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Katarína TEPLICKÁ

EFFICIENCY OF SLOVAK PRIVATE HOSPITALS¹

Zuzana HAJDUOVÁ - Stela BESLEROVÁ

Abstract

The aim of the paper is to highlight the issue of efficiency measurement in selected private health care facilities and propose solutions, which aim to improve the efficiency measurement of health care providers. In the presented paper we focus only on the selected private health care facilities operating in Slovakia, where the level of efficiency can be significantly caused by the change of ownership structure, as those hospitals came from general hospitals under the supervision of Svet Zdravia. In the period we analyzed (from 2012 to 2013), we recorded a slight increase in the level of efficiency.

Keywords:

efficiency, data envelopment analysis, input-oriented model, healthcare

Introduction

The health sector is considered as one of the fastest growing areas of the economy in most developed countries. Governments (and taxpayers) are investing money in healthcare, either directly or indirectly and therefore expect high quality services. In fact, the performance of this sector is different and is characterized by particularly long waiting times, inefficiency, low productivity, stressful healthcare professionals and dissatisfaction of patients. The healthcare system consists of a comprehensive set of entities, activities and processes and covers a wide range of participants, where each of them brings different set of needs, priorities and evaluation criteria. Measuring the efficiency provides information about existing practices, values and assumptions and can help to develop a systematic approach for identifying deficiencies and to improve future efficiency. Despite the fact that the healthcare systems of countries differ either in the form of funding or organization, common goal is to improve health of the population of the country. Every health system, however, brings with it various problems and the effort of policy makers on improving the efficiency of individual health care providers. Achieving optimal efficiency is crucial for both private and public hospitals in order to preserve the quality of care and the needs of the various stakeholders. Despite the diversity of public and private sectors, whether in terms of issues or stakeholders, decision makers are aware of the fundamental importance of the hospital management as a business unit that must be operated as efficiently as possible. Hospitals with efficient systems can subsequently ensure quality and avoid unnecessary waste of resources.

¹ The article is written within the project of young scientists, young teachers and PhD students number I-15-111-00, 2015

1. Methods for measuring the efficiency of healthcare facilities

The two most commonly used approaches for measuring the efficiency of hospitals are DEA and SFA. A common feature of both methods is that they measure the efficiency as the relation to the best or efficient frontier. Deviations from this limit, measured as the geometric distance, determine the efficiency of the subject. (Rajitkanok and Rosenman, 2008). The third most used method is OLS. As to the number of units (DMUs - Decision Making Unit), a studies vary. There are a number of studies, which include a sample of hospitals nationwide, as in a Strumanna and Herwartz (2012) study, who investigated 1600 German hospitals. Secondly, we meet with the studies that monitor only a selected sample, as in the case of Tarazona et al. (2010) who examined 22 Spanish hospitals from selected region. Within the literature, however, we have not found paper or research which would determine the exact or the recommended number of units. In principle, this number is tailored to the needs of the country or target region. Monitoring at least two units, however, can ensure the preservation of logic in the process of assessing the efficiency of healthcare facilities.

There is an absence of studies either directly from Slovakia or the Czech Republic. One of the authors of a such a study in the Czech Republic were Dlouhy et al. (2007), who analysed a sample of 22 hospitals, but their work did not take into account any environmental effects on the efficiency of the monitored facilities. The study on inefficiency in health care, where has been included also Slovakia, was performed by the International Monetary Fund (Grigoli, 2012). They applied DEA method to a sample of 37 countries and in Slovakia they identified significant scope for reducing inefficiency, particularly in resource savings of up to 64%. The OECD confirmed these results by their study (Joumard et al., 2010), which stated that at an unchanged level of expenditure, life expectancy can extend by more than four years. In Slovakia there were also others significant deficiencies recorded, for example in the area of medication and inpatient facilities.

DEA method

Researchers use a variety of DEA model variants in the process of measuring efficiency. Among the two most common we include CCR model which are proposed by Charnes, Cooper and Rhodes (1978) and BBC model designed by Banker et al. (1989). DEA can be oriented either on inputs or outputs, depending on the purpose of performing DEA. Due to the fact that the hospital has a social responsibility to provide medical treatment and care to the public, assessment of operational efficiency of hospitals should follow especially the input-oriented DEA model, which focuses on minimizing inputs with fixed outputs. Selection of appropriate inputs and outputs has a significant

role in the application of DEA model, because the use of various inputs and outputs may result in completely different score for efficiency.

One popular approach is the incorporation of quality indicators into the model as outputs. (Shimshak et al., 2007). This represents a model that was designed by Sherman (2006). The problem with this approach the weight assignment as DEA may assign to some inputs or outputs negligible weights and thereby cause ignorance of qualitative outputs. One way to overcome this problem is the introduction of restrictions in defining the weights. However, there arises the problem of subjectivity, as the restrictions come directly from the person who prepares model.

2. Object of the research

This paper evaluates the efficiency of private hospitals in the Slovak Republic, in ownership of Svet zdravia. The selected health centers were observed in the period 2012 to 2013 and total sample includes 5 facilities, as we excluded hospitals that did not have complete data or possibly experienced extreme values. The selected private hospitals were evaluated and compared with 37 general hospitals and 13 university hospitals.

Inputs and outputs

Selection of the input and output variables is very complex tasks. However, the DEA inevitably faced the problem of selecting the appropriate inputs and outputs. Selection of appropriate inputs and outputs has a significant role in the application of DEA model, because the use of various inputs and outputs may result in completely different score for efficiency. In our research selection of inputs and outputs was largely based on previous research, whether in domestic or foreign literature. Overall, we have included in the analysis 6 inputs and 3 outputs, as listed in tables 2 and 3.

Table 1 Inputs

Input	Label	Explanation
No. of doctors	PLek	Registered number converted to full-time work in professions of doctor and dentist
No. of nurses	PS	Registered number converted to full-time jobs in professions of nurse and midwife
Other stuff	OP	Registered number converted to full-time work - health care workers without professions of doctor, dentist, nurse, midwife
Material costs	MN	Material costs from the income statement - Cost of medicines, medical devices costs, costs of additional assortment in the pharmacy, the cost of blood

No. of beds	PLôž	Number of beds in facility to the date 31.12 of reporting period
Costs per bed	NL	The total cost of income statement / beds

Source: own processing

When identifying inputs, we included the variables of human resources in the form of the number of doctors, nurses and other staff. We have done so primarily because human resources are considered as a key determinant of success in healthcare facilities. Human resources are the carriers of knowledge, skills and know-how, which is an integral part of health services.

Table 2 Outputs

Output	Label	Explanation
No. of treatment days	OD	Total number of days that patients were treated
No. of patients	PP	The number of patients admitted
No. of outpatient visits	AN	Total number of outpatient visits

Source: own processing

One of the outputs are outpatient visits that are from our perspective, important especially in health promotion and prevention. Visit is understood as the active presence of the patient in the clinic for the purpose of examination, treatment, sampling of biological material, prescription drug prescription or regulatory changes, obtaining findings / results, or for the purpose of administrative effort related to health or healthcare provision.

3. Results

In this part of the paper we will present the results of the efficiency measurement of selected Slovak private hospitals. In the analysis we applied only input oriented models, assuming that the outputs are represented mainly by the need of services and individual objective of healthcare providers should be to minimize inputs. Understanding of efficiency in the DEA models and also in the case of out analysis is based on the assumption that each system has certain inputs and outputs. In this case, the production of output is necessary to make the consumption of a number of inputs. Based on theoretical assumptions, it is clear that the highest degree of efficiency is 1 or 100%. However, it is important to note that the presented analyzes have their limitations, which are reflected primarily in the analyzed data set, which does not ensure comparability of health facilities due to the absence of data about specialization of hospitals,

geographical location and other influencing factors which may be explanatory in achieving certain efficiency.

The problem of this method is that the efficiency is understood as deterministic and therefore does not expected that there is also the effect of chance, which effects effective system. Therefore, any deviation from full effectiveness is due to an error even though it can also be caused by statistical noise. (Majorová, 2007). DEA method carries out an assessment of individual DMUs compared with a whole set of units where for each inefficient unit identifies benchmark, which is characterized by a similar combination of inputs and outputs. In our analysis it means that the unit, which achieved efficiency at 100%, it may not actually be effective at 100%. It represents the unit with the best combination of inputs and outputs.

Model CCR input-oriented

As we already mentioned in previous text, for our analysis we applied input oriented models. First of them is CCR model and the result values are shown in the table no. 3.

Table 3 Result values of input oriented CCR model

CCR-INPUT		
DMU	2012	2013
P1	86,32 %	88,06 %
P2	100,00 %	94,69 %
P3	92,10 %	100,00 %
P4	76,46 %	82,88 %
P5	92,86 %	100,00 %

Source: own processing

Out of the hospitals that we evaluated, there is only one of them which achieved full efficiency in 2012 and two hospitals in 2013. Therefore we can see increase in efficiency in 2-years comparison. This improvement can be caused by the change of ownership structure in selected hospitals.

As part of our analysis we also identified slacks for hospitals which did not achieve efficiency in observed period. In this case, these are the slacks based on input oriented CCR model, which expects constant returns on scale.

Table 4 Slacks based on input oriented CCR model, 2013

CCR-INPUT 2012						
DMU	PLek	PS	OP	MN	PLôž	NL
P1	0	25,73	0	2 871 175	0	0
P2	25,17	63,52	0	1 096 028	0	0
P4	11,69	0	0	134 763,8	0	0

Source: own processing

In 2013, hospitals P3 and P5 achieved efficiency in comparison with the rest of evaluated hospitals. In case of P3 we monitored decreased in material costs by 4,80 % and costs per bed by 4,76 %. Hospital P5 reached also decrease of material costs and same decrease in costs per bed as P3. The only hospitals that did not improve its level of efficiency was P2, which was caused by increase in no. of employees and their low utilization.

Model BCC input-oriented

Another model that we applied to analyse efficiency of private hospitals is input-oriented BCC model. As in the model BCC, we observed selected hospitals in years 2012 and 2013.

Table 5 Result values of input oriented BCC model

BCC-INPUT		
DMU	2012	2013
P1	87,98 %	90,36 %
P2	100,00 %	94,90 %
P3	93,12 %	100,00 %
P4	76,48 %	83,05 %
P5	92,86 %	100,00 %

Source: own processing

In case of monitored hospitals we can see significant similarity of the results of both models. Similarly, as the CCR model, model BBC also identified one hospital in 2012 and two in 2013, which achieved 100 % efficiency. Again, it is possible to observe annual increase in efficiency of selected hospitals, with the exception of hospital P2. In the following text we mention suggestions to improve level of inputs in order to increase efficiency.

Table 6 Slacks based on input oriented BCC model, 2013

BCC-INPUT 2012						
DMU	PLek	PS	OP	MN	PLôž	NL
P1	21,43	67,89	0	3 484 489	0	0
P2	29,16	69,54	0	1 582 831	0	0
P4	9,23	0	0	0,28	0	1 801,14

Source: own processing

The year 2012 was especially significant for the hospitals P3 and P5, which reached a 100% effectiveness, within the framework of the present analyzes. The only hospital that recorded a decline in the efficiency was P2, with increase in the number of doctors and nurses. Anyway, we can see progress in terms of efficiency of selected hospitals, which could be supported by change of ownership and leadership style.

Conclusion

Our examination was based on a series of units (DMU), where the efficiency is compared among these units. As effective DMU we consider unit, which reached the efficiency 1 in the monitored year. As we mentioned above, to measure the technical efficiency of medical facilities we used only input-oriented models. To conclude results of private hospitals in Slovakia, we can mention that they recorded increase in efficiency, which was mostly caused by the decrease of material costs and costs per bed. One of the reasons of increased efficiency can be also the change of ownership structure and leadership style, as all the monitored private hospitals are under the one owner. Important fact of our analysis is that we did not consider all the variables that could in some way affect final efficiency. The geographical position of hospital and its specialization can also be one of the factors which could affect efficiency of health care provider. Monitoring of additional details could improve results of our analysis and therefore we will include those in the next research.

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DETERMINANTS OF LABOUR PRODUCTIVITY

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Abstract

In our study we tried to identify determinants of labour productivity in Slovakian firms operating in industry, especially regarding to the type of firm's ownership, average wages paid to the employees, profitability measured by return on sales and innovation activity measured by R&D employees. For our empirical study we used data regarding more than 2000 firms covering the period from 2004 to 2013. The investigated firms were divided according to the type of ownership into two groups; specifically private inland firms, and together international with foreign firms where foreign capital was partially or wholly present. We used correlation analysis as well as regression analysis with OLS estimator techniques in order to identify determinants of labour productivity and results of our study indicate positive and statistically significant impact of all studied explanatory variables on dependent variable labour productivity.

Keywords:

labour productivity, average wages, return on sales, ownership of firms, employee

Introduction

Governments over the world usually offer significant inducements to attract foreign investors to inward their investment. The purpose of their activity is to gain the primary benefits which is ultimately reflected in increasing of the national income (Görg, Greenaway 2003). Many countries or managers from domestic firms try hardly to attract foreign investments in hoping that knowledge and other benefits brought by multinationals spill over to domestic firms and increase their productivity (Javorcik, 2004). Several studies investigated how foreign direct investments inflows affect the performance of firms evaluated from different points of view. In the centre of our interest is to analyze especially the impact of foreign ownership as well as other explanatory variables on labour productivity. Thus, the aim of the present paper is to identify significant determinants affecting labour productivity of firms operating on the Slovak market.

1. Previous Empirical Findings

There are plenty of empirical studies analyzing relationships among such variables as labour productivity, nature of ownership, level of wages and other variables, which were, however, mostly conducted in conditions of developed market economies. For example in USA it was found that foreign owned firms pay higher average wages and are more productive in comparison to their domestic counterparts (Doms, Jensen, 1998). Another study also confirmed that foreign-owned firms pay higher wages in USA than domestically owned firms

due to higher quality of labour force (Lipsey, 1994). In the United Kingdom it was found that foreign firms pay more compared to domestic ones and this corresponds to their higher levels of productivity (Conyon, Girma, Thompson, Wright, 1999). In the case of Portugal, Martins (2004) confirmed that foreign-firm premium is large and significantly positive.

Similar results were achieved in conditions of developing or transition economies. Liu, Parker, Vaiyda, Wei (2001) investigated impact of foreign investments on labour productivity in China and their results suggest that foreign presence in the country is associated with higher level of labour productivity. Moreover, similar results confirmed the study which was executed in India. Foreign ownership is found to have a positive impact on the performance of pharmaceutical companies (Kuntluru, Muppani, Khan, 2008). Accordingly, it can be concluded that labour productivity is closely related to level of wages. Study realized in Mexico and Venezuela confirms that foreign firms pay higher wages than domestic ones (Aitken, Harrison, Lipsey, 1996). Lipsey, Sjöholm (2001) investigated this issue in conditions of Indonesian labour markets, and they confirmed the fact that higher presence of foreign direct investment leads to higher wages, and moreover higher foreign presence raises the general wage level in the industry.

Regarding countries located in Eastern Europe the results of the study realized by Oberhofer, Stöckl, Winner (2012) acknowledge the findings that foreign firms exhibit higher wage growth in short time than their domestic counterparts and the observed wage disparities are most pronounced typically for low paying firms which are situated in Eastern European transition economies. Study, realized in CEECs brought findings that higher total labour costs affect foreign direct investments negatively, but on the other hand higher labour productivity has positive impact on foreign direct investment inflows (Bellak, Leibrecht, Riedl, 2008).

In conditions of emerging markets specifically Bulgaria, Romania and Poland, Konings (2000) come with evidence that foreign firms do not perform better than domestic ones, except in Poland, and furthermore he found no evidence of positive spillovers of foreign investment on domestic firms. The study realized in the case of Hungary confirmed that foreign firms perform better than local firms and inward of foreign investments has a positive spillover effect on labour productivity of local firms in the same sector (Schoors, Tol, 2002). The same results that foreign investment has positive impact on total factor productivity growth of recipient firms, mirrors the study realized in the Czech Republic (Djankov, Hoekman, 2000). The analysis performed by Gauselmann, Knell, Stephan (2011) suggests that investors in the countries as Czech Republic, Hungary, Poland, Romania and Slovakia are mainly interested in low (unit) labour costs coupled with a well-trained and educated workforce and an expanding market with high growth rates in the purchasing power of potential buyers.

2. Data and Methodology

As the primary source of data on average wages, return on sales (hereinafter also “ROS”), and other variables for the paper served Industry Yearbooks published by the Statistical Office of the Slovak Republic. Data on average number of research and development employees (hereinafter also “R&D employees”) come from Statistical Yearbooks of Science and Technology published by the Statistical Office of the Slovak Republic, too.

We conducted a pooled cross section time series analysis of variables referring to firms operating in industrial sector, and spans the period of 2004-2013. Industry Yearbooks involve two types of results of the processing of corporate annual reports. The first group contents results of processing of corporate annual reports submitted by firms with 20 or more employees and the second group contents processing results of corporation with up to 19 employees, but reaching yearly turnover of more than 5 million Euros. Our empirical study involves only results of mentioned industrial firms.

We used data classified according to kind of ownership. We divided investigated firms operating in industry according to the type of their ownership into two groups - domestic and foreign-owned firms. The group of domestic firms involves on average 1380 private inland firms characterized by presence of only domestic capital. The group of foreign owned firms consist of 286 international firms with preponderance of private sector where ownership in terms of capital is mixed as well as of 552 wholly foreign owned firms.

The variables used in the empirical analysis are following: labour productivity (LP), average wages (AW), return on sales (ROS), average number of R&D employees (RDEMP) and ownership. Labour productivity is in this paper defined as turnover for own performances and goods per employee in Euro. Average wages are represented by average monthly wage per employee in Euro. Return on sales is measured as profit/loss before taxation over turnover for own products and services and turnover for own performances and goods. Explanatory variable average number of R&D employees mirrors the R&D intensity of domestic and foreign owned firms. Ownership forms dummy variable that has value one if there is a presence of foreign ownership, and zero otherwise.

Tables 1 and 2 present descriptive statistics of dependent variable labour productivity as well as of explanatory variables for the sample of domestic and foreign owned firms. The descriptive statistics shows that average labour productivity for foreign firms is significantly higher than for domestic firms, although the high standard deviation implies that there is a larger spread of labour productivity around the mean in foreign firms. As we can see, the coefficient for skewness points out that distribution of labour productivity is skewed to the right compared to the normal distribution in both domestic and foreign owned firms, but more skewnesses is detected in case of foreign owned

firms. Regarding to coefficient for excess kurtosis, in all cases we can see that distribution of labour productivity is platykurtic and has a lower, and wider peak around the mean compared to the normal distribution. Finally, mentioned findings which concerns normal distribution of labour productivity, were confirmed by Shapiro – Wilk test. For all cases, null hypothesis that dependent variable seem to stem from normal distribution was not rejected at conventional level of statistical significance 5%.

Table 7 Summary statistics of dependent variable

Variable: Labour Productivity	All firms	Foreign	Domestic
Mean	1,68E+05 (168 000)	2,14E+05 (214 000)	77 623
Median	1,58E+05	2,12E+05	75254
Minimum	52772	1,17E+05	52772
Maximum	3,26E+05	3,26E+05	1,04E+05
Standard Deviation	83622	63301	17782
Skewness	0,29969	0,21666	0,062966
Ex.kurtosis	-1,097	-1,0213	-1,2831
Shapiro-Wilk. Test	W = 0,942089 p-value 0,103546	W = 0,959739 p-value 0,538645	W = 0,948397 p-value 0,649578

Source: Own processing

Basic statistics in table 2 reveal that foreign owned firms pay significantly higher wages. Differences related to the explanatory variable ROS seem to be negligible. Most interesting is the fact that average number of R&D employees is comparable to domestic owned firms, although foreign owned firms have approximately twice as much employees. This indicates that foreign owned firms direct large amount of their expenditures into the purchase of a new technology, to carry out research and development in host country which helps them later achieve better levels of labour productivity compared to their domestic counterparts.

Table 2 Descriptive statistics of explanatory variables

Variable	Mean	Mean	Mean	S.D	S.D	S.D
	All firms	Foreign	Domestic	All firms	Foreign	Domestic
AW	811,219	879,598	674,463	161,709	143,512	98,0322
ROS	0,0242942	0,0263181	0,0202464	0,00956232	0,0105116	0,0058361
RDEMP	1,82521	1,82243	1,83077	0,464895	0,516563	0,364738

Source: Own processing

The empirical analysis reported in the paper is performed using also t-test for equality of means. This test is used to determine if two sets of data are

significantly different from each other. Table 3 reports means and standard deviations of the depended variable labour productivity and the other explanatory variables and the results of t-test for equality of means for the group of foreign owned firms, and domestic owned firms. T-test for equality of means at the 1%, 5 %, and 10% level of significance shows that there are unambiguous and statistically significant and positive results in case of two studied variables; specifically labour productivity and average wages. These basic descriptive statistics reveals that foreign owned firms are on average more labour productive and pay higher wages. Difference regarding variable ROS and R&D employees is negligible. T-test for equality of means at the 1%, 5 %, and 10% level of significance shows that there is no evidence of statistically significant differences in regard to variable ROS and R&D employees.

Table 3 T-test for equality of means for the group of foreign owned firms and domestic owned firms

	Foreign-Owned Firms	Domestic Firms	
Variable	Mean (S. D.)	Mean (S. D.)	T-test for equality of means
Labour Productivity	213897,189 63301,21625	77622,67685 17781,57294	8,94743 (4,118e-009) ***
Average Wages	879,598 143,512	674,463 98,032	4,59752 (0,0001058) ***
ROS	0,0263181 0,0105116	0,0202464 0,00583605	2,03177 (0,05212)
R&D employees	1,82 0,5165	1,83 0,3647	(0,95968)

Source: Own processing

Note: P-values for the t-test are in parentheses. Null hypothesis: means of studied variable are equal. Confidence level that confirms or reject null hypothesis is 10 % (*), 5% (**), 1 % (***).

