Contemporary Issues in Economy

9

Proceedings of the International Conference on Applied Economics:
FINANCE

edited by
ADAM P. BALCERZAK,
ILONA PIETRYKA

Toruń, Poland

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The project implemented with Narodowy Bank Polski
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Adam P. Balcerzak, Ilona Pietryka
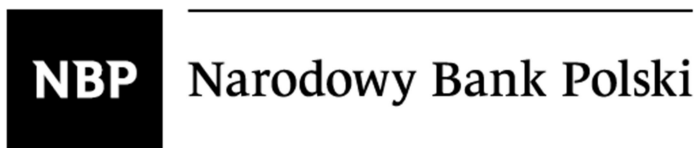
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Factors determining the effect of financial risk in the entrepreneurial environment of small and medium-sized enterprises in the Czech Republic

Abstract

Research background: Entrepreneurs enter into business with the aim of gaining the maximum possible profit. They are increasingly willing to tolerate the effect of a greater intensity of financial risk. Factors which influence the intensity of financial risk in a business are related not only to the securing of financial resources, but also to crucial decisions on the parts of entrepreneurs or the ability to manage financial risk during a crisis in small and medium-sized enterprises (SMEs).
Aim of the article: The aim of the article is to define and quantify the significance of factors which influence, by their character and effect, the intensity of financial risk in the SME entrepreneurial environment.
Methodology/methods: The selection set represented 1,141 SMEs. It was carried out in the Czech Republic in 2015. We used the "inquiring in the form of an online questionnaire" method of ascertaining data. To fulfil the main aim, we used the methods of regression and correlation analyses with the aim of determining the relationship between the intensity of financial risk and the determinants thereof. In the first step, we carried out descriptive statistics (pivot table, scatter plot, skewness, kurtosis, normal distribution plot, and histogram). In the second step, we verified assumptions by carrying out regression modelling and by testing the normal distribution of data in determinants, the assumption of linearity, multicollinearity and homoscedasticity of variables (t-test, z-test, VIF test, Bartlett's test, F-ratio), and interpreted the results (estimate coefficient of parameters, coefficient

correlation, coefficient determination). All the realised tests were carried out on a 0.05 level of significance using IBM SPSS Statistics, Version 23 software.

Findings & Value added: On the basis of the results of the questionnaire investigation and using regression and correlative data analysis, we quantified the statistical significance of determinants which influence the intensity of financial risk in the SME segment. The result of key factors serves as a basis for proposing measures in the context of preventing a business from the intensity of financial risk.

Introduction

Small and medium-sized enterprises (SME) are without a doubt an essential part of every market economy (Ključnikov, Belás, Kozubíková, & Paseková, 2016; Vojtovič, 2016; Dúbravská, Mura, Kotulič & Novotný, 2015; Karpak & Topcu, 2010;). SMEs are a key factor in maintaining and creating a functional market economy, particularly as a means of stimulating competition, creating jobs, and promoting economic boost (Kessler, 2007). They contribute also to the solution of economic and social state problems (Prasetyo, 2016; Virglerova, Dobes, & Vojtovic, 2016).

In line therewith, Henderson and Weiler (2010) state that SMEs could be characterised as the most important catalyst for economic growth. 99% of all companies are from the SME segment in the European Union and the USA (Bhaird, 2010). Tamosiunas (2009) states that SMEs are among the most important factors of economic growth, which has an influence on basic trends, the entire development of economic policy, social stability and the creation of new job opportunities. Therefore the development thereof is one of the most important developments ever.

Most business decisions are made in conditions of uncertainty. This means that there is the same uncertainty and randomness in the development of conditions for business activities, during these activities and the outcome thereof. If we are able to quantify the likelihood of diversion of actual processes and outcomes from the expected level, we speak of risk. Risk is thus quantified uncertainty (Fetisovová, 2012).

International study carried out by The Economist Intelligence Unit and Dun & Bradstreet proved that businesses not only manage risks but also regularly assess the success thereof so as to achieve better results. In other countries, management of financial risks and risks connected with default is considered a given (Belás & Sopková, 2016). Corporate insolvency and the forecasting thereof is not an issue which should be overlooked (Čámská, 2016). The European society perceives financial risk, currency risk and

liquidity risk as the most serious risks (Christopoulos, 2016; Mentel & Szetela & Tvaronavičienė, 2016; Brammertz et al., 2009).

Research methodology

The main aim of the article is to define, quantify and determine the dependence of significant factors which determine the effect of the intensity of financial risk in the SME segment. Scientific hypotheses were defined in order to quantitatively evaluate our objectives:

H: *The intensity of financial risk in the SME segment (IFR) is determined by correct risk management by entrepreneurs (CRM), entrepreneur knowledge of credit conditions (KCC), the influence of credit risk during a crisis (ICR), sufficient funds in SMEs (SF).*

Statistical verification of data from businesses was carried out with the following procedure of steps: 1. Using a method of random selection, 1,600 businesses were selected from a basic set of businesses operating in the CR. These were acquired from the "Albertina" database using the "Randbetween" mathematical function; 2. We contacted the businesses via their e-mail address stated in the above-mentioned database or by searching on web servers; 3. We addressed the businesses by means of the inquiry method using online questionnaire forms on a created webpage; 4. The businesses were asked to have a person responsible for managing the business (proprietor, administrator, director) complete the online questionnaire; 5. In this manner it was possible to obtain statistical data from 495 businesses, which represented a 31% success rate in addressing them; 6. Subsequently, businesses from which a reply could not be acquired were contacted via telephone in cooperation with agents: students and colleagues at partner Czech universities with related professional orientation.

Through an incomplete statistical finding, it was possible to acquire a set of statistical data from 1,141 businesses (70% success rate in addressing businesses). 5,467 items of statistical data from an entire count of 60,476 from representatives of the selected set of businesses were used to fulfil the main aim of the article.

In order to fulfil the main aim, we utilised regression analysis with the aim of explaining relationships between independent variables and the dependent variable. We verified the Linearity assumption by using the scatter plot graphic tool which verified the presence of nonlinear patterns between the dependent variable and independent variables. Assuming normal distri-

bution of data we carried out the normal probability plot for all independent variables and, with a z-test, the descriptive characteristics of independent variables (skewness, kurtosis). The critical value of acceptance of independent variables into the regression model is $|t| \geq 1.9698$ (578 degrees of freedom, significance level at 0.05). Homoscedascity was tested using a point graph and by carrying out Bartlett's test, which confirmed the assumption of homoscedascity if the p-value of the test was higher than the significance level. We verified the intensity of dependence of the dependent variable from the independent variables by means of a correlation matrix. The results of the regression model with three independent variables could challenge multicollinearity. We accept multicollinearity as long as "Variance Inflation Factor" is greater than 5 (Hair, 2010). The basic linear multiple regression model is based on the following relationship between the dependent variable (IFR) and independent variables (CRM, RCC, ICR, SF):

$$IFR = \beta_0 + \beta_{CRM} \, x \, CRM + \beta_{KCC} \, x \, KCC + \beta_{ICR} \, x \, \text{ICR} + \beta_{SF} \, x \, SF, \quad (1)$$

where *IFR* – dependent variable; β_0 – constant, β_{CRM}; β_{KCC}; β_{ICR}; β_{SF} – parameters of independent variables (CRM,RCC ICR, SF*)*; CRM, KCC, ICR, SF – independent variables.

The credibility of the designed linear regression model was verified with the aid of the F-ratio parametric test for analysis of variance when the p-value was lower than the significance level. The regression model explains the variability of the dependent variable with the aid of an R^2 determination coefficient and an adjusted determination coefficient (Adjusted R^2). Descriptive statistics such as contingency tables and descriptive characteristics were applied to fulfil the secondary aim. We carried out calculation by means of sophisticated SPSS Statistics software.

Literature review

Financial risk ranks among economic (operational) risks with defined impacts on enterprise finance. According to Markovič, Vlachynský, Ponecová, and Vanc (2007), financial risk is the probability of financial loss or loss of profit as a result of operational development compared with expected development. Financial risk is mainly caused by fluctuations in financial markets and changing attitudes of entities to individual financial tools and in each transaction. The impact on enterprise results is immediate

as soon as there is a carrier or source of risk in the enterprise portfolio. Enterprise results and performance can be measured by productivity indicators (Klečka, 2014).

In the next section we see authors who in their studies focused on factors which influence the intensity of financial risk: Moro and Fink reported that banks play an essential role in financing firms, especially SMEs, since they have more difficulty accessing equity capital markets. The process used by banks to decide whether and how much to lend relies on different lending technologies, and banks usually tend to use more than one technology at once (Moro & Fink, 2013). According to Neuberger and Räthke, micro-enterprises are especially predisposed to incorrect selection and moral hazard, and their access to debt financing is therefore limited. Small firms are characterised by higher information asymmetry and credit risk (Neuberger & Räthke, 2009). This opinion is confirmed by Kirschenmann and Norden, who argue that information asymmetry and bargaining power are especially important in small business lending because small firms are informationally opaque and bank-dependent. According to Frese, Gielnik (2014), it is also possible to transfer financial risk to suppliers by way of establishing contractual prices and introducing a penalisation system should contract conditions be violated. If the risk occurs, it is possible (e.g. in terms of non-compliance) that the incurred costs will be refunded by the supplier.

Business activities are significantly determined by the environment of the company, which forces it to use a particular method of behaviour and to choose particular business goals and ways of achieving them (Belás & Demjan & Habánik & Hudakova & Sipko, 2015).

Financial risk refers to the possibility that the cash flows of a business will not suffice to pay creditors and fulfil other financial responsibilities. The level of financial risk, therefore, relates less to the operations of a business *per se* and more to the amount of debt a business incurs to finance those operations. The more debt a business owes, the more likely it is to default on its financial obligations. Taking on higher levels of debt or financial liability therefore increases the level of financial risk in a business (Guzman, 2015).

Results and discussion

Using a method of simple classification of the statistical sign of motivation for starting a business, a sample of 581 businesses which answered either money or mission to the question of motivation were selected from the set

of 1,141 entrepreneurs. The structure of entrepreneurs thus selected by statistical selection was as follows: the motive of money was recorded in 330 entrepreneurs. The structure of entrepreneurs which marked the motive of money was: according to gender, 260 men and women; according to completed education, 105 with completed higher education and 225 with other education; according to sector of business operation, 11 in transportation, 113 in services, 102 in trade, 49 in construction, 52 in production and 3 in agriculture. The motive of mission was recorded in 251 entrepreneurs. The structure of entrepreneurs which marked the motive of mission was as follows: according to gender, 179 men and 79 women; according to completed education, 106 with completed higher education and 145 with other education; according to sector of business operation, 11 in transportation, 113 in services, 102 in trade, 49 in construction, 52 in production and 3 in agriculture. The perception of financial risk in the business environment among the motives for starting a business is the subject of Table 1.

Linear relationships between IFR a CRM, ICR, SF were confirmed by graphic analysis carried out in SPSS. Graphic analysis of normal distribution of data shows divergences from normal distribution in the KCC independent variable. The results of the assumption of normal data distribution are given in Table 1.

Table 1. Skewness, kurtosis and z- value of independent variables in the model of intensity of financial risk

Independent variable	Skewness	z- value	Kurtosis	z-value	Bartlett's test
SPR	-0.1684	0.5181	1.3962	1.2106	0.153
KCC	2.8473	2.6221	3.1874	2.9871	0.014
ICR	0.8721	0.9471	1.9782	2.5101	0.654
SF	1.4769	1.9685	-1.3879	-1.7149	0.415

Source: own calculations.

The results confirmed that the CRM and SF independent variables fulfil the conditions of normal data distribution as well as homogeneity of variances (Bartlett's test CRM, SF > 0.05). The independent KCC and ICR variables do not fulfil the condition of normal data distribution (standardised values of the skewness and sharpness descriptive characteristics > 2.000). These independent variables can be inserted into the regression model with the aid of the t-test. We show the results in Table 2.

Table 2. Characteristics of the variables not included in the model in the first phase

Independent variable	Partial correlation	t-value
KCC	0.4853	1.231
ICR	0.6516	3.147

Source: own calculations.

In Table 2 the calculated test characteristic of t-distribution in the ICR variable is higher than the critical test value. We accept ICR as an independent variable in the linear regression model. The t-test of the KCC independent variable is lower than the critical value. KCC is not a statistically significant parameter ($|t| = 1,231$). The intensity between the dependent and independent variables is illustrated in Table 3.

Table 3. Correlation matrix of variables in the model of intensity of financial risk

	IFR	SPR	ICR	SF	KCC
IFR	1				
SPR	0.68514	1			
ICR	0,59872	0.64710	1		
SF	0,54125	0.42287	0.74135	1	
KCC	0.21574	0.38511	0.18762	0.11987	1

Source: own calculations.

From the results of the z-test (see Table 1), the t-test (see Table 2) and the correlation matrix (see Table 3), we accept the independent variables CRM, ICR and SF as statistically significant parameters of the linear regression model. The results of testing the significance of the thus designed regression model with three independent variables are shown in Table 4.

Table 4. Characteristics of the regression model intensity of financial risk

Least squares multiple regression					
R^2					0.5614
Adjusted R^2					0.5496
Multiple correlation coefficient					0.7493
Residual standard deviation					0.1576
Regression equation					
Independent variable	Coefficient	Std. Error	t- Stat	p-value	VIF
(Constant)	0.8723				
SPR	0.4583	0,2134	2.1476	0.0277	1.8532
ICR	0.2458	0,0131	18.688	<0.0001	3.1488

Table 4. Continued

SF	0.3957	0.0241	16.429	<0.0001	2.7442
Analysis of variance					
F-Ratio					84.141
Significant level					<0.005

Source: own calculations.

Graphic analysis of the entire model confirmed the conditions of linearity, homoscedascity and independence of deviations. The conditions of normality were also fulfilled by the results of the normal distribution graph. The Variance Inflation Factor results demonstrated the absence of the effect of multicollinearity (VIF independent variables are less than the critical value 5: CRM = 1.8532; ICR = 3.1488; SF = 2.7442). The differences between the determination coefficient and the adjusted determination coefficient are minimal (R^2 - 0.5614 and Adjusted R^2 - 0.5496). The p-value of the F-ratio of the entire regression model is less than 0.005. From the conclusions stated above (see Table 4), we proceed to formulate a regression equation with a linear function which has the form:

$$IFR = 0.4583 \; x \; CRM + 0.2458 \; x \; ICR + 0.3957 \; _x \; SF,$$
$$(2)$$

where IFR – intensity of financial risk in the SMEs segment, CRM – correct risk management by entrepreneurs, ICR – influence of credit risk during a crisis, SF- sufficient funds in SMEs.

We accept the hypothesis that the designed regression model is statistically significant on a 0.05 significance level. The variability of selected independent variables (CRM, ICR, and SF) explains up to 56.14% of the variability of intensity of financial risk in the SME segment. Entrepreneur knowledge of credit conditions does not have a statistically significant influence and does not determine the intensity of financial risk. The determinant CRM – correct risk management by entrepreneurs – has the greatest influence on IFR. Contrariwise, the smallest influence, if statistically significant, is the determinant of the influence of credit risk on SMEs during a crisis.

Conclusions

The aim of our article was to define and quantify significant factors which determine the intensity of financial risk in the SME sector in the Czech Republic.

Our results showed that the statistically most important factor is correct risk management (CRM) by entrepreneurs, followed by sufficient financial coverage of a business using internal and external sources and the growth of credit risk during a crisis had the smallest influence on the variability of financial risk in a business. Entrepreneur knowledge of credit conditions is a statistically insignificant factor. The article can serve competent persons responsible for business management when justifying the need for preventative measures and may thereby contribute towards a permanent improvement of risk management in a business.

We are convinced that our article has defined and quantified the factors influencing the intensity of financial risk in the SME segment. There is a field for further demonstration of the significance of other factors by testing and the quantified expression thereof.

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Firms' default – from prediction accuracy to informational capacity of predictors

Abstract

Research background: Bankruptcy literature is populated with scores of (econometric) models ranging from Altman's Z-score, Ohlson's O-score, Zmijewski's probit model to k-nearest neighbors, classification trees, support vector machines, mathematical programming, evolutionary algorithms or neural networks, all designed to predict financial distress with highest precision.

Purpose of the article: We believe corporate default is too an important research topic to be identified with the prediction accuracy only. Despite the wealth of modelling effort, a unified theory of default is yet to be proposed. Due to the disagreement, both on the definition and hence the timing of default as well as on the measurement of prediction accuracy, the comparison (of predictive power) of various models can be seriously misleading. The purpose of the article is to argue for the shift in research focus from maximizing accuracy to the analysis of the information capacity of predictors. By doing this, we may yet come closer to understand default itself.

Methodology/methods: We have critically appraised the bankruptcy research literature for its methodological variety and empirical findings. Default definitions, sampling procedures, in and out-of-sample testing and accuracy measurement have

all been scrutinized. We believe the bankruptcy models currently used are, using the language of Feyerabend, incommensurable.

Findings: Instead of what we call the population of models paradigm (the comparison of predictive power of different models) prevailing today, we propose the model of population paradigm, consisting in the estimation a single unified default forecasting platform for both listed and non-listed firms, and analyze the marginal contribution of the different information sources. In addition to classical corporate financial data, information on both firm's strategic position and its macroeconomic environment should be studied.

Introduction

Corporate default is too an important research topic to be identified with the forecast accuracy (in the estimation sample in particular). Despite many advances within theoretical studies, several issues i.e. the very definition of default, the moment it materializes, the nature and the size of bankruptcy (direct and indirect) costs, the interplay between different stakeholder groups - to name just a few, are yet to be resolved. No surprise, no unified theory of default has been formulated to date. We believe it may partly be because the focus of the empirical research is misplaced. Rather than concentrating on maximizing the model accuracy, research should focus on the study of the information relevant to the default process.

The wealth of tools that have been deployed since the late 1960s in econometric modelling of financial default is the greatest achievement of the bankruptcy literature. Apart from the classic MDA-driven Z-score of Altman (1980), logistic regression-led O-score of Ohlson (1984) and probit model of Zmijewski (1984), there are countless other techniques e.g. k-nearest neighbours, classification trees, support vector machines, mathematic programming, evolutionary algorithms or neural networks. Sectorial and geographic cover of the empirical work is also impressive. Still, it is by no means clear how much insight one can gain from these models on the very nature of bankruptcy. The models are frequently arbitrarily defined, one-period, dominated by corporate financial data. The change of the variable levels (data dynamics), as opposed to statically conceived level of the variable itself, is also a rarity. There have usually been no attempts to accommodate for a potential profit management either. The issue is particularly important when examining (accounting) variables 'under the control' of a distressed firm.

Indeed, the arbitrary selection of variables is still a significant weakness of most models. Altman's classic model, using several interconnected financial indicators, is the best example. The need for a different model for

non-listed firms, as the original one for the listed companies proved useless in the new context, is also symbolic. In general, the models estimated in one period for a given set of companies tend to underperform when re-estimated for a different firm sample. The sometimes-dramatic drop in the predictive power when the models are used in a different setting without re-estimation is also well documented (Grice & Ingram, 2001).

All this may not only hinder the understanding of the very process of going under but may even question the rationality of the inter-model comparisons. As the dominant criterion is still model's prediction power, the risk of over-fitting is real. We believe there are many reasons why various models should not be compared with each other at all. Firstly, they usually describe default differently. The existence of so many similar terms e.g. bankruptcy, default, financial distress may already send a warning signal. To make it worse, each of these concepts can be defined/understood in so many different ways. Narrowly speaking, a default is a judicial decision declaring a company insolvent. In the US, it is often identified with the creditor's or management's filing for e.g. Chapter 10 or Chapter 11 protection. This definition is sometimes broadened to include other forms of voluntary or forced reorganization (Boritz et al. 2007), deferral of payments of corporate liabilities, a government rescue support, a forced merger or change of control following a collateral execution (Altman et al., 1977), failure to meet listing requirements or even a dividend omission (Duffie et al. 2007).

Different definitions of the "object researched" determines the moment of registering it. Failure to pay interest on time is certainly something else than filing for bankruptcy. However, even in the unlikely case of the event studied being identically defined in two papers, the research setting may still make the results incomparable. As some papers fail to check the exact dates of a) the default event registration and b) the release of financial data, it is not uncommon that financial data released after the default event are used as independent predictor variables (sic!). This leads effectively to "back rather than fore-casting" (Ohlson, 1980). If defining the moment of bankruptcy proves tricky, what about the time the company faces financial troubles? Platt and Platt (2002, p. 185) regret that "while there is abundant literature describing prediction models of corporate bankruptcy, few research efforts have sought to predict corporate financial distress".

Secondly, to compare the predictive power of various models one should adopt similar (if not the same) predictive power (or model efficiency) measures. The issue is probably even more important as, in contrast to the challenges stemming from the default definition ambiguity, the differences and interrelation between different efficiency measures do not attract

much attention in default literature. For example, an accuracy rate, defined as the percentage of correctly designated ratings, of 95% may indicate both a very poor model performance in the case of a big, representative sample of thousands of firms with, say, 3% of bankrupt companies, as well as quite an achievement for a model with matched pairs. The almost unprecedented richness of terminology used in a binary classification in not helpful either. Most models quote the percentage of properly identified bankrupt companies, referred to as a true positive rate TPR (the probability of detection, a sensitivity, or a recall), equal to 1 – a false negative rate FNR (or a miss rate) (e.g. Zmijewski, 1984). Others, especially Polish authors, quote the total of all (failed and healthy) correctly identified firms – the measure known as an accuracy rate, or 1 – a total error rate TER. This is the weighted average of TPR and TNR (a true negative rate, or a specificity, equal to 1 – a false positive rate, the probability of false alarm, or a fall-out). Some authors (e.g. Altman & Sabato, 2007) take an arithmetic average of TPR and TNR. This measure, equal to 1 – an average error rate, is again referred to as accuracy rate (sic!). Needless to say, its reading may be different from that provided by the "weighted" version. We have listed but a few examples of terms used. There are many more potentially confusing names e.g. a positive predictive value, or a precision; a false discovery rate; a false omission rate; a negative predictive value. Even the classic terms such as type I and II errors may lead to confusion (not debated in the default literature): type I error to Altman (1968) is the misclassification of a failing firm as not failing, while to Ohlson (1980) it is the opposite: a non-failing firm misclassified as failing (sic!). Other efficiency measures originate from the ROC (receiver operating characteristics) curve which illustrates the change of model efficiency with the change of the cut-off point. An AUC ratio (area under curve) is calculated as the area below ROC (Tian & Yu, 2013), while an accuracy ratio is computed as twice the area between the ROC curve and the no-discrimination line (Duan et al., 2012). Many other ROC-related measures can also be used. We believe the measurement of predictive power of default models deserves a separate treatment.

The misclassification (error) costs is another critical issue. Surely, the (economic) cost of branding a bankrupt firm as going concern is different from the case when a healthy firm is recognized as financially distressed. Although the issue of misclassification costs is sometimes mentioned (Altman et al., 1977), it has been hardly invoked in the relative performance of different models debate. The issue is ever more important as the weight of misclassification errors may influence the cut-off point and affect the size of both errors.

Another issue critical to a meaningful comparison of various studies is the way the sample used has been selected. This concerns both the size of the sample as well as the way it was selected. The small size may not necessarily be an artefact of small computing power of the past. It is true that e.g. Tian & Yu (2013) uses several thousands of firms in a recent paper but Sandin and Porporate (2008), in a not much older one, use only 22. What concerns the way the sample is drawn, "it is by no mean obvious what is really gained or lost by different matching procedures, including no matching at all" (Ohlson, 1980, p. 112). What we know though is that the use of balanced samples of defaulted and surviving firms may carry a risk of artificially increasing the efficiency of the model. Zmijewski (1984) proved that "(…) group error rates are associated with sample frequency rates and provide at least a partial explanation for the divergent distressed firm error rates reported in previous financial distress studies". Apart from this choice-based sample bias, he described a sample selection bias resulting from the selection of a complete data sample. A company with financial problems is clearly more likely to have incomplete dataset.

Finally, if the predictive efficiency of any model is to be taken seriously, it is out-of-sample precision that should be quoted and subsequently compared to the (out-of-sample) precision of other models. Paradoxically, we may be here somewhat too optimistic. Out of dozens of papers we have reviewed, only around half do it. For example, having admitted that the comparison between various models would require fresh data, Ohlson (1980) fails to provide out-of-sample validation due to lack of data. He went on to explain that it should not matter as he was "not indulging in any data dredging" (sic!) (p.126). Even when performed, it is not clear how exactly the out-of-sample testing was done (e.g. Shumway 2001). It matters as there are many different out-of-sample validations procedures: e.g. "matched" vs. random, the same vs. future period etc. It is by no means clear what the pros and cons of these procedures are.

To summarise, we are concerned that because of different default definitions, different prediction power measures, different sample selection procedures and the lack of out-of-sample validations, the comparison of the predictive power of different default models is at least dubious. Indeed, one can even claim the models compared are, using the language of Feyerabend, simply incommensurable. Despite this, the comparison between the predictive power of models, typically estimated with the help of small samples, based on predominantly corporate financial ratios, is still very popular. We brand such an attitude - **the population of models paradigm**. In the next section, we propose an altogether different methodological approach to the default research.

Research methodology

We believe our research proposal offers an alternative and potentially very rewarding approach. In contrast to the population of models paradigm, our methodology, referred to as **the model of population**, consists in the estimation of one model for all listed and non-listed companies. To do it successfully, we intend to use an extensive database of Polish firms and diverse sources of (micro, mezzo and macro) data used as predictors. Instead of focusing on the maximization of the prediction power, our research is aimed at quantifying the incremental change in the model accuracy. Thanks to some econometric tools, we hope to be able to 'switch' between different subsets of information and hence capture their marginal contribution. It is **marginal predictive efficiency of the model**, conditional on the data set used, rather than the maximization of a prediction rate that matters here. In short, we intend to measure information capacity of different data within one model rather than compete with other models on the overall accuracy.

We plan to use extensive financial accounting data with an emphasis on input that is more likely to be manipulated by the firm in the face of financial troubles. Macroeconomic data will include GDP, exchange rates, risk-free interest as well as peer sector default probability rates and other indicators e.g. oil prices. However, what distinguishes our dataset most is the extensive use of the data on the firm's competitive position and attractiveness of the market in which it operates. Two firms characterized by identical financial indicators but with different strategic positioning could be in a completely different situation as far as default risk is concerned. For this reason we intend to construct the in-house developed Index of Market Attractiveness and Index of Competitive Strength. Data required will be secured from the survey and subsequently refined via face-to-face interviews with executives. By using various sources of information, the model is hoped to be useful even when the quality of corporate financial data (for non-listed companies in particular) is poor.

To sum up, the objective of the study is to create a single unified default forecasting platform for both listed and non-listed firms, which, in addition to corporate financial information, would include data on firm's mezzo (sector level) and macro environment. Nominal levels of input as well as their dynamics are expected to be used as independent variables (Duan et al., 2012). The model will be a multi-period one, so that we should be able to see not only the events of default, but the whole process of approaching (or avoiding) it. We believe, our approach, although far from trying to create a theory of default, may explain the importance of various sources of information, and thus move us closer to understanding the very causes of

default. This may ultimately help us move away from the research on bankruptcy to a broader theme of financial distress as postulated by Platt & Platt (2002).

The corporate financial information is sourced from a leading business information provider Coface Poland Credit Management Services[1]. The database covers some 116000 individual annual and some 42000 interim (quarterly and half-yearly, sparingly of other frequency) records on over 15000 companies (joint stock companies, private limited liability companies, partnerships limited by shares) spanning from 2006-2015. Only companies maintaining comprehensive bookkeeping, with at least 10 employees, with annual sales of at least the equivalent of € 2 mln (in 2006) are included. Firms declaring financial activity as their main focus (section K in Polish Industry Classification, or PKD) are excluded. The data provided by Coface originate either from the National Court Register (KRS) or is collected by Coface via direct surveys. The database includes information about 35 different KRS-registered categories of legal actions related to different debtor protection schemes recognized under the Polish law, including notions filed and court decisions taken on creditor arrangement, recovery, bankruptcy and reorganization. The default definition followed in this project covers court decisions to open the above-mentioned proceedings or dismiss a creditor arrangement proceeding notion on the grounds of insufficient debtor's net worth. The very moment of default will be backtracked to the date of filing the notion initiating a respective court-approved proceeding.

The macro and financial market data are taken from the Central Statistical Office of Poland (GUS) and Warsaw Stock Exchange (GPW) respectively. Data on listed companies were collected from the OSIRIS database compiled by Bureau van Dijk. Some computational results will be compared and tested against probabilities of defaults datasets provided by Credit Research Initiative, Risk Management Institute, National University of Singapore.

The model is based on a double stochastic process with multi-period prediction horizon up to 3 years (cf. Duffie et al., 2007; Duan et al., 2012). An i-th firm's life is governed by a set of independent double stochastic Poisson processes with their own stochastic intensities. Every intensity is a function of some state variables X_i. We distinguish between default, with the stochastic intensity λ_{it}, and other exit (of dissolving, M&A etc.), with

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the stochastic intensity a_{it} – both only known at or after time t. For the company to survive any period $u = [t, t + \tau]$ the probability equals:

$$P_S = E_t \left[e^{- \int_t^{t+\tau} (\lambda_{iu} + \alpha_{iu}) du} \right],$$

and the probability of default in period $s = [t, t + \tau]$, having survived u, equals:

$$P_D = E_t \left[\int_t^{t+\tau} e^{- \int_t^{t+\tau} (\lambda_{iu} + \alpha_{iu}) du} \lambda_{is} ds \right].$$

We let the dependence of default or other exit be any kind of function of state variable X_{it} as long as they are nonnegative and the default intensity (at the future time τ) $\lambda_{it} \equiv f_{it}(\tau)$ is no greater than the combined other exit intensity $\alpha_{it} \equiv g_{it}(\tau)$:

$$f_{it}(\tau) = e^{\beta_0(\tau) + \beta_1(\tau) x_{it,1} + \beta_2(\tau) x_{it,2} + \cdots \beta_k(\tau) x_{it,k}},$$

and

$$g_{it}(\tau) = f_{it}(\tau) + e^{\bar{\beta}_0(\tau) + \bar{\beta}_1(\tau) x_{it,1} + \bar{\beta}_2(\tau) x_{it,2} + \cdots \bar{\beta}_k(\tau) x_{it,k}}.$$

Following Duan et al. (2012), we do not specify the dynamics of the state variable X_{it}. In this sense the model resembles the model of Duffie et al. (2007) as long as $\tau = 0$, it is when the forward intensity is equal to the spot intensity.

Conclusions

Although it is corporate default forecasting that is the field of our research, we do not intend to focus on the forecasting accuracy but on the information used in the forecasting process. In particular, we focus on the analysis of how the scope and quality of information used, hereafter referred to as information capacity, influence the default forecast prediction power. Marginal contribution of different information sets to predicting default is what in our opinion ultimately matters. Reaching close to 100% forecasting accuracy, which can be relatively easily achieved with the use of advanced econometric techniques and statistical modelling in large data sets (in the test sample in particular), is therefore not our ultimate goal. Although a skilful design of a model, employing input variables significantly broaden-

ing the information set used, will by itself increase the prediction power, such an increase will be a by-product rather than an objective of the approach. We believe an information set containing only corporate financial data (as it is the case in most bankruptcy models referred to in the literature), especially in their static form, is too poor to both accurately forecast the probability of default as well as the marginal informational capacity of the data used, for the non-listed firms in particular. Only after the information on strategic positioning and on its macroeconomic environment are incorporated into the model, the model is able to properly describe the default probability.

We concede the task is ambitious. Given the sample size (over 15000 companies) and the extensive dataset of micro, mezzo, and macro information, the model to be estimated may yet prove too difficult to yield unambiguous answers (due to the inadequacy of e.g. model specification, variables definitions, estimation procedures etc.) We believe the challenge is worth taking though as the switch in the mindset, moving away from small models and inter-model accuracy comparisons, typical of the population of models paradigm, towards the study of marginal contribution of information used, in line with the model of the population paradigm, should eventually prevail.

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Financial sustainability for private higher education institutions

Abstract

Research background: The development of higher education (HE) is amongst topical issues. The modern society recognises that the most valuable capital is a human being with his/her intellectual potential and this has become the main resource for social and economic development. The important component of the HE systems of many countries is formed by Private Higher Education Institutions (PHEIs), although in each case they have national peculiarities. Today PHEIs undergo difficulties inherent to the entire system of education. The problem of financial sustainability and efficiency of HEIs is becoming urgent. In this context, the most important issue is to deal with developing approaches for quantifying financial sustainability and identifying the indicators of its evaluation.
Purpose of the article: To analyse the financial sustainability of the private sector of HE in Latvia and justify the necessity of an integrated indicator system for financial sustainability evaluation.
Methodology/methods: Include methods of economic and statistic analyses, methods of the analysis and synthesis of economic information, methods of grouping, comparisons, classification, summarising, description and prediction.
Findings & Value added: one of the major issues is the existing gap between the assessment of financial activities of a higher education institution (HEI) and its education activities, which is asserted by accreditation standards; according to these standards, financial and education activities are autonomous entities, hardly interconnected.

Introduction

Higher education institutions at all levels are facing extraordinary challenges at present time: demographic shifts, rising costs of providing HE, limited sources of funding (Lapovsky L., 2014). Effectiveness, efficiency and financial sustainability become central concerns for the HE sector. Only those institutions that have sound financial structures and stable income flows will be able to fulfil their multiple missions (Sazonov S., 2015). What is the overall measurement of financial health? A variety of academic and financial performance metrics are used to assess HEI performance. However, there is no consensus on the best performance measures.

There are many methods of analysis for the evaluation of the business, including the use of various financial ratios. But before we begin, we must decide on the viewpoint and purpose of our analysis (Helfert E., 1996, p. 111). Modern approaches to financial analysis offer assessment from the party in interest's point of view, i.e. stakeholders. There are several groups of stakeholders which have interest in the financial well-being of HEIs, whether public or private, profit or non-profit, such as: regulatory agencies, licensing officials, accreditation agencies and equity owners, whether present or potential, and in the case of profit institutions – funding and other financial resource providers (e.g. donors), recipients of institutions' services (students and their parents), faculty members and administrators, as well as the public at large. (Montanaro M., 2013, p. 3). In these days, the important stakeholders are Education Quality Assessment Agencies and the universities' administrators responsible for the quality of learning.

Today, quality assurance is one of the central issues in HE debates. The serious problems include assuring the quality of diverse academic institutions and ensuring that they maintain standards of teaching, admission, and infrastructure. Quality assurance in the private sector is especially important given that a few other methods of control exist other than market forces. (Altbach, Ph.G., 2005, p. 8). "Standards and Guidelines for Quality Assurance in the European Higher Education Area", developed by the European Association for Quality Assurance in Higher Education (ENQA), specify that educational institutions should ensure the availability of adequate and affordable learning resources and student support services relevant to educational goals. This question focuses attention on two levels of financial health: first, the institution`s financial capacity to successfully carry out its current programmes, and second, the institution`s continuing financial capacity to carry out its intended programmes for the expected lifespan of the institution.

At present, there is no single methodology for assessing the financial provision of educational services supplied by commercial companies in Latvia. The objective of this article is to identify the set of financial sustainability's ratios, which are more appropriate for higher education institutions and to evaluate the private sector of HE in Latvia on their basis.

Literature review

Broadly, sustainability refers to the ability of managers to maintain an organisation over the long term. According to the manual "Fundamentals of NGO Financial Sustainability" (Slabyj *et al*., 2000), sustainability is a measure of the organisation's ability to fulfil its mission and serve its stakeholders over time. Sustainability is a process, not an end. The organisation does not "become" sustainable and rest on its success afterwards. Sustainability involves all the elements and functions of the organisation, and every major decision made within the organisation — from human resources to finances to service delivery — must be considered through the filter of sustainability. Financial sustainability can be gauged by the organisation's net income (the surplus of revenues over expenses); liquidity (the cash available to pay bills); and solvency (the relationship of assets and debt or liabilities). Financial sustainability refers to the ability to maintain financial capacity over time.

The financial theory considers the concept of financial sustainability as the provision of financial independence. For example, Savitskaya G. gives the same definition of financial sustainability: "It is the subject's ability to function and develop and maintain the balance of its assets and liabilities in the changing internal and external environment ensuring its solvency and long-term investment attractiveness within the boundaries of the acceptable level of risk. The sustainable financial state is reached provided the capital adequacy, good quality of assets, sufficient level of profitability considering the operational and financial risk, sufficient liquidity, stable income and wide range of borrowing opportunities" (Savitskaya G., 2004, p. 536). The efficiency of a company can be defined as the relationship between the output of products or services and the input of resources necessary for their delivery (Rees B., 1995, p. 157).

Financial ratio analysis for HEIs

One of the classic options for assessing the financial condition of the enterprise is the analysis using financial ratios. There are five categories of ratios used in financial statement analysis. These are: (1) liquidity ratios, which measure a firm`s ability to meet cash needs as they arise; (2) activity ratios, which measure the liquidity of specific assets and the efficiency of managing assets; (3) financial sustainability ratios, which measure the extent of a firm`s financing with debt relative to equity and its ability to cover interest and other fixed charges; (4) profitability ratios, which measure the overall performance of a firm and its efficiency in managing assets, liabilities, and equity and (5) market value ratios, which bring in the stock price and give an idea of what investors think about the firm and its future prospects. (Brigham E., Houston J., 2016, p. 129). The advantage of the analysis using financial ratios is that it not only allows to assess the institution's current financial health, but also compare it to the averages for the industry and leading competitors (benchmarking) and identify development trends. Financial performance may be used to signal academic performance and vice versa.

For the last decades, the economic literature is having debates about the financial position of HEIs, and which indicators are most effective and reflect the specifics of their activities. In October 2014, Hanover Research presented the overview "Financial Reporting in Higher Education". Besides considerations for financial reporting, the report describes financial key performance indicators, which can be used by HEIs to create comparable charts for benchmarking with peer institutions. These ratios can help an institution answer questions like:

− Are financial resources sufficient to support the institution`s mission?
− Is the institution clearly financially healthy or not as of the balance sheet date?
− Is the institution financially better off or not at the end of the year than it was at the beginning?
− Did the institution live within its means or not during the year?

According to Hanover Research, there are three main ratios for private institutions: primary reserve ratio, equity ratio, and net income ratio. The primary reserve ratio addresses how long an institution could potentially operate with its expendable reserves. The equity ratio assesses the proportion of assets that the institution owns. Finally, the net income ratio assesses whether unrestricted activities resulted in a surplus or a deficit.

