities
Section R	arts entertainment and recreational activities
Sections S and T	other service activities; households as employers; goods-and services-producing activities of households for own use
Section U	extraterritorial organisations and bodies

Source: <http://www.klasyfikacje.gofin.pl/pkd/4,0.html> (1.03.2019).

Table 2. Changes in the economic structure in small towns (by PKD section) compared with the urban system in Poland (results of the shift-share analysis)

PKD sections	Components of the shift-share analysis			Total change (TS _{2017/2009})
	NG	IM	RC	
Section A	1,170	-2,862	-538	-2,231
Section B	38	217	-87	169
Section C	5,495	-3,113	-1,186	1,196
Section D	60	790	-462	388
Section E	207	359	-273	294
Section F	6,962	-3,474	444	3,931
Section G	17,843	-30,880	-3,914	-16,951
Section H	3,338	-4,999	1,762	101
Section I	2,519	-252	-2,407	-139
Section J	805	4,876	-1,998	3,682
Section K	1,755	-2,900	-1,346	-2,491
Section L	3,877	7,166	-1,712	9,331
Section M	3,552	7,521	-3,110	7,964
Section N	1,072	2,982	-444	3,610
Section O	428	-558	-63	-193
Section P	1,815	4,066	-2,818	3,062
Section Q	2,995	5,534	-2,192	6,337

Table 2. Continued

PKD sections	Components of the shift-share analysis			Total change (TS _{2017/2009})
	NG	IM	RC	
Section R	1,075	652	3	1,729
Sections S&T	3,653	3,482	689	7,824
Section U	1	3	-3	1
Total	58,659	-11,390	-19,656	27,613*

* An increase in the number of enterprises in 2009-2017 determined from the sum of changes in individual PKD sections (column TS_{2017/2009}) differs from the values determined for total amounts as a consequence of changes in legal regulations effective as of 1 December 2014, regulating the method of providing information to the REGON register on entities subject to registration in the National Court Register, as a result of which it is possible that the REGON register features incomplete items concerning e.g. the type of the core business activity. Consequently, data calculated from the REGON register do not sum up to provide the total number presented in a given subgroup. (*Group description* (n.d.). Retrieved from <https://bdl.stat.gov.pl/BDL/dane/podgrup/wymiary> (11.03.2019))
Source: Own study based on the data derived from the Local Data Bank.

Table 3. Statistical significance of differences in the change of the economic structure in small towns and other urban system units in Poland

PKD section	Statistically significant difference between small and medium towns		Statistically significant difference between small and large towns	
	YES (p < 0.05)	NO (p > 0.05)	YES (p < 0.05)	YES (p < 0.05)
Section A	✓			✓
Section B	✓		✓	
Section C		✓	✓	
Section D	✓		✓	
Section E	✓		✓	
Section F			✓	
Section G	✓		✓	
Section H	✓		✓	
Section I		✓	✓	
Section J	✓		✓	
Section K	✓		✓	
Section L	✓		✓	
Section M	✓		✓	
Section N	✓		✓	
Section O	✓			✓
Section P	✓		✓	
Section Q	✓		✓	
Section R	✓		✓	
Sections S&T	✓		✓	
Section A		✓	✓	

Source: Own study based on the data derived from the Local Data Bank.

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The rural-urban education gap in Poland after 1998

JEL Classification: *O15; O18; R11*

Keywords: *education, human capital, socio-economic cohesion, rural areas, Poland*

Abstract

Research background: The subject of this study is the issue of the disproportionate development of rural and urban areas in terms of education, which is among the most important development factors in a knowledge-based economy.

Purpose of the article: The aim of this study is to investigate the scale and dynamic of changes of the rural-urban educational gap in Poland in the 1988-2017 timeframe. The main research question is: was economic development in Poland after 1988 accompanied by a reduction in the rural-urban education gap?

Methods: Rural areas were distinguished according to an administrative criterion. The education gap was determined as a disparity in the share of people who completed a specific level of formal education in rural areas in comparison with the average level of the educational attainment of the population in urban areas. In a comprehensive approach the education gap was measured by Bray-Curtis structural diversity measure. The analyses refer to local (powiat) and regional (NUTS-2, voivodeship) level.