Regarding labour productivity, foreign owned firms have on average turnover for own performances and goods per employee 213 897 €. Employee of domestic firm produces only 77 622 € of turnover. As the t-test for equality of means shows, there is statistically significant difference. Therefore, we are able to declare that foreign owned firms' labour productivity is higher. Labour productivity can be affected by various external and internal factors for example level of education, qualification, way of motivation, remuneration arrangements for staff, and others.

The main aim of empirical study is to identify the impact of each explanatory variable on the depended variable labour productivity. We first used correlation analysis through Pearson correlation coefficient to identify relationships among studied variables. Subsequently, we performed regression analysis within which as the estimation technique the standard method ordinary

least square (OLS) was used. Homoscedasticity of errors has been verified and confirmed by White's test for heteroskedasticity. Null hypothesis that heteroskedasticity is not present was not rejected at any conventional level of significance. Regarding normality of residuals the results show that null hypothesis: error is normally distributed was not rejected at any conventional level of significance (1%, 5%, 10%) too. In order to estimate the parameter of each studied variable, OLS regression has been performed. Baseline estimating equation is in following form:

$$Y_{it} = \alpha \text{const} + \beta X_{it} + \gamma \text{Ownership} + \varepsilon_{it}$$

Where Y_{it} is vector of dependent variable labour productivity; X_{it} is vector of explanatory variables in our case explanatory variables are following: average wages (AWages), return on sales (ROS), average number of R&D employees (RDEMP); Ownership is vector of a dummy variable that takes the value 1 if firm is foreign owned and 0 if firm is only domestic owned; index i represents type of firms; index $t= 2004, \dots, 2013$ is the time span in our model; α, β, γ represent vectors of the parameters to be estimated; ε_{it} is an idiosyncratic error term which comprises of others factors influencing labour productivity. In Ordinary Least Squares (OLS) regression, the fitted values:

$$\hat{Y}_{it} = \hat{\alpha} \text{CONST} + \hat{\beta} X_{it} + \hat{\gamma} \text{OWNERSHIP} + \varepsilon_{it}$$

3. Results and Discussion

First we used correlation analysis to identify relationships among studied variables. Table 4 provides respective Pearson correlation coefficients. It is obvious that there are prevailingly strong and statistically significant relationships between dependent variable labour productivity on one hand and all the other explanatory variables on the other hand.

Table 4 Correlation matrix

	Labour Productivity	Average Wages	Ownership	ROS	R&D EMP
Labour Productivity	1,00				
Average Wages	0,88 ***	1,00			
Ownership	0,78***	0,61**	1,00		
ROS	0,36 ***	0,06 ***	0,30**	1,00	
R&D EMP	0,45 **	0,63 *	-0,01***	-0,20*	1,00

Source: Own processing

Notes: ***, **, * denote significance at 1, 5 and 10 % levels, respectively

Table 5 provides the results of regression analysis by OLS model, as well as other statistical parameters. The OLS model shows that there is statistically significant and positive impact of all explanatory variables on labour productivity.

Table 5 OLS model

Pooled OLS, using 30 observations, Included 3 cross-sectional units, Time-series length = 10, Dependent variable: Labour Productivity					
	Coefficient	Std. Error	t-ratio	p-value	
const	-200834	28909,1	-6,9471	<0,00001	***
AWages	260,996	59,5892	4,3799	0,00019	***
Ownership	70127,4	15873	4,4180	0,00017	***
ROS	2,12106e+06	510543	4,1545	0,00033	***
RDEMP	32489,4	16575,8	1,9600	0,06123	*
Mean dependent var	168472,4	S.D. dependent var	83621,57		
Sum squared resid	1,50e+10	S.E. of regression	24518,60		
R-squared	0,925887	Adjusted R-squared	0,914028		
F(4, 25)	78,08023	P-value(F)	9,40e-14		
Log-likelihood	-343,0490	Akaike criterion	696,0979		
Schwarz criterion	703,1039	Hannan-Quinn	698,3392		
rho	0,391047	Durbin-Watson	1,016339		

Source: Own processing

Notes: ***, **, * denote significance at 1, 5 and 10 % levels, respectively.

White's test for heteroskedasticity - p-value =0,299059

Test for normality of residual - p-value = 0,312387

Coefficient of average wages shows that increase of wages has positive and statistically significant impact on labour productivity. Specifically, increasing of average wages by one euro will cause increase of variable labour productivity by 261 euro. This finding is in line with previous empirical finding which investigated the relations between labour productivity and wages. (Conyon, Girma, Thompson, Wright, 1999). Finally, results of our empirical study regarding wages are comparable with other evidences. Foreign owned firms established in the Slovak Republic pay more compared to domestic firms and it is in line with findings realized in other countries (e.g. Doms, Jensen, 1998; Lipsey, 1994; Lipsey, Sjöholm, 2001; Görg, Strobl, Walsh, 2007).

The same positive and statistically significant impact on labour productivity was detected in case of variable ROS. Regarding explanatory variable R&D employees, the results show that recruiting one R&D employee will cause that firm can achieve better labour productivity by 32 489 eur.

Finally, dummy variable indicate very positive and statistically significant results regarding impact on labour productivity. Specifically, foreign firms achieve better labour productivity in comparison to their domestic counterparts.

What is more, our empirical study is in line with previous empirical findings which confirmed the fact that foreign firms achieve better labour productivity (Liu, Parker, Vaiyda, Wei , 2000; Schoors, Tol, 2002 and others). To sum up, we can state that presence of foreign direct investment resulting to foreign ownership seems to have significant impact on the firm's performance measured by various indicators. This is in line with results of study realized by Kuntluru, Muppani, Khan (2008). Foreign firms possess more capital, modern technology, usually have better organizational and managerial skills which can have impact on level of labour productivity. Another reason why foreign owned firms can reach better labour productivity in comparison to domestic owned firms can be attributable to the level of economic development of the host country. Overall it is known that foreign investors are rather willing to invest their investment in developing or transitional countries especially due to market potential, relative endowments, cost benefits and relatively skilled workforce (Carstensen, Toubal, 2004).

Conclusion

Several studies based on firm or industry level data have documented heterogeneity regarding to performance and labour productivity between foreign and domestic owned firms. Some studies confirmed the hypothesis that foreign firms overcome domestic owned firms regarding to labour productivity in comparison with domestic counterparts, however other studies confirmed rather the opposite. In our study we tried to find out if there are any differences regarding to labour productivity between differently owned firms in the Slovak Republic and identify significant determinants of labor productivity. For the analysis of differences in labour productivity and other variables between domestic and foreign owned firms t-test for equality of means was used. Further we performed correlation analysis as well as regression analysis using ordinary least square estimation technique.

Our results indicate positive and statistically significant impact on dependent variable labour productivity in case of all studied explanatory variables. According to our study following factors can be considered as determinants of labour productivity: average wages paid to employees, profitability measured by return on sales, innovation activity of the firm measured by number of R&D employees, as well as nature of ownership. We can conclude that foreign owned firms operating in Slovak republic are significantly more labour productive and pay higher wages that is in compliance with prevailing previous empirical findings.

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INDICATORS OF THE QUALITY OF BUSINESS ENVIRONMENT OF SLOVAK REPUBLIC

Michaela BRUOTHOVÁ

Abstract

The aim of the article is to investigate the relationship between different indices of the quality of business environment of Slovak Republic on one side and selected macroeconomic indicators and country's credit rating on the other side. The following indices are analyzed: Ease of Doing Business, Global Competitiveness Index, Index of Economic Freedom, rating from The World Competitiveness Yearbook and Fragile State Index. We use the real gross domestic product growth, unemployment rate and inflation rate as the macroeconomic indicators and the results of the country's credit rating evaluated by Moody's, Standard & Poor's and Fitch Ratings. The analysis is based on the country level data for the 2005 – 2014 period. The analysis is performed through correlation analysis using Pearson as well as Spearman correlation coefficients. The results shows that the clear and unambiguous relationship among different indices of the quality of business environment on one side and selected macroeconomic indicators and country's credit rating on the other side cannot be proven.

Keywords:

quality of business environment, business climate indicators, macroeconomic indicators, country's credit rating, Slovak Republic

Introduction

Business environment can be defined as a set of economic, legal and institutional conditions that affect the firms' behavior in positive or negative way, but usually cannot be controlled by these firms. Demjanová (2009) describes the business environment as business conditions that promote or hinder the creation and development of enterprises. The importance of a well-functioning legal and regulatory system in creating an effective market economy is now widely accepted. After all, a poor contracting and regulatory environment can raise the cost of doing business with knock-on effects to employment, output, investment, productivity, and living standards (Besley, 2015). It has been also noted that the barriers to doing business vary widely across regions and countries, and it has been argued that the business environment will affect aggregate performance, as well as expert influence on the operation of financial markets (Commander, Svejnar, 2011).

Level of development of the economy is most commonly assessed by standard economic indicators such as gross domestic product, gross domestic product deficit, unemployment rate, inflation rate, exchange rate and many others. Country's credit rating from reputable credit rating agencies is another very often used and respected source of information especially on the risk of doing business in the country. The assessment of business environment is

subject to analysis realized by many national as well as internationally accepted institutions, whose outputs have usually form of composite indices reflecting the quality of the business environment. Kolko, Neumark and Mejia (2013) state that business climate indexes summarize policies (and other factors) that might affect economic growth, and these indexes, published by many national organizations, often loom large in policy debates about economic growth.

In this paper, five state business climate indices that are frequently used as indicators reflecting the quality of the business environment are examined. The aim is to provide a preliminary look at the relationship among these indices on one hand and selected macroeconomic indicators (economic growth, unemployment and inflation) and country's credit rating of these countries on the other hand.

1 Literature review

In general, nature of the indices measuring the quality of the business environment can be different. In terms of index construction, we can distinguish between unique and composite indices. A unique index is based on data obtained from special survey that tracks only the purpose. On the other side, a composite index is derived from number of existing indicators and surveys. Composite rates include more details, but overall, they are often criticized because of incompatibility of input indicators that is derived primarily from their diversity. Under the nature of the data, indices can be objective or subjective. Objective indices are calculated on objective measureable data, for example the average length of commercial disputes. Subjective indices are based on subjective views of respondents. Many aspects of the business environment cannot be evaluated by objective data, thus, almost all indicators reflecting the quality of the business environment have subjective nature (Körner, Kudrna, Vychodil, 2002).

Many economic studies use the business environment indicators as either the left- or right hand side of regressions. In each case, the authors report patterns that emerge in comparison across countries. In most cases, the concern is whether a particular indicator is correlated with aggregate or firm-level outcomes, or whether, if used as a left-hand side variable, the indicators are correlated with country characteristics, history, or institutions (Besley. 2015). The following literature review illustrates that the results of the studies are mixed.

Djankov, McLiesh and Ramalho (2006) found a positive relationship between economic growth and the Doing Business indicator. Similar results we can find in work of Gillanders and Whelan (2014). Their principal finding is that the Doing Business indicator emerges as the key explanatory variable in a wide range of instrumental variables regressions for income per capita and has significant explanatory power for longer-run growth.

The evidence of Bittlingmayer, Eathington and Hall (2005) suggests that for some indexes a business climate ranking predicts positive economic outcomes. They found that indexes more narrowly focused on tax policies are more likely to have positive relationships with growth than are broader measures, but also that indexes with these positive relationships explain little of the variation in economic growth. Kolko, Neumark and Mejia (2013) examined the relationship between a large set of state business climate indexes and state economic growth with focus on growth in employment, total wages and Gross State Product. They presented detailed information on what the indexes capture and analyzed whether they predict economic growth. Indexes focused on productivity do not predict economic growth while indexes emphasizing taxes and costs predict growth of employment, wages and output.

The results of Commander and Svejnar (2011) indicate that widely used country-level indicators of business environment provided by the Heritage Foundation and the World Bank do not provide much evidence of a negative relationship between the constraining environment and firm performance. VanMetre and Hall (2011) found that many of the business climate indices are not useful in explaining entrepreneurial activity and further research is needed to better understand the relationship between these indices and entrepreneurship.

The outlined literature review shows different findings on existence of relation between business climate indices and economic growth. There is also a gap in relevant literature focused on Slovak Republic in this field. Therefore, the aim of the article is to investigate the relationship between different indices of the quality of business environment in Slovakia on one side and selected macroeconomic indicators and country's credit rating on the other side.

2 Material and Methods

Following indices of the quality of business environment are analyzed in this paper: Ease of Doing Business (EoDB) created by the World Bank Group, Global Competitiveness Index (GCI), Index of Economic Freedom (IoEF), rating from The World Competitiveness Yearbook (WCY) and Fragile State Index (FSI). For Ease of doing Business, Global Competitiveness Index and rating from The World Competitiveness Yearbook we used ranking, so that the lower value is better. In case of Index of Economic Freedom and Fragile State Index we used index value (a higher value of these indices means the higher quality of the environment).

We use the real gross domestic product (RGDP), unemployment rate (Unempl) and inflation rate (Infl) as the macroeconomic indicators and the results of the country's credit rating evaluated by Moody's (M), Standard & Poor's (SP) and Fitch Ratings (F).

The analysis is based on the country level data for the 2005 – 2014 period from the official statistical reports of World Bank, World Economic Forum,

Institute for Management Development, The Heritage Foundation, Fund for Peace and Eurostat. The analysis is performed through correlation analysis using Pearson as well as Spearman correlation coefficients.

The following text explains the aspects that are being measured and construction of each of five selected indices employed in the empirical section of the paper.

Ease of Doing Business

The World's Bank Doing Business project was launched in 2002. It measures the environment in which businesses operate in countries across the world. The centerpiece of the project is the annual Doing Business report, which currently includes 11 sets of indicators for 189 economies. The study contains quantitative measures of regulations for starting a business, dealing with construction permits, employing workers, registering property, getting credit, protecting investors, taxes, trading across borders, enforcing contracts, getting an electricity connection and closing a business. The study has become one of the flagship knowledge products of the World Bank Group in the field of private sector development, and is claimed to have motivated the design of several regulatory reforms in developing countries. The study presents every year a detailed analysis of costs, requirements and procedures regarding specific type of private firm in all countries, and then, it creates rankings for every country (The World bank, 2010).

Global Competitiveness Index

The Global Competitiveness Report is a yearly report published by the World Economic Forum. Since 2004, the Global Competitiveness Report ranks countries based on the Global Competitiveness Index. The report assesses the ability of countries to provide high levels of prosperity to their citizens. This in turn depends on how productively a country uses available resources. Therefore, the Global Competitiveness Index measures the set of institutions, policies, and factors that set the sustainable current and medium-term levels of economic prosperity. It is made up of over 110 variables, of which two thirds come from the Executive Opinion Survey, and one third comes from publicly available sources. The variables are organized into twelve pillars of competitiveness: institutions, infrastructure, macroeconomic environment, health and primacy education, higher education and training, goods market efficiency, labor market efficiency, financial market development, technological readiness, market size, business sophistication and innovation (World Economic Forum, 2012).

Index of Economic Freedom

The Index of Economic Freedom joints a series of 10 economic measurements created by the Heritage Foundation and Wall Street Journal. The Index's definition of economic freedom is the following; Economic freedom is

the fundamental right of every human to control his or her own labor and property. In an economically free society, individuals are free to work, produce, consume, and invest in any way they please, with that freedom both protected by the state and unconstrained by the state. In economically free societies, governments allow labor, capital and goods to move freely, and refrain from coercion or constraint of liberty beyond the extent necessary to protect and maintain liberty itself. The index scores nations on 10 broad factors of economic freedom using statistics from organizations like the World Bank, the International Monetary Fund and the Economist Intelligence Unit: business freedom, trade freedom, monetary freedom, government size, fiscal freedom, property rights, investment freedom, financial freedom, freedom from corruption, labor freedom. The 10 factors are averaged equally into a total score (The Heritage Foundation, 2015).

The World Competitiveness Yearbook rating

The World Competitiveness Yearbook is an annual report published by the Swiss-based International Institute for Management Development on the competitiveness of nations and has been published since 1989 (Institute for Management Development, 2015). The yearbook benchmarks the performance of 60 countries based on 333 criteria measuring different facets of competitiveness. It uses two types of data, two thirds are hard statistical data from official international and national sources and one third are survey data from Executive Opinion Survey.

Fragile State Index

The Fragile States Index (formerly the Failed States Index) is an annual report published by the United States think-tank the Fund for Peace and the magazine Foreign Policy since 2005. The list only assesses sovereign states (as determined by membership in the United Nations). Ranking is based on the total scores of the 12 indicators (economic indicators: uneven economic development, poverty and economic decline; social indicators: demographic pressures, refugees and internally displaced persons, group grievance, human flight and brain drain; political and military indicators: state legitimacy, public services, human rights and rule of law, security apparatus, factionalized elites, external intervention). For each indicator, the ratings are placed on a scale of 0 to 10, with 0 being the lowest intensity (most stable) and 10 being the highest intensity (least stable). The total score is the sum of the 12 indicators and is on a scale of 0-120 (The Fund for Peace, 2014).

3 Results and Discussion

Over the past decade, Slovakia fastened growth rate of its economy and gradually got above average growth rate of the European Union. The integration with the economies of the European Union has been considered as a key factor of above average economic performance in recent years. It opened up the new trade and investment opportunities to these countries and promoted institutional and macroeconomic reforms. It also accelerated the process of convergence to the level of income per capita of developed Western countries (Spišáková, Pétrová, 2011).

Figure 1 shows the trends of real GDP growth rate, unemployment rate and inflation rate in Slovak Republic in period of 2005 – 2014. Slovakia had very good starting position in terms of GDP level in reporting period. The economic crisis caused a significant decline in GDP in 2009, a further decrease occurred again in 2012. In the following period, GDP growth rate started to grow. In the pre-crisis period, unemployment fell, the lowest level reached in 2008. Since 2009 the unemployment rate gradually increased, except in 2011 when decreased slightly. In 2009 the unemployment rate gradually increased, except in 2011 when decreased slightly.

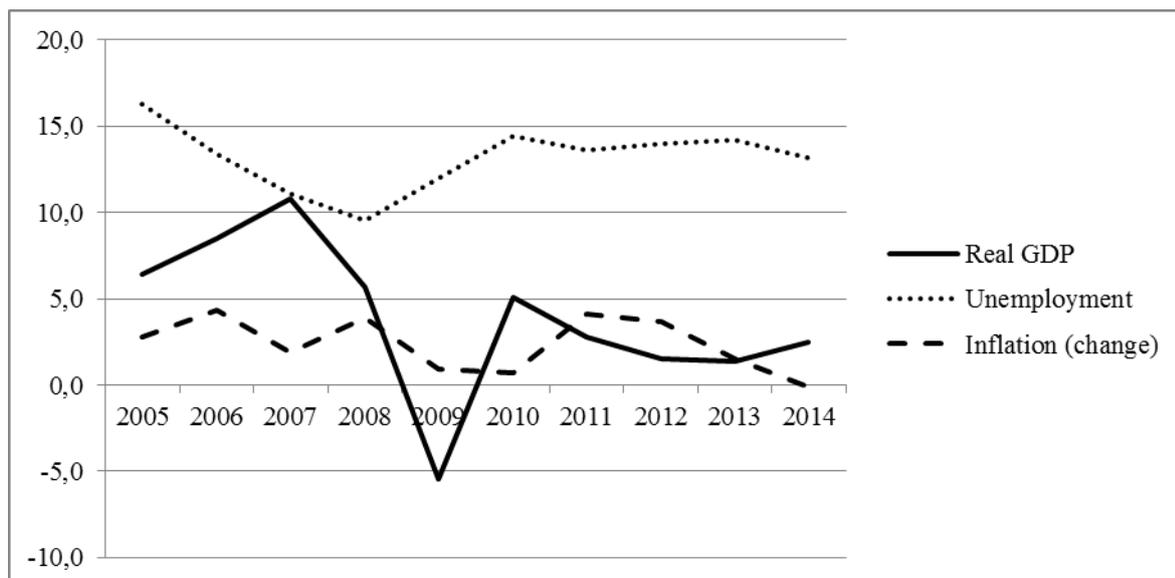


Figure 1 Real GDP growth rate, unemployment rate and inflation rate in Slovakia in the years 2005 – 2014 (%)

Source: Own processing according to data from Eurostat

Following table 1 shows basic descriptive characteristics and testing statistics of studied variables.

Table 1 Descriptive characteristics and testing statistics of studied variables

Variable	Mean	Std Dev	Median	Min.	Max.	Kolmogorov -Smirnov test	p Value
EoDB	40.40000	5.75809	39.00000	32.00000	49.00000	0.22256354	>0.150
IoEF	68.69000	1.39956	69.45000	66.40000	70.00000	0.29402820	0.015
GCI	55.60000	16.98496	53.50000	32.00000	78.00000	0.19368760	>0.150
WCS	41.20000	6.98888	42.50000	30.00000	49.00000	0.20668322	>0.150
FSI	137.20000	13.62025	143.50000	111.00000	146.00000	0.40987621	<0.010
Unempl	13.17000	1.89798	13.50000	9.50000	16.30000	0.20630553	>0.150
RGDP	3.92000	4.51216	3.95000	-5.50000	10.80000	0.18825448	>0.150
Infl	2.37000	1.60003	2.35000	-0.10000	4.30000	0.19707870	>0.150
M	14.60000	0.51640	15.00000	14.00000	15.00000	0.38071099	<0.010
SP	15.30000	0.48305	15.00000	15.00000	16.00000	0.43271960	<0.010
Fitch	15.70000	0.48305	16.00000	15.00000	16.00000	0.43271960	<0.010

Source: Own processing

Table 2 shows the results of correlation analysis using Pearson correlation coefficients and Spearman rank correlation coefficients. We used both correlations, because Pearson correlation strictly requires that the two variables follow the normal distribution, but Spearman rank correlation does not have such requirement. After checking the data set, we found that according to Kolmogorov-Smirnov test (Table 1) not all the variables are normally distributed. Use of Pearson correlation coefficient showed existence of considerably lot statistically not significant relations. Relatively more statistically significant relations among indices of business environment and macroeconomic indicators of particular country have been detected using Spearman rank correlation coefficient that can indicate existence of rather non-linear relationship between studied variables.