Prager, Sealy&Co, LLC, KPMG LLP and BearingPoint offer the use of strategic financial analysis tools. The strategic financial analysis is a com-

bination of approaches, methods and tools to analyse, evaluate and communicate financial information on whether an institution is achieving its mission from a financial perspective. The basis for effective management is a clear institutional mission. Every institution should have a clearly articulated mission and there must be measurement, both financial and non-financial.

Financial analysis of private HEIs in Latvia

The system of HE in Latvia consists of two subsystems: public and private education. In the academic year 2015/2016, 17 public and 14 private HEIs functioned in Latvia, where they enrolled 57,027 and 16,477 students respectively (private HEIs enrolled 22.42% of all students). Among the 14 private HEIs in Latvia, 11 HEIs are commercial companies with the right to earn and distribute profit, 10 HEIs have the status of limited liability companies and 1 is a joint-stock company. 3 HEIs are registered as non-profit institutions without the right to earn a profit (Cernostana Z., 2016).

To assess the overall financial state and sustainability of the private sector of HE in Latvia, the above-mentioned methodology of analysis utilizing financial ratios was used. The set of indicators was selected from the ones used by statistical (Latvian Statistical Bureau, Lursoft database) and state bodies (Ministry of Education). For the calculations, the public financial statement data of 14 HEIs for 2015/2016 academic year were used. The results of the study are presented in Table 1.

Table 1. Analysis of the financial Ratios of Private HEIs in Latvia

Ratio	Formula	EUR	Average	Min.	Max.	Recom-mended
Liquidity ratios						
Current ratio	**Current assets** **Current liabilities**	**13 342 691** **12 118 031**	**1.10**	**0.12**	**2.31**	**>1**
Quick ratio	**Current assets-** **Inventory** **Current liabilities**	**13 342 691-** **1 039 859** **12 118 031**	**1.02**	**0.78**	**2.74**	**0.3 – 1.0**
Activity ratio						
Total assets turnover	**Net sales** **Average total assets**	**27 213 197** **48 170 351**	**0.56**	**0.25**	**1.82**	**Higher is better**
Fixed assets turnover	**Net sales** **Non-current assets**	**27 213 197** **24 707 435**	**1.10**	**0.03**	**2.7**	**Higher is better**

Accounts receivable turnover	Net sales Average accounts receivable	27 213 197 4 640 655	5.86	2.48	22.33	Lower is better
Days payable outstand-ing	Average accounts payable Net sales / 365	4 640 655 27 213 197/365	62.24	8.52	68.39	60- 90 days Lower is better
Financial sustainability ratio						
Debt ratio	Total liabilities Total assets	16 827 856 48 170 351	0.35	0.02	0.72	< 0.5 – 0.7
Debt to equity	Total liabilities Total equity	16 827 856 31 012 269	0.54	0.01	2.62	< 0.45
Equity ratio	Total equity Total assets	31 012 269 48 170 351	0.64	0.98	0.28	> 0.55
Profitability ratios						
Net profit margin	Net income Net sales	2 232 786 27 213 197	8.20	-0.503	15.04	> 1 Higher is better
Return on equity (ROE)	Net income Total equity	2 232 786 31 012 269	7.20	-0.81	9.9	> 0.2
Return on assets (ROA)	Net income Total assets	2 232 786 48 170 351	4.64	-0.81	5.78	> 0.15

Source: own calculations based on www.lursoft.lv.

Liquidity ratio analysis: This ratio shows the current assets available to cover current liabilities at the balance sheet date and help answer the question: whether the HEI be able to settle its liabilities when the time comes while remaining a viable organisation. In general, the current ratio analysis revealed that the PHEIs are in the zone of stability and do not have difficulties with the repayment of payables. But two PHEIs have the indicator below the norm. This is related to the acquisition of long-term loans. The relatively high level of current ratio is explained by the fact that HE services are traditionally rendered on the principle of advance payment, i.e. students pay their fees at the beginning of the semester and the services are rendered at a later date. Therefore, monetary assets (average 57.43%) usually comprise a significant part of the PHEIs' current assets. This is confirmed by the quick ratio value, which differs slightly from the current ratio.

Activity ratio analysis: The coefficients of this group show how well the company manages its assets. These rates answer the following question: how rational is the amount of each type of liquid assets in terms of current

and predicted sales. The analysis showed that the assets mostly consist of the Non-current assets (an average of 51.29%), Accounts receivables (an average of 9.63%) and Cash (an average of 15.91%). The rates of Total assets turnover and Fixed assets turnover are slightly understated and do not correspond to the size of the gained profits. Days payable outstanding corresponds to the receivable repayment norms.

Financial sustainability ratio analysis: shows the ratio of the company's borrowed capital to its own; it characterises the degree of risk and the stability of the company. The financial stability of the most HEIs is within the normal range, although 6 of them are below the norm and are at risk. The analysis of the borrowed funds' structure shows that only 14.35% of them are loans to banks and other organisations, 43.71% are deferred incomes (usually unrealised funds of Grants), and 25.72% are students' advance payments for studying. The remainder is the current payables on wages, taxes and current expenditures.

Profitability ratio analysis: a relative indicator of economic efficiency. The enterprise's profitability comprehensively reflects the degree of efficiency in the use of material, labour, monetary, etc. resources. Profit margins reflect the results of management effectiveness and all operating decisions of the company. The analysis of the studied universities showed that on average the profit margin values are high, with the exception of 3 institutions that finished the fiscal year with a loss.

Conclusions

Financial sustainability is of paramount importance for universities, because this figure characterises the stability of the institution in the long term. The specificity of HE lies precisely in the duration of the provision of services. It is recommended to implement an assessment of financial stability as a criterion for evaluating the financial condition of the institution when conducting accreditation procedures and quality assessments. The analysis showed that a number of universities are in a precarious financial position, and therefore cannot guarantee students a high-quality education for the future periods.

The next problem is the existing gap between the assessment of financial activities of a HEIs and its education activities, which is asserted by accreditation standards; according to these standards, financial and education activities are autonomous entities, hardly interconnected. Financial performance may be used to signal academic performance and vice versa. The institution should not be regarded as a private, but as a socially signifi-

cant economic entity developing the education's quality system. Such definition of the problem requires finding new integral indicators uniting the results of financial and educational activities.

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Lursoft - Data bases of Latvian enterprises: www.lursoft.lv

Latvian Statistical Bureau: http://www.csb.gov.lv/

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The reaction of the stock market on credit rating agencies' decisions

Abstract

Research background: Firms with low credit risk realize higher returns than firms with high credit risk. This credit risk effect in the cross-section of stock returns is a puzzle because investors appear to pay a premium for bearing credit risk. A higher credit risk can reduce a propensity to invest.

Purpose of the article: The basic goal of the paper is to analyse and verify the impact of the changes of financial and nonfinancial institutions' credit ratings on the rates of return of shares. The following hypotheses have been formed: first, differences in the strength and direction of the reaction of stock prices between financial and nonfinancial institutions have been observed. Secondly, downgrades of credit ratings have got a stronger impact on the rates of return of shares than upgrades thereof.

Methodology/methods: The analysis has been constructed for European companies for the period between 1995 and 2016 using the event study method. The sample has been divided according to: the direction of changes in credit ratings, countries' economic divisions, the character of the institution.

Findings & the Value added: The prepared analysis suggests that nonfinancial stock prices react to changes in credit ratings similarly to stock prices of financial institutions. The moment of reaction is differentiated by taking the level of economic development. Generally, a stronger reaction to credit rating changes in the case of companies from lower and middle economies has been observed the than from high-income countries.

Introduction

One of the methods of measurement of credit and default risk is by using credit rating to analyse the risk of investment, especially in the event of banks. They are also taken into consideration to verify credit risk in the internal ratings based approach by financial institutions.

The previous researchers explore the behaviour of the stock prices on credit ratings changes in different subsamples. The mentioned phenomenon has been analysed for a group of countries or on a particular one. The most popular markets that have been researched are: the stock markets in the United Kingdom (Barron et al., 1997, p. 497-509), the United States (Avramov et al., 2009, p. 469-499), and Japan (Miyamoto, 2016, p. 138-143). The mentioned relationship is strictly connected with the size of the stock exchange. The previous analysis has also been prepared in different subsamples, according to: the size of the company and the changes of credit rating agencies (Creighton et al., 2007, p. 1-17), the level of economic development and political divisions (Chodnicka-Jaworska, 2016), the emerging countries (Mateev, 2012, p. 28-41; Flores, 2010; Hun Han, 2009, p. 141-166), the moment of a financial crisis (Kiesel, 2016, p. 20-31), the size of credit ratings agencies (Chodnicka-Jaworska, 2016; Hun Han et al., 2009, p. 141-166). Schweitzer et al (1992, p. 249-263) found that the reaction of banks' stock prices is weaker than of nonfinancial institutions, which can be connected with the level of supervision for the former.

The type of investors and their reaction to credit ratings changes has been verified by Avramov et al (2009, p. 469-499). They found that after downgrades a strong institutional selling has been observed. On the other hand, they have not found a strong differentiation of rates of returns across credit risk groups in stable or improving credit conditions. The mispricing is generated by retail investors and sustained by illiquidity and short sell constraints. Ahn et al (2014) found that negative deviations have significantly stronger associations with bid-ask spreads and investors' reaction to ratings changes than positive deviations. They suggest that only negative non-financial information in credit ratings is perceived as private, which implies that managers are more willing to provide bad news to rating agencies than they are to the general public. Rating agencies incorporate negative information in ratings, which should comfort those who are concerned that the issuer-pay model leads to inflated ratings.

The prepared literature review suggests that there is a lack of research about the comparison between the reaction of stock prices on credit ratings changes for financial and nonfinancial institutions. As a result. the aim of the paper is analyse and verify the impact of the changes of financial and

nonfinancial institutions' credit ratings on the rates of return of shares. The first hypothesis seems as follows: differences in the strength and direction of the reaction of stock prices between financial and nonfinancial institutions have been observed. The second one is: the downgrades of a credit ratings have a stronger impact on the rates of return of shares than upgrades thereof. In the next section the methodology and data used in the analysis have been described.

Method of the Research

The analysis has been constructed for companies from European countries for the period between 1995 and 2016 with the use of the event study method. Data have been collected from the Thomson Reuters database. Daily rates of return are taken as dependent variables. The independent factors comprise long-term issuer credit ratings proposed by Fitch, S&P's and Moody's. To verify the direction of credit ratings changes the linear decomposition proposed by Ferri, Liu and Striglitz (1999) has been used.

The sample has been divided into subsamples according to: the direction of credit ratings changes, economic divisions, whether an institution is financial or nonfinancial. The grouping of countries has been presented in Table 1.

Table 1. Country groups singled out according to the financial development division criterion.

Type of classification	Countries
High income countries	Austria, Belgium, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Monaco, Netherlands, Norway, Poland, Portugal, San Marino, Slovakia, Slovenia, Spain, Sweden, Switzerland, United Kingdom.
Middle income	Albania, Algeria, Belarus, Bosnia and Herzegovina, Bulgaria, Georgia, Macedonia, Montenegro, Romania, Russia, Serbia, Turkey
Lower middle income	Armenia, Moldova, Ukraine

Source: own elaboration.

The analysis has been prepared by using the event study methods. Its goal is to verify the response of the rates of return of shares to credit rating changes in a short period of time. The analysis has been prepared for three periods of time. The first period is named as pre-event window, and relies on the observation of the rates of return from twenty-one to two days before the event. The event period starts from one day before the event date and ends on the third day after it. The post-event window represents twenty

days after it. To verify the impact of credit ratings changes on the rates of return of shares abnormal differences in the variable within each event window are used to construct cumulative abnormal differences (CAD), with an assumption that no other factors occurred in that time. To verify the significance of the influence of credit ratings changes on stock prices the t-Student test is used.

Findings

The analysis of the reaction of stock prices to credit ratings changes has been started on to verify the impact of upgrades and downgrades of notes (Table 2). In the case of S&P's rating a significant impact has been noticed only for downgrades. The comparative results between an increase and decrease of notes suggest that stock prices react more strongly to downgrades than upgrades. The mentioned situation is consistent with the results of the previous studies. In the case of Fitch notes a significant impact has been noticed at the moment the information about an increase of notes was published. The growth of Moody's ratings causes statistically significant abnormal rates of return during the pre-event window period of time. The strongest reaction to Fitch notes has been noticed before the moment the information about a decrease of ratings was published. In the case of Moody's and S&P's notes a stronger impact has been observed during the post-event window. The described situation can be connected with the types of companies that have been analysed. As a result, the next step of the research has been to verify the influence of credit ratings changes on the rates of return by taking the sector type into consideration.

Table 2. Impact of credit ratings changes on the stock prices of European companies.

agency	Fitch		Moody		S&P	
direction	upgrade	downgrade	upgrade	downgrade	upgrade	downgrade
pre-event window						
coef	0,00646	-0,0112**	0,008*	-0,0011	-0,0002	-0,0048
t-Student	-1,39	(-1.92)	(-1.65)	(-0.18)	(-0.06)	(-1.20)
N	75	275	151	389	608	1165
event window						
coef	0,00689**	-0,00929*	-0,002	-0.0103**	0,00123	-0.0113***
t-Student	(-1.94)	(-1.77)	(-0.75)	(-2.05)	-0,59	(-2.86)
N	75	275	151	389	608	1165
post-event window						
coef	-0,00229	-0,00844***	-0,007	-0,0181**	-0,00392	-0,0219***
t-Student	(-0.44)	-2,24	(-1.44)	-3,24	(-1.32)	-5,43
N	75	275	151	389	608	1165

Source: own calculations.

The analysis of the reaction of stock prices to credit ratings changes according to the type of sectors has been presented in Table 3 for Fitch, Table 4 for Moody's, and Table 5 for S&P's. The study of the impact of credit ratings changes on stock prices, taking into account the sector type and the level of economic development, has been prepared for two groups. Entities from high income countries and lower and middle income economies have been used in the studies.

In developed high income economies stock prices of non-finance entities react only to downgrades of notes. The moment of the reaction is differentiated (a reaction to Fitch credit ratings changes has been observed before the moment of publication of notes, for Moody's – during the post event window, and for S&P's – during and after the moment of publication). In the case of middle and lower income economies significant abnormal rates of return are higher than for entities from high income economies. The reaction has been noticed both in the case of downgrades (to Moody's notes – before and after the publication, for S&P's – after the publication) but also for upgrades (Fitch – during the pre-event window, S&P's – during publication and after it). The mentioned situation can suggest that investors treat investment in the companies from developing economies as a good place to allocate their capital that can generate additional profits.

The analysis of the impact of banks' credit ratings changes on stock prices taking the level of economic development into consideration can create similar results. Just as for the previous group of entities, a higher influence of credit ratings changes has been observed for banks from developing economies. In the case of Fitch notes the abnormal rates of return are observed for downgrades, but in the case of S&P's – for upgrades of notes. In the case of banks from high income countries the mentioned reaction has been observed both for upgrades and downgrades of notes presented by Fitch and Moody's, and only for a decrease of S&P's credit ratings. The presented results also suggest that the abnormal rates of return are observed during or after the moment of publishing information about credit ratings changes. The described situation can be connected with supervision over banks and the stability of credit ratings.

The received results suggest that there is a stronger reaction in the case of financial institutions than for non-financial entities. The presented situation is different from the opinion presented in the previous studies. As it has been noticed before, it can be connected with the use of credit ratings in the decision-making process of banks. Abnormal rates of return are between 1 and 2%, so the reaction of the financial market is weak. The described situation can be connected with the level of economic development.

Table 3. Impact of Fitch credit ratings changes on the stock prices of European companies according to the type of sectors and the economic development.

Agency	Fitch											
Direction	U	D	U	D	U	D	U	D	U	D	U	D
Sector	non-finance		banks		other finanance		insurance		non-finance		banks	
Develop	High income countries								Middle and lower income countries			
pre-event window												
coef	0,0062	-0,0158*	-0,00024	0,00499	0,0172	-0,0251*	0,0102	-0,0233	0,0594*	0,00599	0,00487	-0,0465*
t-Student	-0,62	(-1,71)	(-0,03)	-0,85	-0,46	(-2,34)	-1,35	(-1,13)	-4,89	-0,16	-0,5	(-2,44)
N	19	157	33	74	2	13	14	21	3	6	4	4
event window												
coef	0,000956	-0,0139	0,0118*	-0,00263	-0,0384	-0,011	-0,00572	-0,00824	0,0141	0,0341	-0,0078	-0,0158
t-Student	-0,16	(-1,61)	(-2,04)	(-0,77)	(-0,64)	(-0,44)	(-0,89)	(-1,13)	-0,84	-1,08	(-0,75)	(-1,07)
N	19	157	33	74	2	13	14	21	3	6	4	4
post-event window												
coef	0,0113	0,00359	0,0168*	-0,0121**	-0,0141	-0,028*	0,0038	-0,0241*	0,0169	-0,0342	0,0233	0,0489
t-Student	-1,17	-0,69	(-1,87)	-1,98	(-1,29)	-1,89	-0,55	-2,59	-1,31	(-0,71)	-0,86	-1,11
N	19	157	33	74	2	13	14	21	3	6	4	4

Source: own calculations.

Table 4. Impact of Moody's credit ratings changes on the stock prices of European companies according to the type of sectors and the economic development.

Agency	Moody								
Direction	U	D	U	D	U	D	D	U	D
Sector	non-finance		banks		other finanance		insurance	non-finance	
Develop			High income countries					Middle and lower income countries	
					pre-event window				
coef	-0,00661	-0,0078	-0,00303	0,00646	-0,00038	-0,0158	0,0215	-0,073	-0,0373*
t-Student	(-1.25)	(-1.11)	(-0.54)	(-0,43)	(-0,02)	(-0,50)	(-0,37)	(-0,80)	-1,94
N	93	252	45	83	7	15	14	5	25
					event window				
coef	-0,00543	-0,00529	-0,00096	-0,0277**	-0,00143	-0,0119	-0,0222	0,0377	0,00462
t-Student	(-1.54)	(-0.89)	(-0.19)	(-1.97)	(-0.11)	(-0,61)	(-1,07)	(-1,01)	-0,56
N	93	252	45	83	7	15	14	5	25
					post-event window				
coef	0,00418	-0,0226***	0,0211***	-0,0258**	-0,0174	0,0189	-0,0118	-0,0548	-0,0367*
t-Student	-0,66	-3,68	(-3,71)	-2,06	(-0,59)	-0,58	(-0,19)	(-1,35)	(-1,88)
N	93	252	45	83	7	15	14	5	25

Source: own calculations.

Table 5. Impact of S&P's credit ratings changes on the stock prices of European companies according to the type of sectors and the economic development.

Agency	S&P											
Direction	U	D	U	D	U	D	U	D	U	D	U	D
Sector	non-finance		banks		other finanance		insurance		non-finance		banks	
Develop	High income countries								Middle and lower income countries			
	pre-event window											
coef	-0,00022	-0,00747	0,00607	0,000255	-0,00095	0,00817	-0,0169	0,0258	-0,00103	-0,00333	-0,0231	-0,0342
t-Student	(-0,05)	(-1,50)	(-1,08)	(-0,03)	(-0,05)	(-0,35)	(-1,53)	(-0,57)	(-0,10)	(-0,21)	(-0,72)	(-0,89)
N	396	766	102	246	16	46	16	26	65	58	13	23
	event window											
coef	0,00269	-0,0152**	0,000383	-0,00376	0,0148*	-0,0245	0,0254**	-0,0211	0,0114*	0,0114	0,0167	0,0163
t-Student	(-1,01)	(-2,88)	(-0,08)	(-0,52)	(-1,68)	(-1,63)	(-2,27)	(-0,64)	(-1,70)	(-1,05)	(-1,32)	(-0,96)
N	396	766	102	246	16	46	16	26	65	58	13	23
	post-event window											
coef	-0,00337	-0,0232***	0,00439	-0,0265***	0,0232**	0,00165	-0,0161	-0,0827	0,0166*	-0,0315*	0,0409**	0,0647
t-Student	(-0,94)	(-5,3)	(-0,58)	(-3,36)	(-2,43)	(-0,08)	(-0,82)	(-1,08)	(-1,66)	(-1,69)	(-2,15)	(-1,48)
N	396	766	102	246	16	46	16	26	65	58	13	23

Source: own calculations.

As a result, the analysis of the impact of credit ratings changes on stock prices has been prepared by taking into consideration the level of economic development.

The last part of the study, which relies on the analysis of the results for other financial institutions and insurance companies, has been prepared only for entities from high income countries. The described situation has been connected with the small number of observations for the entities from the middle and lower income countries. For the Fitch notes a statistically significant impact on stock prices has been noticed for the mentioned entities after the moment of publishing information about a decrease of notes. The strength of the impact has been higher than in the case of other institutions. Abnormal rates of return for the mentioned entities have not been observed for Moody's ratings changes. In the case of S&P's credit ratings changes a significant reaction has been observed for upgrades. Abnormal rates of return have been noticed during the event window for insurance companies, and for other entities – also after the moment of publication of notes.

Conclusions

The basic goal of the paper has been to analyse and verify the impact of the changes of financial and nonfinancial institutions' credit ratings on the rates of return of shares. The received results suggest that no significant differences between the impact of credit ratings changes on financial and nonfinancial entities' stock prices have been observed. A stronger reaction has been noticed for downgrades than in the case of an increase of notes, which confirms the second hypothesis. The level of economic development has a statistically significant impact on the creation of abnormal rates of return. The described situation suggests that investors try to find additional profits on these markets, and publication of information about credit ratings changes is a good measure of the default probability and creation profits. Also the moment of reaction is differentiated. In the case of developing countries abnormal rates of return are observed after the moment of publication of the information about credit ratings changes. For these stock prices both upgrades and downgrades are significant. In the case of entities from high income economies the stock market also reacts before and during the mentioned period of time. Only downgrades have a significant impact. The described situation can be connected with the fear of investors. The received results also suggest that stock prices react more weakly to credit ratings changes. The moment of the business cycle can also have a signifi-

cant impact on the mentioned reaction. The mentioned determinant will be taken into analysis in the future research presented by the authors.

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Evaluation of the credit risk importance during the crisis: The case study of SMEs according to a time of operating on the market

JEL Classification: *L26*

Keywords: *enterprise, credit risk, business environment, ban*ks

Abstract

Research background: One of the possibilities for entrepreneur who is trying to start-up a successful business or grow a business, is to ensure the business from an economic perspective. Entrepreneurs can use a various alternative forms of financing. Despite the wide range of programs, grants and subsidies, the most commonly used form of financing is still a loan which is provided by the bank institutions. The relationship between entrepreneurs and banking institutions is mainly connected in the area of lending and guarantees for funding. Therefore the perception and the evaluation of the credit risk by entrepreneurs contributes to a better understanding of needs of both sides.
Purpose of the article: A comparison of the evaluation of factors which affect the perception and management of the credit risk by entrepreneurs. Not only socio-demographic factors (gender, level of education or age of entrepreneurs) but also the nature of corporate activities in the business environment for small and medium-sized enterprises in the Czech Republic.

Methodology/methods: During data collection, method of random firm's selection using specialized database of companies "Albertina" was used. Afterwards, the method of interview with responsible managers of the company and method of online questionnaire survey were used. Data from 1141 enterprises in 2015 from all 14 regions of the Czech Republic were collected. In the first step of our research, the descriptive statistics (pivot tables, pie charts) were conducted. Afterwards, the two-sample t-test to compare a mean values of the perceptions of credit risk factors and verify the conditions for its completion (Histogram, Q-Q plot, Goodness of Fit Test, Pearson coefficient of contingency, t- test).

Findings & Value added: With an increase of the time of operating in the business environment, the amount of women as a responsible people for business management is decreasing. Entrepreneurs are united in the opinion that the importance of credit risk during the crisis increases. There are statistically significant differences between entrepreneurs by a gender and age in enterprises with a time of operating on the market between 5-10 years that the importance of credit risk during the crisis increases.

Introduction

The business environment of small and medium-sized enterprises (SMEs) is a current area of theoretical research and practical applications in the European Union (Belás and Sopková, 2016a; Kozubíková, Belás, Ključnikov, & Virglerová, 2015; Dúbravská, Mura, Kotulič, & Novotný, 2015 ; Belás, Demjan, Habánik, Hudáková, M. & Sipko, 2015). Micro, small and medium-sized enterprises can be included among the basic factors which determine the economic growth in each country and a positively impact the social and economic system of the country (Henderson & Weiler, 2009).

The relationship between bank institutions and enterprises operating in business environment affects many risks (Belás & Sopková, 2016b; Mentel, Szetela & Tvaronavičienė, 2016; Betakova, Lorko & Dvorsky). The credit risk is characterized by the possibility that the borrower will not be able to fulfil the obligations arising from the loan relationship to the creditor on time or even at all. It represents the risk of possible failure of the contractor, which leads to non-compliance with the content of the contract and to financial losses of the counterparty in the same time. It can be represented in a form of a direct credit risk, risk of equivalents or settlement risk.

The importance and intensity of credit risk increases as for banks as well as for business particularly during a crisis. During the crisis period, it is found that innovative SMEs are credit rationed from all other sources of external finance and that is suggesting an absolute credit crisis for the innovative firms (Lee, Sameen & Cowling, 2015).

From the bank's perspective, causes that influence the emergence of credit risk are divided on the reasons related to own decisions of banks: credit terms toward entrepreneurs, client's creditworthiness, default measurement, duration of credit risks and etc. (Belás, Ključnikov, Vojtovič, Sobeková-Májková, 2015). Other types of causes are those which are developed by the economic and political situation in the country.

Berger & Udell (2002) states that it models the inner workings of relationship lending, the implications for bank organisational structure, and the effects of shocks to the economic environment on the availability of relationship credit to small businesses. Relationship lending depends on the accumulation over time by the loan officer of 'soft' information.

According to Neuberger & Räthke (2009), micro-enterprises are especially predisposed to incorrect selection and moral hazard, and therefore their access to debt financing is limited. Small firms are characterized by higher Business Administration and Management information asymmetry and credit risk.

A political support for SMEs in the form of subsidies, government programs and the possibilities of co-financing with EU funds (Vojtovič, 2016) are one of the key activities to increase an economic activity, a level of solvency and an export growth of the company. The state plays a very important role within its business environment (Ključnikov & Sobeková Majková, 2016). Through its legislative environment, the state can be helpful to entrepreneurs in their activities or it can burden them (Virglerová, Dobeš, & Vojtovič, 2016).

Research Methodology

The main aim of the article is the comparison of credit risk assessment by entrepreneurs according to selected socio-demographic factors and their variations. The comparison between the relationship perception between persons responsible for the company management according to a gender, age and achieved education and the arguments regarding to granted loans by banking institutions, will contribute to the knowledge of a different attitude with a respect to the examined factors.

To meet the objectives of this article, following statistical hypotheses have been evaluated:

H1A: With an increase of the time of operating on the market, the number of women which are responsible to company's managements decreases.

H1B: Between men and women representing the enterprise with a competence between 1-5 years in the business environment, there is not a statistically significant difference between opinions on the argument that the importance of credit risk during the crisis tends to increase.

H2A: Among entrepreneurs with age under 45 and above 45 years which represents a company with a competence between 5-10 years, there is not a statistically significant difference in attitude on the argument that the importance of credit risk during the crisis tends to increase.

H2B: Between entrepreneurs with the achieved university education and higher education which represents a company with a competence between 5-10 years, there is a statistically significant difference in attitude on the argument that the importance of credit risk during the crisis tends to increase.

The scope of the statistical data represent 1650 enterprises. We managed to collect data from 1141 (70%) companies successfully. During data collection, methods of random selection in "Albertina" database were used. All enterprises are operated in the Czech Republic. Enterprises in the first phase were contacted via e-mail contact that has been mentioned in above mentioned database, or searched on the web servers. In the case where they did not respond to our request, they were contacted by phone.

To evaluate the statistical hypotheses about credit risk arguments, entrepreneurs could select from following options on pre-formulated arguments: strongly agree (score = 2), agree (score = 1), I don't have an attitude (score = 0), disagree (score = - 1), strongly disagree (score = -2). The importance of assigned qualitative assessments of entrepreneurs and their quantitative statement is used not only for the need of statistical evaluation of performed tests but also for the possibility of weight settings toward individual qualitative assessments.

For draw conclusions and answers to our formulated statistical hypotheses in the area of credit risk evaluation, statistical tools of descriptive statistics in the first step were used, as follows: a pie chart, pivot tables - sorting businesses by two or more factors, characteristics and variability - absolute and relative frequency, mean, variance and scores. The score is calculated by the sum of all ratings. To compare the enterprises by selected socio-demographic factors, two-sample test (unpaired) with the same variances is used. Hypotheses where differences between mean values of the sample is zero (null hypothesis) versus non-zero difference between the mean values (alternative hypothesis) were tested. All tests were performed at the signifi-

cance level of 0,05. Critical values for a confirmation or rejection of the null hypothesis with the usage of the numbers of degrees of freedom are represented as the subject of evaluation of the data in tables (t- Statistics and p-value (P (T<=t))). Critical value of test are as follows: gender – t = 1,969 (0.05, 243 degrees of freedom), achieved education – t = 1,973 (0.05, 703 degrees of freedom), age – t = 1,969 (0.05, 243 degrees of freedom). To verify the assumption of normality, the graphical analysis of data (histogram, Q-Q graph) and tests of good compliance (Goodness-of-fit) were used. To verify the hypothesis of equality of variances between samples, F-test was used. The conditions which were imposed on relevant testing by a two-sample t-test with a same variances in individual selected groups of entrepreneurs were met. Calculations have been conducted through a sophisticated statistical software SPSS Statistics.

The structure of entrepreneurs which filled out our questionnaire survey are persons responsible for business management in their companies: men - 75% women - 25%; age: up to 35 years - 25%, 35-45 years - 28%, over 45 - 47%; according to motivation for starting a business: money - 28.9%, seen as a mission - 22%, other motivation - 49.1%. Entrepreneurs who represent enterprises which have the following characteristics: by size: the number of employees up to 10 - 64.9%, between 10 to 50 employees - 26.8%, between 50 to 250 employees - 8.3%; according to the time of operating of the enterprise in the business environment: 1-5 years - 21.5%, 5-10 years - 16.7%, and over 10 years- 61.8%. According to national-economic focus of the company on the market: 33% trading companies, 23% of manufacturing companies, 14% construction companies, 6% transport companies, 3% agriculture companies and other companies which did not mentioned industry specification.

Literature Review

The credit risk in the company may be influenced by external as well as internal factors. The next chapter specifies the authors who have dealt within their studies with factors influencing credit risk:

Yildirim, Akci, & Eksi (2013) have examined the firm-specific characteristics that affect the access to credit from banks for SMEs. They find that SMEs with larger asset base can have more access to formal credit rather than SMEs with small asset base. Because, larger asset base can signal the bank that, the SME will be able to pay the extended loans by liquidating the assets. Higher asset turnover and international trade activities are positively associated with higher possibilities for SMEs to get credit from the banks.

However, they do not find any significant relationship between firm age and availability of credit.

More than 10 years old was able to use 1.3% of trade credit than those firms were less than 2 years old. Hence, the age of the firm was also important in getting the trade credit during the study period. However, when then firms were getting larger they have increased the usage of trade credit and suppliers were able to trust them to provide finance due to a gradual increment of the asset base. The result also found that Spain and Ireland significantly reduced the bank financing to SMEs during the crisis and it encouraged the firms to use the alternative sources of funds. (Casay & Toole, 2014).

The survey showed that young SMEs were twice as likely credit constrained than established firms and more importantly 17.1% for young firms did not receive any form of finance from the bank. On top of that, 13.5% young SMEs reported the problem of accessing bank finance in compared to 2.5% of the established SMEs. Hence, it is possible to say that business age has a significant impact on bank financing in the Scottish market (North, Baldock & Ekanem, 2010).

Carter, Shaw, Lam & Wilson (2007) examined the effect of gender in the bank lending process to the small business when the loan applicant is a female or male. They have found that, when considering an application, applicant education plays an important role, lower level of education for female applicant mostly rejected. However, when considering for the higher level of education, the gender criteria for loan processing diminishes. It is found that, when the loan applicant is male, the loan officer is most likely to know about the business plan, financial history and general characteristics of the applicant.

Results and Discussion

Using a pie chart, relative frequency of persons who are responsible for business management according to their gender, and the length of operating on the market of enterprises have been graphically illustrated (figure 1).

Figure 1. The structure of persons who are responsible for business management according to their gender, and the length of operating on the market of enterprises
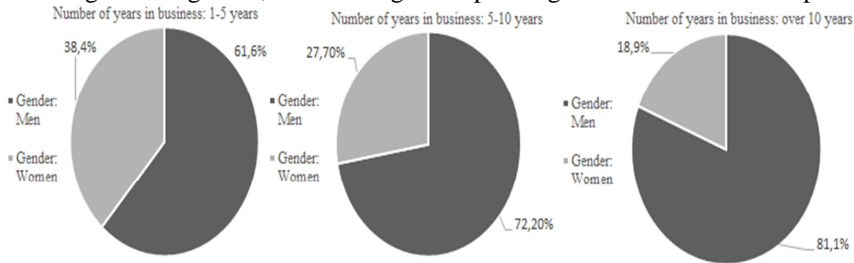
Source: own calculations.

Above mentioned graphic analysis in absolute and relative frequency of businesses by the gender and the time of operating on the market of enterprises shows that the amount of women responsible for business management decreases with an increasing competence in the business environment. *Hypothesis H1A is confirmed.*

Results of credit risk evaluation and its growth during a crisis among entrepreneurs who are operating in companies between 1 to 5 years are the subjects of Table 1.

Table 1. Credit risk importance during a crisis has an increasing tendency among enterprises traded between 1-5 years on the market.

Characteristics	Gender		Education		Age	
	Men	Women	Other education	University education	-45	45+
Number of entrepreneurs	151	94	143	102	222	23
Score	82	39	76	45	109	12
Mean	0.543	0.415	0.531	0.441	0.491	0.522
t – Statistics	**1.729**		1.581		0.351	
P(T<=t)	**0.042**		0.057		0.363	

Notes: -45- age of entrepreneurs till 45 years, 45+ - age of entrepreneurs over 45 years.
Source: own calculations

Entrepreneurs agree with an argument that the credit risk during a crisis had higher importance in enterprises with a time of operating on the market between 1-5 years. The average evaluation of entrepreneurs without distinction of a gender, achieved education or age of entrepreneurs is in the interval < 0.415; 0.543 >. Men are mostly agreed with this statement (mean – 0.543). Between men and women is a statistically significant difference in the attitude toward this given statement (see Table 1 P (T <= t) = 0.042). Between statistical variations of character such as gender and age of entrepreneurs, there are not significantly differences in the attitude to the given

statement (see Table 1: education P (T <= t) = 0.057, age (T <= t) = 0.363). *Hypothesis H1B of above mentioned statement is rejected.*

Results of credit risk evaluation and its growth during a crisis among entrepreneurs who are operating in the companies between 1-5 years are the subject of Table 2.

Table 2. Credit risk importance during a crisis has an increasing tendency among companies which are operated on the market between 1-5 years.

Characteristics	Age		Education		Age	
	Men	**Women**	**Other education**	**University education**	**-45**	**45+**
Number of entrepreneurs	138	53	131	60	137	54
Score	78	37	79	36	78	37
Mean	0.565	0.698	0.603	0.600	0.569	0.685
t – Statistics	**2.133**		0.213		**1.924**	
P(T<=t)	**0.017**		0.831		**0.028**	

Notes: -45- age of entrepreneurs till 45 years, 45+ - age of entrepreneurs over 45 years. Source: own calculations

Entrepreneurs agrees with a statements that a credit risk during a crisis has a higher importance in the companies which operates between 1-5 years on the market. The average evaluation by entrepreneurs without a distinction of a gender, level of education and age of entrepreneurs is in the range of <0.565; 0698>. The highest achieved education of entrepreneurs has not statistically significant effect on assessment of entrepreneurs who are operated in business environment between 1-5 years in the Czech Republic (see Table 2: P (T <= t) ≥ 0.831). *Hypothesis H2A is confirmed.* Between statistical variations of character such as gender and age of entrepreneurs, there are statistically significant differences within attitudes to the given statement. (see Table 2 .: gender P (T <= t) = 0.017, age (T <= t) = 0.028). *Hypothesis H2B is confirmed.*

Conclusions

Different positions of persons who are competent for credit risk management and leadership by the time of operating on the markets and by their socio-demographic factors (gender, age, achieved education) has been examined in this article.

Our research confirmed that the longer time of operating on the market, the less women in the position of competent persons for business management are occurred. With an increasing time of operating on the markets by

enterprises in the Czech Republic, the growing confidence between entrepreneurs that credit risk has higher importance during a crisis has been found out. It can be confirmed that there are significant difference in the assessment of this statement between types of enterprises according to time of operating on the market. Younger entrepreneurs are convinced that a crisis does not have so significant impact on the importance of credit risk in the company; older entrepreneurs are convinced that the importance of credit risk during a crisis increases.

Factors such as gender, age or the highest achieved education does not have an influence on the assessment of the statement that the importance of credit risk increases during a crisis in companies which operates on the market for more than 10 years. Among selected factors which influence the ability to pay company's liabilities at the given time and amount toward a bank, we advise: depth knowledge of credit conditions by entrepreneurs, transparency of bank's conditions toward entrepreneurs and credit history of the companies.

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Value-based banking in CEE countries - ecological point of view

Abstract

Research background: Banks play an important role connected with financing pro-ecological investments made by enterprises. They support pro-ecological activities of the entities applying for financing or offer saving/investment products relating to the environmental impact. In terms of their external pro-ecological activities there can be distinguished two groups of banks. The first group offers a wide selection of products and pro-ecological services as well as uses the tools of environmental risk management. The second group concentrates on offering selective products and services as well as is active in the area of pro-ecological marketing.
Purpose of the article: The main objective of the study is to identify and assess some chosen aspects of ecological activities of the banks listed on Stock Exchanges in CEE countries and included in sustainable indices such as: RESPECT, CEERIUS and VONIX. The scope of this analysis encompasses selected dimensions illustrating banks' activities in terms of environmental protection.
Methodology/methods: The analysis of the investigated dilemma was based mainly on the desk research of digital and documentary sources.
Findings & Value added: The results indicate relatively huge differences across environmental care in value-based banks compared to conventional banks, and small differences between value-based banks themselves.

Introduction

F. de Clerck (2009, p. 4) estimated that the definition of social banking is not clear because "social, ethical, alternative sustainable development and solidarity banking and finance are denominations that are currently used to

express particular ways of working with money based on non-financial deliberations. A precise and unified definition of these types of finance as such is not available and perhaps not possible because of the different traditions from which the ethical finance actors have emerged".

