DEPENDENCY OF RETURN ON EQUITY AND USE OF FINANCE SOURCES IN BUILDING COMPANIES IN V4 COUNTRIES

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Introduction

The aim of the paper is to evaluate whether there is a functional dependency between the used finance sources and reported rate of return on equity in the selected sample of companies from the area of building of the Visegrád Group, and to do such evaluation on the basis of a performed analysis. We will also examine the reverse relation, i.e. how the rate of use of external finance sources affects the return on equity. The attention was paid to the area of building, as the area is considered as the indicator of development of the economic cycle. While up to 2007 we could see the growth, since then there has been an obvious tendency to decline of ground building, which was followed by civil engineering (in 2009 civil engineering still managed to balance the fall of ground building). The weak condition of the area was caused by delayed impact of the global economic crisis and, mainly, by continuous weak demand of households and companies. The unfavourable results were also caused by saving measures of the government which limited infrastructural buildings to a great extent. On the contrary, a positive effect was caused by massive investments into solar power stations for some time [14]. Just as a result of these impaired economic conditions, what should be followed is the impact on partial economic indicators of the monitored companies. It will be interesting to see to what extent the development will show in management of finance sources as well as in profitability not only of the area but also of the Visegrád Group countries.

1. Methodology

Most studies presume that within the finance sources debt financing will be used in some forms. However, the studies may differ depending whether they primarily try to maximize the book value or the market value. They also differ depending whether they use all debt forms of financing or whether they use just long-term debt forms of financing. Thus some authors of studies on the capital structure tend to replace the debt ratio or debt/equity ratio (further "D/E") by a share of financial costs and value of debt, thus the interest rate. At the same time it should be realized that there is a difference between book and market relations. A reason for differentiation lies also in the fact that the book indicators work retrospectively, while market indicators work in real time. However, there is a great difference between Anglo-American models of management of corporations and the Continental European model. The problems lie mainly in that Europe is not primarily based on publicly traded companies and to a great extend it uses such legal system which makes it impossible to work with the market value. The market evaluation becomes very cost-demanding. In conditions of the Anglo-American model, majority of companies is traded at public capital markets, which means that derivation of market value is done on the basis of product of the stock market value and number of issued stocks. That is also why Barclay, Morellec and Smith [2] in their study based on research of companies at the American capital market claim that there is no reason to use retrospective information when there is perspective information. Due to such arguments, the research uses indicators on the basis of accounting data.

The research is performed at two levels. In the first level, the data are mutually compared on the basis of average values of ratio indicators in individual countries. From the methodological view, there are mainly two commonly-used ratio indicators used. D/E ratio evaluates the financial structure of the company. It compares external and internal finance sources used in financial

management. Values above 1 signal a greater use of external finance sources, values below 1 then signal a greater use of internal sources. As Růčková [19] states, ROE – return on equity – is used for evaluation of effective management of means of company owners. It compares EAT of company with the value of equity. ROE is generally considered as one of the most important indicators of efficiency evaluation. The use of return on equity as well as debt/equity ratio comes from studies which are listed below in the text.

The other level of research is focused on data of concrete companies, which is the basis for panel data regression processing. When construing the panel model, I will start from the study by Haas and Lelyveld [8]. A sufficiently wide data base in the cross-section through panels of individual variabley makes it possible to reach robust results by means of the Generalised Method of Moments (GMM) even in a short period of time. Prucha [17] claims that many panel data suffer from the problem of a rather short time line and, from the view of panel regression the use of methods of the least squares on the growth rate is then absolutely inadequate for its use. In his view, the Generalised Method of Moments (GMM) represents a way how to study functional relations just between such panel data. Financial data on the annual frequency, gained on basic accounting reports, organized in panels, is a suitable candidate for study by means of this regression method. A great advantage of using the GMM compared to the method of least squares is also the fact that among regressors there is also a delayed endogenous, explained, dependent variable [7]. The attention is paid to the area of building. From this business branch, there were gained data for individual companies in categories: very large, large and middle-sized companies from the Amadeus database. From the file compiled in June 2014, there were removed companies that did not meet the condition of the complete time line from summer 2005 to 2012 that means that a value of observed items could not be missing for more than three years in the time line. The setting of the time line resulted from the availability of the data in the database. A large amount of missing data for 2013, or possibly its unavailability in the database (updating takes place once a year), brought about the end by 2012. The observed

sample created on the basis of these conditions includes 506 companies in the Czech Republic, 14 in Hungary, 354 in Poland and 83 in Slovakia.