Findings & Value added: Expanding on existing research findings, this study presents typologies of urban and rural areas (at local level) according to structural distances in the field of educational attainment of the population. On this basis, the study indicates the factors that might have differentiated the population structure by educational level between urban and rural areas of Poland. The results allow for the verification of the research hypothesis that the changes in the spatial distribution of human capital resources in rural areas, as well as between rural and urban areas of Poland, after 1988, were of a convergent nature.

Introduction

Educational disparities between rural and urban areas are widely discussed in the literature, especially with regards to developing and transforming countries (Zhu, et. al., 2017; Sicular et. al., 2007; Ulubaşoğlu & Cardak, 2007; Armini, Nivorozhkin, 2015), including Poland (Halamska et. al., 2017; Janc & Czapiewski 2005; Wrzochalska, A. (ed.), 2014). In the European Union the range of the rural-urban development divide is significant for monitoring the fulfilment of social and economic cohesion priorities (Rosner & Stanny, 2017), as well as for verifying the effectiveness of public funds allocated to accelerate the multifunctional development of rural areas.

Studies carried out in different parts of the world unanimously indicate an educational gap between rural and urban areas. The differences observed among countries refer to the depth of the rural–urban educational gap as well as the dynamics of its changes. Studies have also found the mutual connections between closing the education gap and reducing rural–urban development disparities. The scale of educational disproportions between rural and urban areas decreases along with socio-economic progress (Amini, Nivorozhkin, 2015). Simultaneously, education increases the economic potential of rural areas and favours bridging the rural-urban development gap (Sicular *et. al.*, 2007; Raffo *et al.*, 2007; Zhu *et. al.*, 2017; Janc & Czapiewski, 2005).

Against this background the main goal of the research is to establish whether the process of increasing in GDP *per capita* in Poland (from USD 10276 in 1990¹ to USD 27334 in 2017) was accompanied by a reduction in rural-urban education gap. The education gap was recognised as a disparity in the share of people who completed a specific level of formal education in rural areas in comparison with the average level of the educational attainment of population in urban areas. In a comprehensive approach the education gap was measured by Bray-Curtis structural diversity measure. The analysis refers to the local (powiat) and regional (NUTS-2; voivodeship) level and covers the 1988-2017 period.

The studies on the spatial distribution of human capital often apply multidimensional comparative analyses in which educational context is among human capital indicators, next to such aspects as entrepreneurship or health. The cognitive value of such research consists in demonstrating the multidimensional nature of human capital. A comparative research

¹GDP per capita, PPP (constant 2011 international \$), World Bank Database <https://data.worldbank.org/indicator/NY.GDP.PCAP.PP.KD>.

covering a very large number of human capital indicators can lead, however, to an excessively simplified reasoning in regard to the development paths of particular human capital dimensions. It refers to the educational dimension of human capital which in multidimensional comparative analyses is often approximated by means of a single indicator such as the percentage of people with secondary or tertiary education, enrolment rates or the average years of schooling. In such an approach it becomes difficult to monitor the human capital accumulation at each stage of the educational process. In order to contribute to the previous research, the current study focuses solely on the educational dimension of human capital. Moreover, a different research approach is applied, enabling simultaneous observation of human capital formation at different stages of formal education.

Research methodology

A starting point for analysis is a data matrix X meeting the following conditions (Markowska, 2015, p. 9):

- an x_{ij} observation is the share of the i -th feature ($i=1,2,\dots,m$) in the structure of the j -th object, and falls within the $[0,1]$ range,
- the total value of the structure indicators for a particular object equals one:

–

$$\sum_{i=1}^m x_{ij} = 1,$$

In the present study an x_{ij} observation applies to the share of people aged 15 or above who completed a specific level of formal education: tertiary (x_{1j}), secondary (x_{2j}), basic vocational (x_{3j}), primary (x_{4j}) and incomplete primary (x_{5j}).