The proper interpretation of social banking will be probably the object of continuous search and presumably it will evolve as well. However, for the purpose of the research, to reach the assumed goal, namely: *to identify and assess some chosen aspects of ecological activities of the banks listed on Stock Exchanges in CEE countries,* the definition by J. Niven at the Global Alliance from Banking on Values (GABV) was taken. He defines the goals of social banks as follows: "to make an impact directly – by increasing our lending and investing to people and organizations that benefit people, the environment and culture. Making an impact by influencing others indirectly, both by showing that a different approach to banking is both possible and necessary and by actively engaging in important wider discussions about the future of the financial industry (J. Niven personal interview in O. Weber, S. Remer, 2011, p. 2).

R. Milano (2011, p. 31) classified social banks according to their mission statement enlarging, by the same token, the range of the entities. According to the author, there are four groups of social banks:

1. Banks and other similar institutions, which continue social banking activities – (e.g. reflected in social responsible indices, union credits).
2. Banks and other similar institutions, which travel a new road from an economic point of view – (e.g. members of FEBEA, INAISE, GABoV, socially responsible investment funds).
3. Banks and similar institutions, which open new markets (microcredit and microfinance in general) – (e.g. members of FEBEA, INAISE, GABV, socially responsible investment funds).
4. Banks especially engaged in charitable activities - (e.g. children's banks – The Children's Development Bank, charity foundations).

Referring to the above classification, a wide spectrum of activities of the so called social banks is visible. The author refers this name strictly to banks and other financial institutions operating on the basis of different legal foundations. Apart from the entity division, there is also the object division in which financial institutions may be called typically social institutions as well as those which combine the features of social and commercial banks. The above divisions may reflect customary or cultural differences. The culture consists of customary beliefs and values that ethics, religious and social groups transmit fairly unchanged from generation to generation.

Ecological activity of the banks

The interest in pro-ecological projects of bank clients is growing as well as bank offers. Such interest arouses from at least two reasons. First of all, high standards of environmental protection impose on enterprises searching for such products which are to solve ecological problems. Here, the related costs should not be excluded. Although the simple economic logic suggests that restrictive ecological standards should increase the costs of enterprise activities, and consequently influence negatively their profitability, still the growing number of empirical evidence indicates a positive relation between the enterprise value and its positive influence on the environment. R. Klassen and C. McLaughlin (1996) while conducting an event study found considerably abnormal returns, the moment an enterprise received a reward for eco-innovation, and significant negative returns after an environmental crisis. G. Dowell, S. Hart, B. Yeung (2000) stated that corporations seated in the United States and adopting restrictive environmental standards have a much higher market value than those with less restrictive environmental standards. The second reason is connected with following the rules of environmental protection as a common good which should be preserved for future generations. Therefore, the growing social consciousness makes entrepreneurs search for pro-ecological solutions.

Research methodology

The object of the research included banks listed on the Stock Exchanges of Central and Eastern Europe such as: Warsaw Stock Exchange, Vienna Stock Exchange, Bucharest Stock Exchange, Bulgarian Stock Exchange, Prague Stock Exchange, Budapest Stock Exchange (no bank was listed on the Lublajana Stock Exchange in the analyzed period). In order to select a uniform research sample, 24 banks were chosen among 26 banks. The remaining two banks are listed simultaneously on mature markets and have a much bigger experience in conducting environmental activities, hence adopt much higher standards. Some of the analyzed banks are concurrently listed in sustainability indices: RESPECT (5 banks), VONIX (2 banks), CEERIUS (2 banks). One bank is listed in both RESPECT and CEERIUS indices.

The analysis involved the following set of activities within the scope of environmental issues.

1. Environmental reporting and certification.
2. Environmental care in practice: reporting policy, objectives, data, products/services.

In order to realize properly the research goal mentioned earlier, a research method was developed, i.e. content analysis which is to analyze the content of websites. The study was preceded by a profound examination of available literature. Thanks to this method, the message of particular companies referring to environmental activities was examined and evaluated. In particular, the type of published information pursuant to the criteria specified for the research purposes. The methodology by M. Jeuckena (2004, p.389-392) with a slight modification was used as a model.[1] So, only the scope of research was limited. The original approach by Jeucken encompassed a much greater range, namely socially responsible practices (including the environmental one). The paper included only the environmental dimension. Therefore the first modification resulted in further consequences, i.e. the adjustment of weights to particular activities pursuant to the ecological approach. Simultaneously, the research was adjusted to the current conditions of Central and Eastern Europe market, including the current phase of developing pro-ecological activities on the market.

As a result of adjusting a selected research approach, we defined four main groups of criteria on the basis of which we prepared sub-rankings in the next stage as well as the main ranking of the analyzed banks. As it is clearly noticeable, the greatest attention was put to the criterion „generic published information" (40%), which consisted mainly of quantitative and qualitative data referring to internal and external activities as well as the goals of the companies in terms of „environmental care". A smaller attention (30%) was given to green products available on the market, however, we limited ourselves only to: time deposits, investment funds, loans and credits, leasing and „other products". The third considered criterion was „communication" (20%). This highly demanding criterion was based on three components: environmental policy, environmental reports and ISO 14001, 2600 standards or EMSs. The last criterion was „social issues and charity", which consisted of the support for educational and scientific activities, activities conducted by higher education institutions, and activities for

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[1] A similar model was earlier applied by B. Janik and K. Kołodziejczyk in the analysis of the banks listed on the Warsaw Stock Exchange and the results of which were published in (Janik, Kołodziejczyk, 2016, pp. 13-20).

local societies as well as the level of employees' involvement in environmental projects.

Unfortunately, chaos and lack of systematization of the website contents hosted by certain banks was an obstacle met while realizing research assumptions, in particular in terms of social responsibility, including the reference to the natural environment.

Results

The research results were discussed pursuant to the classification of the criteria presented above. In terms of generic published information, there has appeared a contrast between banks listed within socially responsible indices and the remaining banks. A special attention, however, should be also put on trans-border activities of the banks where good practices in terms of environmental protection are being introduced jointly in all countries. Here, it refers especially to one bank (ERSTE GROUP BANK AG) listed on the majority of stock exchanges in Central and Eastern Europe. On the other hand, the results of another group are worth paying attention to (9 banks out of 24 analyzed), namely these banks which obtained zero points. The analysis shows also the third characteristic group, which as a matter of fact gained some points but it was only due to a few detailed criteria.

The second main criterion took into account green products offered by the banks. There were 5 detailed criteria enumerated. The current offer, however, did not seem to be outstanding. Only green investment funds enjoy a relatively rich offer among the research sample (11 banks). Still, it should be emphasized that the main contribution ought to be assigned to investment funds as such since banks only distribute their offers. A relatively huge number of banks offered also loans and credits supporting pro-ecological activities (5 banks). In the case of the remaining products, only one bank offered pro-ecological deposits and one pro-environmental leasing.

The most demanding challenge for the analyzed banks seemed to be the communication of their environmental activities. In these terms we can say about a peculiar dualism among the banks. There are the leaders who in more or less formalized way work on their socially responsible image including their engagement in natural environment issues. There are also banks which do not show any proper interest in social responsibility, including ecological one. As far as the leaders are concerned, the moment the research was being conducted, two banks included in the RESPECT Index, one in the CEERIUS Index and one in the VONIX Index obtained a pres-

tigious certificate ISO 14001, which certifies the implementation of a formalized system of environmental management in the company. The remaining banks, though active in a selected criterion area, were proud mostly of their environmental reports, most of all within social responsibility sphere. Only six banks communicated their own pro-environmental activities on the basis of environmental reports, emphasizing the importance of environmental issues in their own activity. It is also worth mentioning that a considerable number of banks (7 banks including 4 listed within socially responsible indices) informed about passing their own environmental policies by publishing at least the copies of proper documents on their websites.

In terms of the support for pro-environmental social issues and charity, a considerable majority of the banks showed only a slight activity.

Table 1 presents a bank ranking based on earlier defined criteria. This comparison clearly indicates a significant differentiation in the approach to environmental issues. Among the analyzed group, three bank groups were distinguished: Active Banks (AcB) – 8 banks, Preventive Banks (PrB) – 7 banks, Passive Banks (PaB) - 9 banks. The first group consistently faces the challenges of green economy. Their activities do not take a 'stock' character but can be characterized by their systematic and growing degree of formality. Among these banks as many as 5 are also listed in socially responsible indices. One bank operates strictly to support pro-ecological activities (BOS Bank) and the remaining banks are a part of the capital group dispersed in the majority of CEE countries and, by the same token, they have unified environmental standards (ERSTE GROUP BANK AG). The second group includes the banks which notice the importance of this area, proved by the attempts of undertaking pro-environmental activities, however, they are rather at the starting point towards more decisive undertakings. Nonetheless, the estimates are poor for the third group. These banks make an impression of being completely indifferent towards environmental issues.

The research indicated that green products offered by these banks are still more an exception rather than a rule in the offer available on the market.

Table 1. The ranking of the banks based on selected main criteria (between Results and Conclusions)

Bank	Country/SR Index	Sum of points	Ranking/Group
ALIOR BANK	PL	0.0	15/III
BANK MILLENNIUM	PL/RESPECT/ CEERIUS	8.3	5/I
OTP	HU/CEERIUS/	5.2	7/II
BOS SA	PL	9.4	4/I
IDEA BANK	PL	0.0	III
BZ WBK	PL/RESPECT	6.7	6/I
GETIN HOLDING	PL	0.0	15/III
GETIN NOBLE BANK	PL	0.0	15/III
HANDLOWY	PL/RESPECT	9.7	3/I
ING BANK SLASKI	PL/RESPECT	10.4	1/I
MBANK	PL	4.7	8/II
PEKAO	PL/RESPECT	2.1	14/II
PKO BP	PL	4.1	9/II
RAIFFEISEN BANK INTERNAT AG	AT/VONIX	3.5	11/II
BKS BANK	AT/VONIX	3.8	10/II
ERSTE GROUP BANK AG	AT/VONIX	10.3	2/I
ERSTE GROUP BANK AG	CZ	10.3	2/I
KOMERCNI BANKA	CZ	2.6	12/II
MONETA MONEY BANK	CZ	0.0	15/III
ERSTE GROUP BANK AG	RU	10.3	2/I
BANCA COMERCIALA CAPATICA	RU	0.0	15/III
FHB MORTGAGE BANK Co Plc	HU	0.0	15/III
CB CENTRAL COOPERATIVE BANK	BG	0.0	15/III
CB FIRST INVESTMENT BANK AD	BG	0.0	15/III

Source: the authors' own analysis on the basis of the websites of the analyzed banks.

Table commentary:
1. Selected bank groups: IIIG – 0-2.14 environmental passive banks (PaB), IIG - 2.14-6.31 environmental preventive banks (PrB), IG – 6.31-14.40 environmental active banks (AcB).

Selection to the group: grouping using the cluster analysis, k-means.

Group III : 2.14 and less [X < means -0,5*standard deviation]
Group II :   2.14 – 6.31   [means -0,5*standard deviation < X < means +0,5*standard deviation]
Group I :   above 6.31   [means +0,5*standard deviation < X]
Right-enclosed compartments.

Conclusions

The research results indicate some attempts banks make to conduct environmental protection activities in CEE countries. The scope of the analysis includes only the banks listed on Stock Exchanges. It means that the research encompasses only these entities that should show standards higher than their proper counterparts whose stocks are not listed on Stock Exchanges. It results from the transparency rule, the need of strong communication with stakeholders and taking care of their own image. Among active banks, the majority is listed within socially responsible indices (5 banks). Only three banks listed within socially responsible indices were classified into neutral banks and none into passive banks. Also, system-like activities conducted by the banks to protect the environment were noticed within one capital group. Although one of the capital group banks (Erste Group Banks) is listed within the socially responsible index, i.e. VONIX, high standards are followed by each bank. It may mean that the requirements set by the index itself were not the only reason for their implementation. Moreover the conducted research does not exhaust the subject as such. From the cognitive perspective, the analyses of evolution or changes in the income-maximization axiom for stakeholders to a multi-criteria optimization considering such factors as income and concern about social or ecological values, all seem interesting. Still, the conflict between the responsibility towards a society and effective use of resources banks have at their disposal, though is somehow alleviated, remains crucial.

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The introduction of the distributed ledger technology in banking system as an alernative for Single European Payment Area solutions

Abstract

Research background: The year 2016 ended the period of migration from national payment services to the SEPA instruments and it has become apparent that some problems remained unresolved. Overcoming them requires finding suitable technological solutions. The potential of distributed ledger technology (DLT) is currently explored by financial sector and its implementation may affect the SEPA schemes in a variety of dimensions.

Purpose of the article: The aim of the article is to determine the potential impact of the DLT transfer to banking sector on the future SEPA's functioning. The paper presents SEPA's assumptions and the project's current status as well as DLT's concept. It describes the technology transfer implications for banking industry and compares currently operating SEPA schemes with those based on DLT. It also indicates opportunities and threats being the consequence of the new technology implementation and their significance for SEPA.

Methodology/methods: In the article the qualitative analysis is supplemented by the quantitative one. While characterizing the functioning of the main pillars of the SEPA Schemes the elements of descriptive statistics are used. The final conclusions are based on the comparative analysis of SEPA schemes and developed DLT applications.

Findings & Value added: The existing problems might be solved by supplementing currently operating SEPA payment schemes with the applications based on DLT. The developed systems shall provide required real-time processing and a global reach as well as extend the SEPA schemes' functionalities with the ability to transfer other currencies. The technology implementation shall result not only in

new financial products but first of all – in creating new business models. Consequently, we shall expect the modification of currently operating SEPA schemes, based rather on their supplement than total replacement in a short time horizon.

Introduction

Since the establishment of the Economic and Monetary Union, the Eurosystem has aimed to create a single market for financial services. In order to implement the idea various measures have been introduced, including the Single European Payment Area (SEPA). The year 2016 ended the period of migration from national payment services to the SEPA instruments and it has become apparent that some problems remained unresolved. Overcoming them requires finding suitable technological solutions. The potential of distributed ledger technology (DLT) is currently explored by financial sector and its implementation may affect the SEPA schemes in a variety of dimensions.

The aim of the article is to determine the potential impact of the DLT transfer to banking sector on the future SEPA's functioning. The starting point for further considerations is the presentations of the SEPA's assumptions and the project's current status. The following characterization of the distributed ledgers concept combined with the description of the technology implications for banking industry provides grounds for comparison of currently operating SEPA schemes with DLT-based solutions. It also allows to identify occurring opportunities and emerging threats being the consequence of the technology implementation and indicate their significance for SEPA.

Methodology

The article presents the results the Authors in-depth analysis of the currently operating SEPA Schemes as well as developed DLT-based solutions tailored for banking industry.

The qualitative analysis has been supplemented by the quantitative one. The newest *Payments statistics* published by the EBC, presenting comparable information separately for each EU member country, have been the ground for compiling the information regarding the share of non-SEPA transactions in total value of transferred funds inside and outside the Eurozone. The findings are presented in the article in the form of graphs.

As analyzing future consequences of assumed DLT transfer from virtual currency schemes to banking sector cannot be based on quantitative data, the Authors have decided to use the comparative analysis of SEPA schemes and developed DLT applications. This has led to accomplish the article's aim, giving grounds for the formulation of final conclusions.

The creation of the Single Payment Area and the main SEPA schemes

In 2002, the EU Authorities launched the Single European Payment Area (SEPA) process, consisting of a series of initiatives aimed at the introduction of common instruments, standards and infrastructures for retail payments in euro. The main objective was to allow users to make payments in euro throughout Europe from a single bank account, using a single set of payment instruments, as easily and securely as in the national environment (Kokkola, 2010, pp. 187-188). SEPA was also to encourage a shift from cash to electronic payments. As empirical evidence suggests that migration to electronic payment instruments might stimulate the real economy (Silva *et al*., 2016, p. 406), it was assumed that standardization of transaction and their electronic processing might bring substantial benefits for various stakeholders.

The SEPA Credit Transfer (SCT) Scheme and The SEPA Direct Debit (SDD) Core and Business to Business Schemes are the crucial parts of the project. The former enables payment service providers to offer a core and basic credit transfer service for either single or bulk payments, the latter serves as basis for processing direct debits in the private and business customer sectors.

The migration from national payment services to the SEPA instruments ended in 2016. Despite this a significant part of executed transfers in the EU is categorized as non-SEPA. This refers also to countries with the single currency in use. For the whole euro-area more than a half of all transfers (taking into account their value – not the number of transactions) were the non-SEPA ones – in 2014 as well as in 2015. Direct debits more often met the requirements of SEPA. In the Eurozone, only one third of direct debits executed in 2014 and one fifth of those completed in 2015 were described as non-SEPA.

Graph 1. The share of non-SEPA credit transfers in the value of all credit transfers – the Eurozone
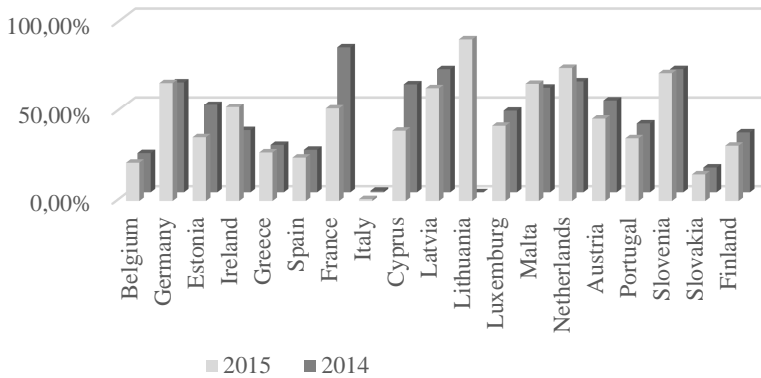
Source: own calculation based on European Central Bank (2016), *Payments statistics*.

Graph 2. The share of non-SEPA credit transfers in the value of all credit transfers – the EU countries with national currencies
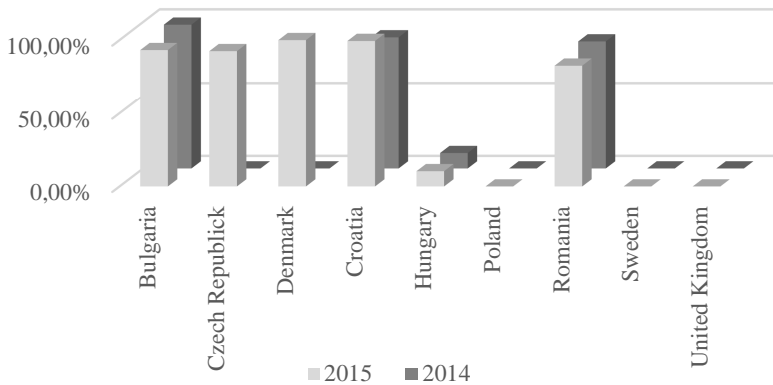
Source: own calculation based on European Central Bank (2016), *Payments statistics*.

Graph 3. The share of non-SEPA direct debits in the value of direct debits – the Eurozone
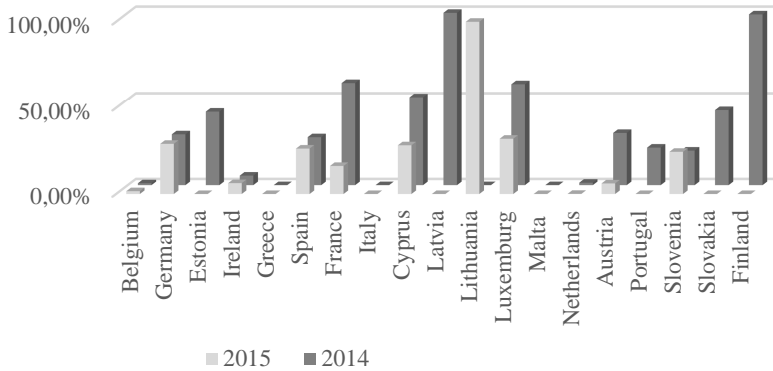
Source: own calculation based on European Central Bank (2016), *Payments statistics*.

Graph 4. The share of non-SEPA direct debits in the value of direct debits – the EU countries with national currencies
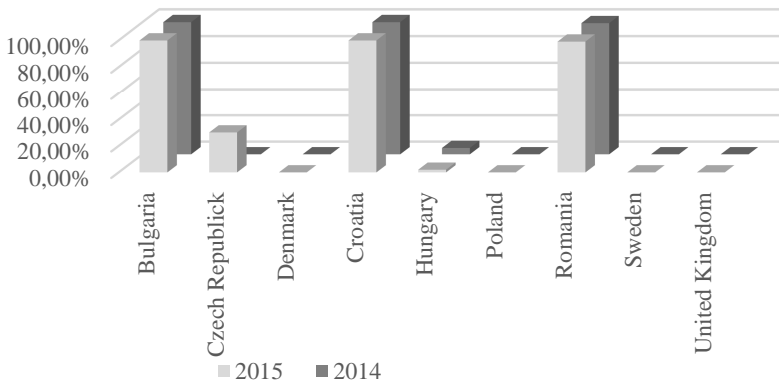
Source: own calculation based on European Central Bank (2016), *Payments statistics*.

It can be assumed that the cause of these state of affairs are funds transferred outside the SEPA, transfers in other currencies and transfers being so called instant payments. As expectations for immediate payments are growing, the SCT scheme seems to be insufficient "remedy" to retail payments market in EU, especially in the context of the market integration. Therefore, the SEPA Credit Transfer Instant (SCT Inst) Scheme is being launched to the market. It is going to enter into effect in November 2017. Nonetheless, the SCT and SDD Schemes still have the opportunity for further growth based on new participants. Those schemes' participation criteria express some aspirations to expand the geographical scope of the SEPA beyond the EU and the EEA (European Economic Area).

DLT applications tailored for financial industry

Execution of real-time payments as well as expanding geographical scope of SEPA requires the creation of adequate financial infrastructure. Number of national currencies in EU countries as well as SEPA's potential partners shall prompt the extension of the SEPA schemes' functionalities with the ability to transfer other currencies. A possible solution to all indicated problems is the development of payment schemes based on distributed ledgers – the technology derived from virtual currency schemes that were launched to the market with the advent of Bitcoin.

In a distributed ledger system, multiple copies of the central ledger are maintained across the established network by a large number of private entities. Transactions are validating with technologies derived from cryptography, allowing a consensus to be achieved across network members regarding validity of the ledger (He *et al*., 2016, p. 18). For some the key to understanding this phenomenon is to think of it as a protocol, akin to those that underpin the Internet. It is an open, global infrastructure upon which other technologies and applications can be built. Thus, it allows people to bypass traditional intermediaries in their dealings with each other, thereby reducing costs of transactions and speeding up their processing (Underwood, 2016, p. 15). It has broad implications for the way of transacting over electronic network.

Technologies classified as asset-centric are potentially the most interesting category for the transaction banking and payments domain. They concentrate on the exchange of digital representation of existing assets – e.g. fiat currencies – using the non-public version of a shared ledger. The network participants use the system to issue digital assets, used next as the base of executed transfers. Direct links created between system users allow

payment service providers, forming the nodes of such network, to transact with trusted partners on an exclusive basis without an exposure to activities of third parties (Euro Banking Association, 2016, pp. 4, 9-10).

Existing studies have not analysed the effectiveness of developed solutions, especially from technical perspective (Yli-Huumo *et al.*, 2016, pp. 21-22, 23-24). Nevertheless, the technology is expected to lead to the emergence of innovative payment solutions. Their introduction would provide various benefits among which the most important are:

− transfers in multiple currencies with the use of a single transaction system;
− global reach;
− real-time payments;
− 24/7/365 processing;
− cost-effectiveness;
− automatic recording of transaction from different locations combined with secure and cost-effective data storing solutions.

According to World Economic Forum's analysis, new financial services infrastructure built on distributed ledgers "will redraw processes and call into question orthodoxies that are foundational to today's business models". It will be one of the technologies that form the foundation of next-generation financial services infrastructure (World Economic Forum, 2016a, p. 18). So far, information technology has contributed significantly to the evolution of financial markets, without, however, revolutionising the way in which financial institutions interact with one another. DLT may change this bringing about revolution in the sector (Pinna & Ruttenberg, 2016, p. 2)

DLT solutions competing with SEPA systems

DLT-based applications shall prove to be more competitive compared to the systems currently ensuring the functioning of SEPA. The summary of basic characteristics of both systems is shown in the table below.

Table 1. Comparison of currently operating SEPA schemes and developed DLT-based solutions

Systems characteristics	SEPA schemes	DLT-based solutions
payment instruments	credit transfers direct debits	credit transfer at initial stage of systems functioning, other instruments introduced in the next phase
currency	euro	at least the main currencies
geographical scope	European countries being SEPA members	global
clearing and settlement	dependent on payment instrument, usually delayed for one day	instant payments
processing	differing, dependent on the system's type	24/7/365

Source: own work

The solutions based on distributed ledgers will provide the possibility of transferring various currencies on a global scale and make instant payments become a standard. There are grounds for presuming that the ultimate costs of DLT transfers will not be higher than the SEPA ones. On the other hand, the potential savings related to the new technology implementation should not be overestimated. Estimates as those made by analysts at Santander InnoVentures specifying that by 2022 the technology could save banks more $20 billion annually as a result of savings in settlement, cross-border payment and regulatory costs (Fanning & Centers, 2016, p. 56; World Economic Forum, 2016b, p. 8) seems to be unreliable. They are also made in isolation from the technology set up and transitions costs.

There are, however, other areas, where DLT-based applications could prove their superiority over currently operating SEPA schemes. The expected shift to instant payment execution offers an opportunity for new processes and technologies. And decentralized payment networks are considered as one of main alternatives that can feasibly provide real-time services (Mai, 2015, p. 1, 11).

In fact, systems based on distributed ledger technologies should not be regarded as conflicting with the main idea underlying the Single European Payment Area and solutions that have arisen on the ground. Due to their multi-currency option, they could ultimately contribute to further financial integration in the EU, where several national currencies besides euro are in use and the common payment system for only one currency seems to be insufficient. They might also realize the idea of extending SEPA's geographical scope.

At the moment, EBC recognizes the technology as not mature enough for use in central banks market infrastructure, precluding their settlement services operation in a DLT environment. Instead they consider central banks interoperation with DLT-based settlement services offered by external entities (Mersch, 2016).

Finding satisfactory technical solutions does not, however, guarantee smooth functioning of the single payment market. Payment habits are slow to change, and payment market still differs across Europe. The successful introduction of SEPA does not automatically translate into convergence of actual payment behaviour in EU countries (Martikainen *et al.*, 2015, p. 81). Nonetheless, systems based on distributed ledger technologies could significantly support the convergence process as they are reflection of the present trends: globalization, virtualization, networking, active users' participation and striving for cost reduction. Thus, they have a good chance of general acceptance (Mikołajewicz-Woźniak, Scheibe, 2015, p. 375).

Conclusions

With the establishment of the Economic and Monetary Union, it was clear that streamlining of complicated processes would be essential to making cross-border payments faster and more cost-effective. The Eurosystem has been working to put in place a harmonized financial infrastructure facilitating the task. The creation of the Single European Payment Area has been one of this infrastructure's pillars. The migration from national services to the SEPA instruments, completed in 2016, has provided the achievement of the main project's objectives, but stopping at this stage would mean leaving many problems unresolved and resigning from further expanding the SEPA's geographical scope.

The mentioned problems might be solved by supplementing currently operating SEPA payment schemes with those based on the distributed ledger technology derived from virtual currency schemes that were launched to the market with the advent of Bitcoin. The developed systems shall provide required real-time processing and a global reach as well as may extend the SEPA schemes' functionalities with the ability to transfer other currencies. It might be crucial for EU countries using national currencies and potential new partners from various parts of the world. In such a scenario, a regional integration would be replaced with the global one.

The anticipated benefits of the distributed ledger technology implementation in various sector of financial market motivate market participants, infrastructure providers and central banks to explore the technology. It shall

result not only in new financial products but first of all – in creating new business models. Thus, the technology implementation will lead to reshaping the market infrastructure and transactional systems. It may also form the basis or further development of the SEPA Credit Transfer Instant Scheme. Consequently, we shall expect the modification of currently operating SEPA schemes, based rather on their supplement than total replacement in a short time horizon.

The distributed ledger technology has undoubtedly an enormous potential to improve the effectiveness of individual institutions as well as the whole financial market, but it is not yet completely mature. Furthermore, critical operational, legal and governance issues are still not enough clarified. Depending on their governance distributed ledgers-based solutions will remove existing shortcomings of SEPA systems, solving various issues relating to financial integration in the EU, or induce a re-fragmentation of the market. This is therefore a great challenge for institutions involved in realization of the SEPA project.

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Multiple linear regression analyses of the performance and profitability of the Czech banking sector

Abstract

Research background: The global financial crisis started in the USA and extended to the European market in 2009 – 2010 and caused significant problems in the banking sector. Czech banks were not significantly affected and recorded a profit in many cases and there was no need for government intervention.
Purpose of the article: The purpose of this paper is to analyze the effect of the economic situation of the Czech Republic on the performance and profitability of the banking market through selected determinants. Constructing a linear regression model predicts the values of the dependent variable from the variability of the values of the independent variables.
Methodology/methods: In particular, the final report focusses on measuring the performance and profitability of the banking sector using the method of "Multiple linear regression". The basis for multiple linear regression model is to estimate the effect of each independent variable Xi to the dependent variable Y. The force of the impact, determine the regression coefficients β_i, also determining which independent variables have the greatest and the smallest effect on the dispersion of the dependent variables. In other words, how much of the variance of the dependent variable is explained by selected independent variables. In addition, a literature review and analysis of secondary are based on data published on or before 1. February 2017.
Findings: This paper clarifies the structure of the Czech banking sector and it is focused on the performance and profitability in the defined time period and how it compares with the selected banking sector and indicators in other countries. On

account of data availability for all the years examined, only selected banks were included.

Introduction

The banking sector plays a fundamental role in the economic growth of the selected countries in this paper and gained even more importance due to the global economic crisis in 2009. The Czech banking system is highly stable, fairly competitive and profitable enough for banks with international capital.

The purpose of this research is twofold. Firstly, we examine selected indicators of the banking sector in the Czech Republic; 2004 - 2015. We use the dataset of Czech banks, which covered about 90 % of the Czech banking sector. The Czech sector has developed similarly to the banking sectors of other Central European transition countries. Secondly, constructing a multiple-linear regression model, we predicts the values of the dependent variable from the variability of the values of the independent variables. We would like to verify how bank profitability, a dependent variable (ROA- return on assets, ROE- return on equity), can be influenced by independent variables. Based on the literature review, we have set the parameters for the independent variables for our research. We have two models investigate using a multiple linear regression model, which allows you to examine the effect of the independent variables on the dependent variable value ROA, ROE. Independent variables are:
- CA (Capital Adequacy);
- IMR (Interest Margin Rate);
- GDP (Dross Domestic Product) per capital.
- ROA (Return on Assets);
- BS (Balance Sheet Total);
- Inflation rate;
- IR (interest Rates) CNB.

Research methodology

Through the multiple-linear regression model will be investigated once the dependency between the dependent variable and at least two independent variables. In the case of a multiple regression analysis based on the values of the dependent variable are looking for from a linear combination of two

or more independent variables. The resulting function is registered using a formula that is similar to the formula for the function of the simple linear regression, and that:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_n X_n + \varepsilon_i, \text{ or } Y = \beta_0 + \sum_{i=1}^{n} \beta_i X_i + \varepsilon_i$$

where Y is dependent variable, $\beta_0, \beta_i \quad i = 1, \ldots, n$ are the regression coefficients (or partial regression coefficients), $X_i \quad i = 1, \ldots, n$ are independent variables and ε_i is random folder $i = 1, \ldots, n$.

The coefficients of the regression functions are determined by least squares.

Before doing the regression analysis, it is necessary to fulfill the specified requirements. Assumptions of multiple regression analysis are set according (VAUSS, 2002, p. 343–344). The assumption of normality is next to the graphical assessment recommends that you verify the tests by one of normality on significance level 0.05, such as Kolmogorov-Smirnov test, Shapiro-Wilk test.

Literature review

We will study the literature review focused on the determinants of bank performance and profitability in the last decade. We set a set of bank characteristics, macroeconomic and regulatory indicators as well as financial structure variables in order to explain bank profitability. This paper examines the effect of defined independent variables (bank-specific, macroeconomic, and industry-related) on the profitability of the banking industry in the Czech Republic. In the literature, bank profitability is typically measured by the ROA (return on assets) and ROE (return on equity). It is usually expressed as a function of internal and external determinants.

Internal determinants are influenced by specific banks´ decisions and policies, which can be changed by banks; Molyneux (1993, p. 17). External determinants of bank profitability are influenced by events outside the banks, industry-related and macroeconomic variables that reflect the economic and legal environment where the financial institution operates. Later, the internal and external determinants were considered together and authors tried to describe the relationship between banking structure,

performance, concentration or market share (Short, 1979, p. 209-219; Bourke, 1989, p. 65-79), and Molyneux (1993).

Ho and Saunders (1981, p. 581-600) described how banking profitability is based on interest margins and interest rates. This paper was supported by a lot of in-depth studies describing the main relationship between lenders and borrowers and based on the idea that interest margin is influenced by two main components, the degree of competition in the different markets and client credibility (McShane and Sharpe, 1985, p. 115-136; Angbanzo, 1997, p. 55-87). In the model of Maudos and de Guevara (2004, p. 2259-2281) the bank is viewed "*as a risk-averse dealer in the credit market and the interest margins is influenced by a phase of economic growth and the environment of macroeconomic stability in which financial markets have shown low volatility*".

Hoggarth et.al. (2002, p. 825-855) explained that GDP variable is not statistically significant in explaining profitability and takes into account private and corporate default possibility. An opposite opinion was put forth by Bikker and Hu (2012, p. 55), writing that gross domestic product (GDP) is one of the very important profitability determinants. Staikouras and Wood (2011, p. 3-6) wrote "*variations in bank profitability can be strongly explained by the level of inflation rate. An important indirect influence on commercial banks lies in the impact of inflation on their customers and the consequent changes in the demand for different kinds of financial services*" and expected that the effects of inflation can be substantial and undermines the stability of the financial system and the ability of the regulator to control the solvency of financial intermediaries.

A number of authors have described that bank profitability is influenced by a balance sheet total indicator, Černohorský and Prokop (2016), using macroeconomic factors like taxation rate as well as banking-specific and institutional factors. Capital and reserves structures are very important for the banks as well. It should be mentioned that capital and reserves are usually significantly higher than minimum capital requirements for almost all banks.

The most valuable for this paper is the Bank of Greece Research, Determinants of Bank Profitability in the South Eastern European Region. This study examine the profitability behaviour of bank sector related on macroeconomic, industry-related and bank-specific determinants, using an unbalanced panel dataset of South Eastern European (SEE) credit institutions over the period 1998-2002; Athanasoglou, Delis and Staikouras (2006).

Economic situation of the Czech Republic and selected independent variable

The financial system of the Czech Republic is characterized by the dominant role of the banking sector, which is one of the most stable markets in the Central and Eastern European region, with a high degree of client loyalty. There are three "big" banks (ČS, ČSOB and KB) with 70% of the market share. (ČNB, 2017)

Gross Domestic Product of the Czech Republic at market prices increased by 2,5% in 2016 compared to the last year, and it is less than the figure of 4,5% published in 2015. A sharp change is not predicted for 2017 (2,6%) or for 2018 (2,4%). This very positive development is caused by a macroeconomic situation and a combination of monetary conditions followed by a huge growth in investment activity (both state and private), steady growth in household consumption and successful foreign trade. The sole source of risk for the Czech economy is a potential deterioration of economic activity in other advanced countries (especially the Euro curreny area, specifically Germany). We can say that the increase of GDP significantly improved unemployment in the Czech Republic. This indicator fell to 4,0 % in 2016, one of the lowest rates in the EU. (ČNB, 2017)

Negative price shocks have contributed to low inflation rates in recent years. Inflation rate (measure by HICP) was 0.7 % in 2016, higher than in 2015 (0,3%), and it is expected the move back towards 2% inflation target of the Czech National Bank's. "*The scenario of stronger growth in rates, which might have a negative effect on borrowers' ability to repay, would thus be a consequence of an adverse external shock rather than domestic developments.*"(ČNB, 2017)

In the current low-inflation environment, total bank loans to the private sector rose by 5.8% and total deposits by 7.0% year on year in 2016. The long term interest rates was at 0.4% in 2016, interest rates on new loans to households, and building society loans were at 3.91%. The interest rate on loans for house purchase were 2.24% and mortgage loans were at 3.41%. The low interest rates on the new mortgage loans provided by banks could caused that the sensitivity of households to a potential rise in loan interest rates not accompanied by growth in their income. ČSÚ (2017)

Figure 1. Macroeconomic Indicators in Czech Republic in years 2008-2018 (2017, 2018 is prediction)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
GDP (growth in %)	3,1	-4,5	2,5	1,8	-0,8	-0,5	2,7	4,5	2,5	2,6	2,4
Consumption on Household (growth in %)	2,9	-0,7	1,0	0,3	-1,2	0,5	1,8	3	2,7	2,4	2,4
Avarage Inflation Rate (%)	6,3	1	1,5	1,9	3,3	1,4	0,4	0,3	0,7	2	1,6
Emploment (growth in %)	1,6	-1,4	-1	-0,3	0,4	1	0,8	1,4	1,8	0,3	0,3
Unemployment Rate (avg. In %)	4,4	6,7	7,3	6,7	7	7	6,1	5,1	4	3,9	3,9
Convergency Interest Rates (% p.a.)	4,3	3,98	3,89	3,7	1,92	2,2	0,67	0,49	0,53	0,6	1,1

Source: ČSÚ (2017)

The financial crisis (2008 – 2010) was started by the fall of investment bank Lehman Brothers in September 2008. This crisis touched financial and banking sectors all over the word. The Figure 2 shows the fact, how financial crisis 2008/2009 affected banking sector in the Czech Republic.
In Figure 2 is analyzed banks´ performance and profitability due to the development of Annual Profit Indicators for Euro Area during and before the crisis. Three ratios were used to represent bank profitability measures.