From the view of the studied topic, the text will be focused on the dynamic theory of the capital structure – the pecking order theory. The reason for using just this theory is the fact that measurability of tax savings from the debt in context with financial distress costs, which is the core of static trade off theories, is problematic in conditions of the Czech Republic. Many of the theories for measuring the potential of financial distress are focused on the use of overall indices of evaluation. Here comes the greatest problem, as most of the overall evaluation indices come from the United States of America and their explanatory power in our conditions is limited mainly for the reason of gaining financial means. All overall indices emphasize the profitability (measured by importance of the total profitability indicator) and very low importance is given to liquidity indicators, although they play a very important role from the view of gaining external finance sources from the bank sector. According to the Neumaiers [15], there is another problem as the compromise theory does not explain why the most profitable companies in the area tend to have the greatest share of equity. According to the compromise theory, the high rate of profit should lead to greater willingness to use the tax shield. From the data gathered by Bauer and Bubák [3] when studying capital structures of companies traded at Prague Stock Exchange it was found that "the debt was most penalized in companies whose capital structure differs from the "optimum" capital structure". Moreover, they say that growth of willingness to use debt is connected to the increasing profit and increasing profit potential.

2. Compilation of Hypotheses on the Basis of Current State of Knowledge

The basis of the dynamic theory is the opinion that the optimum capital structure of a company in general as well as in individual branches actually does not exist and that the effort to excessively generalize may be rather misleading. Every company is so specific that the optimizing efforts may not be transferred to other companies. Every company continuously optimizes its financial decisions regarding to constantly changing specific conditions of the

development. In spite of these statements, dynamic theories lead to certain generalizations. Dynamic theories of capital structure may be divided into two basic groups, i.e. pecking order theories and dynamic trade off theories.

The dynamic trade off theory starts from the fact that companies optimize their capital structures by means of continuous decisions that are related not only to balancing the tax benefits of the debt and potential financial distress costs, but also to balancing the investment decisions and restructuralization costs. Unlike the static theories, with dynamic theories the costs connected to adjustments of capital structure may diverge from the optimum for rather a long time. Strebulaev [22], as a dynamic trade off theory supporter, claims that it is just the dynamic compromise model that can explain the relation between profitability and rate of debt financing use. In his opinion, the profitability growth will cause a positive effect from the point of company value, as it is expected that even in the oncoming years, the profitability growth will continue. However, if the debt is used on a bad level, then there are additional costs of debt use and of course, they decrease the efficiency. According to DeAngelo et all [5] or Strebulaev and Whited [23], "the slowness" of the reaction to divergence from the optimum is given by the debt conservatism of company managers and mainly by their efforts to keep financial flexibility. Moreover, DeAngelo says that companies tend to use debt only temporarily and not to go to the boundary of debt company capacity. According to Bancel and Mittoo [1], 91 per cent of CFOs prefer financial flexibility to reaching the optimum in this context. Just this fact confirms that the debt conservatism and financial flexibility lead to the confirmation of the pecking order theory.

The pecking order theory is based on the fact that due to the existence of unfavourable choice, the company primarily uses retained profit for its financing, then debt financing and, only then it focuses on gaining other internal finance sources. In the pecking order theory the relation to capital structure is seen on the basis of information asymmetry between managers and other people [12]. It causes various evaluations of issued securities by given target groups. Therefore, companies prefer to issue securities that are the least sensitive to available information. If they need free finance,

first they use internal sources, debt and, the issue of new equity is only the last possibility. It follows the view of company managers, not interests of company owners. The theory works on the assumption that companies and their management prefer to use internal sources to external ones. Thus it gets to create a kind of hierarchy of use of finance sources for investments from the most preferred to the least used; internal finance sources are used mostly, then classic external finance sources and only the last position is taken by the issue of stock. Companies prefer financing from internal sources (from retained profit) and only when there is not enough retained profit, they use bank credits. It is also confirmed by study by Hernandi and Ormos [9]. It states that in the Czech Republic (72 companies were represented) the managers claimed that for asset financing they preferably use internally created finance sources. It also means that it might be possible to regard the companies in the sample as companies using the pecking order theory.