Table 2 Pearson and Spearman correlation coefficients

	EoDB	IoEF	GCI	WCY	FSI	Unempl	RGDP	Infl	M	SP	Fitch
EoDB		- 0,40854	0,71343 **	0,64220 **	0,65433 **	0,51830	0,81099 ***	- 0,13415	- 0,35751	0,42041	0,64973 **
IoEF	0,07666		- 0,40606	- 0,27964	- 0,46016	- 0,40606	0,46667	0,45455	0,85280 ***	0,18993	- 0,11396
GCI	0,71642 **	- 0,29419		0,55319 *	0,95099 ***	0,12727	- 0,75758 **	- 0,41818	- 0,42640	0,11396	0,79772 ***
WCY	0,65216 **	- 0,36668	0,72148 **		0,37540	0,74164 **	- 0,25532	- 0,17021	- 0,28513	0,34292	0,34292
FSI	0,40831	0,09279	0,71746 **	0,18629		- 0,04295	- 0,82828 ***	- 0,49697	- 0,35972	0,19228	0,80757 ***
Unempl	0,38044	- 0,54599	0,15503	0,70998 **	- 0,41795		- 0,12727	- 0,10303	- 0,49747	0,11396	0,03799
RGDP	- 0,63071 *	0,17422	- 0,45135	- 0,13297	- 0,46851	- 0,05986		0,41818	0,35533	- 0,34188	- 0,79772 ***
Infl	0,06537	0,24695	- 0,29568	- 0,14348	- 0,41675	- 0,08448	0,33575		0,28427	- 0,18993	- 0,34188
M	- 0,27652	0,90090 ***	- 0,42565	- 0,43717	- 0,04423	- 0,56910 *	0,18502	0,21247		0,53452	0,08909
SP	0,39149	0,41581	0,12459	0,21064	0,32763	0,05938	- 0,47716	- 0,20270	0,53452		0,42857
Fitch	0,64715 **	- 0,02137	0,76922 ***	0,34887	0,80388 ***	- 0,15634	- 0,71064 **	- 0,27171	- 0,08909	0,42857	

Source: Own processing

Notes: under the main diagonal Pearson's correlation coefficients and above the diagonal the Spearman's rank correlation coefficients, Pearson and Spearman correlation coefficients, ***, **, * denote significance at 1, 5 and 10 % levels, respectively

Statistically significant relations were found among Ease of Doing Business and Global Competitiveness Index on one side and real gross domestic product growth rate on the other side. Similar results can be found in work of Djankov, McLiesh and Ramalho (2006) who found a positive relationship between economic growth and the Doing Business indicator and also in work of Gillanders and Whelan (2014).

In case of the relationship between business environment indices and country's credit rating rather contradictory results were identified. It might be caused by different point of view of rating agencies in evaluation of country's business environment and less flexible changes in country's credit rating.

Among Ease of Doing Business, Global Competitiveness Index and ranking in the World Competitiveness Yearbook strong statistically significant relations were detected. These results might indicate that for purpose of initial analysis of business climate of Slovak Republic is the use of these indicators substitutable due to relatively comparable results.

Considering the results of the research, we cannot state that there are clear relations among business environment indices on one side and macroeconomic indicators or country's credit rating on the other side. Reasons can be sought in way of construction of analyzed indices of business environment, because they take into account official macroeconomic data of the country on one hand as well as rather subjective perception of quality of business environment based on questionnaires on the other hand. Similarly, Körner, Kudrna and Vychodil (2002) argue that the indices are typically set to evaluate different aspects of the business environment and they are able to distinguish between strengths and weaknesses of country's institutional framework. However, the indices themselves are unable to answer the question of why some components are better or worse, they also do not answer the question of whether these differences are real, or if it is just the difference in the perception of respondents. This apparent incompleteness can be removed only through deeper penetration into the problem in studies focused on specific countries and in comparative studies.

Conclusion

In this paper, the existence of statistically significant relationship among chosen of analyzed indices of the quality of business environment and macroeconomic indicators or country's credit rating in case of Slovak Republic has been identified. According to results of the analysis, the clear and unambiguous relationship among different indices of the quality of business environment on one side and selected macroeconomic indicators and country's credit rating on the other side cannot be proven. The preliminary findings suggest that the further research focused mainly on the look beyond the aggregate measures and drill down into specific performances across the

indicators is needed. Also a comparative analysis aimed at different countries of European Union would be a useful extension.

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BRAND CREATION OF A PUBLIC FIGURE - A CASE STUDY

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Abstract

Scientific specialization is research problems associated with communication between the company and the market, issues of contemporary advertising market, brand positioning. The author of 156 articles published in Poland and abroad, author of 4 books and 5 monographs. Participation in numerous Scientific Conferences in Poland and abroad. Activity: Since 2008, member of the Faculty of Management Czestochowa University of Technology. From 2012, the deputy director of the Institute of Marketing of the Faculty of Management at Czestochowa University of Technology. Supervisor of SMR Scientific Group on the Faculty of Management at Czestochowa University of Technology. Laureate of 6 individual and collective awards of Rector of the Czestochowa University of Technology. Internships: Academic placement within the Erasmus Programme at the Technical University in Košice (2008), the University of Economics in Bratislava, Faculty in Košice (2010). Projects: Leader from the Polish bilateral Government Project Retail management bioproduktov v Slovenskej republike a Poľskej republike SK-PL-0040-09; Head of Research Project "The functioning of the organization on the Polish market and global aspects of marketing" BW 607/201/07; Individual Research Project BW: "Management through motivation in small and medium-sized enterprises in Poland" No BW 607/201/04.

Keywords:

social stratification, social portal, millennials, election leaflets, brand identity

Introduction

Contemporary life together with postmodernism, changes in social structures, lack of irrefutable rules, results in the need to revise and rebuild traditional methods of communication. In Poland, 2014 and 2015 are key years to the organization of the state - these are the years of the three major political choices: local elections, presidential and parliamentary elections. The following study presents an example of a campaign in the local elections describing the case study. Developing a strategy for the campaign required the adoption of the paradigm of creating the image of a candidate on the basis of appropriate branding. Candidate, as a public person is not a collection of characteristic individual qualities but rather in the perception of consumers is a brand.

Core text

In marketing, there are three main core brand metaphors: the brand as a distinguishing mark, the brand as an asset and the brand as a person. (Davies, Chun, 2003, p. 45-71). The brand identity, as well as vision, is an approach to the interpretation of the brand. Identity is formed by the values and goals of the brand, which distinguishes it from the competition, ensure their individuality and originality (De Chernatony, 2003). The basis for the conduct of the election campaign of the candidate is a way to distinguish him among a large number of other candidates. Forms of communication with voters are often inconsistent,

lots of ads on the streets results in cognitive chaos among the recipients - brand identity of the candidate is a fundamental axiom of his distinction, recognition and identification.

SWOT analysis

The present study is an attempt to describe and analyze the main forms of communication of a candidate X for the office of councilor by building brand identity of a person. Low recognition of candidate was a great difficulty. Without experience in the local government structures, without the political past, she participated in the local elections on behalf of one of the leading political parties. Concise SWOT analysis that specifies the starting position of a candidate helps to identify strengths and weaknesses.

Weaknesses: low social recognition, lack of practical experience in creating brand image and identity, lack of consultants resources, small financial budget for the campaign, the lack of experience in organized social activities,

Strengths: low visibility can be treated as an asset - lack of negative associations with the candidate (elimination of negative halo effect), the lack of high-election budget forced more deliberate and more creative efforts, knowledge of political marketing, high visibility in selected market segments.

Opportunities: knowledge possessed was a chance to develop and implement an effective advertising campaign, people got weary of many other candidates, high interpersonal skills, lack of experience in political activity gave the opportunity to apply the law of the sincerity - the recipient perceives open admission of imperfection as an advantage.

Threats: use of many advertising mediums by rivals, low visual recognition, high efficiency of rivals marketing message.

Stratification of Polish society

Abstracting features of the target groups was preceded by the analysis of the characteristics of Polish society. Based on the analysis of literature, the category of millennials, which represented very high social potential, has been distinguished. This generation Y is a key target group for many brands. Polish generation Y is a diversified group, which can be divided into two subgroups: those born in the 1990 - 2000 years of younger millennials and older millennials born between 1980 and 1989. To initiate contact with the generation Y one should enter into dialogue and choose the content and communication tools, which would result in explaining the message to recipients. Older millennials a group that in many ways has taken over the features of the preceding generation X. Those millennials grew up "offline" and the development of technology has forced them to adapt quickly to the new network conditions. This adaptation continues with the further development of information technologies that change the way in which older millennial communicate with others and make choices.

Millennials is the most influential and most demanding group of consumers present currently on the market. Classic schematic tools and approaches are often ineffective towards members of this group. Thus, thinking about communication with the generation Y requires changes – specific characteristics of this group: its language, behavior, preferences should be taken into account. ([Http://www.brief.pl/artykul,2501,milenials_cechy_pokolenia_y.html](http://www.brief.pl/artykul,2501,milenials_cechy_pokolenia_y.html))

The stages of the election campaign

Target groups

Determination of the target group was fundamental. The analysis led to abstract of target that meets the following criteria: a large number of the segment, the strong position and visibility in the target group, easy access to customers, the ability to communicate with the target group. Due to the professional work (work in higher education) it was concluded that students are adequate segment. The following demographic criteria were used to define and clarify the preferences of the target group: age, sex, lifestyle, education. Older millennials are purchase pragmatists - "smart shoppers", while the younger is a category of "cool hunters" – who appreciate the benefit. Much more often than older generation, are willing to pay more for the product, which they consider to be cult. These types of beliefs are characterized by 28 percent of members of this group. Less inclined to such activities are older millennials (25 percent). The generation X is least likely to pay for the brand and image (21 percent). Younger are more likely than older millennials to choose brands and products that support a goal close to them. Such declaration support 28 percent of them, which is about 7 percentage points more than the older millennials (21 percent) and 4,5 more than a generation X. (http://www.brief.pl/artykul,2501,milenials_cechy_pokolenia_y.html).

The residents of neighborhoods included in the constituency represent the next segment. District in which the candidate resides is most strongly populated and geographically the largest in the city, which gave a chance to gain large number of votes in favor. The specificity of the district: a promenade, dense buildings, numerous points of sale, possession of pets among large number of residents, provide opportunities of high recognition in the local environment. The other three districts of constituencies have been sequentially analyzed and specificities neighborhoods have been identified (numbers, the average age of the inhabitants, places of severe traffic around shops, lifestyles). This target group was set on the basis of geographical criterion – residence became the basis for the determination of this segment.

The tools used for effective communication with recipients

Brand awareness can be interpreted as cognitive simplification. Decisions are made by reference to the simplification especially when there is a large number of candidates. The use of brand awareness is a common decision-making tactic among voters.

Behavior of consumer is not rational when it comes to products that meet our emotional needs. Therefore, brands can be classified with regard to its utilitarian and symbolic functions. The first one meets immediate, real needs. The second is associated with emotional needs and selection criteria of such brands are subjective and personal. Examples are sympathy versus antipathy. The choice of a particular brand is for the most consumers a way to express themselves, identification with a brand, for example, due to the attractive appearance and emotional connotations close to a given recipient – these are essential functions and reasons for choosing the person (Bhat, Reddy, 1998, p. 32-43).

Social networks

Communication with millennials must meet four requirements: be mobile friendly, social, visual and conducted in real time.

Younger millennials represent about 5 million out of 11 million people in Poland included to the generation Y. Like the older millennials have certain features of generation X, so the younger people are similar to the generation Z. Smartphone became almost an extension of themselves, so in every minute they can be online at the same time communicating with friends, listening to music and enjoying applications which make life easier or provide entertainment. Younger millennials are not shy or modest – they attach great importance to the image created using social media. 66 per cent of younger and 60 percent of older millennials use smartphones. They use the Internet in a completely different way than by representatives of generation X. For millennials network is primarily a community. They treat it as a source of links, entertainment, relaxation, advice and inspiration, while the generation X has a more utilitarian approach to the Internet. It is a helpful tool for them, which is mostly used in the work. The younger the millennials the more "smartphone type", the older the closer they approach the generation X
(http://www.brief.pl/artykul,2501,milenials_cechy_pokolenia_y.html)

For effective use of the Internet as a form of image creation and methods of communication with recipients, the principles of webwriting had to be used. Modern reader receives mainly text on the screens (computers, smartphones, smartTV tablets). This fact determines the content of the message - the needs of the reader are different and the way of writing differs from traditional. Today's generation of young people is referred to as "screeners", which reflects their long hours of contact with the screen and it is almost an innate feature. Only

15% of Internet users are reading in the traditional way, i.e. from word to word, while 79% of consumers do not read the screen and limit their activity to viewing pages on the screen – they scan texts with eyes not getting into their content very deeply. The Internet user reads vertically, as opposed to the traditional, horizontal reading. Post on the social networking site is read by the recipient about 10 seconds - at the time the recipient must be intrigued enough to keep it on the page. In order to gain attention recipient is necessary to preserve the principle of the key words in the first sentence of the entry and the conclusion in the first paragraph of the most important information. The more important information the better positioned it must be which is called pyramid information.

Sharing is caring

The survey shows that as many as 94 per cent of Polish millennials share both positive and negative information about brands. There was no target group as aware, informed and active as today millennials. Access to many information from various sources and participation in the community gives this group a lot of power.

Creativity, openness and transparency can win the attention and commitment of millennials. The campaign uses an open table - all users are able to add posts. Opening the table resulted in a feeling of openness in the perception of recipients and led to greater impact on the web page. A social networking site is a place of conversation, dialogue and therefore it should not be hampered. Mainly social networking site have been used for student target. Due to the candidate rules, direct election campaign was not possible in this case.

Election leaflets

For the target group defined by geography election leaflets have been differentiated. Various content relevant to the needs and lifestyles of the residents of the district have been prepared for each of them. For districts located within the Kraków-Częstochowa Jura flyers contained candidate image on the background of the ruins of the Jurassic castle. For the quarter located outside the Jura, and characterized by a large number of pets - picture of the candidate with pet.

In order to maintain uniformity, a common element connecting the four types of leaflets was slogan and basic data about the candidate.

Slogan

Creating an election slogan was based on several principles. The fundamental was to determine the specificity of the city. Częstochowa is a city associated in Poland and in the world with a place of Marian devotion. Thus,

almost the entire promotion of the city is based on references to this asset. Czestochowa lies in the attractive Kraków-Częstochowa Jura. This value has been used in the city election slogan. Campaign slogan was to combine the two segments of different styles of life - was to cement and appeal to the emotions, bypassing the rational aspect. Priority right has been used here: it's better to be first than better! So far in the campaign no one has appeal to the geographical location of the city, so the rule of primacy is maintained. In addition, three of the four districts are located in the Kraków-Częstochowa Jura. Content of the election slogan also met the priority of thought right - better to be first in one's consciousness than the first on the market. Another principle was the right of perception-campaign is not a struggle of candidates, it is a struggle for the perception of recipients. Right of concentration was another principle used in this campaign: the most important is to capture some expression in the minds of potential customers.

Analysis of lifestyles of districts residents and students allowed to formulate the slogan: "Hurra, Jura, Czestochowa". There was a high risk of denial of slogan by recipients due to an appeal to the Jura without the sacred aspect of the perception of a city and a big emotional slogan message to the sense of humor while ignoring rational argument. Testing a slogan before its official publication was met with a mixed response of recipients, while dominated by surprise and smile.

Election poster

Basic features that must be met by election poster are similar to the requirements for billboards. These are: the symbolism of the image must be memorable, short and easy slogan to remember clearly associated with the advertised "product", positive connotation. To distinguish herself, the candidate resigned from a unified form of the poster used by rivals. The resignation from a common photo with another candidate with increased visibility had the same purpose. This decision was taken out of fears of a cannibalism phenomenon - recipient distraction and taking attention from the main advertised subject for people with very high visual identity. Short slogan exposed on the poster was possible to read in 2 seconds, and the picture of the person on the poster was to give the impression of openness and friendliness underlined by colors.

Election spot

In designing advertising spot, the principle of compatibility between the elements of communication with customers and diversity has been maintained. Traditional formula of a spot published on YouTube or broadcasted in city lights in the center and key areas of the city, adopted by the other candidates, has been abandoned. Instead of advertising spot on the YouTube, a comic book, which resembles traditional comics (characteristic comic-like speech bubbles, funny

story with a punch line), has been published. The main character in the comic was a candidate and her dog, and comic was named ambiguously "Campaign under the dog" meaning in Polish "campaign under the dog".

In marketing, there are three indicators of brand awareness:

1. spontaneous brand awareness indicated by recipients. Spontaneous brand awareness thus determines the field of choices of recipients.
Koniewski, M, 2012 Świadomość marki a lojalność konsumentów, 02.2012, www.research-pmr.com free article. 2
2. Top-of-mind knowledge ("brand best remembered and reminded") is a brand mentioned in the first place. This brand is assigned with the highest value - in a situation of choice, which candidate to choose voter chooses most likely a person with clear brand. Brand mentioned in the first place, represents the strength of emotional connection of voters with the candidate brand, better than spontaneous awareness.
3. Besides, supported awareness, which is recognizing brand of a person among brands of other candidates, is also important. Spontaneous brand awareness indicates the brand is memorized by the recipient, but supported awareness is only its recognition ("knows her from hearing/vision"). Supported awareness is an indication of too weak ties of voters with a person brand.

The aim of the election campaign was to create a candidate brand identity on the basis of its top-of-mind familiarity.

The candidate's attitude and emotional involvement are important elements of electoral success analogous to the image of the government acting as a "sum of beliefs, attitudes, and experiences that people have to a certain place" in the political marketing. (Ph. Kotler, D. Haider, I. Rein, 1993, p. 141).

Image of a place can be defined by the attributes of the place, the overall experience; similarly the image of a person, apart from impressions, characterize functional features describing the characteristics of the image and psychological associations related to intangible aspects. (Dashkevich, M. 2012, p. 74-83).

The image can be determined using the "repetitive" features in order to compare the different candidates and those that can be assigned only to selected people (the unique features of the image). Functional characteristics (physical, measurable) are for example election program or education background of the candidate. In the decision-making process, however, psychological attributes that refer to the realm of emotions and abstract associations are more important.

- To assess personal brand awareness people can apply measurement techniques used to measure brand awareness of products. The indicators used in the evaluation of the image of the person are: spontaneous brand awareness or recognition of a person (the percentage of the target group, which is able to give a name or slogan of a candidate),
- Priority in the consciousness of ToMA8 (top of mind brand awareness), which is a percentage of the target group indicating the candidate as the first among the other candidates.

- Awareness of the brand with the assistance of a person or a percentage of the target group of people declaring knowledge through graphic identifiers, e.g. photos, slogan typography, colors.

Conclusion

This article is an attempt to analyze the election campaign carried out to the local government. It is a contribution to the discussion on gaining an advantage for the candidate over her competitors through the creation of a brand identity. Such variables as the external environment including the specifics of the city, adequate to the social stratification, conducted market segmentation and selection of appropriate communication tools are crucial for the development and implementation of the campaign. The power of the Internet as a medium of image is exposed. The historical look at the Internet as a medium of the Internet user responsiveness and direct response to the communication should be abandoned. Social networking is also becoming a key way to build brand awareness and branding campaign effect in the Internet is easily verifiable in political marketing.

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IMPORTANCE OF UNDERWRITERS IN PRIMARY BOND OFFERINGS

Robert VERNER – Peter REMIÁŠ

Abstract

Quality of leader services in managing the issue is important both for issuers and for investors. Proper selection of leading underwriter and secondary bookrunners should lower issuers' transactional and informational costs of capital. This paper focuses on analysis of 23 844 straight bond offerings with fixed coupon issued between January 2003 and April 2015 and identifies largest and most active leaders and bookrunners according to the issued volume, number of deals and their market share. Total of 283 banks, brokers and other financial institutions have been leading the deals. Out of examined leaders and bookrunners, Top 10 placed more than 59% of total issued volume and Top 30 placed almost 91% of total debt volume. Remaining 253 banks and financial institutions led slightly above 9% of issues.

Keywords:

corporate bond offering, generalized least squares, ordinary least squares, underwriting

1 Introduction

Decision to finance corporate intentions by issuing particular securities is usually based on the financial plan and long-term strategy of the issuer. Compared to the equity offering, the main benefits of debt financing are the large amount of funds without change of the ownership structure and tax shield from paid coupons. Despite its advantages, the issuance process is rather costly, time-consuming and complicated, therefore it must be well prepared and carefully performed. In order to optimize the public offering, issuers usually mandate large global bank or broker to lead the issue and specify offering price based on the customer calls, due diligence and industry analysis. The traditional issue framework includes investment bank performing following functions:

- advising the borrower focusing on the timing and details of the offering,
- buying the securities from the borrower,
- allocating the issue to the investors.

The investment bank advisory role might require to develop a bond structure that is more suitable to investors than a conventional instrument. However, in the offering process investment banks do not necessarily perform the second function - buying the obligations from the borrower. Banker might act only as an advisor or distributor of the issued bond. The situation of purchasing the issued securities from the borrower is known as underwriting. When a bank buys the obligations from the borrower and takes the risk of selling them to subsequent investors for a little lower price, it is called the underwriter. Figure 1 illustrates the issuing process, where issuing company chooses the leading underwriter (e.g. large investment bank) in order to manage the bond offering. In order to cover wider base of investors, leading underwriter contacts partner banks (book runners) and they offer the parameters of the issue to their clients (investors).