Figure 2. Annual Profit Indicators for Euro Area (1996 - 2014, %)
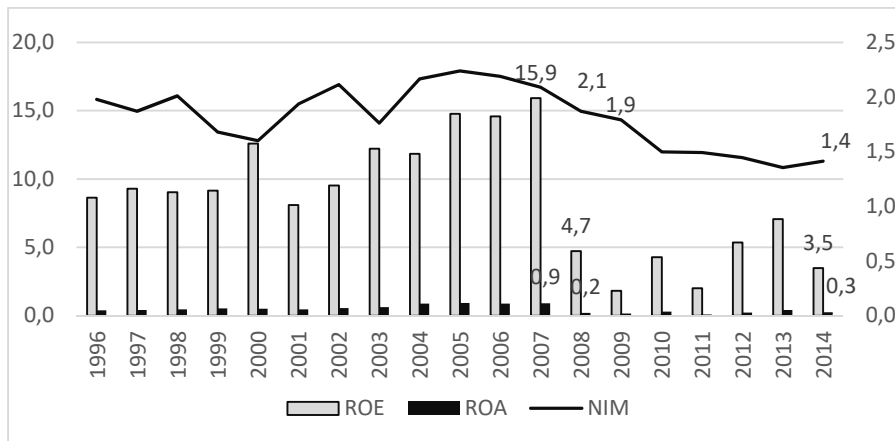
Source: FRED (2017).

The impact of the crisis is investigated by using ROA (return on assets), ROE (return on equity) and NIM (Net Interest Margin Indicator). ROE and ROA are two of the most important profit indicators for evaluating how effectively a company's management team is managing the capital that shareholders entrust to them.

The results showed that the financial crisis had a negative impact on the bank profitability in the Euro Area. The most recent studies, where authors examined the profitability during crisis periods, consider a similar combination of bank-specific, industry-specific, and macroeconomic factors in both pre-crisis and post-crisis time periods; Dietrich and Wanzenried (2011).

The long-standing environment of low interest rates reduces banks' traditional interest income and the decrease in the NIM value after 2009 results from this fact. In these days there are client deposit rates already close to 0% and the year-on-year decline in interest rates on client deposits (by 0.15 pp to 0.47%) and client loans (by 0.38 pp to 4.2%) continues in 2016/2017in the Czech Republic.

Multiple linear regression analyses of the performance and profitability of the Czech Banking sector

MODEL I. Addiction indicator ROA (Return on Assets) on CA (Capital Adequacy), IMR (Interest Margin Rate) and GDP (Dross Domestic Product) per capital was investigated using a multiple linear regression model, which allows you to examine the effect of the independent variables on the dependent variable value.

MODEL II. Addiction indicator ROE (Return on Equity) on ROA (Return on Assets), BS (Balance Sheet Total), Inflation rate and IR (interest Margin) CNB was investigated using a multiple linear regression model, which allows you to examine the effect of the independent variables on the dependent variable value.

The result will also be the quantification of the relationship with subsequent verification provided for the null hypothesis of statistical significance through appropriately selected statistical test. This step is included in the regression diagnostics, which we will evaluate the multiple-linear regression model, fully assembled.

From the above, it is therefore fixed the null hypothesis H_0: the selected indicator is not statistically significant on the chosen level of significance, as well as the null hypothesis H_0: assembled model is statistically insignificant.

Figure 3. Result of MODEL I., II.

Result of MODEL I.

Dependent variable: ROA					
	Coefficient	ERROR	t-stat	p-value	
CA	**2,31620**	0,581579	−3,983	0,0073	*
IMR	0,0271602	0,0463970	0,5854	0,5796	
GDP(per capital)	−0,0220668	0,0181735	−1,214	0,2703	

Coefficient of determination	0,661559
Modifi.coefficient of determination	0,485931
P-value (Anova)	0,085904

Result of MODEL II.

Dependent variable: ROE					
	Coefficient	ERROR	t-stat	p-value	
ROA	**0,570387**	0,169254	−3,370	0,0199	*
BS	**0,0953903**	0,0368753	2,587	0,0490	*
Inflation rate	−0,00684273	0,0137740	−0,4968	0,6404	
IR CNB	**−3,02793**	1,38946	−2,179	0,0812	*

Coefficient of determination	0,506049
Modifi.coefficient of determination	0,110887
P-value (Anova)	0,65904

Source: own calculations based on MODEL I., II.

The parameters in bold type in above of text were indicated as statistically significant in terms of testing statistical significance at a level of 0.05. Statistical significance was not confirmed for the other parameters; this is most likely caused by the length of the time series or an inappropriately selected function type, i.e., the selected linear function was not the most appropriate. The equations with statistical significance demonstrated for most parameters showed the value of the index of determination fluctuating at an average of 30%, which points to a higher definite level of correlation. For the equations with unconfirmed statistical significance, the index of determination's value remains in single digit percentage.

Conclusions

This paragraph should provide a brief summary of the topic of this paper and offer the possible directions of future research. This paper has examined the literature review dealing with internal and external determinants of bank performance and profitability. In addition many of the results confirm findings from former papers on bank profitability and this paper also investigates the impact of financial crisis 2008/2009 to annual profit indicators for Euro Area. The results showed that the financial crisis had a negative impact on the bank profitability in the Euro Area and on macroeconomic indicators in the Czech Republic.

The purpose of this research is twofold. Firstly, we examine selected indicators of the banking sector in the Czech Republic; 2004 - 2015. We use the dataset of Czech banks, which covered about 90 % of the Czech banking sector.

Secondly, constructing a multiple-linear regression model, we predicts the values of the dependent variable from the variability of the values of the independent variables. This model is done for the Czech Republic (2004 – 2015).

Finally, we can say that in the first model is evident that ROA has a statistically significant effect pointer CA, and that the decline in indicators CA leads to a decline in ROA and vice versa. Other indicators were verified as statistically insignificant. The second model is evident that ROE has statistically significant impact indicators ROA, BS and IR CNB. Effect indicators ROA and BS is a direct indicator of IR CNB is indirect. Inflation rate indicator has been verified statistically insignificant.

The possible directions of future research will be the fact that "The Czech National Bank has decided to continue intervening against the Czech crown to keep the exchange rate at around 27 crowns per euro in the second half of 2017." (ČNB, 2017) and how this fact change the macroeconomic environment in the Czech Republic in a short and long-term period.

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Bail-in as an instrument protecting the banking sector from system risk vs. capital adequacy of banks in the EU

Research background: The article refers to the introduced bank regulations aiming at maintaining capital adequacy of banks and a stable situation in the banking sector, allowing to keep the financial system stable at a time of a possible financial or systemic crisis.

Purpose of the article: This article aims at presenting methods of protecting banks. It mostly focuses on the capital structure and the use of capital assets to repay liabilities in a situation that poses a risk to the continued functioning of a banking sector or a financial system.

Methodology/methods: Our research was conducted by ways of analysing literature on using bail-in in the banking sector during an ordered bank restructuring or a winding up process. Data analysis was conducted with the use of statistical methods, including correlation analysis, followed by a comparative analysis of obtained results. The level of interdependence was determined on the basis of Pearson's correlation analysis, and the results were verified with the use of J. Guildford's classification of interdependence.

Findings & Value added: The article presents bail-in — an instrument aiming at performing ordered restructuring or winding up of a bank in the context of capital adequacy of banks in the European Union. The text shows how quickly and strongly capital adequacy rate of banks was changing in specific EU member states between 2006 and 2016, including the variation value evaluated with regard to the division into developed and developing countries. What is more, the article also points at current directions of changes in capital structure of banks in EU member states.

Introduction

Efficient operation of central and commercial banks ensures proper functioning of a financial system. It also allows for a proper flow of cash and economic growth. Any disturbances in the way the financial system functions arising from problems of banks can have negative consequences affecting the economy. The financial crisis of 2007–2009 is a perfect example of such a situation, when the disturbances in bank functioning resulting from excessive involvement of banks in risky financial instruments led to serious problems in the financial system. Only with national financial help could the financial situation stabilize and the financial system could function under its normal conditions. However, in the following years, this crisis also led to the implementation of new regulations aiming at creating an ex ante protecting mechanism for collecting capital and using it at a time of crisis. This mechanism is supposed to protect the banking sector and prepare for any kind of risk and the necessity to provide additional capital to the banking sector when it loses its liquidity. This article aims at presenting the mechanism of ordered restructuring or winding up of banks (bail-in), together with an analysis of their capital-related situation. European Union banking sector is characterized by a significant share of bank assets in relation to GDP (fig. 1).

Figure 1 Bank assets as a percentage of GDP (2013)
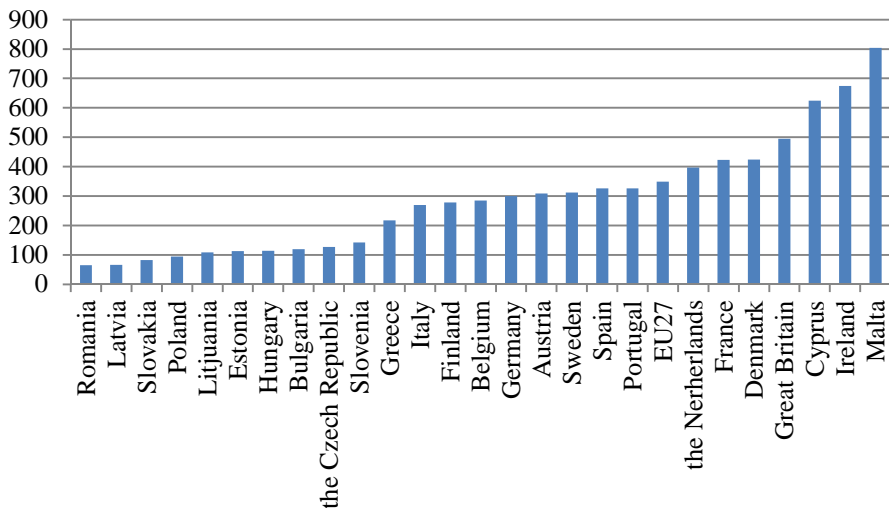
Source: www.marketoracle.co.uk, access date: 28 Dec, 2016.

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Bail-in legal grounds and mechanism

In order to create a mechanism protecting the banking sector from the loss of liquidity and to fight destabilization of the financial system in the European Union, an implemented package of CRD IV / CRR has been used.[1] Another step in the process of creating the regulation was to introduce BRRD[2] to provide a specific order in obtaining capital by banks in order to regulate required liabilities. BRRD (fig. 2) endorses the possibility to finance restructuring of banks with the use of owned capital, subordinated debt, but also with clients' deposits over EUR 100,000 placed in the bank. These resources are not covered with a guarantee according to DGS[3]. A minimum level of deposits that can be used for bank restructuring has been determined at a level of min. 8% of bank's liabilities.

Figure 2 The functioning of bail–in introduced pursuant to BRRD
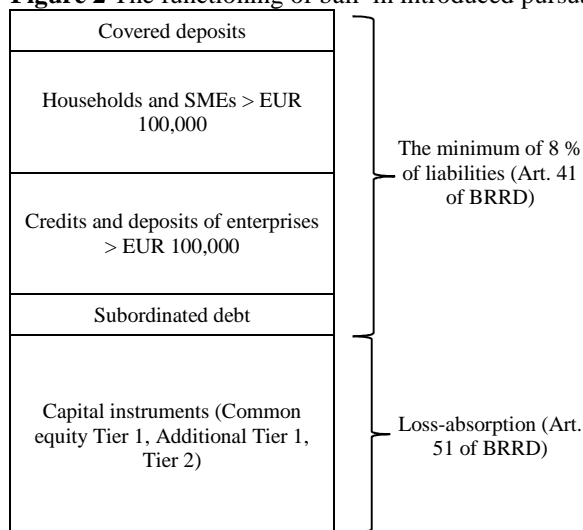
Source: Magnus, Backman,(2015, p. 4).

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[1] The package includes the following documents:
– Regulation (EU) No 575/2013 of the European Parliament and of the Council of 26 June 2013 *on prudential requirements for credit institutions and investment firms, amending Regulation (EU) No 648/2012* (*Capital Requirements Regulation,* CRR)
– Directive 2013/36/EU of the European Parliament and of the Council of 26 June 2013 *on access to the activity of credit institutions and the prudential supervision of credit institutions and investment firms,* amending Directive 2002/87/EC and repealing Directives 2006/48/EC and 2006/49/EC (*Capital Requirements Directive IV,* CRD IV)
[2] Bank Recovery and Resolution Directive.
[3] Directive on Deposit Guarantee Schemes.

Restructuring and ordered winding up of banks are multidimensional processes and pose a challenge when it comes to forming new legal standards. Moreover, the creation of a current protection mechanism is focused on forming security measures and several checkpoints (the requirements of capital adequacy) alarming about a possible difficult situation of a bank.

Overview of literature on the functioning of bail-in and the support for banks

The mechanism of restructuring and ordered winding up of banks (bail-in) at the time of crisis is based on obtaining the sources of financing liabilities in a specific order (fig. 2). In literature, we can find studies on the capital structure in enterprises, such as the research conducted by Modigliani and Miller (Modigliani, Miller, 1958, pp. 261-297), later developed in the study (Modigliani, Miller, 1963, pp. 433-443) by Kraus and Litzenberger (Kraus, Litzenberger, 1973, pp. 911 – 922) published in 1973. Mentioned studies were based on the analysis of a concept of capital structure. On the basis of the conducted studies, Myers and Majluf (Myers, Majluf, 1984, pp. 187 – 221) initiated Pecking Order Theory, according to which the financing sources should be used in a specific order. In bail-in, the order of using bank financing sources is significant, just as in the case of enterprise financing sources. In the context of banks, this order mostly refers to one's owned capital required by a regulator, but new regulations introduce the possibility to use clients deposits as a part of CRD IV/CRR package. Capital requirements are to reduce the risk of future destabilization and regulate any possible winding up of banks. During financial crisis banks assets were shrinking very fast and it has impact on system (Frey, 2016, pp. 90-113). System risk significantly affects future economic fluctuations and practice of banks, which, when combined with improper management, failure to observe other types of risk or to notice some problems at an early stage of their development by regulators or state authorities, can result in serious problems or even a crisis (Zenios, 2016, pp. 579 – 606). The financial crisis of 2007 and its long-term consequences resulted in a necessity to introduce changes in the banking sector in order to reduce risk, including a system-related one. The potential recovery depends on specific of financial crisis and wide variety of financial instruments involved in crisis. The recovery from recession lasted long and it could be comparable to Great Contraction in 1930 and recession in early 1990s (Bordo, Haubrich, 2017, pp. 527 – 541). This situation was related to the fact that conforming to marker rules (market discipline) ceased to be a priority for the sake of maintaining the financial system stable (for financial stability), but also to the stratification of legal and financial system (Biljanovska, 2016, pp. 105 – 135). Stability is really important in sensitive banking system and this is why stress

tests was conducted in many banks as a instrument to check resistance on recession (Klepczarek, 2015, pp. 81-98). Drawing conclusions are useful to enter new regulatory actions in banks stability procedures.

Research hypotheses

Our research was based on verified hypotheses which served as a basis for presented generalizations and conclusions.

Hypothesis 1 (H1): Irregular increase of capital adequacy index[4] for banks in European Union member states.

   At the time of a financial crisis (2007–2009) and restoring stabilization in the following years, enterprises – including those in the banking sector – were also in the process of intensive concentration. In some cases, these companies were still big institutions commonly called "too big to fail" (TBTF). An appreciation of the owned capital to assets ratio due to new regulations was expected; however, in the European Union member states, this process could be asymmetric.

Hypothesis 2 (H2): Verification of capital adequacy index in EU15 states in the context of countries that have joined the EU since 2004 (EU13).

   A significant increase of the ratio of bank assets to GBP in EU15 countries should be based on a large share of capital in relation to assets. Our task is to carry out a comparative analysis of a percentage capital to assets ratio in EU15 countries and in new Member States (EU13).

Methodology

This research was conducted on the basis of World Bank's data on the banking sector in the European Union (EU). The study refers to the capital level as compared to the assets, and also to the coefficient of variation of these factors in relation to the GBP in a given country. The study includes data on the banking sector in the European Union collected from 2004, based on the analysis of individual countries, but also on the comparison of

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[4] Percentage capital to assets ratio of banks

two groups of countries: those which had been in EU before 2004, and those which joined EU in 2004 and later.

The studies were conducted on the basis of literature on the use of bail-in in the banking sector during ordered restructuring or winding up of a bank. The data was analysed with the use of statistical methods, particularly including a correlation analysis, followed by a comparative analysis of obtained results. The level of interdependence was determined on the basis of Pearson's correlation analysis, and the results were verified with the use of J. Guildford's classification of interdependence.

Verification of hypotheses

The introduction of capital requirements for banks means that own capital of a bank will increase. The aim is to determine the level of capital adequacy in individual EU member states and carry out H1 verification (table 2). The level of capital of banks to assets ratio was under appreciation in 2006–2016 (table 1). The highest level was reached in 2015, and the lowest one in 2006. The coefficient of variation[5] was the highest in 2008 and 2011 at the time of financial crisis in the world (2008) and the debt crisis in the Mediterranean countries (2011). The share of percentage capital to assets of banks ratio, as well as standard deviation, increased in EU member states.

Table 1 Indexes of capital to assets ratio of banks in EU

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
EU 28 — average [%]	6.37	6.69	6.42	6.84	7.01	6.90	7.38	7.86	8.21	8.55	8.45
EU 28 — median [%]	6.40	6.53	6.05	6.46	6.58	5.92	6.70	7.14	7.31	7.81	8.06
EU 28 — standard variation [pp]	1.85	2.11	2.37	2.16	2.22	2.54	2.64	2.58	2.78	2.49	2.18
EU 28 — the coefficient of variation	0.29	0.32	0.37	0.32	0.32	0.37	0.36	0.33	0.34	0.29	0.26

Source: Own analysis on the basis of World Bank's data.

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[5] The coefficient of variation was calculated with the following interdependency: standard deviation / average.

Table 2 Verification of correlation between changes in individual countries and EU average (capital to assets ratio of banks, the verification of H1)

Hypothesis 1 (H1): Irregular correlation of change in capital to assets ratio of banks in EU countries			
Interdependence classification according to J. Guilford	Number of countries	Share of countries (%)	Positive or negative correlation
$\|r\|=0\|r\|=0$ — no correlation	0	0.00%	----
$0.0<\|r\|\leq0.1$— slight correlation	0	0.00%	----
$0.1<\|r\|\leq0.3$ — weak correlation	0	0.00%	----
$0.3<\|r\|\leq0.5$ — medium correlation	2	7.14%	100% — positive correlation
$0.5<\|r\|\leq0.7$— high correlation	5	17.86%	60% — positive correlation, 40% — negative correlation
$0.7<\|r\|\leq0.9$ — very high correlation	12	42.86%	91.67% — positive correlation, 8.33% — negative correlation
$0.9<\|r\|<1.0$ — almost full correlation	9	32.14%	100% — positive correlation
$\|r\|=1\|r\|=1$ — full correlation	0	0.00%	----
TOTAL	28	100.00%	

Source: Own analysis.

The objective of Hypothesis 2 is to perform a comparative analysis of countries which, for the purpose of this article, can be classified as developed (they had belonged to EU before 2004 — EU 15) with the countries classified as developing, which have joined EU since 2004 (EU 13). The average value of capital to assets ratio of banks in developed countries (table 3) reached the highest level of 7.26% in 2016, with standard deviation of 1.8 pp. The lowest capital to assets ratio was observed in 2011 and amounted to 5.17%.

Table 3 Indexes of capital to assets ratio of banks in EU 15

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
EU 15 — average [%]	5.44	5.49	4.84	5.52	5.47	5.17	5.65	6.27	6.68	7.36	7.26
EU 15 — median [%]	5.12	5.25	4.70	5.44	5.32	5.05	5.51	6.39	6.50	6.83	7.24
EU 15 — standard deviation [pp]	1.64	1.31	1.11	0.94	0.90	0.87	1.02	1.10	1.97	2.21	1.80

Source: Own analysis on the basis of World Bank's data.

An average bank capital to assets ratio in developing countries (table 4) had an upward trend, similarly to that in the developed countries. However, the ratio value was different, being significantly lower in EU 13. The lowest level for the EU 13 countries observed in 2006 (7.83%) was still higher than the highest level in the EU 15 countries (7.36% in 2015).

Table 4 Indexes of bank capital to assets ratio in EU 13

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
EU 13 — average [%]	7.83	8.23	8.25	8.35	8.78	9.07	9.55	10.03	10.29	10.18	9.87
EU 13 — median [%]	7.60	8.00	8.19	8.08	8.53	9.01	9.49	10.35	10.31	10.11	10.15
EU 13 — standard deviation [pp]	1.07	1.97	2.12	2.19	1.95	2.26	2.42	2.43	2.35	1.88	1.73

Source: Own analysis on the basis of World Bank's data.

Conclusions

This article focuses on bank capital adequacy with a special emphasis on the endorsements of the Basel Committee and the European Parliament, introducing new rules to protect banks from system risk. This study includes an instrument related to ordered restructuring or winding up (bail–in) of banks, which uses deposits over EUR 100,000 collected in banks to repay liabilities. New rules are to allow for an ordered management of banks, and, in particular, to normalize the situation at a time of possible disturbances and crisis. Capital requirements at hazardous moments are

extremely demanding due to the significant capital that banks have invested. During such time, state support in fact means the use of resources coming from tax payers (bail-out). With new regulations to monitor and prevent the lack of capital in unpredicted situations, this situation has been changing.

This study was based on the analysis of foreign and domestic literature, but also of other available data on capital adequacy of banks in European Union member states. Hypotheses were verified with statistical methods.

This study presents the functioning of bail-in, but also capital requirements applicable to banks in EU countries. The tendency regarding variations in the capital to assets ratio of banks in EU is to increase this value in order to provide security of future liquidity of banks. The correlation level is very high or the correlation is almost full in a significant number of cases (H1), which means that these countries introduce capital norms to a different scope, but significantly in the whole sector. The variation of capital adequacy was higher in the EU 13 countries during the financial crisis of 2007–2009 and the debt crisis of 2011–2012 (H2). However, in 2015–2016, a higher variation was observed in EU 15 than in EU 13.

Presented studies are limited by the availability restrictions of detailed data of banks in EU. What is more, introduced norms and regulations have only recently started to function or are still at the stage of deployment. Business practice may look better after a few years, showing the benefits and risks of introduced changes more clearly. The study on regulations of banks and protection from hazards can be extended. Future research can be based on the verification of capital adequacy indexes, in relation to the liquidity coefficients, or the level of financial leverage in banks. Subsequent studies can be multidimensional.

The results of these studies can be used by institutions performing evaluations of or controlling macroeconomic situation of the banking sector in EU, but also by banks in order to determine the direction of future changes.

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The impact of gender composition of boards on firms financial performance in Poland

Abstract

Research background: The so far conducted studies have not been able to answer the question of whether there is a relationship between gender composition of the board and the firms financial performance. Because of the tendency to legally regulate the gender balance of boards of directors as it was, among others, planned in the draft of the EU Directive on improving the gender balance among non-executive directors of companies listed on stock exchanges, which admittedly has been rejected, however, indicates the existence of certain trends among decion-makers, the issue of determining the relationship between gender composition of the boards and firms performance becomes an extremely important issue.

Purpose of the article: The paper aims to answer the question on the number of women in the highest organizational bodies in Polish enterprises and whether there is a relationship between the compositions of boards due to gender of their members and financial results achieved by the companies.

Methodology/methods: For the analysis companies listed on the Warsaw Stock Exchange were analyzed. Following indicators: debt ratio (DR), debt to equity ratio (D/R) and the long-term debt to total assets ratio were chosen. Using statistical analysis the financial indicators were juxtaposed with the number of women on boards.

Findings & Value added: The paper provides insight into the composition of boards in Polish companies listed on the Warsaw Stock Exchange due to gender. It shows that boards of these companies are highly masculine. Nevertheless the paper tries to show if there are any dependencies between the amount of women on boards and the financial performance of the companies.

Introduction

Nowadays certain tendencies to regulate gander composition of boards of directors can be observed. One example can be the draft of the *EU Directive on improving the gender balance among non-executive directors of companies listed on stock exchanges,* which obligates certain organization to disclose non-financial and diversity information or good practices suggested by inter alia Warsaw Stock Exchange to disclose information on corporate governance and gender composition of the board (Maj, 2016). The directive admittedly has been rejected by several EU Member States and thus so far put on ice by the EU. According to Adams (2016) between 2008 and 2015 32 countries have implemented 42 policies regulating gender composition of boards. This shows that there are attempts being made to regulate gender composition of the boards and therefore that decision-makers belief that gender composition somehow influences the organizations functioning.

Some research suggests, that indeed, companies with women on boards perform better. Catalyst (2007) (2011) analyzed Fortune 500 firms regarding return on equity (ROE), return on sales (ROS) and return on invested capital (ROIC) and came to the conclusion that in general companies with more women on boards outperform those with less women on boards. Similar results were presented by Mckinsey (2007) and Credit Suisse (2012). However, those research results were obtained by consulting companies and not in an academic research, therefore the results must be considered with caution. Nonetheless, also academics tried to determine, whether there is a relation between gender composition of the board and firms performance. Post and Byron (2015) came to the conclusion, that female representation on boards is positively connected with inter alia accounting returns and monitoring and strategy involvement. However, they also found, that the relationship between female representation on boards and market performance is not significant. Also Pletzer et al. (2015) came to the conclusion, that if no other factors are considered, the mere representation of women on boards does not correlate with firm financial performance. However Isidro and Sobral (2015) came to an opposite conclusion, that women representation on boards is positively connected to financial performance i.e. return on assets and return on sale.

Therefore, due to the mixed evidence on whether gender composition influences firms financial performance but also due to the fact that organizations are searching for factors, which could give them competitive advantage without the necessity of using advanced technology (Bębenek, 2016) the authors of this paper decided to analyze, whether, based on the

data proved by Polish companies, it can be determined if such a relation exists, which is the main objective of this paper.

Method of the research

For the purpose of this paper 281 organizations listed on the Warsaw Stock Exchange were analyzed. Financial reports for 2015 taken under consideration. Not all organizations listed on the Warsaw Stock Exchange could be included as some of them until the day the reports were collected (February 1-10, 2017) did not disclose that information and others did not disclose information regarding their corporate governance and the composition of their board. The reports were analyzed towards three indicators: debt ratio (DR), debt to equity ratio (D/R) and the long-term debt to total assets ratio. The financial data was then juxtaposed with the number of women within the supervisory board, the management board and organizations, were women were presidents of the boars. The mentioned indicators were chosen, because the present an important part of organizations finical performance. However they also imply important information regarding the openness and willingness to risk as well as information regarding the openness and willingness to investments and development of the organization itself. Therefore, when analyzing the data presented in the paper is must be taken under consideration, that a certain level of debt, especially long-term debt may be an indicator of the organizations growth and not necessarily financial problems of the organization.

Research findings

The first general conclusion refers to the general number of men and women in the supervisory and management boards. In all 281 analysed organizations women were represented only in 91 management boards. More than one woman was present in only 150 supervisory boards. Only in 19 of the analysed companies women were presidents of the boards. Furthermore, even in the boards, were women were present, they still constituted a minority with 12% of all management board members and 14% of all supervisory board members. Therefore it is evident that women are underrepresented in the most important bodies of the organizations and therefore have a more limited access to power and decision-making.

    The relation of the first indicator, the debt ratio to the gender composition of the boards was presented on the Figure 1.

Figure 1. Relation of DR to the gender composition of the management board, supervisory board and the gender of the president of the board.

■ Male/ Without Female Representatives ■ Female/ With Female Representatives
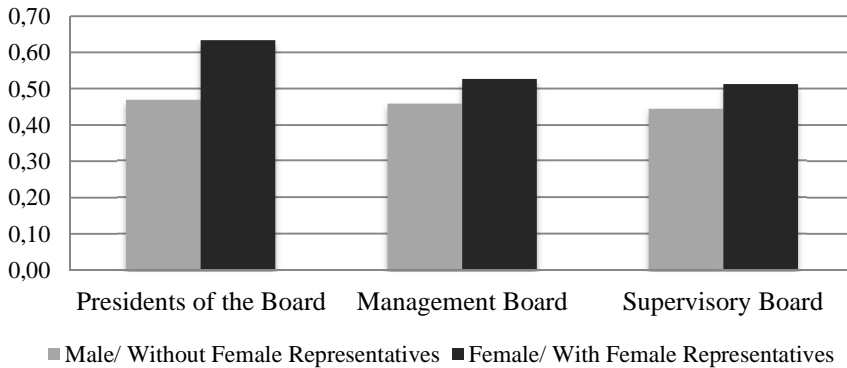
Source: own calculations.

The analysis of the relation of the gender composition of the most important bodies of the organization to the debt ratio (DR) shows, that the indicator is slightly higher in organizations were women are represented in the management and supervisory bodies as well as in those organizations were women are presidents of the boards. However, especially regarding the organizations with female presidents, the low number of such organizations makes it difficult to draw convincing conclusions. Because with the DR, the higher the indicator, the higher the companies debt and in consequence the higher the costs of servicing the loan, the conclusion can be made, that organizations with women on boards tend to have a slightly higher debt and therefore manage capital worse. Organizations with a female president of the board have an average DR of 0,63 and organizations with a male president of the board have an average DR of 0,47. The average value of DR in organizations with women on management boards is 0,53 and without women is 0,46. In organizations with female representatives on supervisory boards the average DR is 0,51 and in organizations without female representatives it was 0,45. However in order to determine whether the presence of women on boards led to the higher debt or whether women joined the boards with an already higher DR further analysis, including a wither time frame, would have to be conducted. As the DR indicator is also strongly connected with the sector the organization is active in, it should also be checked in which industries the organizations with female representation on boards are active in.

The DR may also be analyzed based on the number of women within management and supervisory boards. In organizations with three women on

management boards, the average DR was 0,94. In organizations with two
women it was 1,26 and in organizations with one woman it was 0,37. In
organizations with four women on a supervisory board the average DR was
0,35. In organizations with three women it was 0,6. In organizations with
two women on a supervisory board the average DR was 0,4 while in organ-
izations with one woman it was 0,55. It is therefore hard to indicate a de-
pendency.

The second chosen indicator was the debt to equity ratio. Its' relation to
the gender composition of the boards was presented on the Figure 2.

Figure 2. Relation of D/R to the gender composition of the management board,
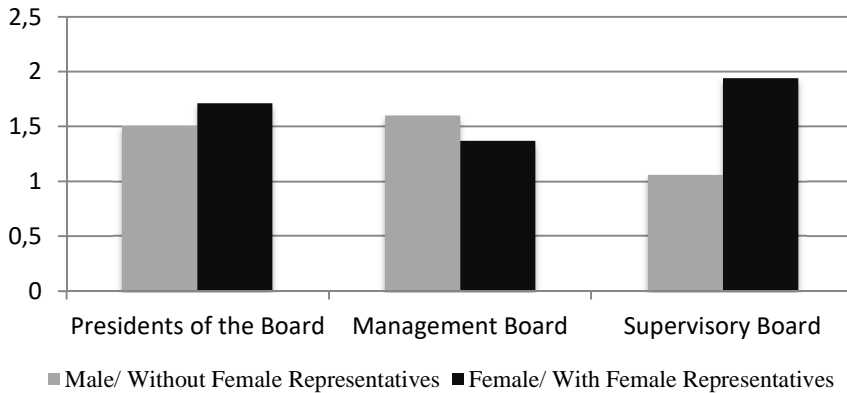supervisory board and the gender of the president of the board.

■ Male/ Without Female Representatives ■ Female/ With Female Representatives

Source: own calculations.

As the value of the debt to equity ratio (D/R) indicator should estimate
around 1,0 to 3,0 all of the analyzed organizations, the ones with and with-
out female representation fall within the optimum compartments. Organiza-
tions with female representation on management boards record a slightly
lower D/R. The average value of the D/R indicator for organizations with
female presidents of the boards is 1,71 and for organizations with male
presidents is 1,51. The average value of the D/R indicator for organizations
with female representatives on management boards is 1,37 and for organi-
zations with only male board members the D/R is 1,6. The highest differ-
ence can be observed in relation to the gender composition of the supervi-
sory board. In organization with female representation the D/R is 1,94 and
in organizations without female representatives the D/R is 1,06. The debt to
equity ratio may suggest a higher willingness and openness to risk. This is
not necessary a negative situation, as it may suggest a greater openness for
innovation and development. However, if the risk and therefore also the

debt to equity ratio is to high it may lead to serious financial problems for the organization.

The D/R may also be analyzed based on the number of women within management and supervisory boards. In organizations with three women on management boards, the average D/R was 7,54. There are however only 3 such organizations. In organizations with two women it was 1,93 and in organizations with one woman it was 1,01. In organizations with four women on a supervisory board the average D/R was 0,6. In organizations with three women it was 1,84. In organizations with two women on a supervisory board the average D/R was 2,13 while in organizations with one woman it was 1,93. Similarly to the DR it is also hard to indicate a dependency in the case of D/R.

The third indicator analyzed is the long-term debt to total assets ratio. The relations between this indicator and the gender composition of the gender composition of the most important bodies of the organization is presented on Figure 3.

Figure 3. Relation of long-term debt to total assets ratio to the gender composition of the management board, supervisory board and the gender of the president of the board
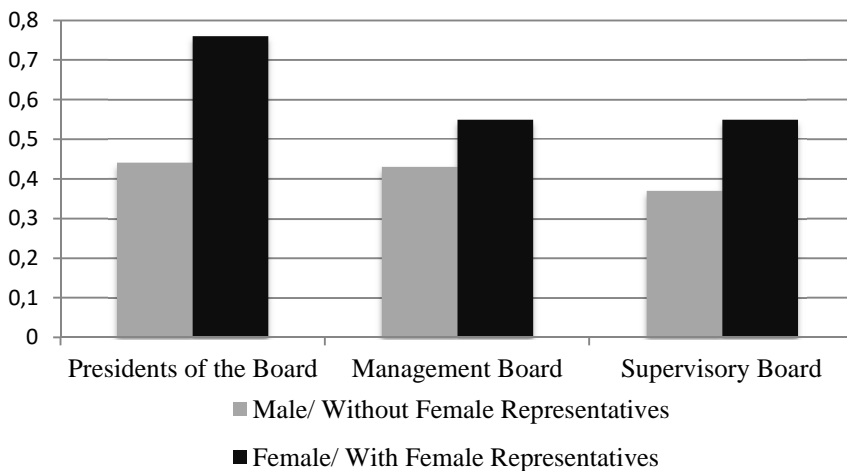
Source: own calculations.

In all three situations, the long-term debt to total assets ratio is higher in organizations, were women are represented in the boards as well as are presidents of the board. In organizations with female presidents the average ratio was 0,76 and in organizations with male presidents the ratio was 0,44.

In organizations with female representatives on management boards average the long-term debt to total assets ratio was 0,55 and in organizations without female representatives it was 0,43. In organizations with female representatives on supervisory boards average the long-term debt to total assets ratio was also 0,55 and in organizations without female representatives it was 0,37. Assuming that this ratio should not be higher than 1, neither the organizations with female representatives on boards nor the ones without are in liquidity threat. The long-term debt may be a result of bank loans aimed at investments. Therefore, if they are at reasonable level, they may be a positive indicator of development, growth and reasonable investments undertaken by the organizations.

Also the long-term debt to total assets ratio may be analyzed based on the number of women within management and supervisory boards. In organizations with three women on management boards, the average long-term debt to total assets ratio was 3,82. In organizations with two women it was 0,93 and in organizations with one woman it was 0,34. In organizations with four women on a supervisory board the average long-term debt to total assets ratio was 0,24. In organizations with three women it was 0,27. In organizations with two women on a supervisory board the average long-term debt to total assets ratio was 1,18 while in organizations with one woman it was 0,24. It is therefore hard to indicate a dependency.

Conclusions

The presented analysis of the distribution of the debt ratio (DR), debt to equity ratio (D/R) and the long-term debt to total assets ratio among organizations with female representatives on boards shows that in general organizations with female representatives on boards tend to have higher ratios. This may not necessarily be a negative trend because, as it was already suggested above, it may be a sign of organizational development and investments undertaken by the organization. Therefore organizations with minimal debt related ratios might be organizations, which struggle with stagnation.

The paper presents only a small part of the organizations financial statement and financial performance. In order to get the full picture on how gender composition of the boar affects the organizations financial performance other financial indicator should be analyzed. Furthermore, it would be beneficial to analyze how the indicator changed over time and juxtapose it with changes of the gender composition of the board. As suggested, it would have to be checked, in which point and which financial situation

women joined the organizations boards or became president of the board. Furthermore a cross industry analysis would also be of interest, as many finical indicators differ significantly across different industries. Also a conduction of more advanced statistical analysis would be beneficial.

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Effects of rumours on IPO success: a qualitative approach

Abstract

Research background: In epidemiology, qualitative models have been developed and applied to study the propagation of infectious diseases since the 1920s. A version of these models is based on the rumour propagation. The main idea behind these models is that spreading an infectious disease or disseminating information are analogous phenomena. Recently, this idea has been used in several areas to analyse how a rumour affects the financial industry. The success of going public depends on many aspects including the predictability and visibility of the initial public offering candidate, enormous growth potential and no signals of a failure. However, the wide public of investors might be reached by rumours affecting significantly the success of initial public offerings.

Purpose of the article: This paper examines the impact of rumours on success or failure of initial public offerings. Rumours might significantly affect the decision-making of uninformed investors while considering investments in newly issued shares and thus are an important phenomenon within going public procedures.

Methodology/methods: The ISS (Ignorant-Spreader-Stifler) model is applied to study the impact of rumours on initial public offering success or failure. We assume that the information asymmetry is one of the most important reasons for spreading rumours. A case study experiment is conducted in order to validate the model.

Findings: Our analysis of spreading rumours suggests that if there is a qualitative model consisting of a set of scenarios and a transitional graph, the decision makers may predict the development of ignorants (I), spreaders (S) and stiflers (R) in time. In such a case, no variant is overlooked, i.e. the model covers all possible changes

of the situation in time. Supposing that rumours are under control of the issuing company, i.e. if detected in a timely manner and effective actions are introduced by decision makers, any reputational damages and thus initial public offering failure can be averted.

Introduction

In epidemiology, qualitative models have been developed and applied to study the propagation of infectious diseases since the 1920s. The SIR (Susceptible-Infected-Removed) compartmental model by Kermack & McKendrick (1927, pp. 700-701) represents a milestone in the development of such models. It was used in public health while studying spreading infectious diseases and plague (Piqueira, 2010, pp. 1). Since the beginning of the 1960s, the transmission of ideas as an "epidemic" process has been studied to analyse how rumours affect marketing strategies, stock markets, etc. (Goffman & Newill 1964, pp. 225). The analogy between spreading an infectious disease and the dissemination of information was mathematically formalized by Daley & Kendall (1964, p. 1118).