From the view of the unfavourable choice, which is the basis of the pecking order theory, the most endangered group is the registered capital, debt is also endangered but to a lesser extent and, the retained profit is not endangered by the unfavourable choice at all. If we still consider groups which are endangered by the unfavourable choice, then we should also consider the risk and the connected risk bonus. The higher level of risk bonus needs to be considered for the equity. It comes from the formulation of legislation defining the position of owners when demanding the share of liquidation balance in case of bankruptcy. Owners, or shareholders, have only residual shares and thus they bear a greater level of risk. Therefore, also from this point of view it is cheaper to finance by debt financing and financing from retained profit. Thus, in accord with this, the retained profit is used as long as its amount sufficiently covers development of the company. With this kind of financing, the company does not get in touch with external investors, capital market, and internal sources do not cause issue costs. [10] In case the amount is not sufficient, debt financing is used. Out of the debt financing such forms will be used which require the least amount of published information; bank credits will be preferably used and only then bonds.

According to study by Hrdý [11], companies engage in capital structure optimization only in case they make a decision about investment (55.6% out of the companies analysed). For long-term capital structure optimization the share of companies is much lower, only 20% companies make efforts to do optimization in the long term. According to Hrdý, from the view of aims, companies strive to minimize external finance sources and to maximize profit. For example, from the study by Rasiah & Peong [18] it resulted that managers are motivated to use external finance sources only when there are investments that may bring additional evaluation. It means that net current value of investments is preferably monitored in order to choose for realization only those that may be significantly efficient. From this it also results that capital structure of such companies change depending on the size of internal finance sources as well as depending on the investment opportunities.

From the above-stated theoretical aspects and in order to meet the above-stated aim more easily, we may state the following hypotheses that shall be the subject of study:

H1: The rate of external finance sources in the building branch is positively affected by return on equity.
H2: The affect of return on equity reports the same function dependency in all monitored countries.
H3: The use of external finance sources has a positive affect on ROE growth.

All three formulated hypotheses will be verified or disproven on the basis of results of panel regression.

3. Structure of Finance Sources in the Building Area in Visegrád Group Countries

From the view of the pecking order theory it should hold true that when using finance sources, companies will prefer the use of internal finance sources to other sources. From this point of view it should hold true then that in their structures, companies should prefer the use of internal finance sources to external sources. Regarding the frequency of primary stock issue in conditions of the Czech Republic we might exclude the potential of use of the third level finance sources in the above mentioned hierarchy. According to Meluzín [13], in the sense of owner structure, a typical Czech joint-stock company has not realised IPO at the Czech capital market yet. Thus there is still the distribution between the use of internal and external capital, already regardless whether these are sources from the bank sector or whether it is an issue of debtor securities (although this way of gaining finance sources does not represent a significant finance source in conditions of the Czech Republic).

If we draw our attention to average values of the used finance sources measured by debt/equity ratio indicator, then this situation is shown in Fig. 1. The dark line at the level of value 1 shows the even use of internal and external finance sources. The values above its level signal a greater level of use of external finance sources.

From the view of the use of external finance sources it may be stated that almost in all the countries and in the whole monitored period, the external sources prevail. From 2008 to

Fig. 1: Average structure of finance sources in building in Visegrád Group countries from 2005 to 2012, measured by debt/equity ratio
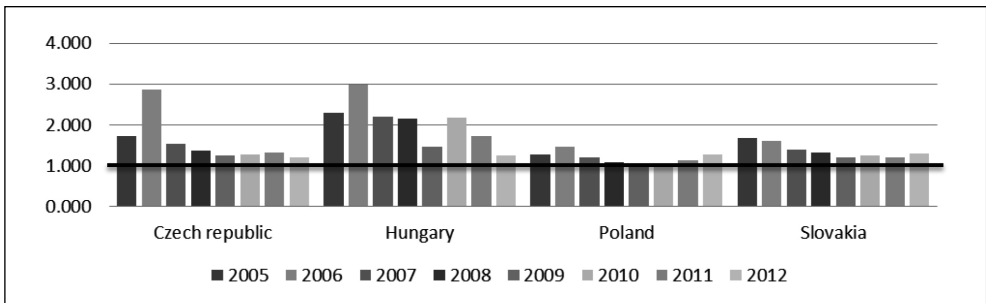
Source: own calculations according to the data in the countries