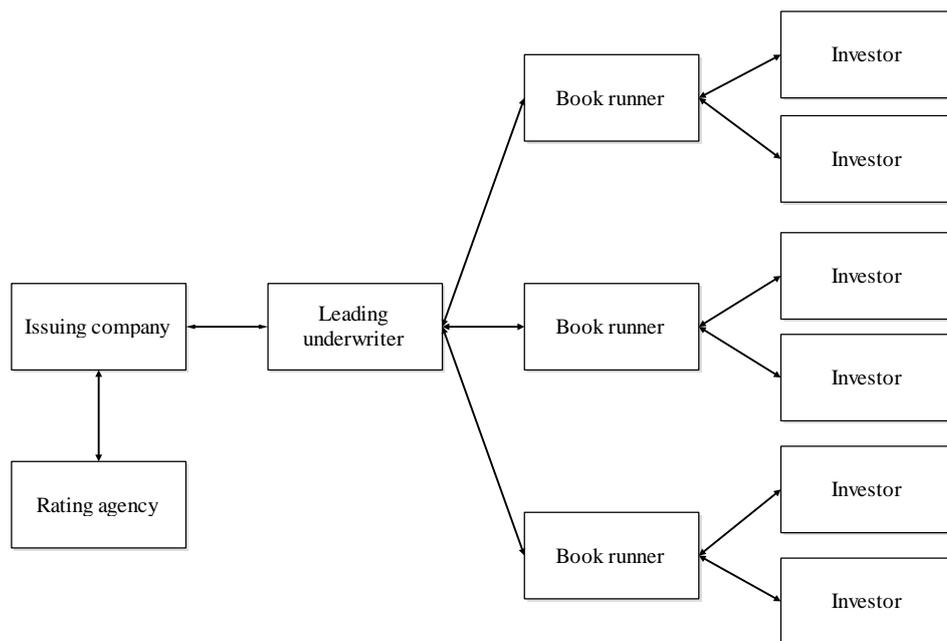


Fig. 1 Standard public offering

Underwriters' specialization in the sales and marketing of securities lower issuers' transactional and informational costs of capital (Fang, 2005). Leading bank should establish appropriate maturity, currency, and legal domicile based on issuer needs. Expert team, which deals with the development and delivery of issue specifications must implement not only the requirements of the company, but also the demands of the main investors such as commercial banks, insurance companies, hedge funds, pension funds and others. For the issuer it is crucial that the underwriter provides optimal services so that investors cover all desired volume at the lowest possible price. Given the fact that the volume of large offerings is often in billions, even a small price change can cause a significant difference in total cost.

Quality of leader services in managing the issue is not only important for the issuer who pays for it, but also for investors. If the underwriter estimates offered yield as too low, investors do not obtain corresponding value for their funds in terms of an adequate balance of return, risk and liquidity. Resulting outcome might imply that the amount of acquired funds requested by the issuer will not be fulfilled. It also may happen that due to precise marketing underwriter sells the entire issue, but investors will feel deceived and interrupt cooperation with given bank because of subsequent decline of bond price in the secondary market. On the other hand, in case of large yields investors will be satisfied, issue is over-subscribed, but the issuing corporation will be paying higher costs until the maturity, or eventual call-date of the bond. For the company it is therefore very important to estimate the yield of the offering as low as possible to cover the desired volume of the issue.

Due to their importance and complexity, public offerings have received considerable attention in academic research. Among most frequently examined topics belong underpricing of offerings, relations with underwriter, marketing of offerings, or their allocation. Ke et al. (2007) explored determinants of different types of bonds at the initial public offerings for the Taiwan Stock Exchange. Their analysis suggested that companies with large research and development expenses were more likely to issue straight bonds, while firms with higher future growth opportunities were more likely to issue convertible obligations. They also showed that the need for financing was the major parameter that influenced types of issued bonds in terms that firms with more significant financing needs were more likely to issue convertible bonds and vice versa. On the sample of 353 firms Davydov et al. (2013) examined the relationships between company valuation and the sources of debt financing. Their results indicated that companies which offered public debt performed worse than firms with other sources of debt financing in terms of stock market valuation, i.e. their market value decreased. Findings of Altunbaş et al. (2010) suggested that companies with higher credit level and financial leverage depended more on public debt, while more profitable firms with large market value relied more on syndicated bank loans. Hale and Santos (2008) claimed that more creditworthy companies with high demand for external funds offered their initial public obligations earlier. Since many firms have issued exchangeable debt as a popular method of financing in recent years, convertible debt offerings had also been researched by several studies (Kang and Lee, 1996; Lewis et al. 2002; Danielova et al. 2010). Dutordoir and Van de Gucht (2007) stated that stockholder reactions to convertible debt announcements were significantly less negative during hot debt windows. Moreover, they emphasized that windows were primarily utilized by companies with higher costs of attracting external funds. Altı (2005), Baker and Wurgler (2002) and Schultz (2003) focused on offering market timing and concluded that capital structure of firms was strongly related to historical market values. Interesting studies on debt offerings features had also been provided by Eckbo (1985), Spiess and Affleck-Graves (1999), and Garay and Molina (2014), while Demers and Lewellen (2003), and Cook et al. (2006) focused on benefits of marketing and promotion.

On the other hand, Butler et al. (2013) examined the statistical robustness of parameters to explain initial public offering returns. They established a list of robust variables and evaluated their implications for different theories of underpricing and illustrated how applying a set of robust explanatory variables can lead to different conclusions. If the issue was priced exactly at its intrinsic value, large and well informed investors would completely cover the issued volume in case of lucrative deals and bear back in case of unprofitable ones. Underpricing of offering is crucial in order to guarantee that also the uniformed investors purchase the issue (Rock, 1986). Focusing on initial public offerings, Booth and Chua (1996) argued that required returns to investors decrease with large liquidity, and Purnanandam and Swaminathan (2004) suggested that

median offering was overvalued at the offer by 50% relative to its industry peers. The role of venture capital in underpricing public offerings had been explored by Lee and Wahal (2004). They questioned the role of venture capitalists in the underpricing of public issues between 1980 and 2000 and argued that the venture funds represented an endogenous preference on the part of the venture capitalist and the entrepreneur. Venture capital backed issues registered larger first-day gain than identical non-venture backed issues. Additional interesting research on underpricing had been done by Hanley (1993), Brennan and Franks (1997), Francis and Hasan (2001), Habib and Ljungqvist (2001) concluding that underpricing had direct effects on secondary market liquidity.

2 Data

We analyzed 23 844 EUR and USD denominated straight bond offerings with fixed coupon issued between January 2003 and April 2015 from the BondRadar information service. Table 1 introduces the 30 largest leaders and bookrunners according to the issued volume, number of deals and share. Total of 283 banks, brokers and other financial institutions have been leading the deals.

3 Results

Given financial institutions had either been the leader or bookrunner of the issue. Since several banks usually participate on one issue, the sum of individual deals for particular banks, financial intermediaries and brokers is considerably larger than actually issued 23 844 offerings. However, declared volume is solely for the leading position, therefore no duplicity is possible and the total amount of issued debt is above 22 trillion of USD equivalent (for the sake of aggregate comparability, volumes of EUR offerings have been by BondRadar service also transformed into USD at corresponding exchange rate). The largest leader (or bookrunner) was JP Morgan with 6 494 deals and 1,88 trillion of USD equivalent issued, followed by Deutsche Bank and Barclays.

Tab. 1 Overview of largest issue leaders and bookrunners

Rank	Lead / Bookrunner	Volume (USDm eq.)	Deals	Share
1	JP MORGAN	1 882 444,67	6 494	8,54%
2	DEUTSCHE BANK	1 677 974,96	5 410	7,61%
3	BARCLAYS	1 491 906,01	4 742	6,77%
4	CITIGROUP	1 477 631,82	5 094	6,70%
5	GOLDMAN SACHS	1 223 130,93	3 810	5,55%
6	HSBC	1 140 285,37	3 279	5,17%
7	BAML	1 139 741,64	4 898	5,17%
8	BNP PARIBAS	1 091 040,57	3 400	4,95%
9	MORGAN STANLEY	1 075 304,23	3 664	4,88%
10	CREDIT SUISSE	894 516,30	3 169	4,60%
11	SOCIETE GENERALE	740 183,95	2 164	3,36%
12	UBS	728 066,88	2 294	3,30%
13	ROYAL BANK OF SCOTLAND	704 964,75	2 675	3,20%
14	CREDIT AGRICOLE	591 830,89	1 976	2,69%
15	UNICREDIT GROUP	536 754,39	1 937	2,44%
16	NATIXIS	473 171,13	1 658	2,15%
17	MERRILL LYNCH	297 019,53	650	1,35%
18	WELLS FARGO	290 841,74	1 847	1,32%
19	ROYAL BANK OF CANADA	269 614,93	1 340	1,22%
20	LEHMAN	266 539,76	540	1,21%
21	COMMERZBANK	254 877,40	1 044	1,16%
22	ABN AMRO	253 671,50	672	1,15%
23	DZ BANK	234 025,85	987	1,60%
24	DRESDNER KLEINWORT	227 042,79	593	1,30%
25	NOMURA	213 545,00	556	0,97%
26	LBBW	207 538,64	914	0,94%
27	SANTANDER	185 342,76	706	0,84%
28	ING	180 152,47	648	0,82%
29	BBVA	159 644,49	584	0,72%
30	BANCA IMI	118 439,23	483	0,54%
Top 10		13 093 976,51		59,41%
Top 30		20 027 244,58		90,87%
Others		2 010 998,79		9,13%
Total		22 038 243,37	23 844	100,00%

Figure 1 presents the performance of 10 largest issue leaders for the period between January 2004 and April 2015 in terms of led issues, while Figure 2 focuses on the total amount of issued debt.

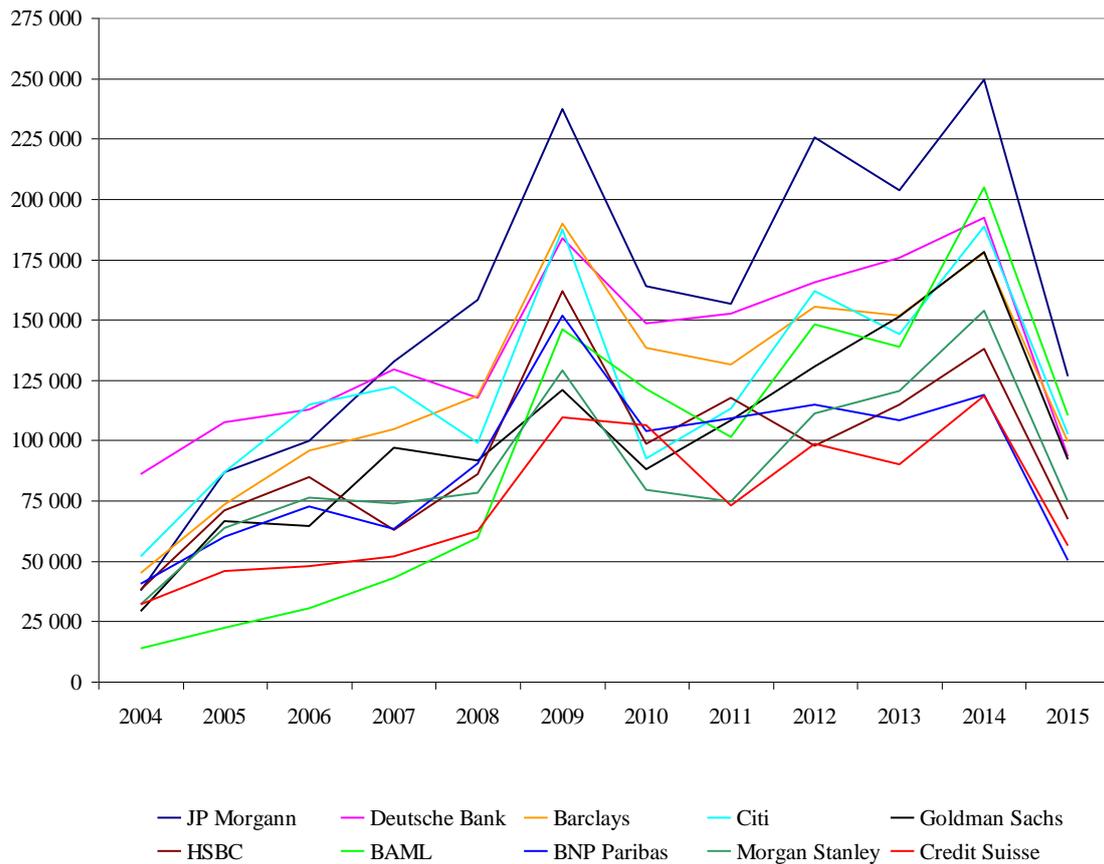


Fig. 1 Performance of 10 largest issue leaders (USD mil. equivalent)

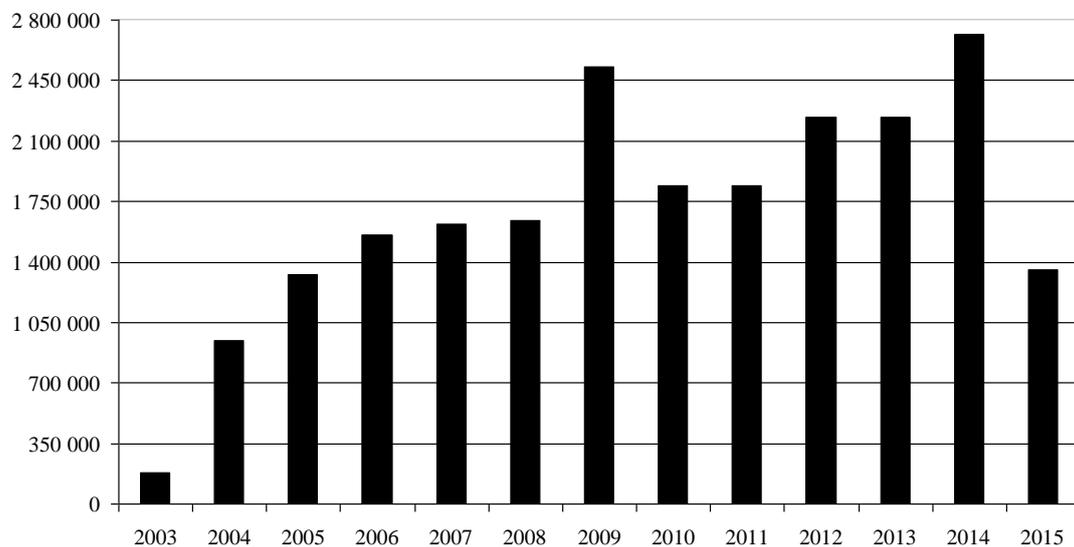


Fig. 2 Total amount of issued debt (USD mil. equivalent)

It is remarkable that out of 283 banks, Top 10 placed more than 59% of total issued volume and Top 30 placed almost 91% of total debt volume. Remaining 253 banks and financial institutions led slightly above 9% of issues.

Conclusion

The recent development suggests that in the current low yield environment investors searching for returns exchanged safety for expected higher yields and accept more speculative instead of investment grade and asset backed bonds. It is worth to notice that the global increase of corporate debt has been followed by consequential shift in the characteristics of issued obligations. Moreover, the rapid rate of issuance has not been accompanied by economic growth and better financial results of issuers. This long term vulnerable situation might therefore result into systemic shock and cause significant turmoil on bond (and financial) markets. Since the amount of issued corporate debt is enormous and still rises, analyzed topic might be considered as very actual and employable in global practice. Due to the volume of offerings and associated advisory fees, this field constitutes a highly lucrative field for further research.

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PROPOSAL OF COMBINATORIAL AND STATISTICAL PROPERTIES OF COMPLEX NETWORKS

Jana CORONIČOVÁ HURAJOVÁ

Abstract

The study of complex networks is a new but very attractive research area. One of the reasons why analysis of complex networks are getting increasing attention is their extensive application and the properties of networks use to describe the structure of systems of several fields of study like aviation and rail transport, genetics or by looking into the deployment of economic activities in the country.

Keywords:

complex networks, centrality indices, graph theory

Introduction

Mathematically, we can represent any complex network as a graph whose vertices correspond to objects of the network and the edges correspond to relationships between pairs of objects. Theoretical knowledge of abstract graph model system obtained in graph theory may not only significantly contribute to understanding the structure of the system, but also provide space for improving the objects position in the system and thus lead to the improvement of the whole system.

One of the most popular characteristic of the analysis of complex networks is the identification of objects with a key position within the network. As an effective means for finding important objects one can make use of centrality indices defined as the real functions which according to the predetermined conditions assign a value to the corresponding vertices or edges, according to the predetermined conditions which will define their position within the network.

One of the basic works in this area is [14], in which L. Freeman summarized the previously known properties of several centrality indices. Degree of a vertex, eccentricity, closeness, eigenvector centrality and betweenness are the examples of the most important vertex centrality indices. Despite of the broad use of centrality indices, the mathematical properties of these real functions have become the subject of the theoretical research just recently and it has happened mainly due to the massive use of social networks and the Internet (Facebook, Twitter, Viber and others.) and the increasing need to solve the typical optimization problems in graphs representing such networks algorithmic effectively (as an example, Page Rank algorithm used when searching with Google).

In [22] there is a chapter describing centrality indices, their characteristics and examples of their applications in network analysis. Similarly, in [15] one of the chapters is devoted exclusively to betweenness centrality. Another examples

of papers with concept based on the mathematical properties of centrality indices are [2], [3], [4], [5].

The justification of the study of centrality indices as well as the analysis of complex networks is demonstrated by a lot of studies from the recent period, in which the mentioned local characteristics of vertices are used to analyze the real networks. In [31] the authors use the degree centrality, closeness and betweenness centrality to identify the most important hub in Chinese aviation. Their results show that these three indices of centrality correlate with socio-economic indicators of the city such as urban population or regional gross domestic product.

Furthermore in [26] the authors solve the problem of deployment of economic activities within the chosen city (Barcelona). They consider three indices of centrality: straightness, closeness and betweenness centrality and subsequently use the multiple centrality assessment model and kernel density estimation model to express correlation between the chosen indices and economic activities within the city. In [28] Ravulaparthi and Goulias have a similar idea.

In their work centrality indices serve as a tool for finding those regions of the city (Santa Barbara, California), which tend to maintain a high intensity of economic activities, especially professional services and retail trade. In [35] the authors focus on the analysis of the health care system of a given country (Serbia). They assume that the more advantageous the object position is the more powerful and influential the given object is. This paper points out that the analysis of complex networks as a chosen research method allows us not only formally describe the structure of a network corresponding to the given system, but compared with the method of questionnaires and various surveys, it is also a time-saving way of testing.

Dass, Reddy and Iacobucci in [9] decided to analyze social network, which represents participants in the auction and the relationships between them. One of the tools of the analysis is the use of centrality indices, especially vertex degree and Bonacich's power index. The purpose of this paper is to identify the key bidders, whose participation in the auction affects the other participants of the auction as well as the final selling prices. Other applications of centrality indices [1], [7].

Scientific level and scientific nature of the proposal

An interesting application of the index centrality is their use in the context of game theory, namely the analysis of cooperative games. Communities are usually composed of nodes that are more densely connected internally than with other nodes in the network. As stated in [32], if we consider the social network formed by all teachers in a city, the teachers from at the same school represent the community. Similarly, trade links among the countries of the European Union are more intense than their links with the others countries. The strength of

the community depends on its composition. If the strong individual join to the community, the importance of the community increases and on the other hand, a strong community can help weak individuals to increase its potential. Such a method for the analysis of real networks where the key task is to consider the community instead of individuals, reflects the synergies that are not obvious at first sight, is considered as a centrality measure. In [32] the authors deal with the flexible modeling of social structures. They suggest to generalise the Owen value, a well-known solution concept for cooperative games, based on the Shapley value expressing player's benefit to the community he belongs to. As a result, they gained centrality measure, which reflects the quality of the community to which the individual belongs and also the importance of an individual for a given community. Even in [31], the authors deal with this topic. The aim of their work is to improve the betweenness centrality based on Shapley value. They develop an algorithm for computing the mentioned measure and show that it has the same complexity as the Brandes algorithm [see] that is used to calculate the standard betweenness centrality. In [24] inspired by emerging applications of social networks, the authors introduce a centrality measure termed gatekeeper centrality. It is another centrality measure based on Shapley value. They present a dedicated approximate algorithm, based on the Monte Carlo sampling method, to compute the gatekeeper centrality and consider two well known applications of the given index in social network analysis.

Similarly, the edge centrality indices are studied just a little (used in practice for the detection of communities in social networks, see [17]), respectively their analogues in directed or weighted graph. As an example of the paper concerning this topic, one can mention [18].

The aim of this work is to acquire new knowledge in statistics and graph theory, which can be used as a tool to analyze complex networks. This topic is extremely current, mainly due to massive use of social networks and the Internet. Because we are not aware of similar research in the Slovak Republic, and the number of similar work published abroad is quite small but it is growing rapidly, we see a great contribution to the area of research.

The concept of the implementation is closely related to the partial goals described earlier:

- to create the databases and to select the appropriate methodology for further study,
- to study and to possibly improve the known arguments of centrality indices in graphs as well as to acquire new knowledge concerning the certain well-known centrality indices,
- to study and to improve the algorithms that identify the communities within a network,
- processing data using statistical methods,
- the applications of the obtained knowledge on the complex networks.

The first six partial goals can be summarized in two major goals, namely data collection and theoretical research of the centrality indices. Both of these goals will be used in the next phase of the research, which will consist of the analysis of the study network.

To obtain the results of the mathematical properties of centrality index we will use conventional methods of the graph theory as well as the computer support for the analysis of real data, respectively graphs of complex networks using the specialized mathematical software such as Wolfram Mathematica. Considering that the research of the theory of graphs as well as the others mathematical areas are constantly in progress, new ones are emerging, many times more efficient methods of research. Therefore, during the term solution to our project, we will study new methods that should help us to get the best possible results. Except of the methods of the theory of graphs we will use quite extensively the methods of the statistics to gain the accurate information of the quality and significance of the object or communities in the given network. For the purpose of statistical analysis and interpretation of statistical data we will use descriptive and stochastic statistical methods such as correlation analysis, contingency analysis, spot, but also interval estimation and regression models.