Here, the Ignorant-Spreader-Stifler model (hereafter also ISS model), as a generalisation of the Daley & Kendall model, is applied to study the impact of rumours on the success of initial public offerings (IPOs). Palmon *et al.* (2009, pp. 210) reports that business magazines as well as high-tech information intermediaries such as websites, blogs and social networks are very often a source of confounding announcements that are likely to affect decision-making of uninformed investors; hence, in situations when rumours are spread targeted communication campaigns have to be introduced by going public companies and their investment banks in order to avoid an IPO failure.

As far as we know, there is a lack of knowledge in the academic literature how rumours might affect a target population of investors and thus their demand for newly issued shares while going public. These are supposed to have different risk and return characteristics compared to already traded shares because of informational asymmetry (see e.g. Pagano *et al.*, 1998, pp. 36).

The methods employed in this article include systematic and logical literature analysis, collecting of original data from experts, qualitative analysis, a case study approach, comparison, and expert interpretations.

The rest of this paper proceeds as follows. First, we review the literature on the adverse selection theory. Section 3 provides an overview of the

methodological approach. Section 4 presents detailed findings and the last sections discuss and summarise the main conclusions.

Theoretical background

Although the continental financial system is traditionally focused on banking, there has been an increasing interest in the stock markets and initial public offering implementation in recent years (e.g. Pagano *et al.*, 1998, pp. 27-28; Black & Gilson, 1998, pp. 244-245; Chemmanur & Fulghieri, 1999, pp. 249-250; Ritter & Welch, 2002, p. 1795; Lizińska & Czapiewski, 2016, pp. 175-194). This process has been accelerated by the globalisation phenomenon and changes leading to a growing role of interdependencies among economies and capital markets in both emerging and well-developed countries (Balcerzak, 2009, pp. 711–739; Balcerzak & Pietrzak, 2016, pp. 231-241; Pohulak-Żołędowska, 2016, pp. 451-466; Orylski, 2009, p. 47; Pietrzak *et al.*, 2016, 61-77; Zinecker *et al.*, 2016, pp. 416-421, Fałdziński *et al.*, 2016, pp. 189-194). Hence, going public is becoming more and more popular for young and small companies while raising external capital. This strategy, however, requires more transparency towards prospective investors considering buying newly issued shares. As reported by Blajer-Gołębiewska & Kos (2016, p. 11), there is an agreement in the academic literature that reputation affects investors' decisions. Therefore, the reputation of a company is "a strategic asset and is said to have an ability to create wealth".

The scarcity of information for young and small firms may put forward financial analysts' and columnists' recommendations. Therefore, both columnists and financial analysts represent very often a source of the "intellectual epidemic" (Palmon *et al.*, 2009, p. 210), which is highly influential in decision-making of uninformed investors. Goffmann & Newill (1964, p. 225) characterized the "epidemic" process as "transition from one state (susceptible) to another (infective) where the transition is caused by exposure to some phenomenon (infectious material)". The transmission of ideas is analogous to the transmission of viruses; "once an individual is infected with an idea he may in turn, after some period of time, transmit it to others".

Research methodology

In this paper, the ISS (Ignorant-Spreader-Stifler) model is applied to study effects of rumours on the success of going public depending on many exogenous and endogenous aspects including e.g. the predictability and visibility of the initial public offering candidate, his growth potential, the business cycle etc. (Supriya, 2016, pp. 40-43). Based on the study of Nekovee *et al.* (2007, pp. 457–470), the total population (T) of investors is divided into three groups. The first group is represented by the ignorants (I) who have not heard the rumour but they are susceptible to become informed. The second group of investors, the spreaders (S), are active individuals that are spreading the rumour. The stiflers (R) representing the third group have heard the rumour but they are no longer spreading it (Piqueira, 2010, pp. 1).

Our approach that models spreading of rumours in the context of IPOs is of a qualitative nature. This means that shallow knowledge on spreading of rumours is available only as a verbal description based on trends: decreasing, constant, or increasing. It means that there are no quantifiers, numbers, and fuzzy/rough sets (Dohnal, 1992, pp. 539-543).

Trend based models (TB) use different types of Equationless Heuristics (EHE). They differ according the derivative orders. The algorithms given below are based just on second order derivatives. It makes no sense to incorporate the third and higher orders derivative. An example of the first order EHE is as follows (for details see Lindgren & Bandhold, 2002, pp. 47-101):

If HCQ is increasing then MCD is increasing.
If HCQ is decreasing then MCD is decreasing. $\qquad$ (1)
Where: MCD - *marginal cost of debt* and HCQ - *home country institutional quality*.
An example of the second order EHE is as follows:
If HCQ is increasing, then MCD is increasing more and more rapidly.
If HCQ is decreasing, then MCD is decreasing more and more rapidly. $\qquad$ (2)

Information intensity of traditional statistical analysis generates pressure on artificial intelligence experts to develop new formal tools, see e.g. Russel (2009, pp. 180-240), which are not as precise as statistics but can take into consideration such information items as EHEs (Vicha & Dohnal, 2008, pp. 70-78). The TB methods presented in this paper are based on four TB values:

Positive	Zero	Negative	Any Value	
+	0	–	*	(3)

Many shallow knowledge items are available just as verbal descriptions based on trends, *decreasing, constant, increasing*, only (Yan *et al.*, 2013, pp. 1-12). For example, *if the management of the issuing company improves reporting towards investors then the information asymmetry tends to decrease and the probability of a successful IPO is increasing.* Typical examples of such pair wise trend relations are given in Figure .

Figure 1. Examples of qualitative pair wise relations
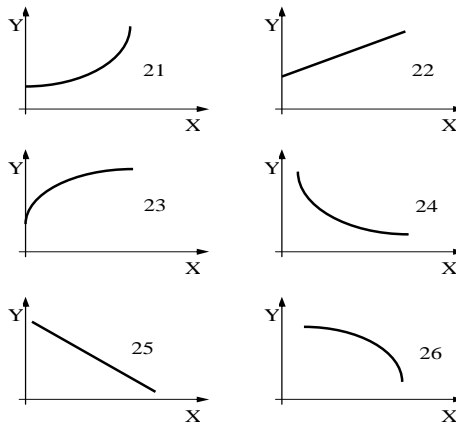
Source: own processing

All pair wise relations *X, Y* in Figure are trend relations. It means that nothing is quantified. For example the relation No. 23 indicates that:
− The relation is increasing, i.e. the first derivative is positive.
− There is a "saturated" relationship between *Y* and *X*, i.e. the second derivative is therefore negative.
− If *X* = 0, then *Y* = positive value.

The scenario based analysis are relatively well known, see e.g. (Bohensky *et al.*, 2011, pp. 876–893). The scenario concept has different interpretations, see e.g. (Derbyshire & Wright, 2017, pp. 254-266). Scenario methods are often qualitative in their approach rather than quantitative (Derbyshire & Wright, 2017, pp. 254-266). Such mixtures of qualitative and quantitative features can be used to distinguish scenarios, forecasts and visions (Lindgren & Bandhold, 2002, pp. 47-101):

Scenarios	Forecasts	Visions
Scenarios	*Forecasts*	*Visions*
Possible, plausible futures	Probable futures	Desired future
Qualitative or Quantitative	Usually qualitative	Quantitative

An intuitive definition of qualitative transition scenarios has been carried out by McDowall (2014, pp. 1-14). Different very specific definitions have been carried out by e.g. in Kröger and Schäfer (2016, pp. 64-81).

Predictive scenario approaches are likely to result in policies that perform poorly under severe information shortages (IS). It is inevitable to combine an adaptive policy-making framework and a computer based approach to generate and explore many scenarios.

The set of variables is as follows:

$$X_1, X_2, \ldots, X_n \tag{4}$$

A set of *m* TB *n*-dimensional scenarios is described by a sequence of *TB* triplets, for details see (Vicha & Dohnal, 2008, pp. 70-78):

$$[(X_1, DX_1, DDX_1), (X_2, DX_2, DDX_2), \ldots, (X_n, DX_n, DDX_n)]_j, \tag{5}$$

Where $j = 1, 2, \ldots, m$. DX_i is the first and DDX_i is the second time *TB* derivatives. The scenarios used in this paper are defined by the set of triplets (5) and the triplets are quantified by the values (3).

A *TB* shallow model, studied in this paper, is a set of *w* pair wise relations, see Figure :

$$P_v(X_i, X_j), \ v = 1, 2, \ldots, w. \tag{6}$$

This set of relations can be solved to evaluate all scenarios satisfying the model (3). For example the following set of relations can be studied:

	Shape	X	Y	
1	22 (see Figure)	X_1	X_2	(7)
2	26 (see Figure)	X_3	X_2	

A solution of qualitative models is a combinatorial task and is not studied in this paper, for details see (Vicha & Dohnal, 2008, pp. 70-78). The solution of the model (7) provides us with 13 scenarios:

	X_1	X_2	X_3	
1	$+++$	$+++$	$+--$	
2	$++0$	$++0$	$+--$	
3	$++-$	$++-$	$+-+$	
4	$++-$	$++-$	$+-0$	
5	$++-$	$++-$	$+--$	
6	$+0+$	$+0+$	$+0-$	
7	$+00$	$+00$	$+00$	(8)
8	$+0-$	$+0-$	$+0+$	
9	$+-+$	$+-+$	$++-$	
10	$+-0$	$+-0$	$++-$	
11	$+--$	$+--$	$+++$	
12	$+--$	$+--$	$++0$	
13	$+--$	$+--$	$++-$	

The interpretation of the results (8) is as follows: e.g., the triplet $(+ + +)$ which describes the time behaviour of the variable X_1 of the first scenario indicates that X_1 is positive; DX_1 is positive; DDX_1 is positive, see (5). It means that the variable X_1 is increasing more and more rapidly.

Any additional relation or equation is restrictive. Therefore, the number of scenarios m (2) will decrease or be constant if a model extension is performed. The following qualitative equation is added to the model (7):
$$X_1 + X_2 = X_3 \tag{9}$$
The following set of scenarios provides us with a solution:

	X_1	X_2	X_3		
1	$+++$	$+++$	$+--$	1	
2	$++-$	$++-$	$+-+$	3	
3	$++-$	$++-$	$+-0$	4	
4	$++-$	$++-$	$+--$	5	
5	$+0+$	$+0+$	$+0-$	6	
6	$+00$	$+00$	$+00$	7	(10)
7	$+0-$	$+0-$	$+0+$	8	
8	$+-+$	$+-+$	$++-$	9	
9	$+--$	$+--$	$+++$	11	
10	$+--$	$+--$	$++0$	12	
11	$+--$	$+--$	$++-$	13	

The right column shows the identification of the corresponding scenario of the model (7). The scenarios Nos. 2 and 10 of the set (8) are not in the

set (10). A complete set of all possible one-dimensional transitions is given in Table 1.

Table 1. A list of all one-dimensional transition

	From	To	Or	Or	Or	Or	Or	Or
1	+ + +	+ + 0						
2	+ + 0	+ + +	+ + −					
3	+ + −	+ + 0	+ 0 −	+ 0 0				
4	+ 0 +	+ + +						
5	+ 0 0	+ + +	+ − −					
6	+ 0 −	+ − −						
7	+ − +	+ − 0	+ 0 +	+ 0 0	0 − +	0 0 +	0 0 0	0 − 0
8	+ − 0	+ − +	+ − −	0 − 0				
9	+ − −	+ − 0	0 − −	0 − 0				
10	0 + +	+ + 0	+ + −	+ + +				
11	0 + 0	+ + 0	+ + −	+ + +				
12	0 + −	+ + −						
13	0 0 +	+ + +						
14	0 0 0	+ + +	− − −					
15	0 0 −	− − −						
16	0 − +	− − +						
17	0 − 0	− − 0	− − +	− − −				
18	0 − −	− − 0	− − +	− − −				
19	− + +	− + 0	0 + +	0 + 0				
20	− + 0	− + −	− + +	0 + 0				
21	− + −	− + 0	− 0 −	− 0 0	0 + −	0 0 −	0 0 0	0 + 0
22	− 0 +	− + +						
23	− 0 0	− + +	− − −					
24	− 0 −	− − −						
25	− − +	− − 0	− 0 +	− 0 0				
26	− − 0	− − −	− − +					
27	− − −	− − 0						

Source: own elaboration

As an example, the third line of Table 2 indicates that it is possible to transfer the triplet (+ + –) into the triplet (+ 0 –). This transition is not the only possible one. There are two more possible transitions. Figure 2 provides a TB description of an oscillation using the one-dimensional triplets $n = 1$ (5). The time sequence of the one-dimensional transitions shown in Figure 2 corresponds to Table 1.

Figure 2. TB one-dimensional time record
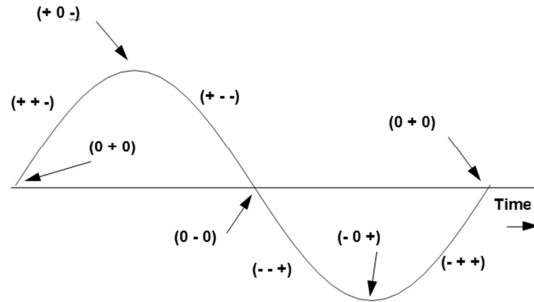
Source: own elaboration

Table 1 is not a dogma. It could be modified on an ad hoc basis. The on-ly requirement is that the transitions must satisfy a common sense reason-ing of the user. A transitional graph G is an oriented graph. Its nodes are the set of scenarios **S** and oriented arcs are the transitions **T**:

$$G(\mathbf{S},\mathbf{T}). \tag{10}$$

The set of n-dimensional transitions **T** can be generated by the corre-sponding set of scenarios **S** using the one-dimensional transitions (see Ta-ble 1). All n one-dimensional transitions must satisfy requirements set in Table 1 if n-dimensional scenarios are studied. A path P is an oriented se-quence of scenarios. The graph G (10) can have loops and therefore a path P can pass through the loop infinitely many times.

Empirical Results: A Case Study Analysis

We applied the methodology described in the previous chapter within a case study in order to investigate the impact of rumours on the success of going public. An IPO can be considered successful if a sufficient demand for shares has been drum up, which results in the sale of issued shares at the highest price while also providing investors with opportunities to cash earn-ings in the long-term.

We assume that the wide public of uninformed investors might be reached by rumours affecting significantly the success of initial public of-ferings. There are two confounding announcements (A1 and A2) involved into our case study:

A1: *Top managers are leaving the company after being listed; thus, the earnings of the going public company might decrease.*
A2: *Trading activities of top management prior going public are investigated. The managers are suspected of bribing policy makers and the scandal might be far more widespread than earlier believed.*

Both announcements are published by a columnist in a leading business magazine and reveal information which is new for the public and is likely to affect negatively the sale of newly issued shares within the IPO procedure. Findings carried out by Palmon *et al.* (2009, pp. 230) suggest that an announcement is potentially confounding and "triggers a larger market reaction" if a columnist's recommendation "makes references to management officials, or contains merger and acquisition news".

The total population (T) of investors is divided into three groups: the ignorants (I), spreaders (S) and stiflers (R). Moreover, we introduced the variable seroprevalence (P), which is calculated as:

$$P = \frac{S}{S + R} \tag{11}$$

Goffman and Newill (1964, pp. 227) assume homogenous mixing among the members of the total population and describe deterministically the whole process while using a system of differential equations. Hence, we obtain our qualitative model as follows:

$$
\begin{aligned}
DI &= -I \\
DS &= I \cdot S - S \cdot (S + R) \\
DR &= S \cdot (S + R) \\
DII &= -II \\
DSS &= II \cdot SS - SS \cdot (SS + RR) \\
DRR &= SS \cdot (SS + RR) \\
(S + R) \cdot P &= S \\
(SS + RR) \cdot PP &= SS
\end{aligned} \tag{13}
$$

We consider the following restrictions:

Shape		X	Y	
1	23 (see Figure 1)	I	II	(14)
2	23 (see Figure 1)	R	RR	

Due to a lack of numerical data a qualitative and trend-based approach has been applied to solve our model. A solution to the system of differential equations (13) requires application of the qualitative summation and multiples. In this case, we are looking for all possible variants of ordered triplets corresponding to the defined equations (see Table 2). Each row represents a scenario how the number of the ignorants (*I*), spreaders (*S*) and stiflers (*R*) might develop in time. The rows are divided into three parts linked to the variables *I*, *R*, *S*, *P* (concerning the rumour A1) and *II*, *RR*, *SS* and *PP* (concerning the rumour A2). Each variable is described while using a triplet, e.g. the variable *I* in the first row is given by the triplet (+ – *). The ordered triplets are just a different way how to define trends of the individual variables describing either the rumour A1 or the rumour A2. For example, the triplet of the variable I (+ – *) represents a decreasing trend (see Figure 1). The interpretation of the individual components of the triplet is as follows:

I	DI	DDI
+	-	*
Positive value	Decreasing trend	Acceleration (2nd derivation) unknown

Table 2. Scenarios

Scenario	I	R	S	II	RR	SS	P	PP
1	+–*	++*	++*	+–*	++*	++*	++*	++*
2	+–*	++*	++*	+–*	++*	++*	++*	+0*
3	+–*	++*	++*	+–*	++*	++*	++*	+–*
4	+–*	++*	++*	+–*	++*	++*	+0*	++*
5	+–*	++*	++*	+–*	++*	++*	+0*	+0*
6	+–*	++*	++*	+–*	++*	++*	+0*	+–*
7	+–*	++*	++*	+–*	++*	++*	+–*	++*
8	+–*	++*	++*	+–*	++*	++*	+–*	+0*
9	+–*	++*	++*	+–*	++*	++*	+–*	+–*
10	+–*	++*	+0*	+–*	++*	+0*	+–*	+–*
11	+–*	++*	+–*	+–*	++*	+–*	++*	++*
12	+–*	++*	+–*	+–*	++*	+–*	++*	+0*
13	+–*	++*	+–*	+–*	++*	+–*	++*	+–*
14	+–*	++*	+–*	+–*	++*	+–*	+0*	++*
15	+–*	++*	+–*	+–*	++*	+–*	+0*	+0*
16	+–*	++*	+–*	+–*	++*	+–*	+0*	+–*
17	+–*	++*	+–*	+–*	++*	+–*	+–*	++*
18	+–*	++*	+–*	+–*	++*	+–*	+–*	+0*
19	+–*	++*	+–*	+–*	++*	+–*	+–*	+–*

Source: own elaboeation

We intend to use our set of scenarios (see individual rows in Table 2) to describe the dynamic behaviour of our model. For this purpose, a sequence of scenarios has to be carried out. A transitional graph is a suitable tool (see Figure 3). Its (numbered) nodes represent the set of scenarios and oriented arcs represent the transitions. The scenarios in combination with their tran-

sitions enable us observing the dynamic behaviour of the qualitative model, which describes how the rumours A1 and A2 might be spread.

Figure 3. Transition graph
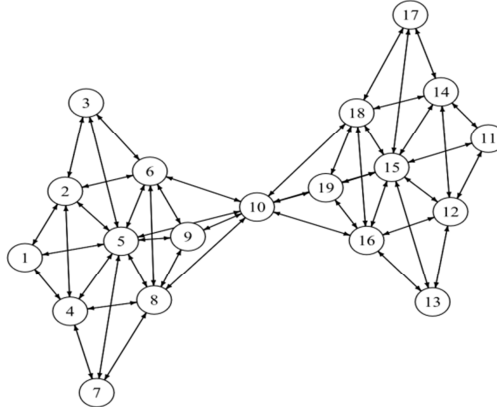
Source: own elaboration.

The dynamic behaviour of the variable *S* can be used as an example. The node No. 1 is defined as the initial one; if the orientation of arrows between individual nodes remains unchanged, we can outline the following path (from a set that is possible):

1 → 2 → 3 → 6 → 5 → 4 → 7 → 8 → 9 → 10 →...
...→ 19 → 18 → 17 → 14 → 15 → 16 → 13 → 12 → 11
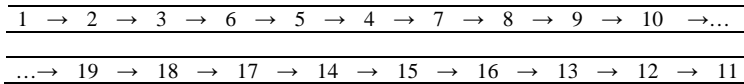
When we use the ordered triplets (see Table 2), the path can be also described in the following form:

++* → ++* → ++* → ++* → ++* → ++* → ++* → ++* → ++* →...
...→ +0* → +-* → +-* → +-* → +-* → +-* → +-* → +-* → +-* → +-*
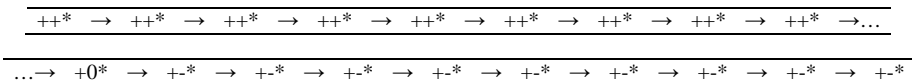
When the above trends of the variable *S* are ordered consecutively, we can obtain a figure describing its development; this figure corresponds to a numerical solution (see Figure 4). Table 3 shows the development of other observed variables incorporated into our model.

Figure 4. Development of spreaders (S)
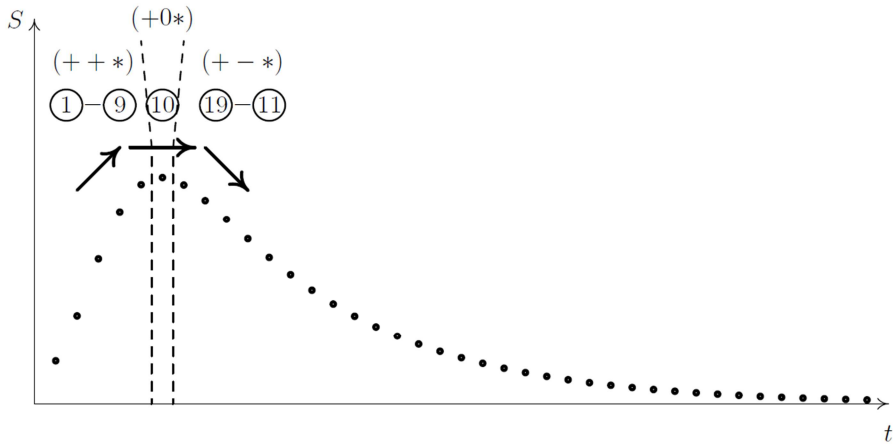
Source: own elaboration

Table 3. Development of observed variables

No Var	1	2	3	6	5	4	7	8	9	10	19	18	17	14	15	16	13	12	11
I	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
R	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
S	↑	↑	↑	↑	↑	↑	↑	↑	↑	→	↓	↓	↓	↓	↓	↓	↓	↓	↓
II	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
RR	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
SS	↑	↑	↑	↑	↑	↑	↑	↑	↑	→	↓	↓	↓	↓	↓	↓	↓	↓	↓
P	↑	↑	↑	→	→	→	↓	↓	↓	↓	↓	↓	↓	→	→	→	↑	↑	↑
PP	↑	→	↓	↓	→	↑	↑	→	↓	↓	↓	→	↑	↑	→	↓	↓	→	↑

Conclusions

Supposing that both rumours included into our case study might be under control of issuing companies; if detected in a timely manner and effective actions are introduced by decision makers, any reputational damages can be averted. Our set of scenarios and the transitional graph represent a tool which makes sure that no variant is overlooked, i.e. covers all possible changes of the situation in time. Thus, the managers of companies going public are not just passive observers. If there is a qualitative model, the decision makers may predict the development of ignorants (I), spreaders (S) and stiflers (R) in time. If investors' choice relies largely on rumours published in columns, blogs or social networks, it is essential for companies going public to know the number of investors within the individual groups. Next, targeted communication campaigns can be introduced to reduce investors' concerns in relation to a failure of the IPO. For example, support-

ive resources of information might be published, as well as press releases refuting rumours or claims convincingly.

The main advantage of the TB analysis is that no numerical values of constants and parameters are needed and the set of TB scenarios / solutions is provably complete. It means that a decision maker and/or forecaster has a simpler task to solve, namely to choose from a given set of variants. No reasonable variant can be overlooked if the analysis is based on a feasible TB model.

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Determinants of Payout Policy and Investment Attractiveness of Companies Listed on the Warsaw Stock Exchange

Abstract

Research background: Making decisions concerning the payout policy depends on many diversified neoclassical and behavioral determinants. Although these factors are well-described in the literature, there is still a research gap concerning the lack of a comprehensive impact model of payout policy determinants on the investment attractiveness of shares.

Purpose of the article: The aim of this paper is to present the diverse nature of relationships between different forms of cash transfer to the shareholders and investments attractiveness of public companies in the context of determinants of payout policy. The possibility to achieve this objective was conditioned by empirical verification of research hypothesis stating that the diversify of payout forms is accompanied by the different determinants of payout policy which condition an effective investment of stock investors capital.

Methodology/methods: The empirical research was conducted on the electromechanical companies which were listed on the Warsaw Stock Exchange in years 2006-2015. The data for analysis were mainly collected from database *Notoria Service SA* and *Stock Exchange Yearbooks*. The calculations were carried out using the methodology of taxonomic measure of investment attractiveness, as well as dividend premium and share repurchase premium.

Findings & Value added: The final conclusion of our research is that the companies conducting the payout policy in different forms of cash transfer differ in terms of many characteristics, such as: financial standing, market value, ownership structure, company's size and age. Moreover, their investment attractiveness differs according to regularity of payment, stock exchange situation and shareholders

preferences. The value added of this paper is a new approach to the evaluation of capital investment with a special emphasis on the determinants of payout policy.

Introduction

The aim of this paper is to present the diverse nature of relationships between different forms of cash transfer to the shareholders and investments attractiveness of public companies in the context of determinants of payout policy. This intention fits into the current and significant stream of research oriented to finding the fundamental factors determining the form, type and way of conducting the payout policy in public companies. Furthermore, this aim is also important due to the efficiency of capital investment. For the implementation of the aim of this paper a research hypothesis was formulated. This hypothesis states that the diversify of payout forms is accompanied by the different determinants of payout policy which condition an effective investment of stock investors capital.

Determinants of payout policy – a brief literature review

The term *payout policy* has a broader meaning than *dividend policy* and includes in its essence the transfer of funds to the shareholders in a form of dividend, share repurchase, or both (Allen & Michaely, 2003, p. 337; Brav *et al.*, 2005, p. 484; Kulchania, 2016, p. 981). An implementation of payout policy is conditioned by many different determinants. Among the most frequently mentioned in the literature determinants of payout policy are micro- and macroeconomic factors, as well as behavioral factors.

One of the microeconomic factors is the financial standing of company. The majority of authors pay attention to such financial determinants as: the financial liquidity (La Porta *et al.*, 2000, p. 34; Grullon & Ikenberry, 2000, p. 41); the profitability of company (Brav *et al.*, 2005, p. 521) and the capital structure (Jensen *et al.*, 1992, pp. 247-263; Wiemer & Diel, 2008, p. 301). Moreover, the form of payout policy depends on the market value of company (Chan *et al.*, 2004, p. 463; Billett & Xue, 2002, p. 1649), the company's size and age (DeAngelo *et al.*, 2006, pp. 227-254) as well as the ownership structure (Short *et al.*, 2002, pp. 105-122; Ginglinger & L'Her, 2006, pp. 77-94). In turn, to the macroeconomic determinants of payout policy belong e.g. the economic situation (Kowerski, 2010, p. 19-34) and tax rates (Hung & Chen, 2010, p. 101; Jacob & Jacob, 2013, p. 1241).

Among the behavioral determinants of payout policy we should point at the shareholders preferences and needs (Gajdka, 2013, p. 130), the anchor effect (Fisher & Statman 2000, p. 72) and the mental accounting (Szyszka, 2013, p. 38). Furthermore, according to the catering theory of dividend, the payout policy should be carried out in the form of payment which is preferred by the shareholders (see Baker & Wurgler, 2004, p. 1125; Li & Lie, 2006, p. 293). It is also noticed that if the opportunities for the economic growth are seen by investors as strong, they prefer not to be paid the dividend and leave the net profit in the company for investment (Gajdka, 2013, p. 143; Fuller & Goldstein, 2011, p. 457).

Research methodology

The empirical research was conducted on a group of 42 companies operating in the electromechanical industry sector, which were listed on the Warsaw Stock Exchange in the years 2006-2015.

An empirical verification of research hypothesis was carried out using the taxonomic measure of investment attractiveness (*tmai*) (see Tarczyński, 1994, p. 275-300). As the diagnostic variables we adopted 13 determinants of payout policy, such as: company's financial liquidity (*CR*, *QR* and *MR*), profitability (*ROS*, *ROE* and *ROA*), debts (*D/A* and *D/EBITDA*), market value of company (*p/BV* and *p/E*), company's size (*lnAss*) and age (*Age*), as well as the share of majority shareholders in the ownership structure (*Share*). The taxonomic measure of investment attractiveness (*tmai*) based on the selected determinants of payout policy is a following function:

$$tmai = f(CR, QR, MR, ROS, ROE, ROA, \frac{D}{A}, \frac{D}{EBITDA}, \frac{p}{BV}, \frac{p}{E}, lnAss, Age, Share)$$

The diagnostic variables were divided into stimulants (*CR*, *QR*, *MR*, *ROS*, *ROE*, *ROA*, *lnAss*, *Age*, *Share*) and destimulants (*D/A*, *D/EBITDA*, *p/BV*, *p/E*) and then restated for comparability and normalized (Grabiński *et al.*, 1989, p. 93). The taxonomic measure of investment attractiveness was calculated using the Euclidean distance (*tmai$_e$*) and weights (*tmai$_w$*) (see Łuniewska & Tarczyński, 2006, p. 43-45).

The empirical research on the investment attractiveness of companies implementing different forms of cash transfer were extended to such de-

terminants of payout policy as: the regularity of payments[1], stock exchange situation[2] and investors preferences. The investors preferences were expressed – according to the extended catering theory of dividend – as the difference between share repurchase premium and dividend premium in year t[3]. This difference (DIF_t) can be calculated using the following formula (see Jiang *et al.*, 2013, p. 41; Baker & Wurgler, 2004, p. 11; Gajdka, 2013, p. 152-153):

$$DIF_t = RP_t^{R-NR} - DP_t^{D-ND}$$

where:
RP_t^{R-NR} – a share repurchase premium in year t,
DP_t^{D-ND} – a dividend premium in year t.

The results of empirical research on the determinants of payout policy and investment attractiveness of companies

The analysis of companies operating in the electromechanical industry sector in years 2006-2015 showed that the average financial liquidity of dividend payers was higher than the average sectoral liquidity. The dividend payers were more liquid than the companies repurchasing shares, those conducting payout policy in both forms of cash transfer, as well as the non-payers. The dividend payers were also profitable companies. Their profitability ratios were higher than sectoral ratios but lower than the profitability ratios of companies conducting the payout policy in both forms of cash transfer. Moreover, the debts ratio of dividend payers were lower than the average debts ratio in that sector. What is more, the market value of dividend payers was high, their average age was longer than the age of companies repurchasing shares, and the average share of majority shareholders in the ownership structure was 66% (see Table 1).

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[1] As the regular payments we understood such cash transfers which were conducted at least 3 times during the 5 previous years. This assumption was made in accordance with the WIGdiv index methodology (*Rocznik Giełdowy*, 2013, p. 104). Otherwise, we considered that the payments to be irregular.

[2] The division of research period into the years of the fall and the rise in the stock exchange was made on the basis of the level of WIG index in those years.

[3] We assumed that in the year when the difference between share repurchase premium and dividend premium (DIF_t) was positive the shareholders preferred companies repurchasing shares to dividend payers. When DIF_t was negative we assumed that stock investors preferred dividend payers to companies repurchasing shares.

Table 1. Average values of chosen determinants of payout policy and investment attractiveness of companies

Spec.	CR	QR	MR	ROS	ROE	ROA	D/A	D/Eb	p/BV	p/E	LnAss	Age	Share
D	3,40	2,61	1,03	0,13	0,13	0,09	0,32	3,38	1,75	18,42	11,93	45,67	0,66
D&SR	2,78	1,91	0,64	0,15	0,16	0,12	0,35	3,64	2,16	20,09	12,24	50,86	0,67
SR	1,79	1,34	0,36	0,02	0,08	0,05	0,48	5,21	1,11	17,79	11,90	32,00	0,29
NP	2,08	1,67	0,58	0,06	0,07	0,04	0,91	3,94	1,64	37,70	29,42	19,50	0,69
Total	2,59	2,01	0,74	0,09	0,10	0,06	0,73	3,77	1,67	26,14	16,48	46,64	0,64

Note: D – dividend payers, D&SR – companies conducting the payout policy in both forms of cash transfer, SR – companies repurchasing shares, NP – non-payers, Total – all companies in the electromechanical industry sector.

Source: own calculations based on Notoria Serwis SA, National Court Register, Stock Exchange Yearbooks and Emerging Markets Information Service.

The empirical research on the investment attractiveness of companies conducting the payout policy in different forms of cash transfer showed that the dividend payers had the highest investment attractiveness. In turn, the companies repurchasing shares reached the lowest investment attractiveness (see Table 2).

Table 2. Investment attractiveness of companies according to the forms of payout policy

Specification	$tmai_e$	$tmai_w$
Dividend	0,65	0,53
Dividend & Share Repurchase	0,52	0,43
Share Repurchase	0,18	0,22
No Payout	0,25	0,30
Total Sector	0,51	0,50

Source: see Table 1.

An evaluation of involvement of investors capital, conducted regarding to the regularity of payments, showed that the investment attractiveness of regular dividend payers[4] was very high in comparison to irregular dividend payers. In turn, the highest investment attractiveness of companies repurchasing shares was observed in cases of irregular share repurchases[5] (see Table 3).

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[4] The regular dividend was paid the most frequently by: Apator SA and Hydrotor SA (each of them paid 10 dividends), Introl SA and Rafamet SA (7 dividends), as well as Es-System SA, Lena Lighting SA and Sonel SA (6 dividends).

[5] In the research period, the share repurchases were conducted most frequently by Amica SA (6 times).

Table 3. Investment attractiveness of companies according to the regularity of payments

Specification	$tmai_e$	$tmai_w$
Regular Dividend	0,53	0,58
Irregular Dividend	0,31	0,46
Regular Share Repurchase	0,10	0,18
Irregular Share Repurchase	0,70	0,62

Source: see Table 1.

The analysis of investment attractiveness of companies conducting the payout policy in different forms of cash transfer was extended to the stock exchange situation[6]. When there was a rise in the stock exchange, the highest *tmai* was observed in the companies conducting the payout policy in both forms of cash transfer. In the years of a fall in the stock exchange, it was worth to invest in the non-payers (see Table 4).

Table 4. Investment attractiveness of companies according to the stock exchange situation

Specification	$tmai_e$	$tmai_w$
Rise in the stock exchange		
Dividend	0,33	0,44
Dividend & Share Repurchase	0,56	0,50
Share Repurchase	0,11	0,16
No Payout	0,24	0,33
Fall in the stock exchange		
Dividend	0,35	0,53
Dividend & Share Repurchase	0,30	0,37
Share Repurchase	0,10	0,16
No Payout	0,70	0,57

Source: see Table 1.

An evaluation of investment attractiveness of the companies implementing the different payout policies was also carried out considering the shareholders preferences expressed as the difference between share repurchase premium and dividend premium. The results of research showed that in the majority of years stock investors preferred dividends to share repurchases (see Table 5).

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[6] For the years of fall in the Warsaw Stock Exchange we took the years in which an annual rate of return of WIG index was negative, i.e. 2008 (-51,07%), 2011 (-20,83%) and 2015 (-9,62%) (see Parkiet.com).

Table 5. Difference between share repurchase premium and dividend premium in years 2006-2015

Spec.	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
DIF_t	-0,04	-0,90	-0,11	-0,38	-0,89	-0,02	-0,54	0,43	-0,28	-1,23

Source: own calculations based on Stock Exchange Yearbooks.

In the years when the stock investors preferred dividend (i.e. $DIF_t < 0$), the highest investment attractiveness was observed for the dividend payers. Moreover, the companies conducting the payout policy in both forms of cash transfer were also seen as a good investment opportunity. When dividend premium was high, the investment attractiveness of companies repurchasing shares was the lowest. In turn, when the stock investors preferred the companies repurchasing shares (i.e. $DIF_t > 0$), the highest investment attractiveness was observed in those companies that conducted the payout policy in both forms of cash transfer. Furthermore, the investment attractiveness of companies repurchasing shares was not high (see Table 6).

Table 6. Investment attractiveness of companies according to the shareholders preferences

Specification	$tmai_e$	$tmai_w$
High dividend premium ($DIF_t < 0$)		
Dividend	0,51	0,36
Dividend & Share Repurchase	0,34	0,32
Share Repurchase	0,09	0,15
No Payout	0,29	0,25
High share repurchase premium ($DIF_t > 0$)		
Dividend	0,49	0,35
Dividend & Share Repurchase	0,70	0,35
Share Repurchase	0,29	0,33
No Payout	0,11	0,26

Source: see Table 1.

It should be also noted that in the years when the stock investors preferred share repurchases to dividends, the investment attractiveness of companies repurchasing shares was higher than in the years when shareholders preferred dividend (see Table 6).

Conclusions

The analysis showed that the form of payout policy is affected by different determinants. One of them was the financial standing of company. The financial condition of dividend payers was better in relation to the financial

condition of companies repurchasing shares (i.e. the dividend payers were more profitable and liquid, their debts were lower, and market valuation was higher). Those companies also differed in terms of company's age and ownership structure. The companies repurchasing shares were younger than the dividend payers, and their ownership was highly dispersed.

The highest investment attractiveness was observed in the dividend payers and the lowest in the companies repurchasing shares. Among the dividend payers, the most attractive for investors were those companies that paid dividend regularly. In turn, the analysis of companies repurchasing shares showed that stock investors preferred the irregular share repurchases. Moreover, when there was a rise in the stock exchange, the most attractive for stock investors were those companies that conducted the payout policy in both forms of cash transfer. When there was a fall in the stock exchange, shareholders preferred the non-payers. Furthermore, in the years when stock investors expected to receive dividend, the dividend payers were more attractive for them.

In addition, it is worth nothing that the presented results of research relate to the electromechanical industry sector and should not be generalized. The research should be extended not only to other economic sectors, but also to other determinants of payout policy.

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The role of comprehensive income in predicting banks' future earnings

Abstract

Research background: In the economic literature there are many arguments presented by critical supporters and opponents of measuring and reporting comprehensive income. There is a justified need to examine the relevance and usefulness of comprehensive income, especially the predictive power of comprehensive income for forecasting future earnings. It may be assumed that the comprehensive income has a better predictive power for future bank performance than net income, because this measure includes many elements, presented in the statement of changes in equity.

Purpose of the article: The major subject in this paper is the evaluation of the usefulness of comprehensive income for predicting banks' future earnings. Realization of the fundamental objective of this paper was centered around the main research hypothesis, stating that in economic practice of banks listed on the Warsaw Stock Exchange it can be assumed that there is a positive predictive power of financial result in forecasting financial standing of these entities.

Methodology/methods: The research comprised bank joint-stock companies listed on the Warsaw Stock Exchange (qualified on 15.09.2016). Empirical data for the study was obtained from the quarterly financial statements (the period from 2009 to 2015) from EMIS. The research method was the regression analysis conducted by means of Spearman's rank correlation coefficient and by two regression models in two versions.