2010 the willingness to use external finance sources declines. There was the only exception in Hungary where a greater increase in external sources was reported in 2010, however, it was again followed by a decline of the use of external sources. The Czech Republic, Poland and Slovakia report a more or less stable proportion between the use of external and internal capital from 2010 to 2012. However, they differ in the development tendency. In the Czech Republic, there has been reported a decline in the willingness to use external finance sources since 2006 in spite of the fact that according to the Euroconstruct evaluation the years of 2000 to 2007 meant a significant growth of the building production rate. Poland has reported a slight increase since 2010. Slovakia holds

a more or less stable proportion of external and internal finance sources. The decrease of use of external finance sources mainly comes from the decline of the building production. A different situation may be seen in Poland, where between the period of 2009/2010 and 2010/2011 there was an increase in the building production and thus the willingness to use external sources grows, too. The last monitored year means stagnation and there is an estimate of decline to 9% for 2013 [6]. The situation from the view of the building production development is also documented in the following Table 1. According to Euroconstruct [6] it may be also presumed that the year of 2013 should be the last year of significant decline of the building production.

Tab. 1:	Rate of building production development from 2008 to 2012 including estimate of values for 2013 (in %)					
	2008	**2009**	**2010**	**2011**	**2012**	**2013***
Czech Rep.	2.70	−1.30	−7.3	−3.8	−7.7	−8.2
Hungary	−3.40	−8.97	−9.4	−9.7	−4.3	1.3
Poland	11.40	4.30	4.6	11.6	0	−8.9
Slovakia	10.97	−12.71	−3.6	−2.8	−13.8	−7.8

Source: Euroconstruct [6]

Fig. 2:	Development of average values of profitability in the V4 countries, measured by ROE (in decimal representation)
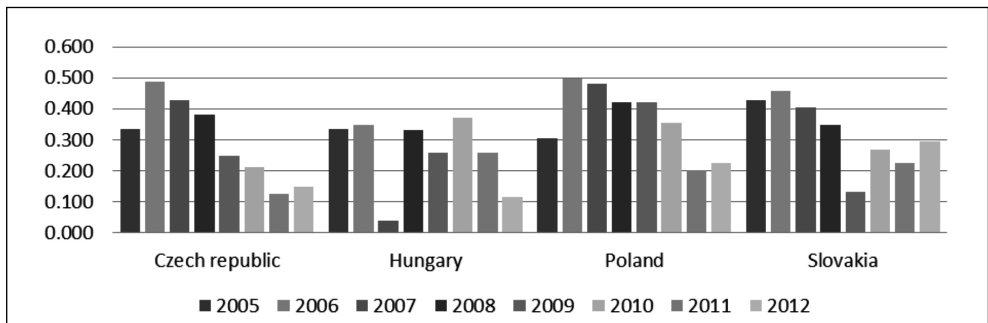
Source: own calculations according to Amadeus database

It has been already mentioned that finance sources are monitored in relation to return on equity development. The dependency may be reciprocal. It means that the rate of reported profitability influences the use of external finance sources. It comes out of the idea that

external sources may be reached under better conditions when the profitability rate increases and thus, the willingness to use them grows, too. The reverse dependency indicates that under certain circumstances the external finance sources are cheaper than the internal

finance sources and influence the size of the reached return on equity due to the financial lever. The following Fig. 2 is focused on the development of average values in the individual countries.

To a great extent, the average values of return on equity in the Czech Republic are influenced by the building production development. Until 2011 there was monitored a drop of the value, and a slight increase in the last monitored year, which is seen as due to the slight recovery mainly in the area of housing construction. However, from the view of total building production, the year of 2012 meant another decline. Nevertheless, it did not affect the efficiency in average values. The greatest drop is reported in the time of the start of the global economic crisis. A similar development tendency from the view of efficiency may be seen in Poland, though the drop of the average values is not as significant as in the Czech Republic. However, it needs to be stated here, that the drop in efficiency in Poland came in spite of the fact that the building production development reported positive figures in 2010 and 2011. The development in Hungary and Slovakia is not that clear. Hungary has reported fluctuating values of average return on equity, but in the last two years it may be stated that the ROE development follows the building production development. It is interesting that although year-on-year the building production significantly dropped in 2010, the values of

ROE were of significant increasing tendency. A similar situation was in Slovakia in 2010 and 2012 when the rate of building production growth declined and the profitability increased.

According to theories and above mentioned studies, both indicators should report reciprocal dependency. One of the ways how to measure the dependency is by means of correlation coefficient. It is true that the use of correlation coefficient will not show the direction of dependency but it will measure its rate. The correlation is expressed by means of the following equation (1):

$$k_{XY} = \frac{\mathrm{cov}(X,Y)}{\sigma_X \sigma_Y} \qquad (1)$$

where X is the median of matrix of debt/equity ratio value and Y is the median of matrix of return on equity value in the individual countries. Values of the indicator should be in the interval from -1 to 1. Values closer to the value of 1 would indicate that when the use of external sources grows, the return on equity grows, too, and vice versa. Values that equal to zero signal reciprocal independence. The following Fig. 3 expresses the rate of reciprocal dependency of both monitored quantities.