We can say that the scientific level of this project is given by the high level of the timeliness of the solved topic and also by the quality of its processing, which will be examined by applying the obtained theoretical results in practice.

Conclusion

Mathematically, we represent any complex network as a graph whose vertices correspond to objects of the network and the edges correspond to relationships between pairs of objects. Theoretical knowledge of abstract graph model system obtained in graph theory may not only significantly contribute to understanding the structure of the system, but also provide space for improving the objects position in the system and thus lead to the improvement of the whole system.

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THE ASSESSMENT OF CORPORATE FINANCIAL PERFORMANCE VIA DISCRIMINANT ANALYSIS

Matúš MIHALOVIČ

Abstract

Paper deals with corporate bankruptcy prediction. The main objective of this paper is to assess the financial performance of Slovak companies via bankruptcy prediction model. In order to model development, linear discriminant analysis was employed. Based on prediction results, it is possible to predict the corporate financial performance in the future with a certain probability. Empirical results indicate that discriminant analysis is not the appropriate tool for financial performance prediction for companies operating in Slovakia.

Keywords:

linear discriminant analysis, bankruptcy, restructuring, financial performance, discriminant score

1 Introduction

Nowadays, the corporate capability to succeed has become serious challenge. The success of each company depends on degree of securing competitive advantage. In this environment, there is an area just for those companies that are capable to respond rapidly to any business conditions, measure and continuously evaluate its business performance.

Information regarding corporate financial performance is necessary for the purpose of company capability prediction or cash flow generation. As highlighted by Ruf et al. (2001), one can not deduce great performance just from the sufficient level of companies' cash flow. The reason is, whereas funds are proxies of ownership, performance reflects companies' capability to extend this ownership.

It is required persistently to analyze and evaluate the financial performance. To this end, there have been various methods developed. According to Orlitzky et al. (2003), there are three classed of corporate financial performance consisting of market-based, accounting-based and perceptual measures. As the widely used accounting-based indicators, Makni et al. (2009) consider following: return on assets (ROA), return on equity (ROW), earnings per share (EPS), Return on Investments or Growth in sales.¹ Each of suggested ratios are from the profitability group of financial ratios. In addition, in financial analysis, it handles debt ratios, turnover ratios and liquidity ratios.

The prompt and simple assessment of financial performance of company is of major request of investors and stakeholders. From their point of view, it is of importance to find whether company is capable to increase its value and provide them return on investment. There is an extent literature (e.g. Altman et al. 2014; Zhou et al. 2014; Laitinen et al. 2014) investigating the level of importance of accounting-based measures for various user groups. There were, inter alia,

¹ For details, see e.g. Fu et al. (2012), Ruf et al. (2001) or Cochran and Wood (1984).

mentioned stakeholders such as investors, loan officers, auditors, management, asset managers, rating agencies.

In order to measure companies' financial performance, there have been established several tools. These tools origin from the financial analysis methods and are common referred to bankruptcy prediction models. Back et al. (1996) defines two approaches in financial performance studies: (i) empirical search for financial ratios (predictors) leading to lowest misclassification rates; (ii) focus on the search for statistical methods leading to improved prediction accuracy.

In this paper, the Linear Discriminant analysis (LDA) will be used to evaluate impending corporate failure based on financial ratios combination. Financial ratios are assessed in line with its capability to discriminate among healthy and unhealthy companies. Consequently, by choosing appropriate financial ratios, linear discriminant function is build. Depend on calculated discriminant score, companies are assigned to bankrupt or non-bankrupt group.

The paper proceeds as follows: In the introduction we present a short summary of the financial performance measures and financial ratios utilization to predict corporate financial situation. The next section describes data and sample. In the section 3, we summarize discriminant model development. Empirical results are reported in section 4 and conclusion drawn in section 5.

2 Data and sample

Sample is formed by two types of organizations, bankrupt ones and non-bankrupt. Each organization including in the sample operates in Slovakia. To be included in the bankrupt group, organization in the past entered in the restructuring process, was liquidated or declared bankruptcy. The sample consists of 236 organizations, from which half of them (118) are from bankrupt group and the other half (118) is considered as healthy organization, respectively.

This approach of sample design tends to be called paired-sample design. The bottom line of such a design is the selection of organizations meeting the conditions of assigning to bankrupt group. Having this portion of sample, to each bankrupt organization is assigned non-bankrupt organization subject to some criterions. In this paper, industry and asset size were employed as proxies of the pairing criterion. These criterions were also used by Dimitras et al. (1999), Dambolena and Khoury (1980), Karas-Režňáková (2012) and many others. The process of organizations pairing is as follows: (i) for each bankrupt organization, industry in which operates, is determined; (ii) correspondingly, asset size of bankrupt organization is computed; (iii) next, from the same industry, all healthy organizations are selected; (iv) from this initial sample of healthy organizations, we selected those from the same industry whose asset size is the nearest to the asset size of the selected bankrupt organization; (v) this procedure is re-run as far as each bankrupt organization is paired with healthy companies fitting criterions mentioned above. The sample is made up by

bankrupt organizations that went bankrupt in 2014. Likewise, assigned healthy organizations in the sample are from the same year.

With reference to data collection, positions of bankrupt organizations were acquired from CRIBIS database and Obchodný vestník. Data regarding financial ratios was adopted from database ORBIS of Bureau van Dijk. Accounting data of companies was taken following the status of bankrupt organizations. It stands for that, for example, if organization went bankrupt in 2014, accounting data from the year of 2013 are considered. Follow by this technique, accounting data for healthy organizations from the year of 2013 are taken into account.

In selecting proper financial ratios (predictors, variables), the previous studies were used. It is worthwhile to mention studies by El Hennawy and Morris (1983), Psillaki et al. (2009) or Laitinen-Lukason(2014). According to these studies, 18 financial ratios available in financial statements were used.²

3 Methodology

In this paper, linear discriminant analysis (LDA) will be employed. As indicated by Lachenbruch (1975), discriminant analysis is a classification problem, where 2 or more clusters (groups) are know a priori and one or more observations are classified into one of these a priori known groups depend on measured features. One would say that linear discriminant analysis is a technique of dimensionality reduction. This reduction is the pre-processing step for machine learning applications. According to Klecka (1980), the main objective of LDA is to project a data on a space with lower dimensionality indicating great class-separability. In this process a feature space (a dataset n -dimensional samples) is projected onto a smaller subspace k (where $k \leq n-1$). It is required to maintain the class-discriminatory ability in this process.

Let assume we have d -dimensional samples, from which n_1 belongs to class ω_1 and n_2 to class ω_2 . Our task is to Access a scalar y by projecting the samples z onto a line

$$y = w^T x \quad (1)$$

Let μ_1, μ_2 be the means of groups 1 and 2 and $\widetilde{\mu}_1, \widetilde{\mu}_2$ are projected means of groups 1 and 2 so that:

$$\widetilde{\mu}_1 = \frac{1}{n_1} \sum_{x_i \in c_1} w^T x_i = w^T \left(\frac{1}{n_1} \sum_{x_i \in c_1} x_i \right) = w^T \mu_1 \quad (2)$$

$$\widetilde{\mu}_2 = w^T \mu_2 \quad (3)$$

² Specifically, there are included ratios : Net Income/sales; Net income/net Working Capital, Net Income/Total Assets, EBIT/Total assets, Net Income/Total debt, Sales/Net Working Capital, Sales/Total Assets, Quick assets/Sales, Current Assets/Sales, Working Capital/Sales, Total Assets/Sales, Current ratio, Acid test ratio, Working Capital/Total Assets, Quick Assets/Total Assets, Current Assets/Total Assets

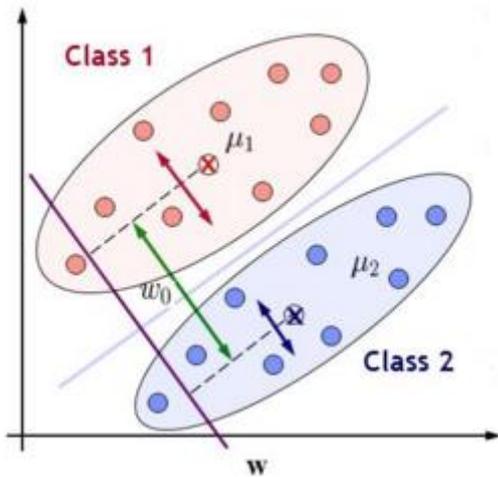


Figure 1 Projected means between and within groups
Source: www.sebastianraschka.com

The main idea behind Fisher's objective function is to maximize distance between classes and minimize distance within a class. Relationship $|\tilde{\mu}_1 - \tilde{\mu}_2|$ appears to be a great projection measure. The issue with this relationship is that it does not include the variance of the groups. If we assume that we have samples z_1, z_2 , then we can define scatter as:

$$s = \sum_{i=1}^n (z_i - \mu_z)^2 \quad (4)$$

As you can see, the scatter is just variance of sample multiplied by n . Hence the difference between the projected means does not consider the variance, Fisher's solution is to normalize this relationship by scatter. Thus Fisher discriminant is to project onto line in the direction v that maximizes

$$J(w) = \frac{\tilde{\mu}_1 - \tilde{\mu}_2}{s_1^2 + s_2^2} \quad (5)$$

All what is needed to do is to formulate J as a function of v and maximize it. The next portion of calculation is formed by defining within-class scatter matrix and between-class scatter matrix. Firstly, take a look at within-scatter scatter matrix S_w .

$$S_w = \tilde{s}_1^2 + \tilde{s}_2^2 \quad (6)$$

While

$$\tilde{s}_1^2 = \sum_{y_i \in group1} (w^T x_i - w^T \mu_1)^2 \quad (7)$$

$$= \sum (w^T (x_i - \mu_1))^T (w^T (x_i - \mu_1)) = w^T s_1 w \quad (8)$$

Equivalently,
$$\widetilde{s}_2^2 = w^T s_2 w \quad (9)$$

Therefore,
$$\widetilde{s}_1^2 + \widetilde{s}_2^2 = w^T s_1 w + w^T s_2 w = w^T s_w w \quad (10)$$

Similarly, we define between-class scatter matrix

$$s_b = (\mu_1 - \mu_2)(\mu_1 - \mu_2)^T \quad (11)$$

Between-class scatter matrix is a measure of separation between the means of 2 groups (classes). By rewriting the formula of separation of the projected means, we get

$$(\widetilde{\mu}_1 - \widetilde{\mu}_2)^2 = (w^T \mu_1 - w^T \mu_2)^2 \quad (12)$$

$$= w^T (\mu_1 - \mu_2)(\mu_1 - \mu_2)^T w \quad (13)$$

$$= w^T s_b w \quad (14)$$

Therefore, Fisher's criterion function $J(w)$ take the form:

$$J(w) = \frac{(\widetilde{\mu}_1 - \widetilde{\mu}_2)^2}{\widetilde{s}_1^2 + \widetilde{s}_2^2} = \frac{w^T s_b w}{w^T s_w w} \quad (15)$$

To find the maximum it is required taking derivative of $J(w)$ with respect to w and setting it to 0

$$\begin{aligned} \frac{d}{dw} J(w) &= 0 \quad (16) \\ s_b w - \frac{w^T s_b w (s_w w)}{w^T s_w w} &= 0 \\ s_b w &= \lambda s_w w \end{aligned}$$

It is a generalized eigenvalue problem. This problem could be figured out directly

$$w = s_w^{-1} (\mu_1 - \mu_2) \quad (17)$$

In order to the discriminant model have explanatory power, it has to be met some restrictive assumptions: (i) the predictors x_1, x_2, \dots, x_p have to be independent of each other, (ii) classes are mutually exclusive and the class size are not too different, (iii) residuals as well as in regression models are randomly distributed; (iv) The independent variables come from multivariate normal distribution, (v) the number of independent variables is not more than two less than the sample size; (vi) the variance-covariance matrix between the groups are equal; (vii) absence of multicollinearity

Since there have not been developed any test for multivariate normality, we will test each financial ratio independently. To this end, Shapiro-Wilk's test will be employed. This test formulate the null hypothesis that a sample come from normally distributed population. The test statistic is:

$$W = \frac{(\sum_{i=1}^n a_i x_{(i)})^2}{\sum_{i=1}^n (x_i - \bar{x})^2} \quad (18)$$

Except for Shapiro-Wilk's test, visually inspection will be conducted through Q-Q plots, box plots and histograms³. Non-normality of independent variables can be caused by skewness or outliers in data. In order to identify the outliers, Hampel's test will be undertaken. Once the outliers are find out, extreme values of independent variables are winsorized. In case that non-normality resulting from skewness, log transformation of independent variables values will be used.

For the sake of assessment of variance-covariance matrices equality, Box's M-test for homogeneity of covariance matrices will be running. Assume we have k groups, p variables and n_i observations per group. Suppose further that within-group covariance is $S_i / n_i - 1$. Box's M is basically the Bartlett's test in multivariate cases. The value of M is:

$$M = (N - k) \log_e |S| - \sum_{i=1}^k (n_i - 1) \log_e |s_i| \quad (19)$$

where

$$N = \sum_{i=1}^k n_i \quad (20)$$

$$S = \frac{\sum_{i=1}^k (n_i - 1) S_i}{N - k}$$

Afterwards, the Chi-square and F test statistic will be used in order to test the statistical significance of the M value.

In following the presence of multicollinearity problem, scatter plots matrices will be used. Finally, to observe correlations among variables, correlation matrix will be put together.

One of the purposes of linear discriminant analysis is to estimate discriminant canonical function. Thus, it is of importance to assess the overall predictive power of this objective function. For this reason, initial sample is randomly divided into analysis and holdout sample. The former is set up to estimate a discriminant function and the latter is used to assess how well the discriminant model predicts.

Having discriminant canonical function, it is required to compute groups centroids. Based on these centroids, cut-off score is determined in order to correctly classify the company as bankrupt or non-bankrupt.

³ Results of this inspection are available upon request

Since the objective of the present paper is to assess the corporate financial performance, company classified by discriminant model as bankrupt, we will consider as low financial performed company. On the other hand, company denoted by model as non-bankrupt, we consider as high performed company.

4 Empirical results

Firstly, descriptive statistics and univariate analysis of independent variables was completed to find out whether there is significant difference in ratios value between bankrupt and nonbankrupt group. At the outset, F-test for equality of two variances was used. For variables, for which this test was statistically significant, Welch t-test was used. Otherwise, two-sample t-test was employed. Results of these tests are shown in Table 1:

Table 1 Test for mean equality between two groups

Variable	Bankruptcy 2014		Nonbankruptcy 2014		F test (p-value)	two-sample t-test (p-value)	Welch t-test (p-value)
	mean	stdev	mean	stdev			
NI/Sales	-0.304	1.563	-0.681	4.128	0.000*		0.6511
NI/Net WC	-0.078	4.170	0.851	4.937	0.000*		0.9991
NI/TA	-0.399	1.067	-0.025	1.031	0.1064	0.006615*	
EBIT/TA	-0.371	1.078	-0.038	1.153	0.6122	0.01671*	
NI/total debt	-0.099	1.148	0.411	2.075	0.000*		0.1604
sales/net WC	-5.318	69.232	2.595	61.724	0.3201	0.3862	
sales/TA	2.037	2.642	2.051	6.350	0.000*		0.7277
QA/sales	1.446	7.548	2.257	7.756	0.9873	0.7834	
current A/sales	1.520	7.539	2.302	7.752	0.9766	0.8069	
WC/sales	-0.837	6.727	-0.107	4.336	0.000*		0.3902
TA/sales	2.560	9.698	3.822	12.826	0.0080*		0.7838
current ratio	1.411	2.812	2.692	3.597	0.000*		0.000*
acid test	1.310	2.811	2.573	3.499	0.000*		0.0011*
WC/TA	-0.429	3.394	0.105	0.294	0.000*		0.08084
QA/TA	0.534	0.335	0.634	0.263	0.02442*		0.9384
current A/TA	0.608	0.318	0.677	0.260	0.02816*		0.6338
current liab./TA	1.642	5.027	0.549	0.359	0.000*		0.0196*
total debt/TA	1.840	5.023	3.327	8.329	0.000*		0.02261*

⁴ Explanatory Notes

From the Table 1, it follows that six variables, including Net Income/Total Assets, EBIT/Total Assets, Current ratio, Acid test, Current liabilities/Total Assets, Total debt/Total Assets. This finding is crucial in ratios selection into the model, since just these variables indicate substantial differences between groups.

⁴ Explanatory notes on Table 1: NI-Net Income, WC-Working Capital, TA-Total Assets, EBIT-Earning Before Interests and Taxes, QA-Quick assets, stdev-standard deviation. The asterisk in the table denotes that variable is statistically significant on the significance level $\alpha=0,05$.

Before estimation of discriminant function, it is necessary to corroborate the assumption validity.. The common violation of financial ratios normality assumption was demonstrated by Barnes (1987). Results of Shapiro-Wilk's test is recorded in the Table 3 below:

Table 2 Shapiro-Wilk's test for univariate normality

Variable	Bankruptcy 2014		Nonbankruptcy 2014	
	W	p-value	W	p-value
NI/Sales	0.4176	0.000*	0.1458	0.000*
NI/Net WC	0.2948	0.000*	0.2452	0.000*
NI/TA	0.5542	0.000*	0.2821	0.000*
EBIT/TA	0.5833	0.000*	0.2795	0.000*
NI/total debt	0.5482	0.000*	0.1243	0.000*
sales/net WC	0.2715	0.000*	0.4270	0.000*
sales/TA	0.6719	0.000*	0.2382	0.000*
QA/sales	0.1653	0.000*	0.2136	0.000*
current A/sales	0.1735	0.000*	0.2187	0.000*
WC/sales	0.1526	0.000*	0.2172	0.000*
TA/sales	0.2286	0.000*	0.2160	0.000*
current ratio	0.4110	0.000*	0.5507	0.000*
acid test	0.4049	0.000*	0.5255	0.000*
WC/TA	0.1722	0.000*	0.9817	0.108
QA/TA	0.9198	0.000*	0.9661	0.004*
current A/TA	0.9146	0.000*	0.9461	0.000*
current liab./TA	0.2073	0.000*	0.9238	0.000*
total debt/TA	0.2161	0.000*	0.2397	0.000*

Shapiro-Wilk's test on presence of variables' normality shows just Working capital/Total assets ratio meets the normality condition. However, as Tabachnick and Fidell (1996) argued, that violation of the normality assumption is not fatal and the significance results are still reliable as long as non-normality is caused by skewness and not outliers.

In addition, in entering variables into the model, it is required the absence of multicollinearity. It was investigated via correlation matrix. Based on normality and non-multicollinearity assumption, there were five variables selected which best separate between bankrupt and nonbankrupt organizations. Pearson's correlations between these variables are exhibited in correlation matrix.

Table 3 Correlation matrix of independent variables

	NI/TA	Current ratio	Current liab./TA	WC/TA	Current assets/TA
NI/TA	1.0000				
Current ratio	0.1983*	1.0000			
Current liab./TA	-0.0622	-0.1262	1.0000		
WC/TA	-0.0105	0.0844	-0.9525*	1.0000	
Current assets/TA	0.1056	0.3292*	-0.0699	0.1543	1.000

Notes: *correlation is significant at the 0.05 level (two-tailed)

It is obvious that the greatest correlation is between Working Capital/Total Assets and Current liabilities/Total Assets (-0.9525). Despite, this seems to be a strong correlation, as Cochran (1964) noted, negative correlations are more helpful than positive correlations in adding new information to the discriminant function.

Once the assumption testing has performed, the discriminant canonical function is estimated. The resultant equation of discriminant function takes on following form:

$$D(f) = -0.507x_1 - 0.263x_2 + 0.271x_3 + 0.235x_4 + 0.526x_5 \quad (21)$$

where, x_1 =Net income/Total Assets, x_2 =Current ratio, x_3 =Current liabilities/Total Assets, x_4 =Working Capital/Total Assets, x_5 =Current Assets/Total Assets.

Earlier we test whether variables independently of each other are able to discriminate between bankrupt and non-bankrupt groups. At this moment, it is worthwhile to perform a multivariate Wilk's lambda test to verify relative explanatory power of variables.

Table 4 Wilk's lambda test

Variable	Wilk's lambda	F-statistic	p-value
NI/Total Assets	0.9689	7.5084	0.007*
Current Ratio	0.9463	13.2554	0.000*
Current liab./TA	0.9766	5.5977	0.019*
Working capital/TA	0.9868	3.1001	0.079
Current Assets/TA	0.9990	0.2275	0.634

In the table above, it is evident that three variables best discriminate between groups, especially Net Income/Total Assets, Current ratio, Current Liabilities/Total Assets.

Summary of canonical discriminant function is provided by the following Table 6:

Table 5 Summary of canonical discriminant function

Function	Eigenvalue	Canonical R ²	Wilk's lambda	Chi-square	df	p-value
1	0.10007	0.0909	0.372	20.181	4	0.000*

Information regarding eigenvalue notices about the efficacy of the discriminant function. It is a ratio of between-class scatter matrix and within-class scatter matrix. Wilk's lambda tests the null hypothesis about the equality of independent variables across groups of dependent variable. We can see that corresponding Chi-square is statistically significant. Therefore, one can assert that there is a relationship between the dependent groups and the independent variables. The value of Wilk's lambda indicates that the 37.2 % of variance in discriminant scores is not explained by group differences.

The canonical correlation coefficient is a measure of association between the independent variables and corresponding discriminant score. In our model, just 9.09 % of variance in the corresponding discriminant function is explained by differences in group means. It is demonstrated by the value of squared canonical correlation coefficient.

The following table represents structure matrix (loadings). It is a table of correlations between the variables and the discriminant axes.

Table 6 Structure matrix of discriminant function

Structure matrix	
Independent variable	Discriminant correlation
NI/Total Assets	-0.5846
Current Ratio	-0.7677
Current liab./TA	0.5068
Working capital/TA	-0.3791
Current Assets/TA	-0.1033

Table 7 demonstrates that each independent variable contribute to discriminant model in a significant way. According to Hair et al. (2006), any variables with a correlation 0.3 or more is considered to be important. The loadings Current ratio and Net Income/Total Assets show a high degree of relationship with dependent variables.