The data matrix X was the base for calculating:

- a) a rural-urban education gap:

$$Edu_{gap,t} = \frac{x_{i,t,j-rural}}{x_{i,t,urban\ average}}$$

The Edu_{gap} values of less than 1.0 indicate a lower proportion of people who completed a specific level of education in the structure of the rural population compared to the urban area (average) in Poland. Values greater than 1.0 are interpreted inversely.

b) the Bray-Curtis (BC) structural diversity measure (Markowska, 2015, p. 8):

$$BC_{ik,t} = \frac{\sum_{i=1}^m |x_{ij} - x_{ik,t}|}{\sum_{i=1}^m (x_{ij,t} + x_{ik,t})}$$

where:

x_{ij} – share of people aged 15 or above who completed a specific level of formal education in the j -th object (powiat or voivodeship) in t period;

x_{ik} – share of people aged 15 or above who completed a particular level of education in the k -th object (powiat or voivodeship) in t period. The reference object (k) includes: a) average values observed in Poland; b) average values of urban areas in Poland; and c) average values of rural areas in Poland.

The BC measure values fall within the [0,1] range. The lower the BC values, the higher the similarity of objects for the studied phenomenon structure.

The delimitation of rural areas was carried out based on an administrative criterion. The analyses covered rural and urban areas within different territorial arrangements:

- powiats (local level) – for the years 1988 and 2011 (the National Census data),
- and voivodeships (NUTS-2) – for the 1995–2017 period (the Labour Force Study data; LFS).

The figures used in the research was retrieved from the Central Statistical Office of Poland dataset (CSO; Local Data Bank).

In order to present typologies of urban and rural areas (at the local level) according to structural distances in the field of educational attainment of the population, clustering of powiats (based on comparative classification using a median) was performed (Strahl, 2006, pp. 191–199). Six types of rural (urban) areas were distinguished according to similarities for the share of inhabitants who completed a specific level of formal education. The grouping results were verified using the Kruskal-Wallis test.

Results

In Poland over the whole study period (1988–2017) there was a gap in the share of people with tertiary and secondary education in rural areas in comparison to urban areas (Figure 1). This is evidenced by the lower than 1.0 Edu_{gap} values for these levels of education. At the same time, the rural pop-

ulation exhibited a relative surplus of people with vocational and primary education, as indicated by the Edu_{gap} values exceeding 1.0.

The greater rural-urban disproportions were observed for the share of people who completed tertiary education (the lowest Edu_{gap} values, below 0.5), and in terms of the share of people with primary education (the highest Edu_{gap} values, exceeding 1.5). This is the rationale that indicates the less favourable population structure by educational attainment in rural areas than in urban areas from the point of view of human capital development.

At the same time, however, the scale of rural-urban disparities in terms of the share of well-educated inhabitants has been decreasing over the past 30 years. The rural-urban educational gap declined: for tertiary education from 81% in 1988 to 52% in 2017, and for secondary education - from 59% in 1988 to 18% in 2017. Nevertheless, on these levels of formal education the differences between the rural and urban areas still remained statistically significant, which is confirmed by the results of Kruskal-Wallis test ($p < 0.05$). Simultaneously, a rise in the rural-urban divide in the share of inhabitants with vocational education was observed: Edu_{gap} values increased from 1.04 in 1988 to 1.5 in 2017. In the case of inhabitants with primary or lower education Edu_{gap} values become stable around 1.80 after 2004.

In the comprehensive approach to the rural-urban educational divide, the structural distance measure (BC) between rural and urban areas decreased from 0.263 in 1988 to 0.219 in 2017. A persistent downward trend in the Bray-Curtis measure was visible, however, only after 2004 (Figure 2). Until 2004 the level of rural-urban educational disparities fluctuated around a 0.260 BC value. This would mean that only after 2004, the convergence process between rural and urban areas observed at higher levels of education began to prevail over the increase of disparities occurring for vocational education.

Between 1988 and 2011 a drop in internal educational disparities within the rural and urban population (at the local level) was also observed. For rural areas the BC measure in 2011 took lower value (0.067) than in 1988 (0.071). For urban areas the BC measure amounted to 0.084 in 1988 and to 0.077 in 2011. These processes, however, varied in the urban and rural space, as indicated by the results of grouping of powiats (without cities with powiat status). Six types of rural (urban) areas were distinguished (Figure 3; Table 1). The distinguished groups of powiats are ordered: the lower the group number, the relatively inferior characteristics of the inhabitants' education structure (from the point of view of socio-economic development). In other words, powiats included in groups 1-2 have a relatively higher share of people who completed tertiary or secondary education,

whereas powiats classified as groups 5-6 are characterized by a relatively lower percentage of well-educated inhabitants and a higher share of those with vocational, primary or lower education.