Findings & Value added: The research showed that the analyzed bank companies were characterized by a diversity usefulness of comprehensive income for predicting banks' future earnings. Nevertheless, it must be stressed that the calculated

Spearman's rank correlation coefficients confirm in most instances a positive character of dependence between the comprehensive income and future return ratios. The results of the estimation of econometric models shows the positive association of comprehensive income with future profitability of banks.

Introduction

Profit of every economic entity is a measurement of enterprise effectiveness, on the other hand it is an instrument of wealth growth that is identified with comprehensive income (Hendriksen, & van Breda, 2002, pp. 294-295; Szychta, 2012, p. 66). Within the first concept the financial result that is calculated based on current operating profit is treated as a measurement of management effectiveness that undoubtedly concerns basic enterprise activity and is generally characterized by continuity and repetitiveness. According to the concept of comprehensive income, profit is generated when a value of net assets of entity (equity) at the end of accounting period is higher than their value at the beginning of that period. In these terms, capital is identified with wealth while expressing a value that was generated or lost by an enterprise in a given period.

The main purpose of the paper was to verify a research hypothesis stating that in economic practice of banks listed on the Warsaw Stock Exchange it can be assumed that there is a positive predictive power of comprehensive income in forecasting financial standing of these entities. Justification of the purpose of study results from high usefulness of presenting comprehensive income in financial reporting not only in the banking sector (Eccher *et al.*, 1996; Evans *et al.*, 2014; Park *et al.*, 1999; Petroni & Wahlen, 1995; Venkatachalam, 1996). These aspects of comprehensive income of banks are a result of providing reliable information that shape a picture of future effects of activity of these entities, enabling to undertake and control creating and realization of future conditions, ways and results of action. Furthermore, revealing bank comprehensive income and its changes allows users of financial statements to make proper reclassification and calculation of more adequate volumes of future earnings than while doing so based on a traditional profit and loss account. Ignoring some values in calculating net profit (loss) can, on the one hand, lead to manipulating or polishing financial results, on the other, it can limit access to important information that influence predictive value of presented results of activity and development of banks.

Research methodology

Presented empirical research concerns banking companies listed on the Warsaw Stock Exchange (as of 15 September, 2016). In order to realize the aim of the study, a 7-year research period was adopted i.e. years between 2009-2016 in the aftermath of the need to prepare statements of comprehensive income by Polish listed companies from January 1, 2009. Thorough analysis covered quarterly financial statements of banks[1] where, due to availability of data, the last studied accounting period was the second quarter of 2016. Empirical data was taken from the EMIS (Emerging Markets Information Services) database and from the websites of analysed companies.

Presented research problem is realized on the basis of evaluation of profitability of analysed companies by means of traditional ratio analysis and using accounting measures. Analysis of dependencies between comprehensive income in a given reporting period and selected measures of profitability in absolute and relative terms in subsequent accounting periods, was conducted by means of Spearman's rank correlation coefficients while using *t* statistics to study significance of these dependencies.

A leading dimension of evaluation of predictive power of comprehensive income in shaping future profitability of banks was oriented at using two single equation models (M1 and M2) in two versions (A and B) i.e. influence of comprehensive income in *t* period on profitability in *t+1* and *t+2* periods (Bratten *et al.*, 2016, p. 290) (see table 1).

Table 1. Analytical forms of applied single equation models

Model version	Analytical form
M1A	$lnNI_{t+1} = \alpha_0 + \alpha_1 \times lnNI_t + \alpha_2 \times lnCI_t + \alpha_3 \times lnA_t + \alpha_4 \times (lnNI_t \times lnA_t) + \mu$
M1B	$lnNI_{t+2} = \alpha_0 + \alpha_1 \times lnNI_t + \alpha_2 \times lnCI_t + \alpha_3 \times lnA_t + \alpha_4 \times (lnNI_t \times lnA_t) + \mu$
M2A	$ROA_{t+1} = \alpha_0 + \alpha_1 \times ROA_t + \alpha_2 \times lnCI_t + \alpha_3 \times lnA_t + \alpha_4 \times (ROA_t \times lnA_t) + \mu$
M2B	$ROA_{t+2} = \alpha_0 + \alpha_1 \times ROA_t + \alpha_2 \times lnCI_t + \alpha_3 \times lnA_t + \alpha_4 \times (ROA_t \times lnA_t) + \mu$

Marks:
NI_t – net income, CI_t – comprehensive income, ROA_t – return on asset.
Source: own study on the basis of (Bratten *et al.*, 2016).

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[1] For two banks (SANTANDER and UNICREDIT) due to lack of individual reports data from consolidated financial statements was used.

Taking into account the fact that enterprise profitability is associated with productivity of specific outlays (assets, capital, sales) and determines a scale of generated profits, the measures of bank profitability in absolute and relative terms used in these models were calibrated by means of volume of total wealth of a given bank (Bratten *et al.*, 2016, p. 290). This type of approach is justified by excluding a possible impact of scale of conducted activities on bank comprehensive incomes.

In the abovementioned models time asymmetry between periods that were profitable for banks (profits) and unprofitable (losses) should be taken into consideration (Basu, 1997, pp. 3-37). However, bearing in mind values of quarterly earnings generated by 16 analysed banks, in which in 95% of analysed accounting periods positive financial results were noted, it was assumed that the problem of asymmetry was minimized and what followed, no additional artificial variables were introduced (Braumoeller, 2004, pp. 807-820).

Predictive power of comprehensive income – overview of literature

Total financial result, defined in the literature as global and overall, is also referred to as comprehensive income. It is understood as a change in equity that appeared as a result of transactions and events other than changes resulting from transactions with owners acting as shareholders (Buk, 2013, p. 9). It can be stated that comprehensive income comprises all elements of profit and loss account as well as "other comprehensive income", which includes: changes from revaluation of wealth elements, actuarial profits and losses from programmes of specific employee benefits, profits and losses resulting from recalculating a position of financial statement of an entity active abroad, profits and losses from revaluation of elements of financial assets available for sale as well as an effective part of profits and losses connected with a hedging instrument within cash flow hedges. Other comprehensive income provide information about potential profits or losses, which an entity realizes in the subsequent periods, and which already caused these changes in a current period (see figure 1).

Comprehensive income is a clearer financial result than net profit for users of reporting as, among others, it expresses a bigger potential of enterprise to generate profits in the future (Kanagaretman *et al.*, 2009, p. 352), is more consistent and compliant with the theory of enterprise valuation (Dhaliwal *et al.*, 1999, p. 45), shows a higher correlation with rates of return on shares (Biddle, & Choi, 2006, pp. 1-32), and above all, it seems to

be less vulnerable to accounting manipulations and implementation of a strategy of legal or illegal management of financial result (Chambers *et al.*, 2007, p. 561).

In literature provides some statements that comprehensive incomes are an irrelevant and inconstant resulting item (elements of other comprehensive income are characterized by the biggest volatility) (Goncharov, & Hodgson, 2011, pp. 27-59), to a slight extent they are linked to a rate of return on shares, they are unreliable reflection of final measurement of enterprise performance as well as they do not help to forecast future flows and revenues (Dhaliwal *et al.*, 1999, p. 45; Barton *et al.*, 2010, pp. 753-89). Statement of comprehensive income additionally includes external and unclear components (Rees, & Shane, 2012, p. 794), which diminish a possibility of predicting long-term results (O'Hanlon, & Pope, 1999, pp. 459-482) and show different usefulness in creating enterprise value (Louis, 2003, pp. 1027-1047).

Figure 1. Comprehensive income against changes in equity

Changes in equity			
Comprehensive income			Investments and payments for owners
Resulting income/costs	Capital income/costs		
Net income		Balance sheet corrections of current period	Other changes in equity (not for owners)
Income	Aggregate effects of changes in equity resulting from accounting policy		

Source: (Gerbaulet, 1999, p. 54).

Critics of the category of comprehensive income also indicate that changes in fair value that is a base for evaluation of comprehensive income, are only temporary and related to short-term movements in the market, which have not much in common with expectations concerning future financial results (Chisnall, 2001). As a result, comprehensive income is more volatile than categories of traditional financial results (Barth *et al.*, 1995; Hodder *et al.*, 2006) and is subject to a bigger measurement error that weakens reliability and predictive value of this economic category (Landsman, 2007). Furthermore, there is an opinion that using a fair value to eval-

uate enterprises contributed to market crash in the years 2007-2009, forcing, first of all, banks to use unjustified corrections down to fair values of assets, leading at the same time to a diametrical decrease in market value (Bhat *et al.*, 2011; Bowen, & Khan 2014).

Results of empirical studies

The results of empirical studies show that calculated Spearman's rank correlation coefficients indicate a positive character of dependencies between comprehensive income achieved by examined banks in a given quartile (CI_t) and future net income (NI_{t+1} and NI_{t+2}). What is important, analysed dependencies turned out to be statistically significant and showed a considerable impact of comprehensive income on the future profitability of banks in absolute terms (see table 2).

Table 2. Spearman's rank correlation coefficients between analysed categories

Relations	Values of correlation coefficients	Statistical significance (level 0,05)
CI_t vs. NI_{t+1}	0,799	
CI_t vs. NI_{t+2}	0,784	YES
CI_t vs. ROA_{t+1}	0,448	
CI_t vs. ROA_{t+2}	0,444	

Source: own study on the basis of quarterly financial reports of companies available in EMIS.

Conducted analysis of multiple regression that was necessary to evaluate four single equation economic models (M1A, M1B, M2A, M2B), with one dependent variable and four independent variables showed that directions of impact of the main independent variable ($lnCI_t$) on dependent variables ($lnNI_{t+1}$, $lnNI_{t+2}$, ROA_{t+1}, ROA_{t+2}) were positive, and estimated parameters at this variable proved statistically significant at confidence level of 0,05. At the same time it can be indicated that future profitability of analysed banks, both in absolute and relative terms, was positively influenced comprehensive income (see table 3).

It has to be undeniably emphasized that values of estimated parameters at the $lnCI_t$ variable were, yet, lower than at $lnNI_t$ and $lnROA_t$, whose influence on dependent variables also proved statistically significant. This situation can be translated into slightly weaker predictive power of comprehensive income in forecasting bank profitability, contrary to net income

and return on total assets, calculated by means of a traditional financial result.

Table 3. Results of estimation of M1A, M1B, M2A, M2B models

Model version (dependent variable)	Independent variables	Parameter values	t Statistics	Test significance level	Critical value $t_\propto$ when $\alpha = 0.05$	Coefficient of determination R^2
M1A ($lnNI_{t+1}$)	$lnNI_t$	**0,775**	2,846	0,005		0,69
	$lnCI_t$	**0,180**	2,964	0,003		
	lnA_t	**0,483**	2,960	0,003		
	$lnNI_t \times lnA_t$	-0,030	-1,154	0,249		
M1A ($lnNI_{t+2}$)	$lnNI_t$	**0,615**	2,266	0,024		0,70
	$lnCI_t$	**0,396**	6,613	0,000		
	lnA_t	**0,512**	3,148	0,002		
	$lnNI_t \times lnA_t$	-0,035	-1,385	0,167	1,960	
M1B (ROA_{t+1})	ROA_t	**3,290**	7,363	0,000		0,43
	$lnCI_t$	**0,242**	3,327	0,001		
	lnA_t	**-0,205**	-2,481	0,014		
	$ROA_t \times lnA_t$	**-0,387**	-5,899	0,000		
M2B (ROA_{t+2})	ROA_t	-0,268	-0,851	0,395		0,29
	$lnCI_t$	0,031	0,609	0,543		
	lnA_t	-0,042	-0,736	0,462		
	$ROA_t \times lnA_t$	0,088	1,889	0,060		

Statistically significant independent variables are shown in bold.
Source: Own study on the basis of quarterly financial reports of companies available in *EMIS*.

It is worth stressing that in the fourth model (M2B) a direction of influence of ROA_t variable on dependent variables was negative. However, in this only model, estimated parameters at all independent variables proved statistically insignificant at the confidence level of 0,05, thereby, relations between examined categories cannot be unequivocally confirmed.

Conclusions

Presented results of studies on the role and significance of comprehensive income in forecasting profitability of selected banks indicate numerous important and complex problems concerning a process of management of

information about financial results of entities. An important role of comprehensive income in shaping future gains is visible in increasingly wider application of fair value as a basis for evaluation of elements of assets and liabilities of economic entities in recent years.

Analysis of collected and processed figures concerning examined banks points out that there are positive dependencies between comprehensive income and future gains of these entities, both in absolute and relative terms. Estimated coefficients of correlation confirmed that there is a positive relation between analysed categories, however, the character of these relations was either significant or moderate, but, what is important, statistically significant. Estimated values of parameters of four economic models also indicated a positive direction of influence of comprehensive income on future financial net results and return on total assets, which is confirmed by the set research hypothesis about a positive predictive power of comprehensive income in shaping future financial standing of entities.

While forecasting bank profitability it must be emphasized that there is a certain dominance of net income category and return on assets over comprehensive income, which enables to reflect, among others, effects of combined influence of many media and components of profitability, which however, create premises of conducting further deepened theoretical-empirical studies. Hence, presented results should be regarded as a foundation for further theoretical studies as well as empirical studies on the predictive power of comprehensive income, its components, in particular, in shaping future financial results of bank. They cannot, yet, claim to be regarded as generalized reflections and scientific conclusions.

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The importance of quality in customer service on the example of the banking sector

Abstract

Research background: Competitive counts the provider that rendered by the customer service better than the other and through the quality strategy overcomes the competitors and reaches a commercial success. In view of the particular attention should be paid to the quality of the service which significantly affect the customer loyalty. The aim of this study was to investigate the importance of quality in customer service individual commercial banks. For this purpose a SERVQUAL using the questionnaire especially by which was calculated difference between expectations and insight from the consumers on the areas being audited quality customer service.
Cooperative Bank in Kalisz Pomorski (Pomeranian province), Bank of Environmental Protection in Bydgoszcz (Kujawsko - Pomorskie), and a third bank, who reserved to publish their data in research.
Purpose of the article: The aim of this study was to investigate the importance of quality in customer service individual commercial banks.
Methodology/methods: The method used in the work to analyze the results of the survey method was SERVQL.
Findings & Value added: Each subject area of service quality in the assessment of customers' needs some improvements, because in each of them there is a discrepancy between expectations and insights. Banks as service companies must be aware that the quality of service, appropriate communication with the client, contributes not only to improve their image, but primarily becomes a factor distinguishing them from competitors.

Introduction

In a market economy quality it is one of the most important determinants of corporate success - both manufacturing and service. The level of quality of services in the enterprise depends on the level of customer satisfaction. Therefore, any company providing services should recognize the consumer as the central entity of its activities. Customer care, concern for its satisfaction contributes to maintaining long-term relationships, and thus becomes an important factor in the success of companies.

In the banking services sector in Poland awareness of the importance of quality in the competitive struggle on the market is growing. The quality of banking services is best described by customers. They, according to their experiences, preferences, and needs, decide the services of which bank they will use and who does not meet their expectations. Banks as service companies must be aware that the quality of service, communication with the client, can not only help create positive opinion, but most of all gives the opportunity to stand out among the competition.

Research methodology

The study was conducted with the application of the SERVQUAL method using a questionnaire that allowed to evaluate the difference between expectations and perceptions of customers regarding the quality of service provided. The aim of this study was to investigate the importance of quality in customer service individual commercial banks. Selection of respondents in the sample had a non-sampling nature, random. The study was conducted from 1 May to 30 June 2016 among people who use the services of commercial banks.

The study used materials provided by three commercial banks containing a list of customer service quality standards. Another source of data were also individual interviews conducted with representatives of banks, as well as objections regarding the handling of customers in the bank, which were indicated during individual interviews. The work also benefited from secondary sources, including literature and articles from newspapers.

On the basis of information provided by the banks, 6 main standards of individual customer service quality was identified, to which the banks place the greatest emphasis in their materials, they are:
1. The quality of direct service.
2. The appearance of the facility.
3. Appearance of employee.

4. Telephone support.
5. Handling of correspondence.
6. Staff attitude.

The method used in the work to analyze the results of the survey method was SERVQL. It involves "measuring the difference between the level of satisfaction of expectations and perceptions of services by the client" (Karaszewski, 2009, p.280). The concept is implemented by measuring the expectations of the client first, and then perceived services. The quality of the service is expressed in the difference between the expected and the received services. This method therefore allows for the identification of the so-called vulnerabilities, where the quality of services differs from the customer's expectations (Xian-ying & Qin-hai, 2007, p.1110). The general logic of the SERVQUAL method is illustrated by Fig. 2. It presents five situations in which the quality of services may decrease. They include (Lipowski, 2003, p.43):

− 1 gap - the difference between customer expectations and perceptions of expectations by managers of the company;
− gap 2 - illustrates the difference between perception of customer expectations by management of the company and the set standard of quality of service;
− gap 3 - is the difference between the applicable standards of service and the actual performance of services;
− gap 4 - represents the difference between the performance of the service and external communication with customers;
− gap of 5 - illustrates the difference between the expected service and the service received.

The study focuses on gap 5 which shows the difference in the provided service and service expected by the customer (Wolniak & Skotnicka-Zasadzien, 2012, p. 1242). To assess the magnitude of differences within the gap, the study was based on a research tool - questionnaire. It consisted of five statements concerning the expectations and perceptions of individual customers of commercial banks regarding quality of service. These statements have been divided into five standards, i.e. .:

1. The appearance of the employee - the test area: the appearance of bank employees.
2. Handling o correspondence - the test area: diligence in drawing up the documentation.
3. Staff attitude - the test area: the waiting time for service.
4. The quality of direct service - the test area: ensuring privacy when making a transaction.
5. Appearance of the facility - the test area: the location of the bank.

Figure 2. Service quality model (gap model)
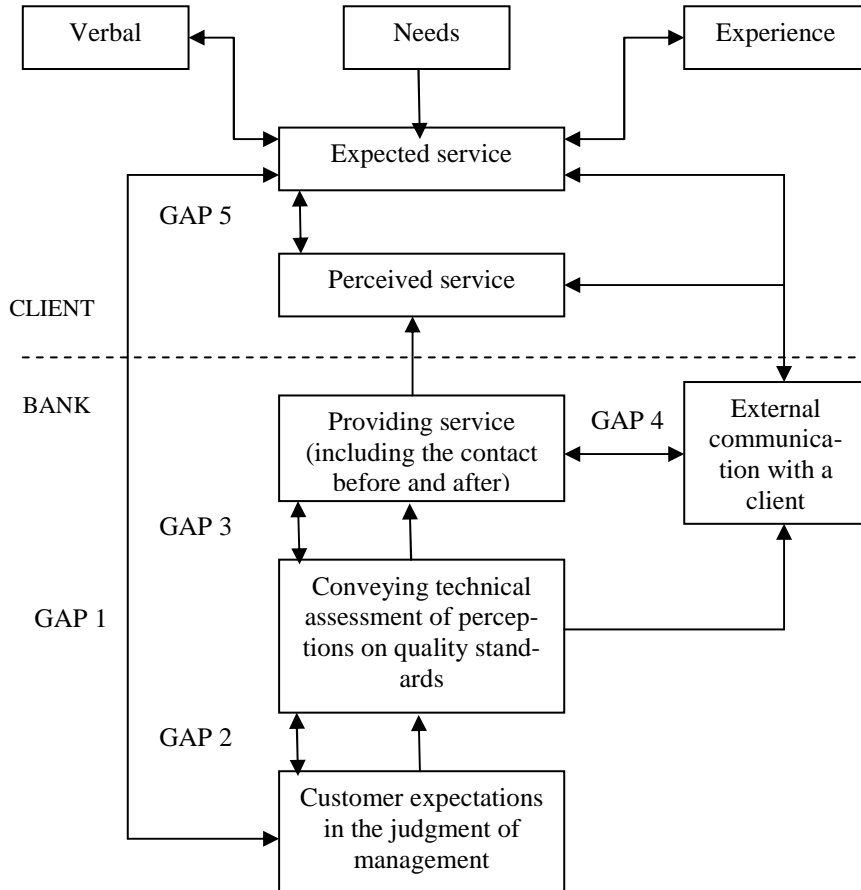
Source: M. Lipowski (2003), *Bank Marketing. Management of the demand and supply of
services,* Publishing House Lublin: The M. Sklodowska - Curie University, p.1.

The essence of customer service

One of the basic objectives of the enterprise that wants to achieve success is
marketing activity and focus on the potential client. The consumer should
be here seen as a central link, the driving force, which meet the needs of the
main goal of the company. Because it depends on the customer how long
the company will remain on the market. This emphasizes Ph. Kotler, claim-
ing that the company, which focuses on the customer may find it easier to
succeed (Kotler, 1994, p.32). However, wanting to achieve this objective,
the company must not only produce and deliver products of higher and

higher quality, but above all, still seek the favor and recognition among new and existing customers (Guo, 2015, p. 178).

Referring to the issue of customer service we mean "the whole range of needs, which the customer at the time did not identify and did not specify" (Biesaga-Słomczewska & Iwińska-Knop, 2000, p.7). The task of the company is, however, to recognize these needs and, if possible a quick response. Thus, the level of customer service consists of many factors, such as (Leland & Bailey, 1999, p.25):

− "Knowledge of not only the needs but also the desires and expectations of customers, knowledge based on experience,
− product knowledge and conveying its features into benefits
− commitment of the trader.

The way to success is the ability to create a distinctive and unprecedented way of meeting needs by offering a unique product that entails many benefits. But simply acquiring a customer is not enough, you must keep it. In the concept known as relationship marketing, it is noted that the success of the company consists of not only the ease of acquiring a growing number of customers, but above all, the ability to maintain a solid and loyal customer base (Wilmańska-Sosnowska, 2011, pp.11-12).

In every enterprise customer service it is just as important as the customer itself, because as says J. Rewers "the client co-creates support and service creates a clientele, and the client and the service must equate" (Rewers, 1997, p.55). This relationship stems from the fact that the way to treat customers when direct contact is essential to re-purchase by the customer in the company.

Therefore, proper customer service, having regard to its care and satisfaction, which makes it possible to maintain relationships with customers, is becoming an important factor in the success of companies in the economy, which is characterized by increasing competition. Indeed, according to K. Zięba the positive experience of a single client creates a good image of the company (Rudawska & Soboń, 2009, p.342).

Quality policy in Polish banks

Banking services play an increasingly important role in the Polish economy, which is highly competitive. Currently, this sector is characterized by very strong competition and difficulty in obtaining and maintaining existing customers. The banks to attract new customers and win against competitors must provide their services at ever higher levels of quality (Paul et all, 2016, p.618).

Understanding customer needs, as well as an indication of what the benefits of use of the service offered is a starting point for shaping the appropriate quality of service. The problem is, therefore, appropriate definition of the concept of "quality". W.E. Deming defines quality in relation to interactions occurring between the product or service provider and consumer (Deming, 1986, p.7). It is presented in Figure 1.

Figure 1. Service quality model
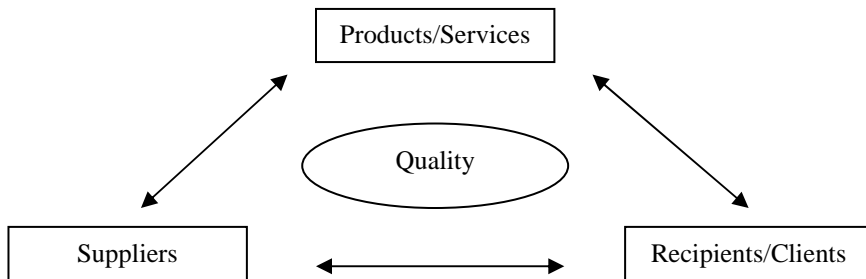
Source: S. Smyczek (1997) *Quality Policy in Polish banks,* "Marketing and Market", No. 1997-1911, p.1.

Due to the complexity and comprehensiveness, which are characterized by banking services, testing of the quality is difficult. This requires an evaluation of services in relation to multiple dimensions (Smyczek, 1997, p.15):

1. "tangibility: physical existence,
2. reliability: good exercise of duties for the first time,
3. attitude: willingness to provide services,
4. communication skills: information for a customer in an understandable language,
5. trust: honesty and openness,
6. security: physical security and discretion.
7. competencies: knowledge of procedures and proficiency in their application,
8. politeness: respect and friendly attitude.
9. professionalism: knowledge of procedures and understanding the customer,
10. availability: ease of contact ".

However, not all of the above dimensions of quality are equally important for each customer and for each bank. Therefore, it is necessary to develop by the individual bank its own quality policy. ISO 8402 defines the

quality policy as "general plans and courses of action concerning the quality, as determined by management of the entity" (ISO 8402, 1996). The main premise of the standard is also the fact that in each bank should be developed appropriate quality policy, which is consistent with other lines of action, as well as understood by the banking staff. Therefore, quality issues, definitions and targets should be formulated in a clear and understandable way for everyone. The main tasks of the quality policy developed in banking services is (Smyczek, 1997, p.16):

− characterizing the features relating to the operation of services,
− proper selection of traits and determining their levels
− standardization and indication of the differences in services
− choice of operating systems of the services.

In order to better satisfy newer needs of potential customers, the bank from the point of view of the market, must introduce new utility traits of services to make the offer became more favorable and encouraging for the buyer (Tseng, 2016, p. 210).

Proper planning of the quality policy of the bank becomes a key task for the board. The development of effective quality policy is necessary due to the fact that many of the problems faced by banks today is the result of an earlier lack of plan for specific actions (Monferrer-Tirado at all, 2016, p. 240). In contrast, the correct planning of the activities results from the fact of the substance of quality policy, which is (Kleniewski, 1994, p.23):

− "a guideline for directions and methods of management in terms of quality,
− the basis for the creation of operational plans,
− signpost for the directions of action, formally implemented in the quality manual and procedures,
− means of communication between employees,
− part of the company's marketing,
− guideline when making a decision,
− the basis for building quality assurance systems in the bank ".

In the Polish banking sector should increase awareness of the importance of the highest quality in the creation of a competitive market position.

Examination of the importance of quality in customer service
on the example of the banking sector

The aim of this study was to investigate the importance of quality in customer service individual commercial banks. Selection of respondents in the sample had a non-sampling nature, random.

In this study were investigated service quality standards for individual clients in three commercial banks: Cooperative Bank in Kalisz Pomorski (Pomeranian province), Bank of Environmental Protection in Bydgoszcz (Kujawsko - Pomorskie), and a third bank, who reserved to publish their data in research. The study was conducted with the application of the SERVQUAL method using a questionnaire that allowed to evaluate the difference between expectations and perceptions of customers regarding the quality of service provided. The study was conducted from 1 May to 30 June 2016 among people who use the services of commercial banks.

On the basis of information provided by the banks, 6 main standards of individual customer service quality was identified, to which the banks place the greatest emphasis in their materials, they are:
1. The quality of direct service.
2. The appearance of the facility.
3. Appearance of employee.
4. Telephone support.
5. Handling of correspondence.
6. Staff attitude.

The first stage of the analysis of the results of the research was to identify areas where customer expectations regarding quality of service in commercial banks are not fully satisfied by the service provider, i.e. it pointed out the differences between expectations and perceptions of customers. This is achieved by calculating the average scores, and then were calculated the differences between the perceptions and expectations of the client. The above analyzes are shown in chart 1.

As chart 1 shows, the greatest difference can be observed between the average value of perceptions and expectations about the value of waiting time for service. The difference between the observations (4.23) of customers and their expectations (6.8) has the value "-2.57". This indicates that the waiting time for service is the area most unsatisfied by bank employees. However, regarding the appearance of a worker the difference between the average expected value (6.8) and the value of the observations (6.26) is the smallest, and is "-0.54". This indicates that the expectations about the appearance of the operating personnel is mostly satisfied by bank employees. Ensuring privacy during service is another area poorly satisfied by bank

employees. The difference between the observations (5.44) and the expectations (6.85) in this field is set to "1.41." At a similar level ranks the difference in the area of bank location. Here, the difference between observations (5.5) and expectations (6.84) of a client is "-1.34", which testifies to the fact that customers' expectations as to the location of the bank are relatively satisfied.

The results show that each area is beyond negative. This in turn indicates negative gaps in each of the areas analyzed. Customer expectations regarding service quality is thus significantly outweighed by the facts. Customers increasingly require high quality of service in every respect, so that their needs are becoming more demanding and difficult to achieve by banks.

Chart 1. The results of the measurement of expectations (O) and observations (S) of clients and the difference S-O (N = 100)
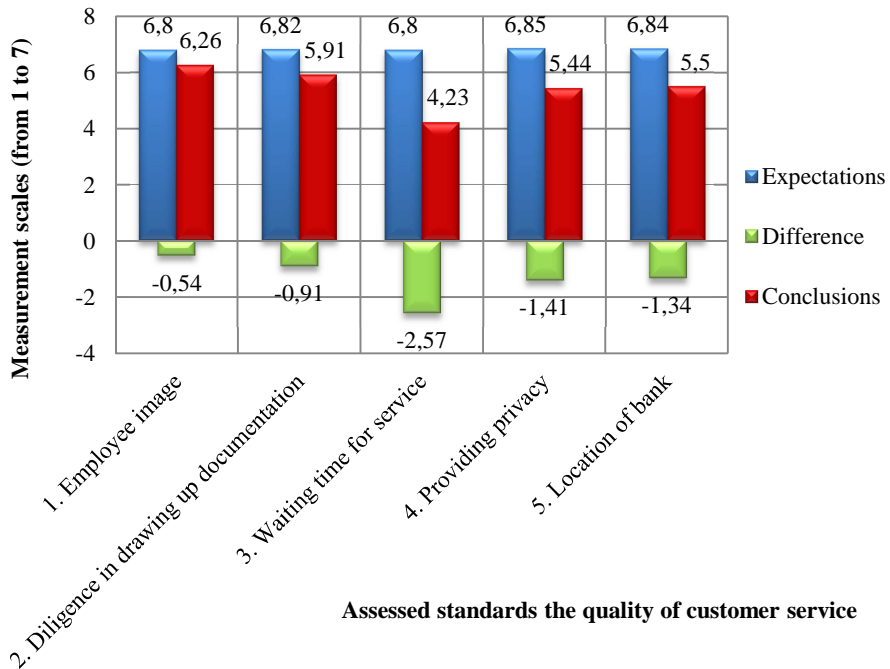
Source: own study based on studies.

The next stage of the research was to assess which areas of service quality are most important for individual clients of commercial banks. The results were presented in chart 2.

Chart 2 shows that for the customer area the most significant while service is waiting time for service, which scored 25,70 points. In turn, the area of the least significance for the respondents is the appearance of employees with only 14.25 points. The location of the bank is the second largest area of least importance to the client (18.95 value). Slightly higher ranks got the diligence in drawing up the documentation, with 20.35 points. In second place in terms of importance to the customer's area was ensuring privacy (20.75 value). Looking at individual areas in terms of importance for the customer it can be seen that the value of the weights of all these areas ranks at a similar level and none of them goes beyond the level of 50 points. One can conclude each service area is significant for respondents, and this in turn proves the extensive requirements for banks. Customers expect "clarified" service in every respect.

Chart 2. The importance of the considered areas in the assessment of the quality of clients (N = 100)
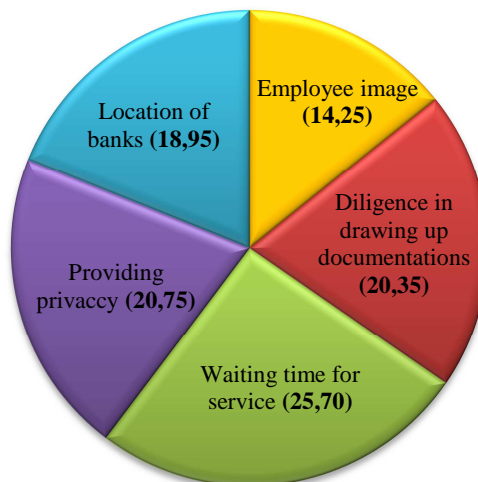
Source: own study based on the research.

The study shows that subjective customer expectations for quality of service in banks outweigh the assessed facts. Respondents who use banking services expect that they will be provided at the highest level. This applies to all dimensions of quality, both material dimension, reliability, response

to customer expectations, professionalism and trust as well as empathy. This represents a difficulty for the bank, because the requirements for the provision of services - customer service - are becoming increasingly prohibitive. Thus, to better meet customer needs, one must first know its expectations.

The study shows that the importance of individual areas, in the opinion of customers is as follows (from the most important):
1. The waiting time for service.
2. Ensuring privacy.
3. Diligence in drawing up documentation.
4. Location of the bank.
5. Appearance of employee.

Conclusions

After analyzing the results it can be inferred that each subject area of service quality in the assessment of customers' needs some improvements, because in each of them there is a discrepancy between expectations and insights. Banks as service companies must be aware that the quality of service, appropriate communication with the client, contributes not only to improve their image, but primarily becomes a factor distinguishing them from competitors. The customer of the bank as a consumer should be here seen as a central link, the driving force, which meet the needs of the main goal of the company. Because it depends on the customer how long the company will remain on the market.

The Bank using the highest quality strategy, will become a noticeable and appreciated by customers. Because nowadays the client is looking for a service provider providing a service of the highest quality. On the other hand, the study's findings indicate that the examined banks in many respects do not meet fully the requirements posed to them by customers. As a reason for this phenomenon one can point to the current situation on the banking market. Banking services are one of the fastest growing sectors of the Polish economy and bank managers strive to be able to stand out from the competition, which set goals or make promises that they are not able to realize. As a result, the services expected and actually provided vary considerably.

The research shows that customers expect from the bank above all fast service and as much as possible to ensure privacy when making a transaction. Thus the bank as a service company in this segment should make the biggest steps. To focus on those aspects that are relevant to the customer.

Neat and well-groomed appearance of employee does not overshadow customer dissatisfaction arising from long waits for service. In order to achieve a strong market position the company should constantly monitor the needs and expectations of customers and constantly strive to meet them.

Nowadays, customer is looking for a service provider providing the service at the highest level. Therefore, the success of the banks consists in the adjustment of their operations in order to meet customer needs in such a way that it felt satisfaction and contentment. A useful tool here are customer service quality standards applied by commercial banks. From the point of view of the bank, they are a useful tool for enhancing turnover, but from the perspective of the customer they provide the high level services. The bank can focus its attention on areas that are less important to the customer, which cannot see the actual needs and expectations of consumers.

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Private equity fund structures in Czech Republic within the framework of the new institutional economics

Abstract

Research background: Institutional aspects of a well-functioning private equity and venture capital market are emphasized in the recent academic literature. In particular, a favourable tax and legal environment is essential, since formal institutions enable the industry to attract a larger volume of investors and thus to contribute more efficiently to the growth of GDP. In the Czech Republic, however, legal barriers represent an essential obstacle affecting a rather poor scope of resources available to domestic private equity and venture capital funds.

Purpose of the article: This paper examines the current tax and legal environment for private equity and venture capital investments in the Czech/ Republic. Proposals for prospective improvements of legal and tax framework are made in the empirical part of the study.

Methodology/methods: As the phenomenon under study is complex and explanatory in nature, qualitative data with content analysis proved to be the best way how to assess institutional framework for PE/VC in the Czech Republic. Data collection methods cover a comparative analysis of scientific literature documents and reports, as well as primary data from interviews with experts in the industry. The results of both secondary and primary data analysis were categorized and core lacks in the institutional framework were identified and discussed. Finally, proposals for prospective improvements of the institutional framework are made.

Findings & Value added: The conducted analysis implies that the issue of the legal and organisational structure suitable for PE/VC funds may be deemed resolved in the Czech Republic. A Czech equivalent to a Limited Partnership (SICAR), i.e. a limited partnership with investment certificates, has already with pro-

vided with sufficient support in the legislation in terms of the legal form. The legal form is a necessary, yet not sufficient condition. A tax handicap was identified implying that it is necessary to amend the tax law so that the legal regulation extends the tax exemption. Another amendment to the applicable legislation should then be directed towards eliminating or mitigating the barriers imposed on pension funds when investing in PE/VC funds.

Introduction

The new institutional theory proved to be a popular theoretical foundation for exploring a wide range of scientific topics in the entrepreneurial research inclusive of private equity and venture capital (Bruton *et al.*, 2010, pp. 421-440; Almstorm & Bruton, 2006, pp. 299-320; Li & Zahra, 2011, pp. 95-111; Lerner & Tåg, 2013, pp. 153-182; Balcerzak, 2009, 711-739). Private equity and venture capital (PE/VC) is one of the most important sources of financing for start-ups and high-growth potential businesses in both well-developed and emerging economies (Almstorm & Bruton, 2006, p. 299). The phenomena of uncertainty and information asymmetry, however, play an essential role in terms of its availability because of transaction problems (Li & Zahra, 2011, p. 95).

Recent academic literature on PE/VC documented that both formal and informal institutions represent the proper incentives supporting investors in reducing transaction problems and thus enhancing their investment activity (Almstorm & Bruton, 2006, p. 299; Li & Zahra, 2011, p. 95; Lerner & Tåg, 2013, p. 153). There are several elements of a stable institutional framework as shown by Almstorm & Bruton (2006, p. 300): a predictable rule of law and enforcement regime to facilitate and safeguard the investments, efficient markets for corporate control and capital and minimal corruption. The concept of quality of institutional system is currently considered as the core of institutional economics (for more details see e. g. Balcerzak & Pietrzak, 2016, p. 68; Lizińska *et al.*, 2016, p. 286; Woźniak-Jęchorek, 2016, p. 130).

According to the statistics of *Invest Europe* (2016a), the Czech Republic took the last place in CEE countries in terms of the share of PE/VC investments to GDP (Invest Europe, 2016a, p. 18). Based on a comprehensive review of empirical research in the area, we assume that the development of the PE/VC market in the Czech Republic is adversely affected by the following set of institutional drawbacks, which are, however, essential for a higher level of commitment of both domestic and foreign investors: inflexibility of corporate law, tax obstructions and non-transparency of fund

structures (see Zinecker, 2011, pp. 541-551; Pazour & Marek, 2011, pp. 30-33).

Therefore, in this paper, we examine the current tax and legal environment for PE/VC investments in the Czech Republic to answer the question whether the institutional framework after incorporating legislative changes between 2012 and 2016 is comprehensible and competitive from the perspective of both domestic and foreign investors. In the empirical part of the study proposals for prospective improvements of the institutional framework are made.

Research methodology

This research assesses formal institutional environment for PE/VC investments in the Czech Republic from the perspective of legal structures, tax transparency and investment obstacles. The analysis is founded on the assumption that Czech Republic as an emerging economy has less-developed formal institutional structures and many institutional differences compared to well-developed countries (see also Almstorm & Bruton, 2006, p. 303).