The overall prediction accuracy of discriminant model is assessed by means the classification table (confusion table)

Table 7 Classification (Confusion) table

Classification Results					
		Predicted Group Membership			
		bankrupt or not	bankrupt	non-bankrupt	total
Original	Count	bankrupt	35	26	61
		non-bankrupt	19	38	57
	%	bankrupt	57.3	42.7	100.0
		non-bankrupt	33.3	66.7	100.0
Test data	count	bankrupt	26	31	57
		non-bankrupt	11	50	61
	%	bankrupt	45.7	54.3	100.0
		non-bankrupt	18.0	82.0	100.0

When prediction is ideal, all cases lie on the diagonal. Table 8 indicates that the overall accuracy of model based on training data (original model, analysis sample) is 61.86 %, while in the case of test data (holdout sample) it is 64.41 %. Performance of test data overcomes the original model. Such a overall predictive accuracy is well-known as hit ratio. The overall predictive accuracy of both models is 63.55 %. It stands for that the misclassification rate is 36.45 %. Several studies (e.g. Tabachnick and Fidell 1996; Altman et al. 2014) consider as strong hit ratio such that is 25 % larger than chance (50 %). We can see that our model fails to accomplish this criterion. Consequently, Pearson's chi-squared test was performed which test the null hypothesis that two variables are

independent. At the level significance of 0.05, we reject null hypothesis and therefore variables in classification table are not independent. In other words, it means that knowing the level of the first variable does not help us predict the level of the second variable.

Conclusion

The aim of paper was to assess the corporate financial performance via linear discriminant model. In order to develop such a model, the sample was divided to two subsamples. The first subsample (analysis sample) was employed to estimate discriminant function. The second one (holdout sample) was used to assess the prediction accuracy of developed model.

Empirical results indicate that in financial ratios is violated normality assumption and homogeneity of variances. This is because of extreme values (outliers) inherent for ratios of bankrupt companies. Developed discriminant model is able to predict 63.55 % of impending corporate financial distress one year prior company goes bankrupt. A great performed model is considered to be a model with 25 % accuracy than random model. It means that well-going model should have 75 % prediction accuracy. Taking into this fact, it would be concluded that linear discriminant model is not able to predict impending bankruptcy in Slovak companies.

To overcome this deficiency, some other models should be used since discriminant analysis required several restrictive assumptions that are commonly violated in the model.

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PROPOSAL OF DESIGN OF TRUST BUILDING PLATFORM FOR PUBLIC ADMINISTRATION

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Abstract

Trust represents essential aspect of relationship between citizen and public administration. The aim of this article is to create proposal of what the trust building platform for public administration should have and why it is important to implement such a platform to public administration processes. The novelty of the approach lies in utilization of electronic services to support trust building.

Keywords:

trust, electronic services, public administration

Introduction

One of the most important priorities, which Slovak republic declared within her historically first presidency in Council of EU, is about development of Digital agenda and building of united digital market. Support of the action plan, which name is 2016-2020 eGovernment Action Plan, is key step to realize an idea of united digital market (Oettinger, 2015). Action plan 2016-2020 eGovernment is about implementation of electronic services into processes of public administration. On the other hand, trust, conceptualized as a cumulative process of acquisition of several successful mutual relationships (Nicholson et al., 2001), presents according to European commission one of the basics pillars of Digital Agenda. According to study Future of Public Sector Outsourcing from Copenhagen Institute for Futures Studies, trust of people into public sector (Figure 1) is 14 % lower than into private sector. Study further states that decrease of people's trust into government and public administration has mostly consequences in form of trust decline on market.

Trust building platform

Development of ICT and implementation of digital public places bring opportunity to implement trust-building mechanisms based on electronic services, which were established with good results (Tkáč, 2011) in private sector, however, in public sector these tools are still missing. One of reasons could be the fact, that processes and organization in public sector are fundamentally different from processes and organization in private sector. This brings a need to implement electronic tools of building trust, which are derived not only from processes and needs of providers, but are derived from processes and needs of recipients as well.



HISTORIC GAP BETWEEN BUSINESS AND GOVERNMENT TRUST

GLOBAL TRUST IN GOVERNMENT AND BUSINESS SINCE 2009

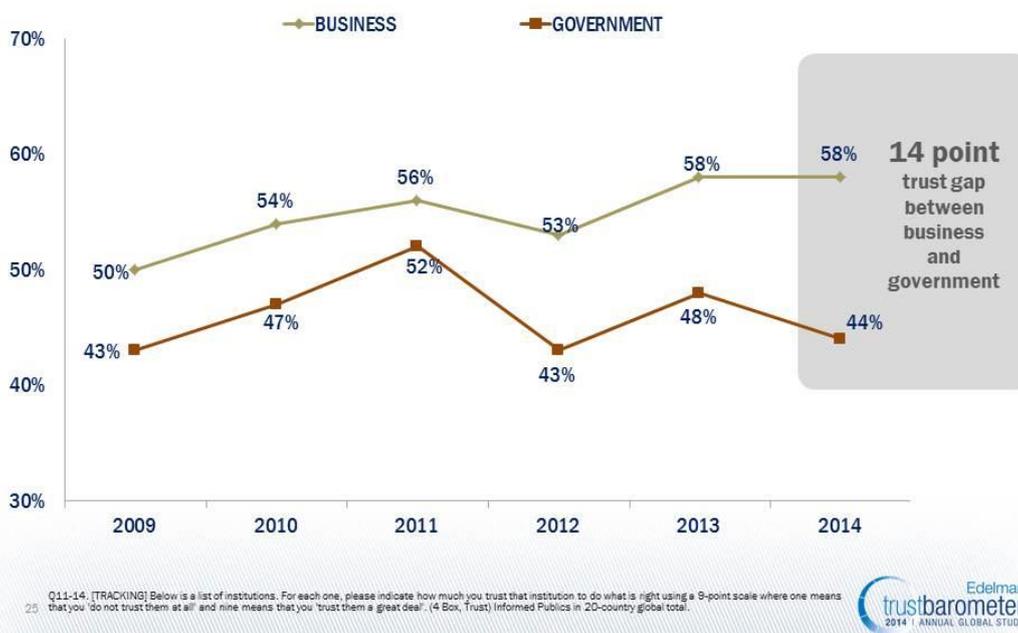


Figure 1: Historical development of trust into private and public sector
Source: Edelman Trust Barometer - Global Results (2014)

We exactly do not know yet how relevant are processes of building trust in context of government management, which means that there does not exist any research about the level of efficiency and acceptance of these services in given field. It is generally assumed, that building of confidence is based on prediction, classification, binding, reputation and identification processes.

Each of these processes improves perceived trust between other participants of digital space (Chopra, 2003). Lot of studies demonstrate fact, that reputation is the most important element of building the trust (eg. Atif, 2002). Mechanisms of building the trust based on electronic services are not only about a classification and reputation. Examples from private sector indicate (Delina, Tkáč, 2012) that portfolio of services, which these tools offer can be expanded for example by reference, validation, or even reinsurance services. Full range of opportunities to use these mechanisms in public sector will be, similarly like in private sector, shown after identification of determinants building the trust in this space what is linked with the analysis of needs of process participants. To do this, we need to create a methodology of trust measurement, which will place emphasis on identification, measurement, classification and improvement of processes from viewpoint of trust. Although there are some methodologies of trust measurement, they either do not use electronic services, or use the electronic services only to collect data. However, the possibilities of ICT give dynamical and immediate building of links between citizens and public sector. Fledderus (2014) argues that a lot of countries solve a gap between citizen and

public sector by reforms built on the paradigm of New public management (NPM) based on private sector. This paradigm describes a market-oriented approach to citizen like to consumer (user). Like as the measurement of consumer satisfaction in private sector, also in the public sector at first we have to recognize a requirements of consumers (citizens) and after that we measure their satisfaction with final product (for example with changes in legislative). Citizen does not influence the process of creation. Research focusing on the impact of above mentioned transformation did not bring any evidence about an increase of trust of citizens into a public sector (Van de Walle, 2010; Kettl 2000; Pollit, Bouckaert 2004). We have to realize, that in private sector exists competition mechanism, which realizes full repletion of consumer needs and his satisfaction. But in the public sector, there is an absence of competition mechanism. This is reason for intensive discussions about new management models of public sector, which can ensure a safety access of citizen to process of public sector. For example, Public Value Theory (PVT) says, that approaches based on calculations of economic efficiency cannot adequately include social values which can be found in public services (Hefetz, Warner, 2004). Other theory, the paradigm of new public governance (PGP – new public governance) says, that the base of relationship between citizen and public sector should be partnership and cooperation, not competition (Osborne 2010a). Despite that these approaches are different, the base of discussions is an idea, that citizen should not be just a passive client or consumer, but he should be an active participant on creation and classification of processes and results of public administration. Active connection of citizens into processes of public administration constitutes an effective tool how to revitalize trust into public administration, improve social cohesion and increase the level of social capital (Barker, 2010; Bovaird, Löffler, 2012; Ostrom, 1996; Pestoff, 2009). It is based on assumption that change of essence of relationship will result into the change of approach, specifically trust will increase and distrust will decrease. On the other hand, according to Fledderus (2014), there does not exist any empirical research which could support these results. Some effects are expected, others are just supposed, but the most of them have not been proven. Reason is the lack of system tools, which can illustrate relationship into public space and which can test assumed effects. Involving citizens and stakeholders into processes of public administration, identification relationships and testing effect are fields, where electronic services can realize their potential and can build a trust. For this reason we have to identify and suggest suitable electronic mechanisms of trust building for processes of public administration, which are linked with each other and create a complex system of electronic services for support to trust building in favor of public administration. Implementation of this system should be realized by developing of base platform of electronic services for trust building. Validation of this platform should be realized on the base of pilot testing into selected parts of real conditions of public administration. Design of complex system and its implementation in the form of platform and following validation

of its parts will show how to measure and classify trust in public administration (public sector), but it can also show how to create an environment for trust building where we use electronic services. Harmonization of public administration will allow application of developed approaches, systems and solutions within all EU. Application level of expected result is ensured on the base of pre-agreed partnerships with autonomies, such as district Košice – Staré mesto, where should be realized the pilot project and could be tested selected parts of proposed electronic solution of trust building. On the base of a preliminary survey of demand and formation of citizen initiatives such as Slovensko.digital, we can argue that there exists a large group of citizens, public institutions and stakeholders, which support a design and follow application of systems of classification and trust building into processes of public administration.

Based on the above mentioned facts we have defined the primary objective followed by partial targets:

The main objective: Propose a system of electronic support for confidence-building in public administration processes and ensure the development, deployment and testing of pilot application.

Partial objectives:

1. Identify and analyze the determinants of building the confidence in public administration processes
2. Analyze the requirements of participants in the public administration
3. Propose a methodology for measuring trust in public administration processes
4. Identify and propose appropriate mechanisms for confidence-building processes of public administration
5. Propose a system of electronic support for confidence-building in public administration processes
6. Develop a basic electronic service platform for building trust
7. Deploy and test a pilot application in the real environment of public administration

Proposed methodology:

The methodology is based on standard practice in international research projects and Horizon 2020 where the proposed solution is based on the realized research.

Logical continuity is ensured by the system and the flow of creation of final output activities to meet the objectives. The essence of the logical framework of the project is to analyse the environment, public administration and to identify processes in places suitable for building trust. The next step is to create a

methodology for measuring and evaluating confidence-building, which will allow confidence, in the public administration, to become measurable element. After identifying the locations of building trust and the methodology, with which will we measure and assess In next phase of the project will be involved the design of mechanisms and self-confidence building elements that would be appropriate to implement in those locations. The recommendations of these elements and mechanisms will then be transformed into the design of electrical services. Interconnection of proposals will create recommendations for its essential infrastructure and analytics. The proposed infrastructure will be subsequently developed into the prototype. Selected functional elements of developed prototype will be validated by pilot testing under real process of end-user. This methodological framework corresponds to the sequence of WP and has formulated tasks. Tasks are built, so that in the identification of the current status, barriers and potential of public administration processes, we propose appropriate mechanisms for confidence building and methodologies for the measurement and evaluation of this trust. The role of the design, development and pilot of the project are based on the transformation of the identified mechanisms and methodologies developed into infrastructure of electronic services.

Impact of trust building platform on processes of public administration

The Slovak public administration (as well as many other foreign environment, public administration) are characterized by the absence of the use of electronic services in the context of activities such as the assessment activities, the involvement of citizens in the formulation of legislation and in building trust between citizens and public institutions. Slovakia lacks a comprehensive mechanism to evaluate the processes of government, and at the same time should use ICT tools to secure and develop trust between citizens and the process itself. Here it should be emphasized that electronic services of confidence-building deal not only with measurement and evaluation of trust, but provide a reference, reputation, reinsurance and validation services in the private sector. Specific service is also “online conflict solution”. The volume of use of these electronic services is determined by the nature of public administration environment. Transformation of confidence-building mechanisms used by the private sector in complying with the conditions of electronic services of public administration, will give opportunity to raise number of specific services for the dynamic communication between the citizen or stakeholder and public administration apparatus. Another advantage of this approach is, that by harmonizing of the processes of public administration these services will be applicable throughout the EU. Also, the application of such mechanisms of trust building is a big innovation not only for the public sector, but also for users of the platform. These mechanisms allow assessing their satisfaction with the work of officials, MPs, mayors and also enabling commenting on the work of

employees, thus contributing to increased confidence in the public sector, through quantitative and qualitative expression. The introduction of these mechanisms should ensure a higher interest in public service, improved possibility of evaluation and encourage quality improvement and better availability of services. Also, implementation of such mechanisms can be considered as new type of public sector services, which contributes to the transparency of decision-making on public affairs. At the same time, however, it allows voting on individual proposals that will be discussed at assemblies, creating a unique instrument of direct democracy where citizens can express their views on the planned investments, but also on other plans for public institutions. From this perspective, these services can therefore be considered for partial electronic alternative to the referendum offered by parliamentarians and mayors guidelines concerning public opinion on the selected type of problem and intentions or activities of the civil servants. Very important is the attribute of the involvement of people in decision-making and drafting. It is now common practice for satisfaction measurement that it takes place after the adoption of the action. The project results also highlight the weaknesses in the processes of public administration in terms of confidence-building, and propose recommendations for their elimination. These recommendations will assist not only to the project user, but by harmonizing processes will be applied to the environment of public administration across the EU. Among the economic benefits, there is no doubt that elements, such as confidence in public administration, better quality and accessibility of public services and the involvement of citizens and stakeholders in policy-making, improve the living standards and quality of life have an impact on community development and business in the region (establishment of a firm, business environment improvement). Last, but not least is an important part of building a digital single market, which implementation brings with it a host of other economic benefits.

Conclusion

Implementation of innovative and efficient electronic services in processes of public administration is an essential action in meeting the idea of a digital single market like the Digital Agenda, which one of the pillars is trust building in online environment. The active involvement of citizens into processes of public administration is an effective tool how to revitalize trust in public administration, how to improve social cohesion and how to raise the level of the social capital. In project there will be designed a complex system of support of electronic services for trust building in public administration and communication with final users as well as implementation of pilot SW application and its following validation in real conditions. Proposed project should not only design how to measure and classify the trust in public administration, but it will also create a complex environment for building trust with supporting electronic communication services.

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PROJECT MANAGEMENT IMPLEMENTATION FOR THE COMMUNITY DEVELOPMENT

Liliya RYCHKINA

Abstract

The article analyzes the examples, trends and prospects of the implementation of project management for the development of communities, investigates barriers interfering the successful implementation of the local communities projects.

Keywords:

design, project management, barriers for implementation of project management.

Introduction

The real democracy is based on the cooperation between the authorities and communities, and on the permanent public participation in the process of solution of the important for community problems. There are some domains that can contribute to the above mentioned issue. Among them are the process of decentralization as a result of the Ukrainian reforms; ensuring social effective activity of public authorities that meet the society expectations; the timely identification of the society needs, their most complete satisfaction and coordination of the needs and interests of the population. All this is possible with the help of the project management.

Recent research and publications analysis. Project management in the sphere of public administration and local self-government is the subject of the scientific investigations. In particular, O.Fedorchak considers the basic theoretical principles of the usage of the project approach in public administration¹, O.Bezlugyi describes organizational component of the project management², Yu.Sharov investigates the formation of the project-oriented system for strategic planning of the municipal development, suggests methods of the municipal investment projects evaluation³.

The paper objective is to analyze the main examples, trends and prospects of the project management implementation for the territorial communities development.

¹ FEDORCHAK, O. *Innovative tools for management of purpose-oriented programs and projects* Fedorchak O. *State building: electronic scientific special publication*. Kharkiv. Kharkiv Regional Institute of the National Academy of Public Administration, 2012. No.2. Available at: <http://www.kbuapa.kharkov.ua/e-book/db/2012-2/doc/1/10.pdf>.

² BEZLUGYI, O.V. *Regional projects management within the context of the tasks for the territories development*. Managements of the projects for regional development: materials of scientific and practical conference, Feodosia, July 8-12, 2013). Kharkiv: Kharkiv Regional Institute of the National Academy of Public Administration, 2013, p. 9-14. (in Ukrainian).

³ SHAROV, Yu. *The methods of integrated assessment of the projects for implementation of the strategic priorities in municipal management*. Pressing challenges of state management: collection of scientific papers. DF UADU, 2001. Pub.1(4), p. 210-223. (in Ukrainian)

The paper body

The implementation of the projects is the one of the most effective and powerful tools of the local economic development. Local economic development is the process aimed at the formation of the economic potential of the populated area for improvement of economic future and quality of life. It is a process in which public authorities (state and municipal), business and non-governmental (social) organizations work together to provide better conditions for economic growth and welfare of the population⁴. The projects implementation will enable community to participate in the process of management of territorial community, will provide the real possibilities for citizens to influence the activity of the authorities, formation and implementation of strategic plans, programs of local economic development of the territorial communities.

The expected results of reforms in self-government system in Ukraine are strengthening the legal, organizational and financial capacities of the territorial communities and self-governments bodies; carrying out their activity in accordance with the principles and provisions of European Charter of Local Self-government; accessibility of public services, improvement of their quality; implementation of the mechanism of control over public services provided by self-government bodies and territorial authorities of the central executive bodies by the local state administrations and the public; implementation of the standards (norms) of the quality of public services provided to the public by the local authorities of basic and regional levels; quality evaluation criteria; creating favorable legal terms for wide public participation in decision-making and direct democracy forms development; development of the effective regional system of self-government and local authorities for providing steady social and economic development of the respective administrative and territorial units; formation of united territorial communities capable to solve the local problems on their own or through local authorities; social and economic development of the territorial communities and regions; establishing distinct boundaries of every administrative and territorial entity, providing ubiquity jurisdiction of the local authorities on the territory of the relevant administrative and territorial entity and preventing presence of the other administrative and territorial entities of the same level within the territory of the community; establishing of the executives authorities of regional and district councils; the change of status of local state administrations from the authorities of general power to regulatory authorities in the system of the executive bodies responsible for coordination of the activity of the territorial administrations of the central executive authorities on the relevant territory; providing separation of powers between the local authorities of the

⁴ PARASIUK, I. *What is barring the cities of Ukraine to implement the public private partnership projects?* [The 2nd conference "Acceleration of public private partnership in Ukraine"]. Kyiv, April 11-12, 2013, (in Ukrainian)

basic and regional levels, local state administrations and territorial administrations of the central executive authorities⁵.

The reform provides the public an opportunity to take the initiatives in solution of the territorial community problems that have existed for years. According to the classification of the International Association for Public Participation, IAP2 there are five levels of public participation: distribution of information, consulting, involving, cooperation; broadening of powers for exerting the rights (direct participation)⁶. The implementation of the projects includes all five levels of public participation.

Cooperation with the community requires treating it as a living being, understanding and taking into account its dynamics. "The development of the community" means not only the improvement of its well-being, but first of all the social changes that result in the new initiatives appearance. There is an increase in social capital; people, their outlook and their role in the world are changing. And all this is the development of the new possibilities and their own potential. The point is to make possible for the public, communities, institutions and relations between the wide range of the organizations to change and be ready for participation in the process of the community development and contribution to the social and economic policies improvement⁷. It is obvious that the majority of the territorial communities in our country are problematic ones from the economic and social development point of view. Thus, there is the urgent necessity for them to study and implement the best practices of home and international experience.

However in Ukraine there are the examples of the communities ready for changes which despite of the lack of financing, pressure of the central authorities develop their territorial communities. The following are the examples of the successful implementation of the projects of the local development in Ukrainian cities. These projects relate to different fields of activity. They have different financing resources and size; they are implemented in the cities of different size, status, level of financial support.

One of the examples of project of the cooperation between the authorities and the community worth attention is the project " My Lviv - My Initiative" which is being implemented by Lviv regional non-governmental organization "Committee of Voters of Ukraine" together with Lviv municipal council in association with the initiative "Democratization and the rights of the people" of United Nations Development Program with the support of the Ministry of

⁵ On the approval of the concept of reforming of local self-government and territorial organization of the authorities in Ukraine: Decree of the Cabinets of Ministers of Ukraine dtd. April 1, 2014 No.333. Uriadovuy Kurier [Governmental courier] , 2014. No.67. April 11. (in Ukrainian)

⁶ *Local self-government in Ukraine: the current state and principal directions of modernization: scientific report* [editorial board: Kovbasiuk Iu.V., Vashchenko K.O., Tolkovanov V.V. and others]; under the general edition by Kovbasiuk Iu.V., PhD in state management, professor. Kyiv, National Academy of State Management, 2014, p. 59. (in Ukrainian)

⁷ YELCHEVA, L. O. – IBRAGIMOVA, I. M. and others. *Textbook for communities development: Practical recommendations for not indifferent people*. Kyiv, "LAT & K" Publ., 2007, p. 25. (in Ukrainian)

Foreign Affairs of Denmark. The portal "My Lviv - My Initiative" gives the possibility to the residents and the guests of Lviv to take an active part in the city management and make the city a better place. The portal allows the users to inform about any problem of the local self-government activity, initiate, discuss and support the projects of the city development or its improvement. The principle of its work is the following: the portal of not indifferent citizens "My Lviv - My Initiative" is a crowd sourcing platform for forming the associations of like-minded people and searching sources or possibilities to support the local initiatives. The portal users can initiate their own proposals as for the city activity improvement, take part in discussions, support and vote for the proposals of other community members⁸.