The verification of the homogeneity of groups distinguished in this way with the Kruskal-Wallis test ($p < 0.05$) suggests that average structural distances (BC measure) in the groups vary in a statistically significant way. *Post hoc* tests (the Dunn-Bonferroni pairwise comparisons) revealed that the characteristics of groups 1–2 and 5–6 affect the level of internal diversification of rural and urban areas. In the case of urban areas, the differences between the group 1 and groups 3-6 and the differences between the group 2 and groups 5-6 were found statistically significant. In rural areas, all groups differed statistically significantly (if the reference object was formed by average values observed in Poland). If the BC measure was calculated in relation to the average values observed for the rural areas - the differences between group 1 and groups 3-4 were statistically significant.

The results of grouping of powiats reveal the weaknesses of the Bray-Curtis measure in the assessment of internal differentiation of the educational attainment of the population in rural (urban) areas. Groups 1-2 and 5-6 - in rural and urban areas - are outliers characterised by the relatively higher values of the BC measure (Table 1). Meanwhile, higher BC values in these groups can be attributed to different causes. Greater structural distances of powiats included in groups 1 and 2 result from a relatively higher share of people with tertiary and secondary education. Greater structural distances of powiats classified as groups 5 and 6 result from a relatively poorer structure of education among their population as compared to the national average.

The internal educational disparities within the rural and urban differences are statistically significant also on NUTS-2 (voivodeships) level (Kruskal-Wallis test $p < 0.05$).

Post hoc tests indicate the voivodeships affecting the internal diversification of rural and urban areas on NUTS-2 level. There are:

- rural areas in Slaskie voivodeship: 95% of powiats were included in groups 1-2 characterised by the relatively most favourable features of the education attainment of the population and the lower BC values (calculated in relation to average values observed in Poland),
- rural areas in Warmian-Masurian voivodeship (89% of powiats were classified as groups 5-6) and Podlaskie voivodeship (57% of powiats were included in group 5) characterised by higher BC values (in comparison with the national average);
- urban areas in Mazowieckie, Podkarpackie and Lubelskie voivodeships:

- from 68% to 85% of powiats from these voivodships were classified as groups 1-2;
- urban areas in Kuyavian-Pomeranian voivodeship: 95% of powiats were included into groups 5-6.

The internal educational disparities within the rural (urban) areas observed in 2011 are similar to that in 1988 (Figure 3). The Pearson correlation coefficients between BC measure in 2011 and 1988 - amounting to 0.676 ($p < 0.001$) for rural areas and 0.694 ($p < 0.001$) for urban areas - indicate that the powiats with greater structural distance to the national average in 1988 also presented a greater structural distance in 2011. It suggests some persistence in the division of rural and urban space due to the local features favourable or unfavourable to individual investments in human capital through formal education.

The results of grouping of powiats due to the population structure by educational attainment indicate even an increasing significance of the above mentioned factors. In 2011 – as compared to 1988 – an increase in the number of powiats classified as groups 1 and 6 was observed. They are outliers characterised by the highest value of the BC measure (Table 3). An increase in the number of powiats included into groups 1 and 6 might be indicative of deepening educational diversification inside rural and urban areas. The internal disparities, both in rural and urban areas, was growing mainly in terms of the share of people with tertiary education (Figure 4). On other levels of formal education reduction in internal diversification can be observed.

Conclusions

In Poland in the 1988–2017 period the rural-urban education gap was gradually reduced in terms of tertiary and secondary education. This process was accompanied, however, by increasing rural-urban differences in vocational education. Nevertheless the process of bridging the rural-urban education gap prevailed over an increase in urban-rural differences in vocational education which is evidenced by the persistent downward trend of the Bray-Curtis measure.

However, at the local level, symptoms of preserving the spatial disparities within rural and urban areas were noticed. Moreover, both in rural and urban areas the growing internal disparities in terms of the share of people with tertiary education were visible between 1988 and 2011.

The study results suggest that the role of factors associated with traditional division into urban-rural areas in the diversification of the Polish

socio-economic space has been decreasing. Instead, along with socio-economic progress a growing significance of functional factors related to the capacity and ability of a particular area to provide conditions for the development and absorption of highly qualified staff has been observed.