The research approach was developed after an extensive review of recent academic literature on institutional economics and venture capital in well-developed and emerging markets (Almstorm & Bruton, 2006, pp. 299-320; Li & Zahra, 2011, pp. 95-111; Lerner & Tåg, 2013, pp. 153-182; Balcerzak & Pietrzak, 2016, pp. 66-81; Lizińska *et al.*, 2016, pp. 285-296; Woźniak-Jęchorek, 2016, pp. 129-151; Caselli, 2009; Cumming, 2010; Gregoriou *et al.*, 2011; Cumming & Johan, 2013).

As the phenomenon under study is complex and explanatory in nature, qualitative data with content analysis proved to be the best way how to assess institutional framework for PE/VC in the Czech Republic. Data collection methods cover a comparative analysis of scientific literature documents and reports, as well as primary data. Experts from PE/VC industry (investors as well as CVCA Tax and Legislation Committee members) were interviewed to gain primary data. The key topics covered within face-to-face and phone interviews were as follows: tax and legal factors affecting PE/VC funds structures in the Czech Republic and the EU, defining the tax and legal environment for limited partners and fund management companies, available PE/VC fund structures within Europe, the tax and legal environment for PE/VC in the Czech Republic, tax and legal barriers preventing the establishment of a standard PE/VC fund in the Czech Republic, and legislative amendments of corporate law. The questions were open response because the novel nature of the topic. The interviews were con-

ducted and transcribed. The results of both secondary and primary data analysis were categorized, a set of variables was defined, and core lacks in the institutional framework were identified and discussed. Finally, proposals for prospective improvements of the institutional framework are made.

Private equity and venture capital fund structures and taxation of capital gains

The first part of the analysis focuses on the research question: Does the current Czech regulation allow establishing legal and organisational form of the PE/VC fund which is competitive in the European context in terms of domestic and foreign investors?

On the basis of the literature review, e.g. Jenkinson (2008); Metrick & Yasuda, (2010, pp. 2303-2341), and the interviews with investors and experts from the PE/VC industry, it may be stated that the legal form which the investors prefer is the *Limited (Liability) Partnership* (in United Kingdom) and its variations, such as *Société d'investissement en Capital à Risque* (SICAR) in Luxembourg. The most frequently cited reasons and fulfilling these criteria by means of various legal forms established in the Czech legal system is analysed in the following paragraphs, whereas the summary of the qualitative analysis is shown in Table 1.

Investment funds are now regulated by *Act on Investment Companies and Investment Funds* (No. 240/2013 Coll.). Two structures are important for PE/VC funds: a joint stock company with variable registered capital (hereinafter only as the SICAV, according to the Luxembourg *Société d'investissement à capital variable*) and a limited partnership with investment certificates (hereinafter only as the KSIL) The aim of these legislative changes was to make the Czech Republic more attractive for foreign investors (*Explanatory memorandum of the Act on Investment Companies and Investment Funds*, 2013).

SICAV fund issues two types of shares, i.e. founder shares and investment shares. It belongs to open-end funds, whereas it also maintains the legal personality and it may establish sub-funds with different investment strategies.

The closest to the SICAR type is the KSIL, with the general partner with unlimited liability for debt, whereas the shares of limited partners are represented by investment certificates.

It may be concluded that the current legislation (except the area of taxes, as specified further) has already set up acceptable conditions. For details see Table 1.

Table 1. Content Analysis Results - PE/VC fund structures in the Czech Republic from the perspective of legal conditions

	Criteria						
	Flexible capital rules	Tax transparency	No duty to repurchase the share	Possibility of establishing for a definite term	Possibility of capital calls	Possibility of limiting the share transferability	Various types of member securities
Limited partnership with investment certificates	✓		✓	✓	✓	✓	✓
Joint stock company with variable registered capital	✓	✓		✓	✓	✓	✓
Limited partnership			✓	✓	✓	✓	
Joint stock company		✓	✓	✓	✓	✓	
Limited liability company		✓	✓	✓	✓	✓	

Source: Own elaboration on the basis of the literature research (secondary data) and interviews (primary data).

But there has been no investment fund in the KSIL legal form registered in the list kept by the Czech National Bank (*Regulated institutions and registered financial market entities lists*). It may be assumed that the reason for this consists in the substantially discriminating tax conditions, as specified below.

Taxation is in the Czech Republic regulated by the Act on Income Taxes (ITA) (1992). The tax conditions of PE/VC funds in the Czech Republic are largely unfavourable both on the level of taxation of funds themselves, and their investors (for details see Table 2). Firstly, it is impossible for the KSIL to apply the tax exemption concerning the received shares in profits and income on the sale of shares held in the long-term, which is essential to

a PE/VC fund. Next, it is impossible to offset the loss of individual invest-
ments to the profit. Third, it is impossible for the investors in PE/VC funds
to apply the tax exemption:

− If the fund uses the KSIL legal form;
− If it is an investor outside the EEA;
− If it is an investor with an investment share in the PE/VC fund lower
  than 10%;

Last, the withholding tax for funds investors may in the case of some
non-residents amount to 35%.

Table 2. Content Analysis Results - Differences between individual types of fund
structures established in the Czech legislation from the perspective of taxation

Criteria	Yes	No
Tax transparency for the fund (according to the fund's legal form)	Upon meeting other conditions: Joint stock company, SICAV, limited liability company, cooperative, (European Company, European Cooperative Society)	Limited liability partnership, KSIL
Tax transparency for the investor (according to the fund's legal form)	Upon meeting other conditions: Joint stock company, SICAV, limited liability company, cooperative, (European Company, European Cooperative Society)	Limited liability partnership, KSIL
Tax transparency for the fund (according to the share size)	Upon meeting other conditions: At least 10%	Less than 10%
Tax transparency for the investor (according to the share size)	Upon meeting other conditions: At least 10%	Less than 10%
Tax transparency for the investor (according to the tax domicile)	Upon meeting other conditions: EEA Member States	Countries outside the EEA
Reduced income tax rate for the fund	Basic investment fund under the ITA	Other investment funds
Increased tax rate for the investor (according to the tax domicile)	So-called tax havens	Others
Tax-deductible loss of investment for the fund (according to the assets in which the fund invests)	For example, shares for trading or real property	Significant shares in companies

Source: Own elaboration on the basis of the literature research (secondary data) and inter-
views (primary data).

Discussion and conclusions

The conducted analysis implies that the issue of the legal and organisational
structure suitable for PE/VC funds may be deemed resolved in the Czech
Republic. A Czech equivalent to a Limited Partnership (SICAR), i.e. a lim-
ited partnership with investment certificates and the Czech version of
SICAV funds, i.e. a joint stock company with variable registered capital,
have been provided with satisfactory legislative conditions of their legal

forms. Unlike the KSIL, funds of this legal form have already been established in practice.

The current situation, however, points to the fact that some of the changes of the conditions for PE/VC capital only make sense if they are performed in interdependence. This is demonstrated as the non-existence of even a single representative of the limited partnership with investment certificates, where the suitable legal regulation concerning the legal form is overshadowed by absolutely unsatisfactory tax conditions. Our analysis has shown that the legal form is a necessary, yet not sufficient condition.

Our research results imply the following proposals. Above all, it is necessary to amend the IAT so that the legal regulation extends the tax exemption.

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Earnings management and the floatation structure: empirical evidence from Polish IPOs

Abstract

Research background: Firms use discretionary accounting choices to manage earnings disclosures around the time of certain types of corporate events. The IPO provides an opportunity to earnings management because of the significant information asymmetry between investors and issuers at the time of the offering.
Purpose of the article: The main aim of the study is to empirically investigate the links between the earnings management and the portions of primary and secondary shares sold in IPO.
Methodology/methods: In order to investigate whether the earnings management influences the issue of new shares and the sale of secondary shares I use Tobit and logit regressions, where discretionary accruals are the proxy for earnings management.
Findings & Value added: Using a sample of 221 firms from WSE between 2005 and 2015 I do not find evidence that the increase of pre-IPO discretionary accruals positively affects the sale of primary shares in the IPO, but the analysis revealed that the reporting less limits the probability of the new shares issuance. In turn, the sale of secondary shares in the IPO is more likely in companies using a conservative earnings management. Furthermore, negative discretionary accruals increase the portion of secondary shares in the IPO.

Introduction

Initial public offering (IPO) as a strategy of shaping the size and structure of the company's equity is determined by a number of different factors. In this context motives for going public are particularly important. As Huy-ghebaert and Hulle (2006, p. 318) indicate, the source of the shares sold in the IPO, that is newly created shares sold by the company and the outstanding shares sold by existing shareholders, actually distinguish subgroups of firms with different objectives for listing. The sale of primary shares provides an opportunity to increase the company's resources. In turn, offering the secondary shares allows original shareholders to reduce their capital commitment in the company and receive the proceeds.

The main aim of this study is the empirical evaluation of the relationship between earnings management in the year prior to the first listing of the company's shares on the stock exchange and the decision on the sale of primary and secondary shares in the IPO. In both situations, when the purpose of the IPO is to raise additional funds to the company, as well as if existing shareholders want to sell shares in order to cash out and cut back their holdings, earnings management can be put into action.

In this paper I address two central questions. The first one regards the source of shares sold in the IPO. Specifically, whether the use of earnings management prior to going public determines the type of shares sold in the IPO. I investigate the links between earnings management and the general motives for going public such as raising additional capital to the company or execute the divestment process. The second research question expressed in this study refers to the scale of the sale of primary and secondary shares in the IPO, than it is: how earnings management affects the scale of the issuance of new shares and the scale of the secondary shares sale by shareholders in the IPO. Therefore, it can be expected that the extent to which earnings were managed before the IPO will be associated with the demand for additional capital into the company submitted by the managers and the shareholders' desire to exit their earlier investment in this firm. Thus, an expression of these needs intensity is the portion of primary and secondary shares sold in the IPO.

Earnings management in IPO: evidence from prior research and hypotheses development

Numerous empirical studies have investigated the use of earnings management by IPO firms, but their mixed results do not allow to draw clear con-

clusions. On one hand, prior studies of Teoh et al. (1998, pp. 1935-1974), DuCharme et al. (2004, pp. 27-49) suggest that earnings management tend to be used in companies around the IPO in order to raise reported results. Issuers adopt such accounting accrual adjustments, because inflated earnings are translated directly into a higher offering price. On the other hand, a growing body of literature indicates that the pre-IPO abnormal accruals are not the result of the opportunistic behavior of insiders but arise from the growth potential of such companies (Armstrong et al., 2016, pp. 1316-1338). Moreover, because financial information in prospectuses are an object of intense scrutiny, it makes that IPOs are likely to report less and more conservatively in this crucial period (Ball & Shivakumar, 2008, pp. 324-349; Venkataraman et al., 2008, pp. 1315-1345; Roosenboom et al., 2003, pp. 243-266).

Earnings management is likely to influence the floatation structure. Considering issues of new shares, the managers of IPOs may deliberately report high earnings in order to raise additional capital to the company from the stock market. Linck et al. (2013, pp. 2117-2143) indicate that the reducing the firm's financial constraints may be the goal of the earnings management. Managers can adopt aggressive earnings management to raise extra funds and achieve adopted goals in the future without the threat of occurrence of significant financial constraints. Based on this I posit the following hypothesis:

H1: The sale of primary shares in IPO is positively related to the earnings increasing management activity.

As far as the sale of secondary shares in the IPO is concerned, creation of the firm's initial value by earnings management may have a significant impact on the decisions of the original shareholders. The implied increase in the IPO offer price makes that implementation of exit strategy becomes more attractive at this point. For example, Darrough and Rangan (2005, pp. 1-33) show that decline of current reported earnings before IPO due to an increase in R&D spending is negatively correlated with insider selling. Klein and Li (2009, pp. 1194–1212) provide evidence of positive correlation of window-dressing with secondary share offerings. This leads me to posit the following hypothesis:

H2: The sale of secondary shares in IPO is positively related to the earnings increasing management activity.

However, the research shows that for shareholders seeking to sell their holdings the IPO only starts the divestment process and the relevant reduction of the capital commitment in company occurs later (Paeglis & Veeren, 2013, pp. 104-123). The offering of secondary shares in the IPO aims mainly at increasing the liquidity of shares (Huyghebaert & Hulle, 2006, p. 313-314). A too aggressive earnings management before the IPO can generate negative effects, because the implied increase in the initial value of the company is not sustainable (Xie, 2001, s. 357–373). The opportunistic strategy could spoil the market reputation and would prevent a later profitable sale of shares held by original owners. The issue is of particular importance for such market participants as private equity funds (Nahata, 2008, pp. 127-151). Thus, the bigger incentives to inflate earnings do not arise before IPO, but it will occur after the IPO, when the lockup expires and subsequent sale of secondary shares is possible. Given that borrowing from future earnings encounters significant limitations and cannot be pursued indefinitely, you can expect that before the IPO, the company will report less, not more aggressively. Taking into account this argumentation I posit an alternative to the H2 following hypothesis:

H3: The pre-IPO use of conservative earnings management is positively related to secondary shares sale in IPO.

Research methodology

The study sample consists of Warsaw Stock Exchange (WSE) IPOs that satisfy the following criteria:
a) their shares were listed on the main market of the WSE for the first time between 2005 and 2015,
b) their offer does include the sale of primary, secondary or both primary and secondary shares,
c) the company's shares were not previously publicly traded (e.g. New-Connect, MST-CeTo),
d) foreign companies, banks and insurance companies are excluded.

Then I exclude 14 companies for which it was not possible to obtain the required figures. The final sample includes 221 IPOs.

The leading research methods used in the study for the diagnosis of links between earnings management and the sale of primary and secondary shares in the IPO are:

a) logistic regression model in which the endogenous variable is a dummy variable PRIMARY (SECONDARY) that takes the value of one

when new shares are issued in IPO (the original owners sell secondary shares in IPO) and zero otherwise,

b) Tobit regression model in which the dependent variable is PRIMARY (SECONDARY) PORTION, that is the ratio of number of the new issued (secondary) shares sold in the IPO relative to the total pre-IPO number of shares.

First, as a proxy of earnings management, I directly use information about the level of discretionary accruals for each company (DACC). I apply Larcker and Richardson (2004, pp. 634) model, which is more appropriate for the assessment of accruals in growing companies. To eliminate the heterogeneity of analyzed firms I follow Ecker et al. (2013, pp. 190-211) and estimate accruals models separately in the cross-section for each decile group of a similar size, measured by lagged total assets.

However, because reducing or increasing of earnings may differently affect the decision on the sale of primary and secondary shares in the IPO, I follow Teoh et al. (1998, p. 1948) to assess the type of earnings management strategy in individual firms. The first group consists of companies with the lowest discretionary accruals (below the first quartile) i.e. applying the conservative earnings management strategy. As a proxy of such a strategy I use a dummy variable DACC <Q1 that is set 1 when firm is classified to this group and 0 otherwise. I act in the same way identifying companies with the strategy of aggressive earnings management. As previously, as a proxy I use DACC> Q3 that is dummy variables and equals 1 for firms in this group and 0 otherwise.

Regarding the conclusions from the priori research on factors affecting the sale of primary and secondary shares in the IPO, I use a set of additional exogenous variables, controlling the influence of other factors on the floatation structure (see Table 1).

Table 1. Symbols and description of the control variables

Variable	Description
DR	The debt-to-assets ratio.
ROA	Return on assets[*].
TC	Total assets[*] [in millions of PLN].
AGE	Age of the company at the IPO.
MV/BV	Market capitalization scaled by the book value of equity before IPO
HOT	Dummy variable which takes the value of 1 if in the year of the firm's IPO there is more new companies on the WSE than the average in the whole study period, and 0 otherwise.
PE	A dummy variable that takes the value 1 when the private equity fund is a shareholder of the company at the time of the IPO, and 0 otherwise.
STATE	A dummy variable that takes the value 1 when the State Treasury is a shareholder of the company at the time of the IPO, and 0 otherwise.

[*]In logit and Tobit regressions I use natural logarithm (Ln) of this variable.
Source: own study.

Empirical results

Empirical research on the practice of IPO in the Polish stock market indicates that the decision to go public is connected with the wish to implement a variety of strategic goals. Table 2 presents descriptive statistics on the types of shares (primary and secondary shares) offered in the IPO. The information indicates that the dominant reason for going public on WSE is the need to raise new capital to the company.

Table 2. Summary statistics for offering types and proceeds

Specification	Mean	Median	Std. dev.	Min	Max	Q1	Q3
Pure primary offerings N=120							
Primary portion	0,3383	0,2649	0,2741	0,0034	1,8956	0,1751	0,4322
Primary proceeds	124.08	26.72	599.49	0.14	5968.81	13.36	51.90
Pure secondary offerings N=27							
Secondary portion	0,4044	0,3629	0,2379	0,0587	1,0000	0,2520	0,4888
Secondary proceeds	704.82	178.20	1290.43	35.81	5371.48	58.72	568.75
Combined offerings N=74							
Primary portion	0,2525	0,2000	0,1981	0,0504	1,1896	0,1255	0,3250
Primary proceeds	57.55	29.60	66.70	3.75	370.50	18.54	70.54
Secondary portion	0,1890	0,1507	0,1586	0,0082	1,0000	0,0801	0,2628
Secondary proceeds	60.01	26.56	113.78	0.74	689.00	10.33	46.46
Proceeds in total	117.56	67.42	167.01	5.43	1059.50	31.25	103.75
Whole sample N=221							
Primary portion	0,2682	0,2086	0,2554	0,0000	1,8956	0,1000	0,3569
Primary proceeds	86.64	22.50	444.79	0.00	5968.81	9.61	52.50
Secondary portion	0,1127	0,0000	0,1854	0,0000	1,0000	0,0000	0,1660
Secondary proceeds	106.20	0.00	501.94	0.00	5371.48	0.00	34.79
Proceeds in total	192.85	43.05	661.13	0.13	5968.81	20.00	97.38

Proceeds is the number of shares times the offer price [in million PLN].
Source: own calculations.

Table 3 presents some descriptive statistics of the characteristics used in the study as variables for the full sample of 221 IPOs. The data indicates that the going public strategy is adopted by firms with the diversified profitability, varied size and structure of liabilities, often using various strategies of earnings management.

Table 3. Descriptive statistics of the explanatory variables

Specification	Mean	Median	Std. dev.	Min	Max	Q1	Q3
DACC	0,0090	0,0011	0,1239	-0,3377	0,6094	-0,0520	0,0683
DR	0,5157	0,5458	0,2559	0,0058	2,3219	0,3399	0,6699
TC	541.15	76.21	2237.45	0.29	21762.09	28.82	213.21
ROA	0,1226	0,0871	0,1274	-0,0984	0,8170	0,0451	0,1595
AGE	23,47	15,00	25,44	3,00	149,00	9,00	23,00
HOT	0,6063	1,0000	0,4897	0,0000	1,0000	0,0000	1,0000
PE	0,1719	0,0000	0,3782	0,0000	1,0000	0,0000	0,0000
STATE	0,0860	0,0000	0,2810	0,0000	1,0000	0,0000	0,0000
MV/BV	7,08	3,77	13,95	-103,63	88,30	1,83	8,31

Source: own calculations.

In order to recognize, which of the characteristics used as explanatory variables affect the type of shares offered to investors I estimate six logit models, that are presented in Table 4.

Table 4. Determinants of the likelihood of primary and secondary shares sale in the IPO - Logit regression results

Specification	Sale of primary shares			Sale of secondary shares		
Intercept	21,0118 (4.2014) ***	27,2524 (4.3416) ***	20,6000 (4.2682) ***	-10,6321 (-4.6936) ***	-11,8087 (-5.0261) ***	-10,1716 (-4.6637) ***
DACC	1,9341 (0.4955)			-1,7798 (-0.9280)		
DACC<Q1		-2,7649 (-2.7037) ***			0,9603 (2.3480) **	
DACC>Q3			0,4913 (0.6697)			-0,2134 (-0.5055)
DR	0,4854 (0.3283)	1,5232 (0.9519)	0,5468 (0.3673)	-0,7989 (-0.8565)	-0,8304 (-0.8877)	-0,7113 (-0.7645)
ROA	-11,2486 (-2.6635) ***	-14,5114 (-3.3635) ***	-11,2137 (-2.8294) ***	8,2264 (3.6482) ***	8,8751 (4.1585) ***	7,6842 (3.5467) ***
Ln(TC)	-1,3433 (-3.6654) ***	-1,7657 (-3.9757) ***	-1,3344 (-3.7694) ***	0,6582 (3.7062) ***	0,7148 (3.9962) ***	0,6280 (3.6361) ***
Ln(AGE)	-0,3914 (-0.9295)	-0,4985 (-1.1358)	-0,3431 (-0.7920)	0,5631 (2.2718) **	0,6283 (2.4651) **	0,5501 (2.2188) **
MV/BV	-0,0717 (-1.1848)	-0,0808 (-1.2370)	-0,0694 (-1.1388)	0,1048 (2.9969) ***	0,1103 (3.1260) ***	0,1018 (2.9258) ***
HOT	1,7963 (2.6654) ***	2,0398 (2.8748) ***	1,7817 (2.6464) ***	-0,0120 (-0.0326)	-0,0336 (-0.0895)	-0,0211 (-0.0574)
PE	-2,3850 (-3.5522) ***	-3,0500 (-3.8667) ***	-2,3281 (-3.5117) ***	1,9561 (4.1168) ***	2,0086 (4.2260) ***	1,9370 (4.0661) ***
STATE	-1,0947 (-1.2324)	-1,0275 (-1.1306)	-1,0579 (-1.1850)	-0,6528 (-0.9849)	-0,5950 (-0.8956)	0,6132 (-0.9257)
LR stat	74.3537	82.5265	74.5648	65.5874	70.4098	64.9751
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Numbers in parentheses are z-statistics. *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.
Source: own calculations.

The use of earnings management before the IPO affects the likelihood of the sale of the specified type of shares only in certain cases. Across the proxies for earnings management only coefficients on DACC<0 are statistically significant. For the issuance of new shares, the coefficient on DACC<0 is negative. It indicates that the intentional reporting less in the period preceding IPO reduces the likelihood of the sale of primary shares in the IPO. In turn, there is a positive relationship between negative discretionary accruals and the reduction of the original shareholders' holdings. Consistent with hypothesis 3, the coefficient on DACC<0 is positive and significant at the 0.05 level.

The data show that the issuance of new shares is more likely in the case of smaller companies with lower profitability. In turn, in the case of older, larger, characterized by the higher profitability and market-to-book ratio firms there is a greater likelihood of the sale of secondary shares in the IPO. If a private equity fund is one of the original shareholders, it increases the probability of the sale of secondary shares and, in turn, limits the likelihood of creating new issued shares in the IPO.

The next part of the research focuses on the analysis of the links between the use of discretionary accruals and the scale of sale of secondary shares, as well as newly created shares. Table 5 presents the results of analysis using Tobit regression.

The results explaining the primary portion in Table 5 do not indicate the existence of the relationship between the scale of the issuance of new shares and the use of discretionary accruals before the IPO. In contrast, the figures indicate that the adoption of conservative reporting strategy prior to the IPO results in the increased scale of secondary shares sale.

The data in Table 5 provide additional evidence that smaller companies, characterized by lower profitability and lower growth potential offer the larger proportion of primary shares in the IPO. Moreover, the growth of the firm's debt and favorable market conditions promote the increase of the issuance scale. In contrast, the presence of private equity fund among the shareholders negatively affects the primary shares portion. Regarding the sale by original shareholders, there is a statistically significant, positive link between the firm size, age and portions of secondary shares sold in the IPO. Furthermore, the higher profitability also positively affects the growth of the secondary portion.

Table 5. Determinants of the portions of primary and secondary shares - Tobit regression results

Specification	Primary portion			Secondary portion		
Intercept	1,1371 (6.5983) ***	1,2127 (6.9755) ***	1,1379 (6.8585) ***	-1,1606 (-4.9870) ***	-1,2807 (-5.4692) ***	-1,1213 (-4.9079) ***
DACC	0,0341 (0.2126)			-0,1855 (-0.9195)		
DACC<Q1		-0,0530 (-1.5768)			0,1120 (2.7543) ***	
DACC>Q3			0,0362 (0.9958)			-0,0175 (-0.3912)
DR	0,2207 (2.8241) ***	0,2242 (2.9062) ***	0,2303 (2.9479) ***	0,0021 (0.0216)	-0,0027 (-0.0282)	0,0095 (0.0967)
ROA	-0,4357 (-2.4082) **	-0,4956 (-2.9536) ***	-0,4863 (-2.7789) ***	0,8727 (3.8253) ***	0,9502 (4.4507) ***	0,8159 (3.6855) ***
LnTC	-0,0773 (-5.5043) ***	-0,0813 (-5.8685) ***	-0,0786 (-5.7279) ***	0,0721 (3.9719) ***	0,0775 (4.3581) ***	0,0694 (3.8801) ***
LnAGE	-0,0174 (-0.8317)	-0,0211 (-1.0093)	-0,0152 (-0.7245)	0,0056 (2.1418) **	0,0632 (2.4451) **	0,0558 (2.1142) **
MV/BV	-0,0100 (-3.5271) ***	-0,0103 (-3.6759) ***	-0,0102 (-3.6238) ***	0,0056 (1.5839)	0,0057 (1.6460) *	0,0054 (1.5152)
HOT	0,0659 (2.0739) **	0,0669 (2.1143) **	0,0659 (2.0786) **	-0,0134 (-0.3355)	-0,0128 (-0.3249)	-0,0147 (-0.3667)
PE	-0,1211 (-3.2440) ***	-0,1236 (-3.3214) ***	-0,1184 (-3.1711) ***	0,2391 (5.5130) ***	0,2461 (5.7599) ***	0,2377 (5.4392) ***
STATE	0,0452 (0.7324)	0,0456 (0.7469)	0,0512 (0.8305)	0,0398 (0.5698)	0,0443 (0.6524)	0,0429 (0.6114)

Numbers in parentheses are z-statistics. *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.
Source: own calculations.

Conclusions

In this paper I investigate the links between earnings management in the period preceding the company's going public and the decision on the sale of primary and secondary shares in the IPO. Among the surveyed IPOs there are companies which, by earnings management, tried to improve the financial results presented to the public, as well as firms with negative discretionary accruals.

The empirical research allows me to formulate the following conclusions. Firstly, the data do not show that managers of new stock companies use an aggressive strategy of earnings management prior to the IPO to raise additional financing to the company. However, although I do not find evidence that the increase of pre-IPO discretionary accruals positively affects the sale of primary shares and its scale in the IPO, the analysis revealed that the deliberate conservative reporting limits the probability of the new shares issuance. Secondly, as far as selling actions of initial shareholders is

concerned, inflating earnings do not encourage reducing their shareholding in the company. On the contrary, the sale of secondary shares occurs in companies with the lowest discretionary accruals before the IPO i.e. the ones using a conservative earnings management strategy. This suggests that shareholders with the intention of cut back their holdings tend to report less before the IPO, anticipating the possible negative consequences of window-dressing. Furthermore, intentional conservative reporting increases the portion of secondary shares sold in the IPO. This is possibly due to the fact that such IPOs may struggle with the negative consequences of reduced liquidity of the stock, as the negative discretionary accruals decrease the probability of the primary shares offering.

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portfolio. Although the final sale of the company's shares may occur even several years after the first listing on the stock market, this type of exit from investment is known as the initial public offering (IPO). However, the stock exchange is not just a place where PE funds can cash out their best and successful investment, but also a place to create and accumulate good reputation. A large stream of studies suggests that companies conducting the initial public offering (IPOs) engage in the earnings management in order to inflate the issue price (Teoh et al., 1998, pp. 1935-1974). However, while such activities may generate benefits for sellers of shares at a going public event, in the long run they will result in the subsequent negative changes in the company's performance and value (DuCharme et al., 2004, pp. 27-49). Thus, the use of earnings management is beneficial only for a selected group of stakeholders. Especially for PE funds that are repetitive stock market players who accumulate the reputation capital such a strategy of the wealth transfer from less informed stock investors may be very risky.

The main aim of this study is to investigate the use of pre-IPO earnings management by PE funds in the process of divestment conducted on a stock exchange. Some studies suggest that PE funds may take advantage of the privileged position, preferring their own needs above the interests of other groups of shareholders, both present and future (Liu, 2014, p. 173). Due to the significant information asymmetry, the time around IPO is ideal to take this type of action (Teoh et al., 1998, p. 1937). Thus, in this paper I address the question whether the presence of a PE fund in the company's ownership affects the scale of earnings management prior to the IPO. The incentive to manage earnings in order to increase the sale price is particularly high. Without a doubt, PE funds have the purpose, opportunity and ability to undertake such activities. Nevertheless, literature emphasizes the key role of PE funds in the supervisory process and their beneficial effect on the applied corporate governance standards (Hochberg, 2012, p. 430). Moreover, the significance of divestments undertaken by the IPO in building reputation capital of PE funds is highlighted (Nahata, 2008, pp. 127–151).

To fulfill the aim of the paper I posit the hypothesis that the scale of earnings management in the period preceding the IPO in the PE-backed companies is lower in comparison to the non-PE-backed companies that go public. For PE funds the good reputation is essential to build a stable and strong position in the very competitive private equity market. The market evaluates the achievements of individual funds through the track record of the portfolio companies. Since the increase in the share price triggered by the earnings management is only temporary and does not cause a lasting increase in the value of the company (DuCharme et al., 2004, pp. 27-49), engaging in upward window dressing around the IPO may negatively affect

how the PE fund is perceived by the market participants. The loss of trust and positive opinion can significantly hinder or even prevent the divestments on the public securities market in the future. Thus, it is in the interest of the fund to establish the appropriate corporate governance solutions, oriented towards accumulation of the reputation capital and preventing the use of aggressive earnings management prior to the introduction of the company's shares to the stock trading (Hochberg, 2012, p. 430).

Literature review

Although earnings management is widely discussed in literature, there is no agreement among researchers about the essence and purpose of such activities. Healy and Wahlen (1999, p. 368) emphasize that this practice occurs when managers use judgment in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on the reported accounting numbers. Therefore, this practice can be useful in reducing the cognitive value of reported earnings and may lead to the wealth transfer in favor of better-informed groups, mainly managers and original shareholders, at the expense of other users of financial statements (Grabiński, 2016, p. 33).

In spite of the fact that earnings management is mainly seen as if sneaky managers pulling the wool over the eyes of naive owners by manipulating accruals (Wójtowicz, 2015, p. 142), such actions may not always be perceived negatively and result from opportunistic actions. It can be used to increase the informativeness of the company's financial results, so that the internal, true and important for external users information is provided to the public (Subramanyam, 1996, pp. 249-281).

While growing literature shows the use of it by the IPO firms, only a few studies directly investigate the role of PE funds in financial reporting quality. Examining the quality of profits in PE-backed IPOs Morsfield and Tan (2006) document that the presence of funds among company owners is associated with the lower level of discretionary accruals. They suggest that PE fund's involvement in the company and the incentives to monitor its business effectively constrains the earnings management actions. Also, Hochberg (2012, pp. 429-480) points out that the PE fund's presence reduces the level of window dressing in the firm at IPO and such companies are more likely to be conservative and less aggressive in terms of earnings management than similar non–PE-backed firms.

Although many papers emphasize the positive certification and monitoring roles played by PE funds, there is also a growing body of literature, which seems to question that findings. The study of Darrough and Rangan (2005, p. 1-33) shows that the portfolio companies of PE funds strive to present higher reported earnings to the public by reducing R&D expenditures in the year of the IPO. Wongsunwai (2013, pp. 296-324) emphasizes the importance of reputational concerns for the financial reporting strategy and points that only portfolio companies of higher-quality PE funds, which are willing to protect the standing they have, constrain aggressive earnings management prior to the IPO. Hu et al. (2012, pp. 251-268) provide evidence that the participation of the PE fund lowers earnings management in the period preceding IPO and increases earnings management in the post-IPO year in order to increase the accounting earnings in the time in which the lock-up period expires.

Methodology

Study sample

Empirical studies undertaken in order to verify the hypothesis of a different scale of earnings management in the IPO process of the PE funds' portfolio and other firms have been conducted on a group of companies whose first listing of shares on the Warsaw Stock Exchange took place between 2005 and 2015. The analyzed firms have their headquarters in Poland and their IPO includes the sale of primary or secondary shares. In the first stage, out of all companies that met the above selection criteria I identify those, in which IPO is conducted because of the divestment process of the PE funds. In total, 38 companies meet this criterion.

In the next stage of research I distinguish companies, which constitute the control sample. I use the following criteria for selecting these companies:
− the initial market value of the company (MV),
− the company's initial book-to-market ratio (BV/MV).

Then I use cluster analysis in order to assign companies similar to those which are backed by PE funds. I use the method of single-linkage clustering on a set of standardized data, where the distance between the grouped objects is expressed by the Euclidean metric. The application of these procedures allows me to identify companies with a similar initial market value and growth potential. As a result I select, for further empirical analysis, a

total of 76 companies, which are divided into two equal groups (see Table 1):

Table 1. Some descriptive statistics of the initial market value (MV) and book-to-market ratio (BV/MV) of both samples.

Specification	MV (in thousands PLN)		BV/MV	
	PE sample	Matched sample	PE sample	Matched sample
Mean	327196.5	287112.8	0.2209	0.2286
Std. dev.	293972.3	340979.9	0.2201	0.2180
Lower quartile	85844.2	98427.8	0.0851	0.0912
Median	266145.5	211670.9	0.1569	0.1587
Upper quartile	415476.5	332203.5	0.3040	0.3063
Number of comanies	38	38	38	38
Kolmogorov-Smirnov Z test	p-value>0.1000		p-value>0.1000	

Source: own study.

What is especially important, p-values corresponding to the Kolmogorov-Smirnov Z test of difference in the distribution cross pairwise subsamples do not indicate that these two groups, in terms of both MV and BV/MV ratio, differ from each other in a statistically significant way.

Earnings management detection

In order to investigate the application of earnings management in a given firm I use the discretionary accruals (DACC). First, it is necessary to disaggregate total accruals (TACC), which is the difference between the net earnings and cash flow from operation, into two components: the discretionary and non-discretionary part. In most empirical studies on earnings management to estimate the value of discretionary accruals, the model developed by J. Jones is applied, which assumes that non-discretionary accruals result from the changes in sales (ΔSELES) and gross property, plant and equipment (PPE), or its modified formula of Dechow et al. (1995, pp. 193-225), which additionally takes into account fluctuations in trade receivables (ΔAR). However, Ball and Shivakumar (2008, pp. 324-349) emphasize the significant limitations of these models and their application leads to an overestimation of discretionary accruals. Therefore, I use Larcker and Richardson (2004, p. 634) extension of a modified Jones (1991, pp. 193-228) model, which is more suitable for assessing accruals for fast-growing companies. They add the company's BV/MV ratio to the standard model, which refers to the growth option and cash flows from operations (OCF) to

control the influence of the firm's operating performance. In general, the model is estimated as follows:

$$\frac{TACC_t}{TA_{t-1}} = \beta_0 \left(\frac{1}{TA_{t-1}} \right) + \beta_1 \left(\frac{\Delta SALES_t - \Delta AR_t}{TA_{t-1}} \right) + \beta_2 \left(\frac{PPE_t}{TA_{t-1}} \right) + \beta_3 \left({BV}\!/\!{MV_t} \right) + \beta_4 \left(\frac{OCF_t}{TA_{t-1}} \right) + \varepsilon_t$$

and the residual value from this model is discretionary accruals. TA_{t-1} is the total assets at the beginning of the year t, $\beta_0, \ldots, \beta_4$ are the regression coefficients, and ε_t is the error term in a regression equation, while t refers to the fiscal year before the IPO year.

To eliminate the heterogeneity of the sample I follow Ecker et al. (2013, pp. 190–211) and combine companies into a relatively homogeneous sets of observations according to their size measured by lagged total assets. First, I divide all 221 new stock companies into 10 subsamples of firms of a similar size, and then I estimate the structural parameters of the accruals model separately for each decile group.

Empirical results

As an overall view, I first report the mean and median of some characteristics of the companies included in the study sample and comparison results. Table 2 indicates that there are some differences between the two groups of companies. Especially, when the floatation structure is considered.

Table 2. Characteristics of companies qualified to the research sample

Specification	Mean		t-test of difference in means	Median		Wilcoxon rank-sum test of difference in medians
	PE sample	Matched sample	p-value for t-statistics	PE sample	Matched sample	p-value for z-statistics
Panel A: Firm characteristics						
SALES	209.25	165.06	0.5802	82.81	84.45	0.4268
EAT	17.35	8.17	0.2449	8.10	5.34	0.2342
OCF	11.96	6.40	0.2382	3.68	4.11	0.4268
ASSETS	158.41	156.70	0.9770	105.33	79.92	0.6217
DR	0.4973	0.5786	0.2963	0.5203	0.6186	0.2342
ROA	0.1447	0.1424	0.9495	0.1072	0.0872	0.6969
AGE	22.37	23.50	0.8295	15.00	16.00	0.7711

Table 2. Continued

Specification	Mean		t-test of difference in means	Median		Wilcoxon rank-sum test of difference in medians
	PE sample	Matched sample	p-value for t-statistics	PE sample	Matched sample	p-value for z-statistics
Panel B: IPO transaction characteristics						
IPO PROCEEDS	86.55	60.85	0.1984	52.33	36.20	0.4030
PRIMARY PROCE-EDS	21.18	39.98	0.0204	12.13	29.19	0.0176
SECONDARY PRO-CEEDS	65.37	20.88	0.0198	33.79	0.00	0.0005
PRIMARY POR-TION	0.1646	0.2595	0.0242	0.1257	0.2608	0.0037
SECONDARY POR-TION	0.2240	0.0921	0.0023	0.2176	0.0000	0.0003

SALE is total sales. EAT is earnings after taxes. OCF is operating cash flow. ASSETS is total assets. DR is debt to total assets. ROA is earnings after taxes to total assets. AGE is firm age at the IPO. IPO (PRIMARY, SECONDARY) PROCEEDS is the number of total (primary, secondary) shares sold in IPO times the offer price [in million PLN]. PRIMARY (SECONDARY) PORTION is the ratio of new (existing) shares sold in the IPO relative to the total number of shares pre-IPO.
Source: own study.

The information in Table 2 indicates that the size of the primary and secondary portion as well as corresponding proceeds are significantly different between PE-backed IPOs and the matched sample but the difference in the total amount of money collected is statistically insignificant.