The major part of the projects implemented in Ukraine is aimed at solving social problems.

For example, the system of partnership of the executive bodies of Kharkiv municipal council and social-oriented non-governmental organizations has been working in Kharkiv since 1999 for about 15 years. One more important step of the project management was the joining of disconnected efforts of non-governmental organizations which provide legal, psychological and other social support to Kharkiv residents. Thus, the structure named as "Integrated social network" was set up. It included consulting centers and hot lines of partnership non-governmental organizations of different fields of activity.

At the first stage "Integrated social network" involved the following organization:

- Consulting center for blind disabled people of Kharkiv non-governmental organization "Social rehabilitation center for blind people";
- Consulting center for families bringing up the disabled children of Charity Fund "Rehabilitation center for disabled since childhood "Promin";
- Consulting center for support of women in critical situation of Kharkiv municipal non-governmental organization "World of Women";
- Consulting center for prevention of human trafficking of Kharkiv municipal organization "Women's community".

During the period from 1999 to 2011 there were 12 competitions of projects with 628 submitted social projects. 435 agreements about the mutual activity of Kharkiv municipal council with socially oriented non-governmental organizations were concluded with the winners of the competitions. 376 projects received the financial support from the municipal budget.

In 2005 Kharkiv municipal council implemented the project "Implementation of innovation mechanism for improvement of quality of social services to provide life activity of the territorial communities" which won the grant for 500 000 UAH from All-Ukrainian competition of projects and programs for development of the local self-government under the Cabinet of Ministers of Ukraine. The project demonstrated the new level of work in

⁸ Web-portal of not indifferent people "My Lviv - My Initiative". Available at: <http://www.mycity.lviv.ua/>
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providing social services. The events of the project were carried out by the Department of Labor and Social Protection of the population together with some non-governmental organizations, territorial centers and subordinated institutions. Within the frames of the project there were opened 20 electronic social offices, there were bought 5 minibuses that gave the possibility to provide innovation transport social services to the city residents⁹. The implementation of this project and the further development of partnership relations with non-governmental organizations provided the new stage in social services market development in Kharkiv and the benefit to the territorial community.

Today in Kharkiv following the twelve year experience of work there were formed two main approaches in the field of intersectional social partnership.

The first direction is a competitive one or the mechanism of municipal social grants. This mechanism is applied for example for solving the problems for social rehabilitation of people with disabilities, taking the preventive measures for homeless children, etc., in cases the initiatives and the proposals of non-governmental organizations which are directly dealing with these problems are required.

In this case it is necessary to organize competitive selection of the projects and programs meeting the priorities of social and economic development of the city and suggesting the specific ways to solve particular local problems. The selected projects will receive the required financial support from the municipal budget. After this, the relations-"order" emerge, according to which the agreements about the projects implementation are concluded with the winners of the competitions. In such case the social proposals of the non-governmental organizations selected as per the competitions results became the subject of the social services contracting.

Carrying out of the social projects competitions itself initiated the partnership relations between the authorities and the community in social protection of the population. The competition of the social projects appeared the mechanism that promoted the non-governmental organizations. It became the mechanism for selection of the innovative proposals, qualified social technologies, challenging social ideas.

The other direction is the program and target one or the mechanism of social service contracting. This mechanism provides for the formation and placing of contracts for services provision (implementation of measures), the list, content and scope of which can be clearly determined by the local authorities proceeding from the objectives of city development. The authorities responsible for the social programs development and implementation are aware what is required to do and formulate this in the form of contracts (tenders) and place them among the non-governmental organizations on a competitive basis. Such a mechanism is the most appropriate for provision of the specified social services to the

⁹ GORBUNIVA-RUBAN, S. O. – BULBA, V. G. – TAMM, A. Ye. – KULNICH, O. V. and others. *Social passport of Kharkiv: Integrated social network*. Kharkiv, ADNDU Publ., 2011, p. 8. (in Ukrainian)

definite social groups, for carrying out systematic research and organizational actions aimed at correction of interactions of all participants at the social services market (social research, social information distribution), and holding the municipal events devoted to the certain dates, etc.

It is necessary to note that the leading donor organizations, such as World Bank, MacArthur Foundation, Network of Social Activity in Ukraine (UCAN/ISC), International Fund "Renaissance", the Embassy of Kingdom of the Netherlands in Ukraine, the Embassy of the USA in Ukraine, Open Society Institute, Company "Philippe Maurice -Ukraine" and others more likely allocate funds for such non-governmental organizations which cooperate with the authorities. Most of them support those particular projects which have the initial financing from the local budget. Fund "Institute of early intervention", "Kharkiv non-governmental organization of blind lawyers", Kharkiv non-governmental organization of disabled people "Creavita", "Association of Community Development" and others have such positive experience.

Having analyzed the experience of the activity of Kharkiv municipal council, the cooperation with the municipal social project "Integrated social network" we can state that from year to year the number of clients in Kharkiv who receive the qualified social services has been growing; the number of non-governmental organizations willing to become the local authorities partners; the amount of money allocated from the local budget is raising; number of external donors organizations for the implementation of the projects aimed at the local community development is increasing; the scope of information for the community about the social services market is increasing, too. The level of the non-governmental organizations working with budget money, learnt to work with each other and private donors has been essentially grown up. It could be said that owing to the competitions of the social projects and social services contracting within the frames of "Integrated social network" at the social services market in Kharkiv there has been formed the public non-governmental sector which extends the possibilities of local government authorities in population social protection, providing the services to the residents of the city which are beyond the scope of the governmental social services¹⁰.

Conclusions

In view of the above we can make a conclusion that the strategic need of nowadays is the necessity of speeding up the legislative and legal settlement of the problems of the local self-government in Ukraine on the basis of European Charter of local self-government, providing legal, material and financing, organizational independence of local authorities, absoluteness and exclusiveness

¹⁰ GORBUNIVA-RUBAN, S. O. – BULBA, V. G. – TAMM, A. Ye. – KULNICH, O. V. and others. *Social passport of Kharkiv: Integrated social network*. Kharkiv, ADNDU Publ., 2011, p. 10. (in Ukrainian)

of powers and functions of the territorial community that obviously will promote the project management implementation for local economic development.

The implementation of the project management into local self-government practices will promote:

- implementation of new approaches to the development and implementation of the local economic development programs, in particular, on the basis of the interactions with bodies of self-organization of the population;
- strategic vision of local economic development;
- orientation to a citizen; the improvement of informing of the population about main directions, priorities and strategy of the territorial community development;
- speeding up the modernization of the system of administrative and territorial structure which today is archaic and does not meet the needs of the contemporary society;
- creation of self-sufficient territorial communities and effective bodies of the local self-government capable to conduct full and legally defined exclusively own and delegated state powers.

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CAN CONSUMER CONFIDENCE HELP TO PREDICT THE INFLATION OF V4 COUNTRIES?

Veronika ILLÉŠOVÁ – Ladislav PANČÍK

Abstract

We test the relationship between inflation and consumer sentiment in the countries of Visegrad group (V4; Czech Republic, Hungary, Poland, Slovakia) in a predictive framework. We estimate a basic heterogenous autoregressive (HAR) model that predicts one month ahead growth in price index (Harmonized Index of Consumer Prices, HICP) from its previous values. Then we introduce a series of competing HAR models that include not only previous values of price index but also previous values of the Consumer Confidence Index (CCI). Then we compare predictive performance of the models using Diebold – Mariano (1995) test. We find a positive significant result only for one model specification in the case of Poland.

Keywords:

prediction, heterogenous autoregressive model, consumer confidence, inflation

Introduction

Economic theories present an infinite source of hypotheses. Based on assumptions about human choice behavior, one can also derive his own theory about economic variables and the expected relationships among them. We present a simple hypothesis about relationship between inflation and consumer sentiment together with a testing framework and empirical results for selected countries.

In the presented paper we empirically test the relationship between consumer confidence and inflation. Our hypothesis is pretty straightforward. An increase in consumer confidence means (among other things) increased willingness to spend money in the future. An increase in aggregate demand should lead to increase in price level and cause an increase in inflation. This mechanism is also expected to work the opposite direction.

To test the presented hypothesis we use a framework based on prediction models. We create two types of predictive regression models. A basic model predicts growth in price level on the basis of the previous values of this time series. The specifications of a series of competing models include previous values of consumer confidence indicator. If competing model(s) prove to be a better predictor of price level than the basic model, we can conclude that consumer confidence contains information useful for prediction price level changes.

1. Data description

In this study we strive to predict the Harmonized Index of Consumer Prices (HICP) through its own previous values and through the Consumer Confidence Index (CCI). For our research we choose the counties Visegrad group (V4),

namely: Czech Republic (CZ), Hungary (HU), Poland (PL) and Slovakia (SK). The values of the HICP of V4 countries were obtained from the European Commission on-line database and the CCI data were obtained from the OECD on-line database. Both the HICP and CCI data are time series with monthly frequency. HICP is an index with base year 2005 (base value 100) and CCI is also an index with base year 2010 (base value 100). The time series used in our study spanned from May 2001 to September 2015. The following tables show selected descriptive statistics for the two time series.

Table 1 Descriptive statistics of the HICP of CEE countries

Country	Average growth	Average value	Standard deviation	Minimum value		Maximum value	
				Value	Date	Value	Date
CZ	0,00085	100,46	1,56	97,23	May 2009	102,61	Oct 2009
HU	-0,00248	100,03	1,64	96,27	Apr 2009	103,43	Nov 2009
PL	0,01574	100,00	1,09	98,04	Jun 2009	102,28	Oct 2009
SK	0,02180	100,37	2,01	96,29	Apr 2009	105,05	Jan 2010

Source: own calculations based on data from online database of European Commission.

Table 2 Descriptive statistics of the CCI of CEE countries

Country	Average growth	Average value	Standard deviation	Minimum value		Maximum value	
				Value	Date	Value	Date
CZ	0,15475	109,04	10,00	94,30	Feb 2009	123,60	July 2011
HU	0,32837	117,47	21,52	82,49	Feb 2008	146,41	June 2013
PL	0,17091	109,51	12,03	91,80	Nov 2008	126,20	Oct 2011
SK	0,24232	107,21	13,10	80,83	Dec 2007	123,27	July 2011

Source: own calculations based on data from OECD online database

2. Methodology

Denote Harmonized Index of Consumer Prices (HICP) observed in period (month) t as y_t and Consumer Confidence Index (CCI) observed in period (month) t as x_t . Define a logarithmic change of variable z between periods k and l as

$$z_{k,l} = \ln\left(\frac{z_k}{z_l}\right), k > l \quad (1)$$

We estimated the total of six predictive heterogeneous autoregressive models and measured their relative prediction power. Each model was estimated for each of the four countries. We used a moving window methodology in order to account for structural breaks in the underlying time series. The window width was on 48 months (4 years) with respect to higher number of regression coefficients estimated in some models.

All the models predicted one month ahead growth in HICP. The specification of the first model (model 0, M0) included the values of past HICP

growth on various lags. We use a model similar to the one used by Corsi (2009) to predict financial market volatility. One month ahead growth in HICP is explained by its last known monthly growth, growth during the previous month, growth over last quarter, last six months and last year.

$$M0: y_{t+1,t} = \beta_0 + \beta_1 y_{t,t-1} + \beta_2 y_{t-1,t-2} + \beta_3 y_{t,t-3} + \beta_4 y_{t,t-6} + \beta_5 y_{t,t-12} + \varepsilon_{t+1} \quad (2)$$

where $y_{t,t+1}$ is one month ahead growth in HICP calculated in line with formula (1), β_k , $k = 0, 1, \dots, 5$ are regression coefficients and ε_{t+1} is the error term.

The remaining five models (model 1 – model 5) are in some sense competitive models to model 0. The specifications of these models include the information about past CCI growth. They were specified as follows:

$$M1: y_{t+1,t} = \beta_0 + \dots + \beta_5 y_{t,t-12} + \beta_6 x_{t,t-1} + \varepsilon_{t+1} \quad (3)$$

$$M2: y_{t+1,t} = \beta_0 + \dots + \beta_5 y_{t,t-12} + \beta_6 x_{t,t-1} + \beta_7 x_{t-1,t-2} + \varepsilon_{t+1} \quad (4)$$

$$M3: y_{t+1,t} = \beta_0 + \dots + \beta_5 y_{t,t-12} + \beta_6 x_{t,t-1} + \beta_7 x_{t-1,t-2} + \beta_8 x_{t,t-3} + \varepsilon_{t+1} \quad (5)$$

$$M4: y_{t+1,t} = \beta_0 + \dots + \beta_5 y_{t,t-12} + \beta_6 x_{t,t-1} + \beta_7 x_{t-1,t-2} + \beta_8 x_{t,t-3} + \beta_9 x_{t,t-6} + \varepsilon_{t+1} \quad (6)$$

$$M5: y_{t+1,t} = \beta_0 + \dots + \beta_5 y_{t,t-12} + \beta_6 x_{t,t-1} + \beta_7 x_{t-1,t-2} + \beta_8 x_{t,t-3} + \beta_9 x_{t,t-6} + \beta_{10} x_{t,t-12} + \varepsilon_{t+1} \quad (7)$$

Estimating models M0 – M5 for all countries and time windows we obtained regression coefficients which were transformed into one period ahead estimates of HICP for given country given time t . Denote this estimate $\hat{y}_{t+1,t}$. We obtained the total of 24 time series of such estimates (6 models, 4 countries).

From each time series was derived a time series of mean squared errors (MSE):

$$MSE_t = (y_{t+1,t} - \hat{y}_{t+1,t})^2 \quad (8)$$

Denote, for a given country, MSE_t^0 mean squared error of model (2) and MSE_t^j , $j = 1, \dots, 5$ mean squared errors of models (3) – (7). Define the difference between MSE of the basic model and a given model j , $j = 1, 2, \dots, 5$ as

$$d_t^j = MSE_t^0 - MSE_t^j \quad (9)$$

A positive sign of the expression (9) indicates that the prediction error generated by the basic model (M0) is larger than the error generated by the j -th competing model and therefore that the competing model has better predictive ability (of model j in time t).

This logic is used by Diebold – Mariano (1995) test when regressing the whole time series of MSE differences (9) on a constant:

$$d_t^j = \alpha + \varepsilon_{t+1} \quad (10)$$

A significant positive regression coefficient α indicates that model j is in average a better predictive model than model 0 and vice versa. To evaluate the significance of α we used the t-test with Newey and West (1994) HAC robust standard errors for testing the significance of the γ coefficient. All calculations for this study were performed using the statistical programming language R. To perform the above-mentioned t-test we used the R function `coefstest()` which is described in Zeileis (2004).

3. Results

The results of the statistical test described above are in the following table 3. We also report average MSE for model 0 (M0) and Pearson correlation coefficient calculated between real HICP growth and its estimate based on model 0. The values of Pearson correlation coefficient are significant for Hungary, Poland and Slovakia. From the results of model comparison we see that in only one case the competing model specification outperformed the basic model (Poland, model 5).

Table 3 Results of model comparison

Country		CZ	HU	PL	SK
M0	MSE (*100 000)	2,6217	2,4882	0,8733	1,3430
	Correlation coefficient (Pearson)	-0,0198	0,3556 ***	0,3705 ***	0,2340 ***
Test statistic of t-test	M1	-0,0606	-0,0114	-1,0E-02	-0,0055
	M2	-0,2505	0,0401	-1,0E-02	-0,1340
	M3	-0,1994	0,0358	3,2E-02	-0,2030
	M4	-0,1099	0,0338	4,1E-02	-0,3010
	M5	-0,1702	-0,1641	7,1E-02 **	-0,3550

Source: own calculations

Note: *** $p \leq 0.001$; ** $p \leq 0.01$; * $p \leq 0.05$

Conclusion

In general, the basic model (M0) seems to be a good predictor of HICP growth in the selected countries. That is due to high correlation between real values and the estimates of HICP growth obtained from this model. The five competing specifications M1 – M5 failed to outperform the specification M0.

The only exception was model 5 in case of Poland. As a result, we cannot conclude that it is useful to include consumer confidence to prediction of inflation in the way we hypothesized.

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THE TAX BURDEN OF INDIVIDUALS IN SELECTED MEMBER STATES OF THE EUROPEAN UNION

Jana SIMONIDESOVÁ – Adela FERANECOVÁ

Abstract

A view on the fiscal policy of the European Union focuses mainly on its relationship to national fiscal policy demonstrative in effort to harmonize taxation used in member states of the European Union, or in the coordination of its fiscal policy. The tax burdens of individuals in states of the European Union are various. It mainly depends on different tax systems in every single country, the method of calculating the tax liability and other items, that are part of the tax base and also from different rates of income tax. We have focused in this paper mainly on the analysis of the tax burden of individuals by direct taxes, especially by an income tax in Slovakia, Czech Republic, Poland, Hungary (V4 countries) and Portugal.

Keywords:

tax burden, tax liability, purchasing power parity, tax coordination, tax harmonization, approximation of tax systems

Introduction

A cooperation among member states of the European Union in the sphere of direct taxes can be in terms of success or depth divided into two areas: at sharing tax information about prevention of double taxation and fighting against tax haven, member states of the European Union reached a significant agreement and reconciliation, but on the other hand, a harmonization process itself is stagnating.

Although the harmonization of direct taxes is discussed in a separate article of the Founding of the European Economic Community (eec), a harmonization is currently running through the Court of Justice of the European Union (so called negative harmonization).

Reasons of this condition are mainly these circumstances:

- different accounting systems in member states, where on the one hand, there is so called tax accounting (e.g in Germany or Austria), in which a trading income is the same as tax base, and in accounting (mainly Anglo-Saxon countries), when a trading income is transformed on tax base after many modifications and operations,
- a reluctance of member states to further harmonization, which they consider as an interference in the sovereign affairs to internal policy at the possible use especially of corporation taxes as an instrument of economic policy.

1 Theoretical basis for international cooperation in tax matters

International cooperation in taxes could be classified into the following three levels:

- tax coordination,
- tax approximation,
- tax harmonization with the three phases and three methods.

Tax coordination is characterized as a creating bilateral or multilateral schemes of taxation to limit arbitrage trades. In the process of the coordination are done agreements or recommendations to avoid laundering money and harmful tax competition and the aim is to determine the minimum standard of transparency and exchange of information in tax matters. For a typical result of tax coordination, we can consider for example model contracts to a prevention of double taxation.

Tax harmonization can be understood as adjustment of national tax systems and various taxes (not necessarily the same tax and the same definition of tax bases) on the principle of compliance with the common rules of the participating countries. Harmonisation may be related to tax structures and its administration (tax payment, a duty of the payer, tax control).

A harmonization of each tax takes place in three phases:

- determination of tax to be harmonized,
- harmonization of the tax base,
- harmonization of the tax rate.

Tax harmonization is the highest degree of unification of tax systems of the member states with a common EU rules. It is a process of moving the national tax legislation with EU legislation. It leads to applying the same rules and procedures in the single market of the member states of the European Union - so called positive harmonization. Negative harmonization relates with the application of EU principles - a prohibition of a discrimination (Schultzová, 2010).

A harmonization in the field of direct taxes to allow differential rates of direct taxation in the member states of the EU would not be a barrier of the free movement of labor, services, goods and capital. In other words, the aim is to introduce a single market and its smooth functioning. A part of this process is a coordination of a tax administration, administrative efficiency and the exchange of information among the member states (Láchová, 2007).

Prime directive in the field of direct taxation is the directive 77/799 / ECC on mutual assistance among the competent authorities of the member states in the field of direct and indirect taxes. This directive modify the exchange of information, cooperation in ensuring and investigating and the presence of the officers of one member state in the area of the another member state. The major change was the adoption of the directive 2011/16 / EU, which introduces a mandatory automatic exchange of information (Nerudová, 2011).

Some of legislative sources distinguish a tax harmonization by methods of used and enforced objectives to:

- transposition - into a national legislation is formally incorporated content of European Communities' standard, but without practical effect.
- implementation - into a national legislation is not only formally enclosed a content of European Communities' standard, but also nationally applied including the enforcement of its effectiveness.
- communitarisation of national law - it means a direct replacement of the national law by a law of the European Communities.

Approximation of tax systems expresses the direction of tax cooperation, which not has to be a harmonization of tax system of states of the European Union, but their proximation to each other (Široký, 2006).

2 Data and methodology

The selection of countries balanced with the availability of processed data and the fact that Slovakia is one country of the V4, we compared other countries from V4 and the choice of Portugal was random as one state of the European Union while there was a comparison among the V4 countries and one country from EU.

We gained data, that were used in the analysis of research problems, mainly from verified and publicly available sources such as: database of the European Commission and the OECD, from which were obtained information about tax incomes, implicit tax rate and the effective tax rate for selected countries, annual reports of European Commission and the OECD, which provide a comprehensive view of the evolution of taxes in every single member state, tax calculators for each country available on the internet, book publications focused on the tax problem.

Basic methods of research that were used at the processing of the specific problem, can be mainly theoretical methods such as a method of analysis, synthesis, comparison and induction method. In the processing of starting data, there was used mainly a method of analysis. The method of synthesis, comparison and induction is used mainly in the evaluation of results and formulation of conclusions, while a comparison was made in time and in space. Among the graphics evaluation methods and interpretations belong a bar and line chart.

Purchasing Power Parity (PPP) is used by Eurostat for European countries. Using this method, we can compare the amount of the tax burden in the V4 countries and Portugal. It can tell us how the price level varies in these countries or how in these countries differs value of purchased goods and services.