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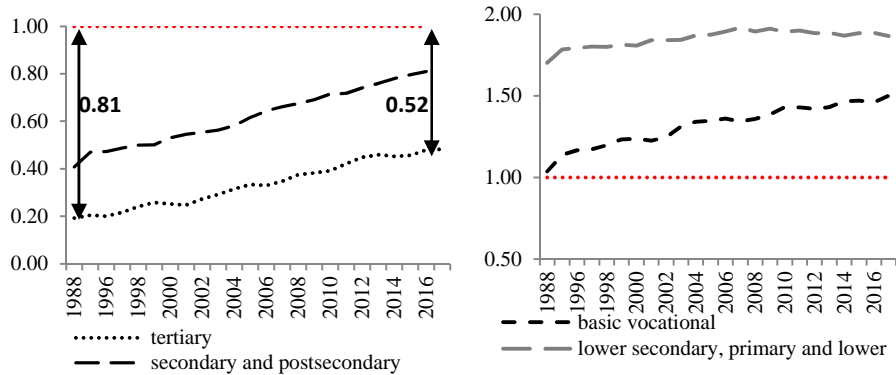
Annex

Table 1. Grouping of powiats due to the population structure by educational attainment

Group	Number of powiats				Population with tertiary education (%)			
	Urban areas		Rural areas		Urban areas		Rural areas	
	1988	2011	1988	2011	1988	2011	1988	2011
1	32	64	5	33	8,2	21,3	3.2	15.7
2	73	38	72	57	7,0	19,5	2.3	11.1
3	47	62	70	65	6,3	18,2	1.8	9.3
4	47	48	85	65	5,4	16,1	1.6	8.5
5	81	55	75	71	4,6	14,8	1.3	7.5
6	24	44	-	23	4,4	14,0	-	7.2
BC (average)								
	Urban areas-Poland		Rural areas-Poland		Within urban areas		Within rural areas	
	1988	2011	1988	2011	1988	2011	1988	2011
1	0.116	0.101	0.123	0.089	0.080	0.070	0.060	0.105
2	0.091	0.077	0.149	0.120	0.057	0.048	0.074	0.063
3	0.073	0.061	0.175	0.151	0.047	0.040	0.057	0.051
4	0.064	0.061	0.200	0.178	0.054	0.049	0.070	0.056
5	0.061	0.58	0.229	0.206	0.071	0.059	0.081	0.075
6	0.042	0.051	-	0.207	0.079	0.063	-	0.084

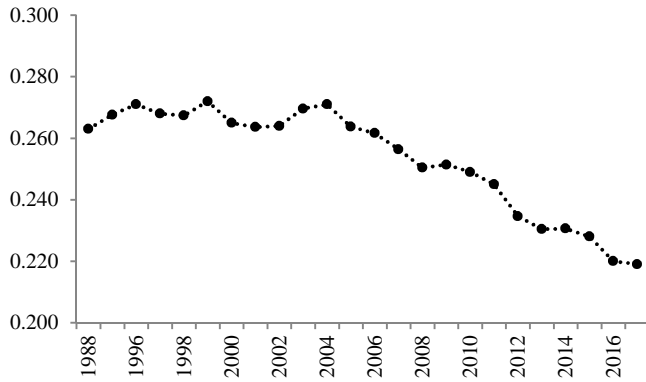
Source: own calculations based on National Census 1988 and 2011.

Figure 1. Rural-urban education gap (Edu_{gap}) in Poland



Source: own calculations based on CSO data: 1995-2017 on economic activity of population aged 15 years and more, prepared on the basis of the sample Labour Force Survey (LFS); 1988, National Census 1988.

Figure 2. Rural-urban education gap (*BC*) in Poland



Source: own calculations based on CSO data: 1995-2017 on economic activity of population aged 15 years and more, prepared on the basis of the sample Labour Force Survey (LFS); 1988, National Census 1988.