To analyze whether the presence of a PE fund among the company's shareholders affects the quality of financial reporting of companies conducting IPO, which is expressed in earnings management, first, I estimate the value of discretionary accruals for all 221 IPOs qualified for the study sample. Figure 1 shows the results of these calculations.

The scale of earnings management is diversified among the whole sample although it is dominated by companies in which the ratio of discretionary accruals scaled to total assets varies between -0.1 and 0.1, i.e. a double peak is observed in the histogram. Then one can see the small advantage of companies deliberately reporting lower financial results, i.e. with negative discretionary accruals.

Figure 1. Distribution of discretionary accruals for the total sample of 221 IPOs
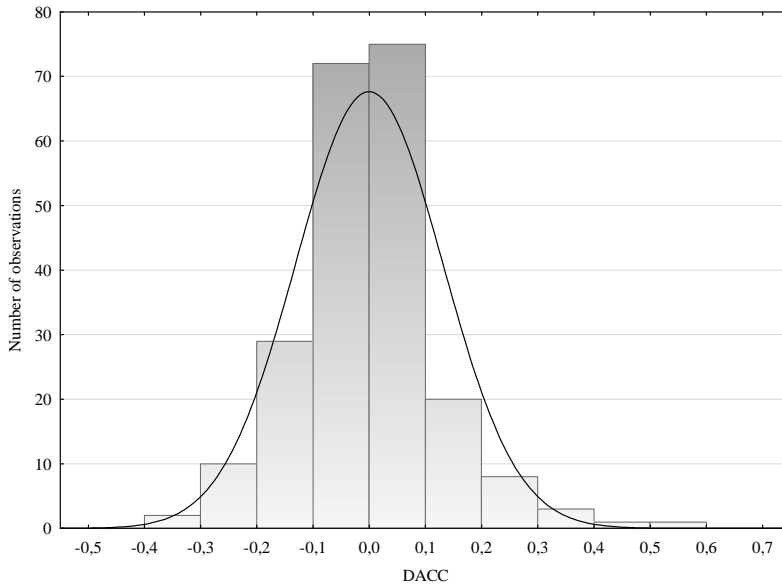
Source: own study.

Next, I turn my attention strictly to the issue of earnings management in PE-backed companies and the matched sample. Table 3 presents descriptive statistics and results of the analysis.

Table 3. Summary statistics of discretionary accruals for PE-backed IPOs and matched sample

Specification	Mean	Std. dev.	Lower quartile	Median	Upper quartile	Min	Max
PE sample	0,0129	0,1177	-0,0503	0,0094	0,0474	-0,2871	0,3525
Matched sample	0,0218	0,1605	-0,0976	-0,0025	0,0967	-0,2266	0,5974
t-statistic, t-test of difference in means							0,2754
p-value from a t-test statistic							0,7838
z-statistic, Wilcoxon rank-sum test of difference in medians							0,8152
p-value from a Wilcoxon rank-sum test statistic							-0,2337

Source: own study.

In the PE-backed IPOs the average discretionary accruals scaled to total assets amount to 0.0129 and it is slightly smaller as compared to the matched sample in which the mean is at the level of 0.0218. In turn, the median of discretionary accruals is lower in the matched sample and amounts to -0.0025 in comparison to PE-backed companies with the medi-

an of 0.0094. However, both the t-test and the Wilcoxon test show the lack of the statistical significance of the observed differences. In the matched sample I observe greater differentiation of the analyzed category. In this group of IPOs DACC varies between -0.2266 and 0.5974 and from -0.0976 in the first quartile to 0.0967 in the third quartile. Overall, my findings do not indicate that the presence of PE funds among the shareholders of the company in the period preceding the process of going public has a significant impact on the scale of earnings management prior to the IPO and are not in line with the hypothesis I posit.

Conclusions

In this paper I investigate the issue of the PE funds' impact on the quality of financial reporting in the companies that go public and I draw the following main conclusion. In contrast to previous studies I do not provide evidence that companies using PE financing have less aggressive financial reporting. The analysis shows that the difference between the level of discretionary accruals in PE-backed and other companies, when controlling for the market value and book-to-market ratio, is statistically insignificant.

However, there are several limitations to the results presented in this study. First, the Polish private equity market is relatively small in comparison to the developed markets of Western Europe and the US, so the study sample size is considerably reduced. Then, I analyze earning management using only the discretionary accruals. The issue of the real earnings management activities used by managers of PE-backed and other companies in the period preceding IPO is an interesting research area.

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Corporate reputation and corporate image - empirical analysis on the example of Polish banking sector

JEL Classification: *G21; L14; L25;M31*

Keywords: *corporate reputation, corporate image, intangible resources, banking sector*

Abstract

Research background: Corporate reputation and image are two valuable intangible resources of the company, aimed at building its long-term competitive advantage and market value. Although reputation and image are interrelated categories, they should not be identified with each another. The differences are not only in the definition and character, but also in the mechanism of formation and tools to create these resources by the company. Image is a picture, perceptions and associations about the company in the minds of consumers, which may be created using the tools of PR and advertising in a relatively short period of time. Reputation is a review of the company and its activities, formulated by various stakeholder groups on the basis of not only the advertising, but also on the basis of the assessment of real activities of companies in the long term.
Purpose of the article: The cognitive objective of the article is to point out the fundamental differences between reputation and image on the basis of the analysis of approaches and theoretical concepts. The practical objective is to make an attempt to identify the differences and relationships between reputation and image on the basis of empirical analysis, therefore the research was conducted in the Polish banking sector.
Methodology/methods: In order to evaluate the image and reputation, the survey method was used aimed at the customers of banks operating on the Polish market.
Findings: The results allowed formulating the thesis that the banks that are characterized by a consistent, unambiguous and positive image have higher rates of reputation. Due to some limitations of research conducted, mainly concerning the size and methods of sampling as well as the method applied for measuring the corpo-

rate reputation and image, the relationships identified should be treated as a starting point for broader research and for conducting further discussions in this area.

Introduction

Image and reputation are part of the company's intangible resources that can be built on its long-term competitive advantage and market value. Image is a picture, a set of imaginations and associations about a company which is emerging in the minds of its audience as a result of the interaction of information coming from different sources. Corporate image is very important for the company because it can be a very important decision criterion for different stakeholders, especially customers (Scott and Lane, 2000; Cornelissen, 2002, 2006; Caputa, 2015). Reputation, on the other hand, is the opinion about the company, formulated by different stakeholder groups based on an assessment of the various aspects of its activities. Good reputation fosters greater customer loyalty, acquiring solid business partners and investors, attracting talented employees, and encouraging the administrative or local community. All this translates into better market performance, financial profits and goodwill (Figiel, 2013, pp. 55-63; Dąbrowski, 2010, pp. 232-249, Szwajca, 2016b, pp. 25-40).

An image and reputation of the company are categories that have a common pedigree, which were originally treated as semantically related concepts and used interchangeably, with the more commonly used concept of an image (Dąbrowski, 2010, p. 72) Although the essence and nature of the relationship between image and reputation has not been settled unequivocally, most of the authors share the opinion that they are not the same concept (Bernstein, 1986; Fombrun and Rindova, 1996; Walker, 2010). Corporate image may be created relatively quickly by the use of advertising or Public Relations actions, while a reputation cannot. Reputation is built as a result of ongoing interactions between the enterprise and its key stakeholder groups, where their experience is consistent with the values the enterprise claims to uphold as well as with promises it makes through advertising and other marketing communications (Rindova, Williamson et al, 2005; Rindova, Pollock et al., 2006; Chovanová Supeková et al., 2016, p. 85; Szwajca, 2016b).

In this study it was assumed that both resources: image and reputation are needed by the company needed and they are mutually supportive. Without good reputation, it would be difficult to create a desired positive image successfully, but good reputation without image support would not allow the company to make full use of its potential because the company

would be poorly visible and recognizable, and good opinions would be too slow and could not reach everyone.

A cognitive purpose of the article is to indicate the fundamental differences between reputation and image on the basis of the analysis of concepts and theoretical concepts in the context of the enterprise's processes and management tools. A practical purpose is an attempt to identify differences and correlations between reputation and image on the basis of empirical analysis based on research conducted in the Polish banking sector. The method of survey addressed to clients of banks operating on the Polish market was used to evaluate both, the image and reputation.

In order to accomplish the purpose adopted, the following research hypotheses are formulated:

H1: Banks with a better reputation are characterized by a more consistent and unambiguous image, while banks with a worse reputation are characterized by a more dispersed and less unequivocal image.

H2: Banks with a better reputation have a more positive image, while banks with a worse reputation have a less positive image.

H3: Banks with a better reputation are characterized by a higher level of compliance with declarations and advertising slogans.

Research methodology

In order to calculate the corporate reputation index and to identify the corporate image a methodology of measurements was used, based on survey research. A questionnaire method was used, which was aimed at the customers of retail banking. The group of respondents comprised of part-time undergraduate and graduate students from the Faculty of Organization and Management of the Silesian University of Technology from four facilities: in Zabrze, Katowice, Bytom and Rybnik, who have at least one bank account opened. The questionnaire was sent to the students via e-mail to the e-mail of the university. The research was conducted at the turn of year 2015 and 2016.

1137 people took part in the research[1], including 67.5% of women and 32.5% of men. The age structure was as follows: there were 67.1% of people at the age of 19-25, 20.7% at the age of 26-35 and 12.2% of those at the

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[1] Over 2000 completed questionnaires were collected but for the purpose of the analysis 1137 questionnaires were chosen among the customers of the seven banks that were most strongly represented. The limit of representativeness was set at 100 customers of a given bank.

age of more than 35 years old. These were the customers of the following banks: ING BSK (22.6%), PKO BP (20.2%), Alior Bank (15.8%), mBank (15.4%), BZ WBK (13.7%), Pekao S.A. (12.3%). Due to the selection method (target selection method), the size of the sample and its relatively low level of representativeness, the research may be considered as pilot research.

The index of bank reputation was determined on the basis of evaluation of the selected aspects, suggested by the creators of the *Fortune* methodology and *Reputation Quotient* (see: Nawrocki, Szwajca, 2016; Szwajca, 2016a).

In order to identify an image of the banks, one of the forms of the test of imagination was used - the test of association with animals, which belongs to projection techniques, and to be more precise, to personification and animation techniques (Kaczmarczyk, 2011, pp. 298-301; Mazurek-Łopacińska, 2011; Szreder, 2004). The respondents answered the question which of the given animal images best suited the bank. The respondents had a choice of six animals: a dog, an owl, a lion, a cat, a fox and a snake. Animals were selected in such a way as to represent both positive and negative traits.

As can be seen from the quoted characteristics attributed to individual animals, positive associations refer to a dog, an owl and a lion, while negative to: a cat, a fox and a snake.

Presentation of results

Identification of banks' image was made on the basis of an analysis of the association test results' with animals, which is shown in Table 1.

Table 1. An image of the surveyed banks on the basis of the association test with animals

| Tested banks	Dog	Owl	Lion	Cat	Fox	Snake
ING BSK	1,7%	4,2%	**89,6%**	0,7%	1,9%	1,9%
PKO BP	13%	**43,2%**	23,3%	7,2%	11,9%	1,4%
Pekao S.A.	12,3%	**42,7%**	21,1%	4,6	17,6%	1,7
mBank	25,3%	**39,3%**	6,8%	9,6%	15,1%	3,9%
Alior Bank	12,5%	**37,5%**	24,7%	9,1%	12%	4,2%
BZ WBK	12,6%	**30,1%**	19,3%	5,1%	10,4%	22,5%

Source: own work based on the findings.

As can be seen from the table, an image of all surveyed banks was rated as positive because they were mostly attributed to the images of animals with positive symbolism, iea dog, an owl, a lion. Definitely the best and

most clearly seen ING BSK, however, is due to the fact that this bank has in its logo just a lion's image.

Other banks were most often associated with owls, Pekao S.A. and PKO BP were mentioned the most often , whereas BZ WBK and Alior Bank were mentioned the least often. Relatively, the most negative associations (with a cat, a fox and a snake) were reported in BZ WBK (38%), mBank (28.6%) and Alior Bank (25.3%).

An assessment of the degree of image uniqueness was based on the level of dispersion (concentration) of indications per animal (Figure 1).

Figure 1. Image of tested banks
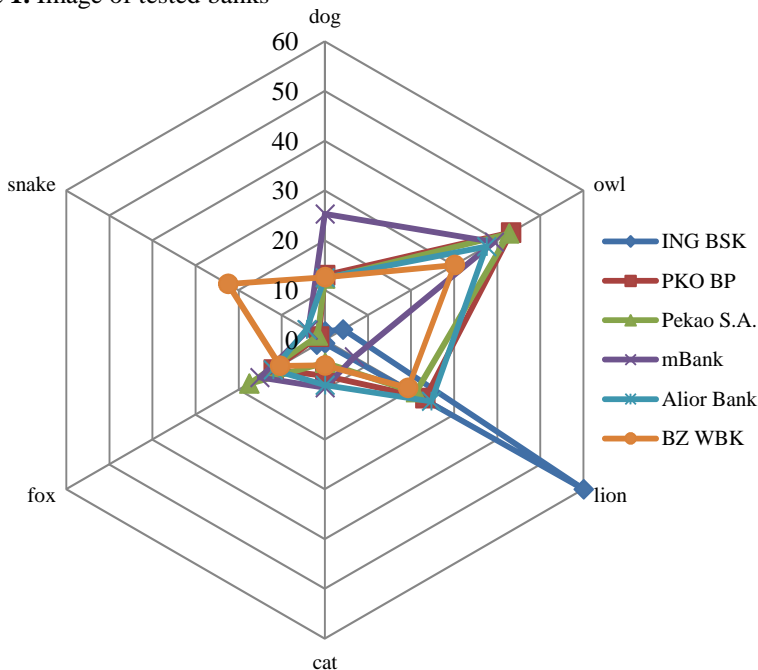
Source: own work based on the findings.

Of course, ING BSK (89.6% associations with a lion), and PKO BP (43.2% associations with an owl) and Pekao SA (42.7% associations with an owl) are the most consistent and unmistakable images. In turn, the least consistent/concentrated and unambiguous image according to the level of indications of associations with owls are: BZ WBK (30.1%), Alior Bank (37.5%) and mBank (39.3%).

A reputation of the surveyed banks was determined on the basis of four attributes that could be assessed by the clients, ie the quality of services,

social responsibility, the level of trust and the attractiveness of the bank as a potential employer. The results are presented in Table 2.

Table 2. Indicators of a reputation measurement of the surveyed banks

Tested banks	Quality of services	Employer attractiveness	Social re-sponsibility	Level of trust	Reputation index
ING BSK	91,7%	76,5%	78,3%	90,4%	**84,2%**
PKO BP	88,1%	62,4%	67,2%	89,7%	**76,8%**
Pekao S. A.	87,9%	63,2%	70,4%	82,1%	**75,9%**
mBank	92,4%	59,3%	63,2%	96,8%	**77,9%**
Alior Bank	84,5%	49,2%	45,7%	79,8%	**64,8%**
BZ WBK	71,8%	43,7%	50,8%	83,1%	**62,3%**

Source: own work based on the findings.

As we can see, the highest overall reputation was obtained by ING BSK, while the lowest by BZ WBK. In general, the highest quality of products and business ethics was assessed, and the lowest rating was the attractiveness of the bank as an employer.

As already stated, reputation is a reflection of the consistency of what the company declares and promises with what it actually does, ie the consistency of words with deeds. If you assume that the image is a collection of images created largely by the company itself (advertising messages, document declarations, ethical codes, etc.) and a reputation is an assessment of the company's actual activities, then based on the identification of the degree of conformity of the declaration with the actions, an assessment of the degree of conformity of an image with a reputation can be done (whether the image was positively verified). In order to do that, customers were asked a question whether the bank's activities are consistent with the declarations and advertising slogans. Table 3 presents the results.

Table 3. Assessment of the compliance of the surveyed banks with declarations and advertising slogans

Tested banks	Definitely yes	Probably yes	Probably no	Definitely no
ING BSK	17,2%	74,1%	8,7%	0%
PKO BP	17,4%	69,5%	13,1%	0%
Pekao S. A.	7,6%	69,3%	23,1%	0%
mBank	17,5%	70,1%	12,4%	0%
Alior Bank	12,5%	66,0%	12,5%	0%
BZ WBK	9,8%	65,8%	24,4%	0%

Source: own work based on the findings.

ING BSK received 91.3% of positive responses, followed by mBank (87.6%) and PKO BP (86.9%). The biggest discrepancies were noted with BZ WBK (75.6%) and Pekao S.A. (76.9%).

Based on the results presented, the hypotheses can be verified. Confirming hypothesis H1 (Banks with a better reputation is characterized by a more consistent and unambiguous image, while banks with a worse reputation are characterized by a more diffuse and less explicit image) is a comparison of reputation ratios with the assessment of concentration / scattered image (Table 4).

Table 4. Comparison of a reputation ratio with the concentration of an image of the surveyed banks

Tested banks	Reputation index	Image concentration degree
ING BSK	84,2%	89,6%
PKO BP	76,8%	43,2%
Pekao S. A.	75,9%	42,7%
mBank	77,9%	39,3%
Alior Bank	64,8%	37,5%
BZ WBK	62,3%	30%

Source: own work based on the findings.

According to the data in the table, banks with the highest reputation rates also have the highest concentration of image, which is characterized by the most consistent and unambiguous image, while banks with lower reputation have lower levels of image concentration, which show less coherence and unambiguity of their image.

Verification of the second hypothesis that banks with a better reputation have a more positive image, while banks with less reputation have a less positive image requires a comparison of reputation ratios with positive and negative associations of banks with animal images. A summary of indicators is presented in Table 5.

Table 5. Reputation indicators and positive and negative associations of image

Tested banks	Reputation index	Positive associations	Negative associations
ING BSK	84,2%	95,5%	4,5%
PKO BP	76,8%	79,5%	20,5%
Pekao S. A.	75,9%	76,1%	23,9%
mBank	77,9%	71,4%	28,6%
Alior Bank	64,8%	74,7%	25,3%
BZ WBK	62,3%	62,0%	38,0%

Source: own work based on the findings.

As can it be seen from the table, for almost all banks (except for Alior Bank, which has a relatively high compliance rating), a high reputation ratio corresponds to a high percentage of positive image associations with positive animal images, such as dogs, owls and lions.

Verification of the third hypothesis that reputable banks are characterized by a higher level of compliance with advertising declarations and slo-

gans has been compiled on the basis of a comparison of the reputation ratio with the degree of compliance of the bank's activities with declarations and advertising slogans (Figure 2).

Figure 2. Reputation and bank compliance index with bank statements
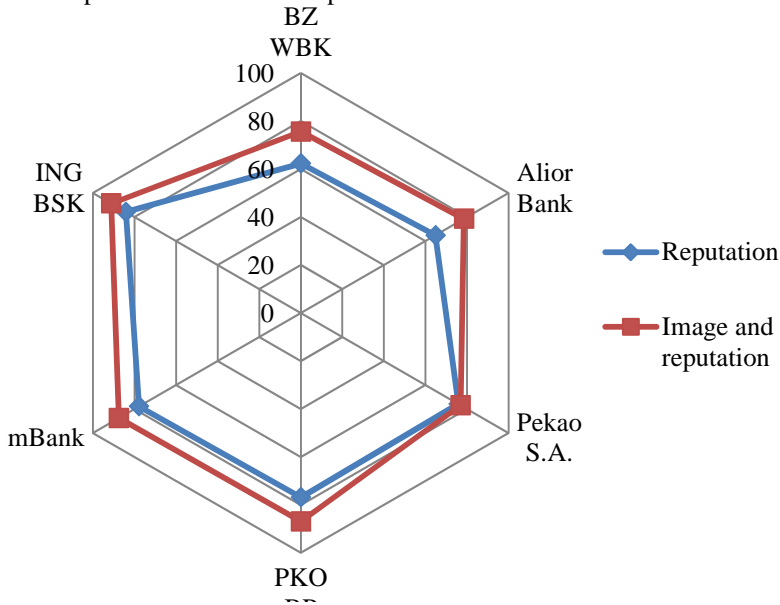
Source: own work based on the findings

The biggest discrepancies between an image and a reputation are with banks BZ WBK and Alior Bank, the ones with the lowest reputation ratios. The smallest discrepancies are with Pekao S.A., but also with ING BSK, mBank and PKO BP, which are banks with relatively good reputations. It can be assumed that the third H3 hypothesis was only partially confirmed.

Conclusions

An image and a reputation of the company are two valuable intangible assets that can be used to build long-term competitive advantage and market value. Currently, the management and marketing specialists are of the opinion that these are separate categories. Differences arise from the perception of their essence, character, the way they are built. An image is an image of an enterprise created in the minds of the stakeholders, which is shaped pri-

marily by the company's communication with the environment. It is individual, can be positive, negative or neutral, strong or weak, consistent or blurred. An image as a reflection of reality can be artificially created by the company in relatively short time using image advertising and public relations. On the other hand reputation is an assessment of the company formulated by its stakeholders not only on the basis of communication but also their own experience with the company and the opinions of other entities having their experience. It evaluates the credibility of a business, based on the confrontation of words with deeds, promises and declarations with their fulfillment. Reputation is social in that it affects the collective, aggregated opinion of different stakeholder groups. It can be positive or negative, strong or weak. It is built in a relatively long time, based on the identity and real business operations. It is relatively harder to manipulate, maintain and control than an image. It has relatively stable character and is comparable.

An image and a reputation affect market behavior and stakeholder business decisions, so businesses try to manage them consciously and effectively. Among the authors there are divergent views on the interdependence between these categories: some believe a reputation is a tool for an image building, others suggest that this image influences reputation. The paper expresses the view that image and reputation interact with one another: a positive, coherent image strengthens a reputation, and a good, strong reputation favors the creation of a desired corporate image. Such a position confirmed the results of the research conducted on the example of Polish banking sector. It turned out that the banks with the best reputation have a consistent, positive image, while banks with a weaker reputation have a more blurred and less positive image.

It should be noted, however, that the research conducted, due to its numerous limitations and shortcomings (ie size and selection of the samples, the methods of measurement of a reputation and an image) do not allow to generalize and formulate categorical theses. However, these reflections and conclusions can be treated as an attempt to identify the relationship between an image and a reputation and can be inspiration for further in-depth research.

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Influence of group purchasing organizations on financial situation of SMEs

Abstract

Research background: SMEs often operate in markets where they compete with large companies. A fight for the customer, payment backlogs, problems with debt collection and new branches make management seek solutions that will influence positively on the situation of financial companies. Maintaining liquidity and generating income are the primary steps to build a competitive position and a progressive development of enterprises. One of the most popular methods that allows companies to do profitable business and increase their chances for safety is operation within group purchasing organizations. Currently in the market there are many different types of GPOs (Group Purchasing Organizations). The choice of the right one is a chance to improve their financial situation.

Purpose of the article: This article presents functioning of enterprises within group purchasing organizations and their impact on financial situation of enterprises. In the article the classification of groups is done and there are shown the benefits that commercial enterprises operating in them gain. The article presents some obstacles to join specific group purchasing organizations and difficulties faced by companies operating in them.

Methodology/methods: The studies will be carried out on the basis of 60 SMEs. These companies operate in five Polish GPOs. The groups were divided into branch and multi-branch ones. The study period covered the years 2013-2015. In order to analyze the impact of purchasing groups on the financial situation of enterprises there were used selected groups of financial ratios and a preliminary analysis of financial balance sheets and profit and loss account was conducted

Findings: The analysis showed that the choice of an appropriate group purchasing organization has a large impact on financial situation of companies. Different opportunities can be offered by a sectoral purchasing group than the multi-sectoral

one. Research has shown that better results relate to dynamics of revenues, costs, liquidity, profitability that gives the operation within the sectoral purchasing groups.

Introduction

Small and medium-sized enterprises are forced every day to fight for contracting parties with big corporations. Competition about a customer is difficult because very often companies, when choosing a supplier, take into account only a price. SMEs acting alone in the market are not able to compete with the big players. They do not have too many options in terms of price reductions, and when buyers choose their supplier they pay attention to three items: a price, a merchant credit and quality. Price is still a key element in choosing a supplier. Next there are negotiations that deal with the merchant credit. Quality is often overlooked for price but lately it has been noticed that buyers are increasingly starting to take this element into consideration when deciding to choose a supplier.

However, more and more attention is paid to the fact that many tasks are performed better when working in groups. This is why the popularity of small and medium-sized enterprises is being won by an organization called a group purchasing organization. This form of organization is already available in every industry. The joint operation gives a great opportunity for companies operating in the group purchasing organizations, which positively influences their finances, the prices of offered goods and the opportunities for the merchant credit.

Method of the research

In order to determine the impact of group purchasing organizations on the financial situation of a company, companies were divided into two types of groups, i.e. branch and multi-branch. Then the appropriate analysis methods were chosen to answer how functioning within the group purchasing organizations influences the financial situation of enterprises. The analysis was carried out in two stages. The first one concerned the preliminary analysis and the second the indicator analysis. The study period were the years 2013-2015. The research covered 60 retail businesses operating in 5 GPOs. The financial data of individual entities were from the public financial statements of the audited companies.

Group purchasing organizations

A groups purchasing organization is a unit composed of companies and a group holder called an integrator. The integrator is the central unit that manages the entire organization, most often it is a specially appointed company that make up the GPO. The central unit may be an external company. A consolidation of members of a given group is the basis for negotiations with producers (Blair, Durrance, 2014, pp.433-443). Its degree has a big impact on the success of the group. The purpose of GPOs is to defend individual companies against strong competition and to increase negotiating power. (Prakash, 2009, p.22). This is possible because joint operation and economies of scale give for businesses many opportunities to improve their financial situation. Purchasing group is an entity that uses collective purchasing power to obtain a discount (Yang, Cheng, Ding, Li, 2107, pp. 581-589). This is the effect of scale which is characteristic for GPOs. A group purchasing organization can be defined as a group of companies from the same or another sector that combine to make a joint purchase. They are managed by a specially created central unit, which aims to carry out the tasks assigned by the purchasing groups (Zimon, 2017, pp.675-682). The broader definition of a group purchasing organization is based on Martin Christopher's logistics and supply chain definitions and it is as follows: The group purchasing organization is a group of cooperating companies that jointly control and streamline the flow of goods, information and money from suppliers to final recipients. Participants in such a system form a separate central unit, whose main task is to meet the goals set by the companies operating in the system (Zimon, 2014, pp. 319-327). There is a flow of information, money and goods between the central unit and the individual companies. The same possibilities of co-operation and organization of flows have businesses among themselves. Such actions should strengthen the competitive power of enterprises, operational safety, and affect positively the financial position of a company. Faced with increasing pressure to meet short-term financing needs, companies are looking for ways to unlock potential funds from within the supply chain (Lekkakos, Serrano,2016, pp. 367-392). This way to do this is to create a purchasing group.

Figure 1 Organization scheme
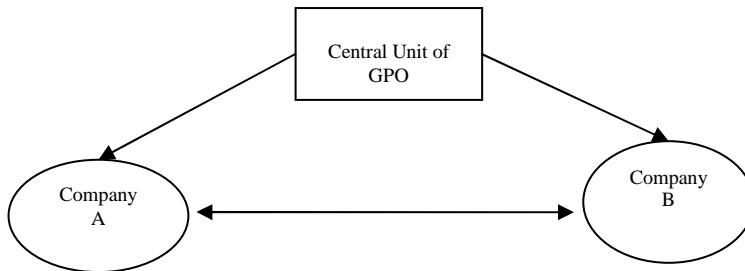
Source: own research.

The central unit of a purchasing group is often referred to as a purchasing group. This is the most important part of any group because it deals with the organization of the purchase of strategic goods or materials. It is an ideal situation when the central unit of a purchasing group is a company formed by all participants in a given group. This is a very good solution because it is strictly controlled by all participants, and most importantly it is not geared to profit. Its main task is to negotiate terms and conditions of the transaction with manufacturers. When analyzing the functioning of purchasing groups, it is worth dividing them into branch and multi-branch ones. This is an important division due to the effect of scale that these groups can achieve. In the branch GPOs, the number of suppliers is limited, so the scale of the negotiations is strong. In multi-branch ones this effect is "blurred." Many suppliers divide businesses into smaller groups, which makes purchasing power smaller. In the case of a purchase of certain services or materials these divisions may not occur, but such a division exists in the multi-sectoral groups in the situation when a purchase of strategic goods or materials for the unit is made.

Significant cost decisions are made in the area of logistics of group purchasing organizations. Companies operating in marketing and purchasing groups may organize deliveries in several ways, depending on the fact that they have the central warehouse that can serve as a distribution point. Choosing the right procurement method has an impact on costs. A rational strategy is to improve the profitability of a company.(Rushton, Croucher, Baker, 2010, p.27) In purchasing groups with the central warehouse, organization of delivery can be divided into four variants.

It is not easy to join a purchasing group. There are some entry barriers to be followed if companies operate in this type of organization. The most important barriers for branch and multi-branch groups are (Zimon, 2016, pp.219-229):
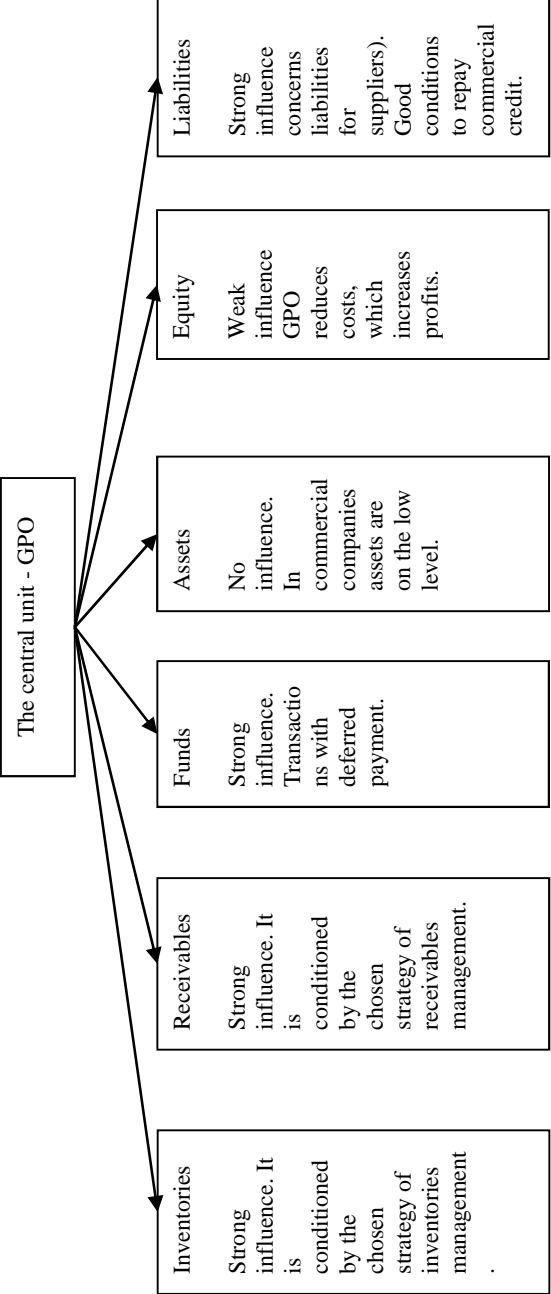
1. Territorial barriers, this restriction is related to the fact that there cannot be several companies operating in the same purchasing group in the same area. This limitation allows a company operating in a given area to compete effectively with other entities. The absence of this limitation would allow the creation of successive units in a given region with a similar competitive force, which would limit the financial performance of the two entities.
2. Economic barriers, there are restrictions on a turnover which companies should implement.
3. Environmental barriers, the environment of the enterprise is important.
4. Positive recommendation by members of the group, individual members of the integrated supply chain must accept the new unit.
5. Only those companies that operate in the same branch are allowed to operate in branch purchasing groups. There are no limits to this.

The impact of group purchasing organizations on corporate finance

Companies should grow and expand their position in the market. Functioning of GPOs just in terms of help is the norm. There are a number of finance areas where purchasing groups' role is visible, especially in the financial management areas. See Figure 2 for details.

When analyzing fig. 2, one can state that functioning within GPOs has a positive effect on profitability and liquidity. Collaboration within the groups influences significantly on working capital and the individual components that make it up, i.e. receivables, inventories or liabilities. An efficiency improvement in these areas significantly affects the profitability of SMEs. (Pais M.A, P.M., 2015, pp.341-358). In addition, the central unit has an opportunity to negotiate long payment terms. The level of commitment will depend on the individual management strategy. The liability management strategy has a big impact on corporate profitability. (Madhou, Mossa, Ramiah, 2015). The effect scale allows to get a low price for goods, which directly affects the costs. Low prices are a weapon in the fight for business partners, there is a chance to win new customers, which should increase sales revenue.Running together reduces the risk of liquidity loss. Loans, mutual transactions- all this helps improve liquidity. Businesses in GPOs have a number of opportunities to improve the company finances. Their use and level of benefits in particular areas are already dependent on the strategy that the business manager implements and on the type of a purchasing group.

Figure 2. The impact of purchasing groups on particular areas of corporate finance management

The central unit - GPO

Inventories	Receivables	Funds	Assets	Equity	Liabilities
Strong influence. It is conditioned by the chosen strategy of inventories management.	Strong influence. It is conditioned by the chosen strategy of receivables management.	Strong influence. Transactions with deferred payment.	No influence. In commercial companies assets are on the low level.	Weak influence GPO reduces costs, which increases profits.	Strong influence concerns liabilities for suppliers). Good conditions to repay commercial credit.

Source: own research.

An analysis of the impact of GPO on the financial situation was presented in a group of 60 companies operating in 5 groups:

− Branch group A - 26 companies
− Branch group B - 7 companies
− Multi-branch group C - 5 companies
− Multi-branch group D - 6 companies
− Multi-branch group E - 16 companies

The first element that was analyzed was the dynamics of sales revenue. Joint purchases and an opportunity to get a low price and a long merchant credit gives an opportunity to encourage new buyers. Table 1 provides information on the dynamics of sales revenue.

Table 1. Changes of sales dynamics in the years 2015-2013

GPO	Growth	Decrease
A branch	19	7
B branch	5	2
C multi-branch	4	1
D multi-branch	4	2
E multi-branch	13	3
Total	45	15

Source: own research

When evaluating the dynamics it is clearly visible that in most companies approximately 75% of revenue were recorded in the years 2015-2013. In other units, revenues declined.

Another measure compared the dynamics of revenues and costs in enterprises during the period considered. And as with revenue, there was a greater increase in revenue over costs or a higher decrease in costs over revenue.

In 75% of the surveyed companies, the dynamics of revenues and costs can be assessed positively. The details are shown in Table 2.

Table 2. Change of costs and revenues dynamics in the years 2015-2013

GPO	Revenues increase	Costs increase
A branch	19	7
B branch	7	0
C multi-branch	4	1
D multi-branch	4	2
E multi-branch	8	5
Total	45	15

Source: own research

Then the financial liquidity was assessed. The ratio for coverage of current liabilities (table 3)

Table 3. Average ratio of financial liquidity in the years 2015-2013

GPO	2015	2014	2013
A branch	3,6	3,8	2,2
B branch	3,2	2,7	2,6
C multi-branch	1,6	1,5	1,4
D multi-branch	1,6	1,4	1,4
E multi-branch	2,4	2,9	2,5

Source: own research

When assessing financial liquidity, it can be stated that all the purchasing groups have liquidity at a safe level. The analysis showed that the largest groups A, B, E generating the highest revenue achieved very high liquidity, it can be said over liquidity. The smallest units scored at 1,4-1,6. A detailed analysis has shown that only in the multidisciplinary groups the companies that have difficulty in maintaining liquidity emerged. However, they represent a small share - three companies.

Another concerned the profitability of sales. The profitability of sales in all groups was reported to have risen in comparison to 2013. The best result was recorded by the sectoral group A. In addition, each company operating in a professional group earned profit in the periods under consideration. In the case of 8 companies operating within multiple-sectoral groups, losses occurred.

Table 4. Average profitability sale ratio in the years 2015-2013

GPO	2015	2014	2013
A branch	0,043	0,041	0,039
B branch	0,024	0,022	0,020
C multi-branch	0,032	0,024	0,032
D multi-branch	0,032	0,024	0,026
E multi-branch	0,034	0,003	0,029

Source: own research

Then the inventory management, current receivables and current liabilities were assessed. The details are shown in table 5.

Table 5. Inventory turnover of receivables and liabilities, inventory in days. Average for the period 2015-2026

GPO	Receivables	Inventories	Liabilities
A branch	66	59	63
B branch	61	69	53
C multi-branch	74	49	80
D multi-branch	49	70	83
E multi-branch	56	67	76

Source: own research

The high level of receivables should be assessed positively, it is not due to difficulty in debt collection but it results from the favorable merchant loans that are offered to customers. Such opportunities give companies an ability to operate in purchasing groups, as they receive an attractive merchant credit as a result of negotiations conducted by the central unit. They do not have to rush to pay, and therefore they can also offer their customers a favorable time to pay their debts. They can apply no aggressive debt collection policy. In the case of commitments very often in the sectoral purchasing groups additional discounts for early repayment of liabilities appear. Companies have high liquidity, have the opportunity to use such opportunities that have a positive impact on liquidity. Therefore, in these purchasing groups, the turnover ratio of liabilities in days is clearly lower than that of the multi-sector groups. The choice of the right commitment management strategy has a big impact on the company finances (Banos-Caballer, Garcia-Telurel, Martinez-Solano, pp. 1189-1204).

Inventory management needs to be positive, results are average and group purchases are higher than actual needs. Therefore, the stock is often beyond the actual demand. This is the cost a company bears because of the desire to get a low price for a product. However, after comparing the cost of maintaining of inventory excess and the price we achieved the company policy of buying over the demand is favorable. Additionally, this action increases the level of liquidity or security of the enterprise.

Conclusions

The analysis conducted has shown that joint action brings financial benefits to companies. This is evident primarily in the fields of liquidity, profitability and management efficiency. Functioning in multi-branch and branch GPOs increases the financial liquidity of businesses. This is due to the purchase of goods often over demand, extended payment deadlines, increased sales, the use of discounts for early payment. The profitability of sales is most affected by the decrease in cost items in the value of goods sold at the purchase price. Certain costs groups such as inventory management, maintenance costs of the central unit increase. However, the reduced price of purchased goods and materials compensates for these costs. An attractive price allows to attract new customers and keep the existing ones which positively influences an increase of sales revenue. An analysis of cost and revenue dynamics is beneficial for 75% of companies. When analyzing the results of all groups, it is important to note that the companies that are active in the branch purchasing groups are more successful. In this type of

group there are no additional divisions, which positively influences the effect of scale and the negotiating power of the central purchasing organization.

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this publication was cofunded by City of Toruń

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