3 Analysis of the tax burden on the EU

The tax burden is referred as "tax quota I". It expresses the share of total taxes on gross domestic product (GDP). For a more complex view of the burden, it is necessary to add to the tax quota I another non-tax payments (customs duties, insurance, contributions and possibly import surcharge), which are designated as tax quota II. By counting these quotas, we get so called general, aggregate tax burden.

In 2014, the tax burden in Slovakia was the third lowest in the European Union (EU). This follows from data on the total revenues of the state for the generated gross domestic product (GDP) for 2014, published by EU statistical office Eurostat. The ratio of total government revenue to GDP reached 29,3% in Slovakia and according to Eurostat steadily declined till 2007, when it represented 35,7%. In this period, lower tax burden than Slovakia had only Romania (29%) and Lithuania with 28,9%. An average of tax burden of 27 member states of the European Union was 39,6% and in Euro Area (13 members) it was 39,9%. According to Eurostat, total tax revenue consist of direct and indirect taxes, customs duties and social transfers. In Slovakia, the ratio of these government revenue to GDP is called tax quota II.

The total extent of the tax burden in the European Union ranges from more than twenty points of GDP, from 51,3% in Sweden to almost 28% in Romania. The width of this range reflects the important differences in the role that plays the state within the member countries. Generally, the ratio of taxes to GDP tends to be significantly higher in the "old" EU-15 than in the 12 new Member States which joined the EU since 2004.

The highest tax burden in the EU the year before last was in Sweden, where the ratio was 51,3%, second one was Denmark with 50,3%, then Belgium - 45,5%, France with 44% , Finland with 43,9% and Austria with 42%. To the member states of the European Union with a low tax burden belonged Romania, Lithuania and Slovakia, Latvia with a ratio of 29,4%, Ireland with 30,8% and Estonia with 30,9%.

Taxes are traditionally divided into direct and indirect, the first group generally allows for greater redistribution and progressivity as feasible in indirect taxes. For this reason, recouring to direct taxes is more "visible" for voters, tend to be more intense in countries where fiscal redistribution objectives are more highlighted and proclaimed; It is therefore usually reflected in higher levels of the highest tax rates of individual income tax.

In general, new member states have a different structure compared to the EU-15; while most of the old member states maintain similar share of revenues from direct taxes, indirect taxes and social transfers, new member states often have a much lower share of direct taxes in total taxes. The lowest shares of direct taxes are recorded in Bulgaria (only 17,9% of the total amount), Romania (19,1%) and Poland (20,5%). Main reason for this difference may be generally lower tax rates (from personal income and income of companies) valid in new

member states ; in terms of progression, some of new member states it completely excluded by applying a single tax system (example of this is Slovakia).

There are some interesting differences in old member states of of the European Union. Scandinavian countries (Sweden, Denmark and Finland) rely mainly on direct taxation, while some south countries (especially Portugal and Greece) have relatively high share of indirect taxes. In Denmark, most social spending is financed out of general taxation as a substitute for social transfers, therefore a share of direct taxation in total tax incomes in Denmark is in fact the highest in the EU, while social security income is very low. It is different in Germany, where is the highest share of social contributions and the lowest share of direct tax income in the EU-15. A similar situation is also in France.

Schemes of taxation of the personal pension tax in member states of the European Union are various, in terms of making provision for calculating the tax liability social aspects of the taxpayer (the number of dependent children, disability) either in the form of a allowable items from the tax base or directly by a tax relief, that depends on tax brackets, tax rates and the progressivity of the tax rate.

Summary of the highest tax rates of individual income tax in the various states of the European Union and Norway is shown in Figure 1.

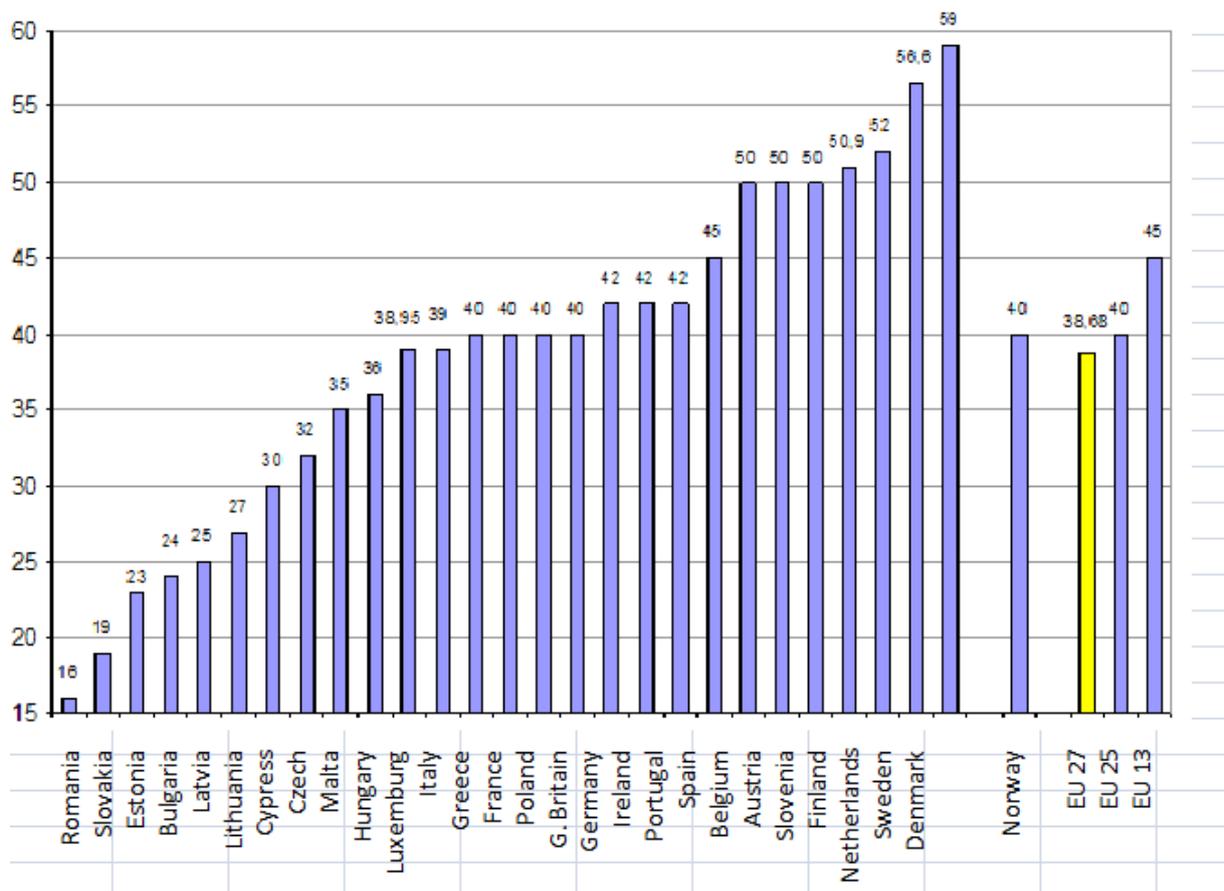


Figure 1 The highest rates of personal pension taxes for the year 2015 in %
Source: Taxation trends in the EU, p. 32

Although details of income tax are not available, the development of tax rates is known by now. Currently, the highest rate of personal income tax is on average 38,7% for the EU- 27. This rate changes within the EU ranging from a minimum of 16% in Romania to a maximum of 59% in Denmark. New member states have lower top (top - top) rates; none of the countries of the original EU-15 does not have a rate among the ten lowest values. As expected, the highest rates are proper to the member states with the highest overall tax burden (tax quota II), such as the Scandinavian countries, although the Netherlands reports the third highest rate of personal income taxes even it was on the position number 12 according to a ratio between taxes and GDP. Not surprisingly, the lowest rates are in Romania and Slovakia, where the overall tax ratio is the lowest in (Romania) and the third lowest (Slovakia) in the European Union.

4 Analysis of the tax burden on individuals in the field of direct taxation in the V4 countries and Portugal

In every single country, there are different purchasing power parities, this means that in one country a company can buy for the same amount of money more goods and services than in the other, or calculated tax is lower. A calculation of tax liabilities to the purchasing power parity in various countries shows Table 1.

Table 1 Calculation of the tax liability to PPP

		Czech republic	Poland	Hungary	Portugal
Tax liability	1593,87 EUR	42 762 CZK	6 842,27 PLN	626 984 HUF	1 353,69 EUR
Tax liability (EURO)	1593,87 EUR	1727,45 EUR	2027,28 EUR	2797,35 EUR	1353,69 SEUR
PPP na EU 27	0,681491 EUR/EUR27	17,011 CZK/EUR27	2,25373 PLN/EUR27	154,553 HUF/EUR27	0,836764 EUR/EUR27
Calculation of the tax liability to PPP	1593,87 EUR	1714,25 EUR	2064,86 EUR	2764,45 EUR	982,00 EUR

Source: own processing

Purchasing power parities (PPP) measure a ratio of prices in two countries and they are used to convert economic indicators on an artificial common currency called Purchasing Power Standard (PPS), which equalises the purchasing power of different national currencies, for example 1 PPS buys the same amount of goods and services in all countries, while to buy the same amount of goods and services it requires different amount of national currency units, that depends on national price levels.

Purchasing power parity of each country is expressed in the national currency to the average EUR exchange rate in the 27 member states of the European Union. We multiplied purchasing power parity of each country with the average exchange rate of National Banks in 2015, and we got the purchasing power parity in euro / EUR27, which is already comparable figure. Then we calculated a purchasing power of the national currency in the Slovak Republic as

a proportion of purchasing power parity in a country in EUR / EUR27 and purchasing power parity in Slovakia.

According to a comparison of purchasing power of the national currency in Slovakia we can see that the price level in the countries of V4 is approximately the same, purchasing power in the Czech Republic and Hungary is a bit higher than in Slovakia, while in Poland the purchasing power is lower. Another case is Portugal, where purchasing power is much more higher, which means that in Slovakia there is lower price level than in Portugal and for the same amount of money it is possible to buy more goods and services.

For comparison a real burden of the company calculated by tax liabilities in each country, we divided tax liabilities with the purchasing power of the national currency in Slovakia and we converted tax liabilities to purchasing power parity. As the purchasing power in the V4 countries is quite similar, there are no big differences between tax liabilities calculated by an exchange rate of National Bank and tax liabilities calculated by purchasing power parity. Within the V4 countries would a company pay the highest tax in Hungary, which would be by taking a standard of living at amount 2764,44 EUR, then it would be Poland with tax liabilities 2064,86 EUR and the Czech Republic with amount 1714,25 EUR. Among the countries of V4, Slovakia has the lowest tax burden from individual income tax, that is 1593,87 EUR.

There is a different situation in Portugal, where the purchasing power is higher. While tax liability is 1353,69 EUR, that is 240,18 EUR less than in Slovakia, taking purchasing power parity, tax liability would be 982 EUR. It means, that if the entrepreneur is residents of Portugal, he would pay tax in amount 1353,69 EUR, but burden would be the same as at entrepreneur in Slovakia, that is 1593,87 EUR.

The lowest tax liabilities among these countries would have an entrepreneur in Portugal, because there is stronger purchasing power parity.

Conclusion

Based on the analysis of the tax burden of company by individual income tax in every single country of V4 and Portugal and assuming that the entrepreneur has been a resident of the country, so a taxpayer with unlimited tax liability, we can say that the company should do business in Portugal. Portugal is one of the founding members of the European Union with developed market economy.

In each country, where was realized comparison of tax burdens have similar tax systems in taxation of individual income. The differences are mainly in a nontaxable part of a base and in tax relief, that is different in every single country. For example in Slovakia, it is claimed a nontaxable part of a base, from which tax can not be calculated, in the Czech Republic, Poland and Portugal may be applied the tax relief for every taxpayer. There is not applied a nontaxable part of a base in Hungary and single tax relief applies only to

employees, not to self employed persons. This is the main reason, why in Hungary there is the highest tax liabilities from among the compared countries.

Based on there results, we determined the order of the countries where it would be the most ideal to do business for the company in terms of tax burden from incomes calculated to purchasing power parity:

1. Portugal
2. Slovakia
3. Czech republic
4. Poland
5. Hungary

For an entrepreneur's decision where to do business, it is not determining only an amount of tax liabilities. It is a big decision, and there are a lot of factors, that has to be considered, especially language barriers, cultural differences, background and family relationships, housing, legislative conditions related to business, and of course the overall tax burden.

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ASSORTMENT ANALYSIS AND ITS IMPORTANCE FOR MANAGEMENT DECISIONS

Katarína TEPLICKÁ

Abstract

The basis for management decision-making is the choice of a suitable alternative solution to the problem in the company. Suitable alternative solutions of the problem can bring economic and financial benefits that will occur as a key factor in business success. Competitive advantage will ensure the company strategic growth and development. In this paper we describe using of the assortment analysis and benefits of the product assortment for the company. Assortment analysis is managerial instrument for decision and management in the company.

Keywords:

profit, calculation, product, indicators, efficiency.

Introduction

Managerial decision-making is the basis of effective management. In production companies are faced with the fact that managers do not assess the product assortment of economically and production efficiency. Important information for the production process is product assortment, which is to be increased or reduced. Determine the appropriate product assortment is fundamental to the competitiveness of the company. In practice are manufacturing companies that produce a large product assortment, which they do not bring added value. This fact will result in economic efficiency and business performance. A suitable method to be used to determine the optimal structure of the product assortment in the manufacturing process is applied in practice as the assortment analysis.

Methodology of assortment analysis

Appropriate tool to select an optimal product assortment is assortment analysis that tracks the assortment of products of the company and its optimal representation, preference value, eliminate, reduce product assortment. The definitive criteria for the choice of a suitable product assortment are the needs and requirements of the customer. In addition to basic parameters such as quality, price, safety and environmental reliability are important and specific customer requirements. (Šatanová, Potkány, 2004) These are reflected in the costing i.e. the value of the product without acceptance profit margin and value added tax.

Costs are economic indicators by which we can determine the effectiveness of the product assortment. We will be at the assortment analysis uses the following indicators:

1. profitability of cost
2. return of sales
3. allowance to cover
4. gross margin

Profitability of cost: $Rn = \frac{Zj}{\dot{U}VNj} \times 100 [\%]$

The indicator tells about the effectiveness of the product assortment of the company. Represents the share of unit profits accounted for by € 1 cost for the product. In the pipeline, should this indicator show an upward trend.

Return of sales: $Rt = \frac{Zj}{Cj} \times 100 [\%]$

The indicator tells about the effectiveness of the product assortment of the company. It represents the share of unit profits, which falls on € 1 of sales realized through the sale of the product. In the pipeline, should this indicator show an upward trend.

Gross margin: $Hr = Cj - Nprj [€]$

Gross margin reflects the difference between the unit price of products and the direct costs of producing the product. The higher the gross margin of a specific product, the greater the contribution of the product involved for the common overhead costs and to an overall profit.

Allowance to cover: $Pú = 1 - \frac{Nprj}{Cj} [€]$

Allowance to cover expresses how many contributing € a particular product from every € sales to cover the common costs and making profits. The contribution is higher; the product is more advantageous for the entrepreneur. (Potkány, 2007)

Assortment analysis and effect at the profit creation

In evaluating these indicators in practice often faced with the fact that managers in the choice of product range, only take into account cost efficiency and sales and do not pay sufficient attention to indicators of gross margin and contribution to reimbursement, which have a higher explanatory power and more accurately reflect the importance of the product range. When analyzing recommend assortment calculates all the indicators and then we can decide correctly. The decision remains the responsibility of the manager, but to decide correctly can still be used in calculating the corporate income unaltered state production capacity. Advantageous product for the enterprise is the product that generates sufficient profit to cover overhead costs.

The calculation of profit in new production assortment we can realize by the following: (Skrivanek, 2005)

1. Revenue from sales
2. - Direct costs
3. = the gross margin (difference of sales and direct costs)
4. - Overheads
5. = profit

Discussion

We use product assortment analysis to the manufacturing enterprise which manufactures of construction materials. For assortment analysis we need data from calculations of individual products and to know the planned production volume and sales prices of individual products. We calculated from the calculation profit margin of the product as the difference between the selling price and the costs.

Table 1 Profit margin of the products

Product (€/1 tonu)	CEM I-R	CEM I-N	CEM II-N	CEM II-R	CEM III
Direct material	33,20	32,99	29,07	25,45	22,20
Direct labour	0,20	0,20	0,20	0,20	0,20
Other direct costs	6,20	5,17	6,0	6,17	6,90
Overhead	3,58	3,58	3,58	3,58	3,58
Costs	43,18	41,94	38,85	35,40	32,88
Profit margin	32,06	29,74	25,52	24,33	20,21
Selling price	75,24	71,68	64,37	59,73	53,09

Determine the economic parameters for determining an appropriate choice of product range.

Table 2 Economic indicator of assortment analysis

Product	CEM I-R	CEM I-N	CEM II-N	CEM II-R	CEM III
Costs	43,18	41,94	38,85	35,40	32,88
Direct costs	39,6	38,36	35,27	31,82	29,3
Profit margin	32,06	29,74	25,52	24,33	20,21
Selling price	75,24	71,68	64,37	59,73	53,09
Profitability of costs (%)	74,25	70,91	65,69	68,73	61,47
Return of sales (%)	42,61	41,49	39,65	40,73	38,07
Gross margin (€)	35,64	33,32	29,10	27,91	23,79
Allowance to cover (€)	0,47	0,46	0,45	0,46	0,44

Based on the calculation of the economic indicators we can conclude that an enterprise's decision of reducing the product range might consider the excluded products CEM III of the manufacturing program as all calculated indicators clearly specify the worst value. The most suitable product of the product range IR CEM is a product manufactured by an undertaking in a sufficiently large volume. The decision will be made to produce the product and eliminate CEM IR will manufacture the product CEM III.

We calculate the amount of the corporate profits for the planned production volume, for determining the sale price of each product.

Table 3 Planning volume of production

	CEM I-R	CEM I-N	CEM II-N	CEM II-R	CEM III
Volume of production	136846	42969	41354	250818	146059

Table 4 Profit of product assortment

Indicator	CEM I-R	CEM I-N	CEM II-N	CEM II-R	CEM III
Revenue	10296293	3080018	2661957	14981359	7754272
Direct costs	5419102	1648291	145856	7981029	4279529
Gross margin	4877191	1431727	1203401	7000330	3474744
Overheads	489908	153829	148047	897928	522891
Profit	4387283	1277898	1055354	6102402	2951852

The highest profit achieved in the production CEM I-R but in the case of products CEM III, which we planned to dispose of the production program, we found that its benefits will be higher than in the product CEM I-N a CEM II-N. Based on this finding we can conclude that the decision to eliminate a product CEM III from the manufacturing program is not suitable.

The amount of profit making full use of production capacity at the disposal of the product with the worst characteristics product CEM III.

Table 5 Profit of actual product assortment

Indicator	Actual product assortment
Revenue	42 009 106
Direct costs	15 194 278
Gross margin	26 814 828
Overhead	2 212 603
Profit	24 602 225

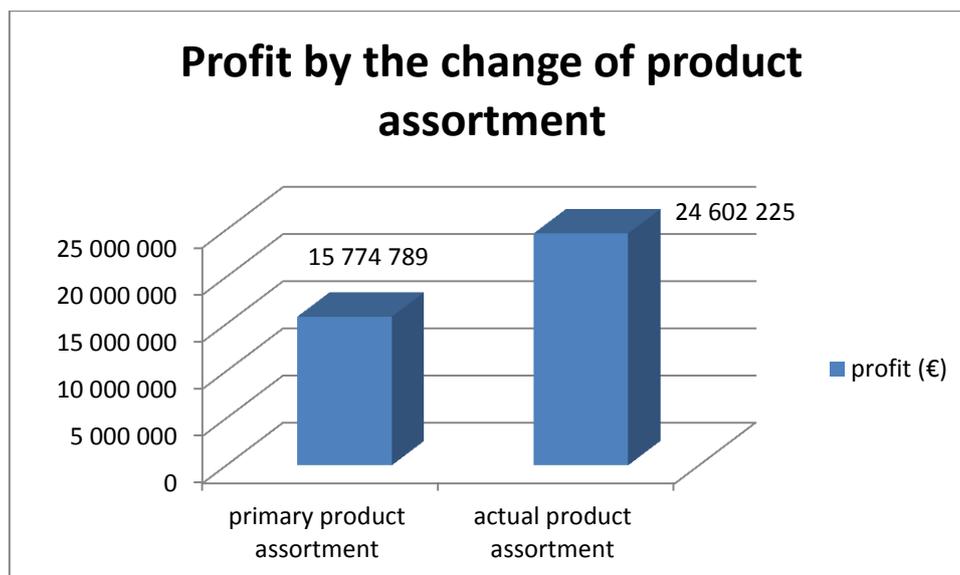


Figure 1 Profit after change of product assortment
Source: (Teplická, 2008)

For the same volume and the same level of production fixed costs by the company achieved a profit of € 24 602 225 € it depends increasing of sales 8 827 436 €. If we evaluate the importance of the product by the customer, and we would find that the product cannot be taken out of the production program, as an essential product for the building industry and the customer is key for our business customers, our decision on withdrawing the product from the manufacturing the program would not be possible. Given these facts, it should be noted that the choice of the product range are important, other indicators not just financial. At the same time in selecting the optimum assortment of the firm must remember that the majority part of overhead cost is fixed and must be paid at each output and any change in the product assortment. (Potkány, Hitka, Gejdoš, 2007)

Conclusion

Use of the assortment analysis is particularly important in companies with financial problems related to the production of some inefficient products and manufactures expansive product assortment that is not sales. Decision making of reduction of product assortment cannot be based on valuation of economic indicators, but it is necessary to accept other specific requirements from customers or to respect position on the market. Assortment analysis offers to managers look at added value of the individual products and their impact that is reflected in the overall economic efficiency of the company. If the enterprise is facing the decision to reduce or eliminate product assortment this analytical tool is very good support for the right decision.

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