Figure 3. Grouping of powiats due to the population structure by educational attainment

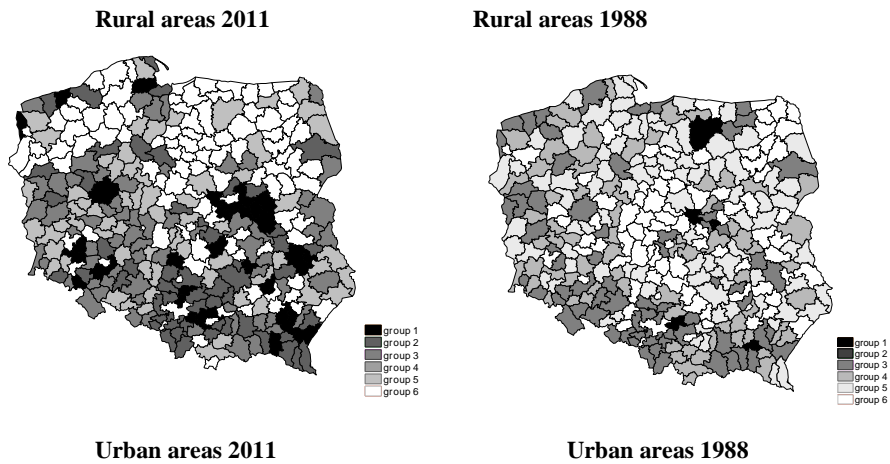
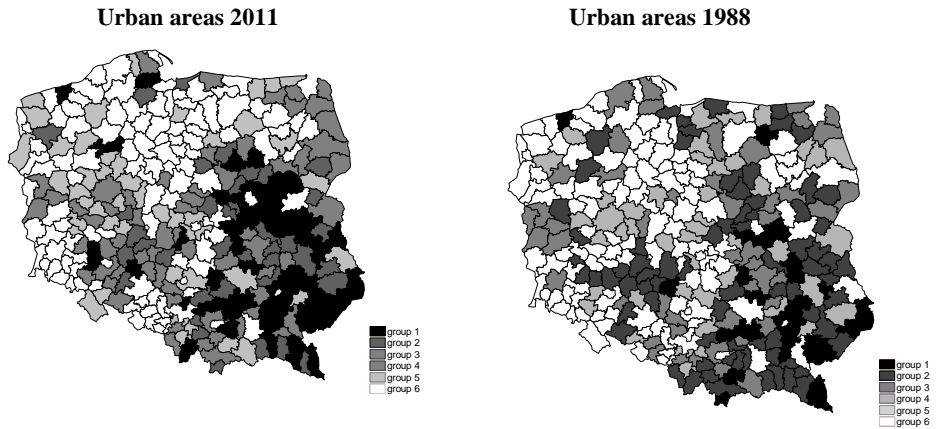
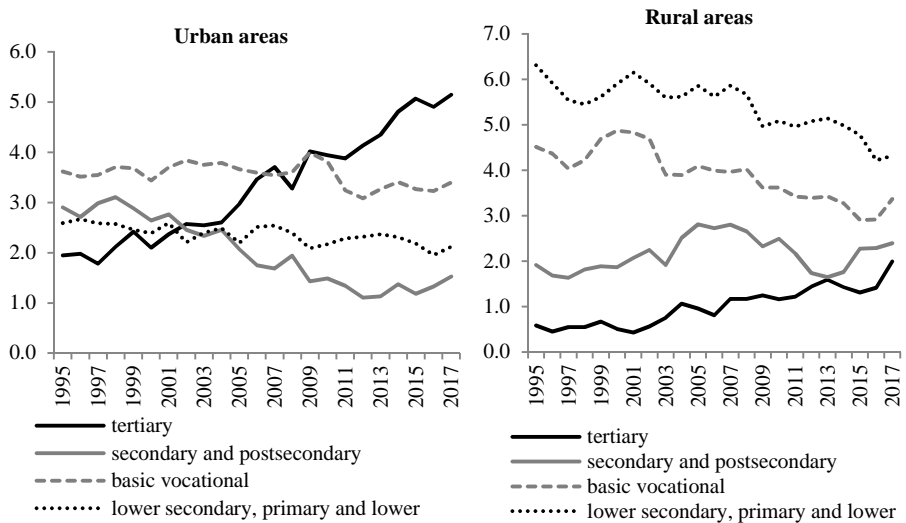


Figure 3. Continued



Source: own calculations based on CSO data: National Census 1988 and 2011.

Figure 4. Internal educational differences in rural and urban areas in Poland (standard deviation)



Source: own calculations based on CSO data on economic activity of population aged 15 years and more, prepared on the basis of the sample Labour Force Survey (LFS).

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