In all four countries we may notice a positive correlation of the relation of both quantities, which means that when one quantity grows, the other grows, too. The Czech Republic reports a positive correlation of the relation of

Fig. 3: Correlation of relation of debt/equity ratio and return on equity of average values from 2005 to 2012
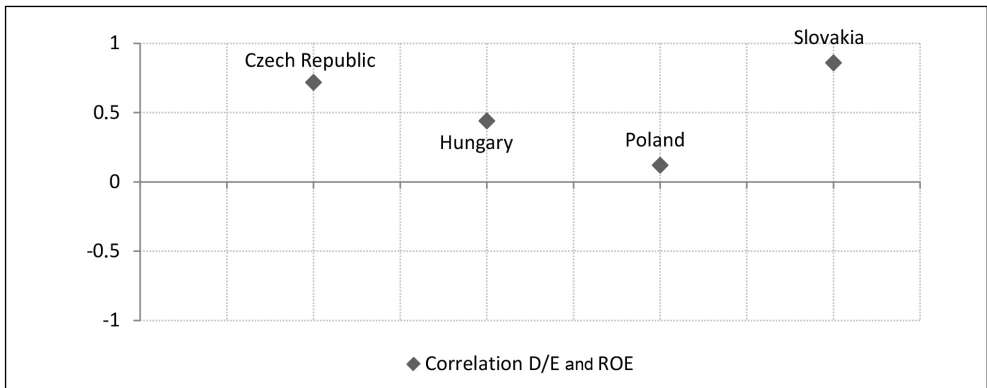
Source: own

debt/equity ratio and ROE at the level of 0.72, which would actually mean that the inflow of external finance sources also brings the growth of profitability. The Czech Republic and Slovakia (0.67) report a high rate of correlated relation and Hungary (0.44) and Poland (0.12) report a lower rate of correlation. From this point of view, the hypothesis 1 would seem verified as in all the monitored countries a reciprocal positive dependency of the monitored quantities has been reported. However, the pair correlation does not provide sufficient rate of expression in this sense, as it does not clearly indicate the relation of dependency, thus it does not define the influence of independent quantity on the dependent one. That is also why the oncoming analysis has been focused on modelling in a sample of companies where the functional dependency is clearly indicated by and equation. In spite of these deficiencies, it will definitely be interesting whether it is possible to monitor the same functional dependency in the sample in the panel, as for the average values.

4. Analysis of the Functional Relation of the Building Industry

When using the GMM model in the sample of the companies as it was limited at the beginning of the paper, the attention was first drawn to how the development of the use of external finance sources (DER) is affected by the reached efficiency and the use of external sources in the previous period. Thus, is uses the idea of greater willingness to use external finance sources when the profitability grows. The relation is expressed by the following equation (2):

$$DER_{it} = \alpha_1 + \beta_1 * \Delta DER_{it-1} + \beta_2 * ROE_{it} + \varepsilon_{it}$$
(2)

when the edogenous dependent variable represents the development of debt/equity ratio of it-variable in time t, and it assesses the use of external sources of financing, and the exogenous independent variables being the delayed value of debt/equity ratio from the previous year and the development of return on equity. Symbols and are the constant of the model and residual part in the GMM model. The reason for choosing the above mentioned indicators also comes from the performed studies (such as Nivorozhkin [16], Hernardi & Ormos [9], Crnigoj & Mramor [4], Růčková [20], Růčková & Heryán [21]) that considered particularities of the European environment, mainly weaker availability of the market data. It is just the unavailability of the market data that makes it impossible to apply studies performed in the United Stated of America as most of their models mainly use the market value of the company as a factor. The first model proves or disproves the first formulated hypothesis – the rate of the use of external finance sources is positively affected by the return on equity. The situation is modelled in a sample of companies from the Visegrád Group countries.

In Table 2 we can see a positive functional influence of return on equity onto the use of external finance sources in a sample of 506 building companies in the Czech Republic. Thus it may be said – also regarding the statistic significance of the item – that when the efficiency of companies grows, the willingness to use external finance sources grows, too. At the same time on the level of significant 0% there was proven a slightly negative functional relation with changes in debt/equity ratio in the previous period. Thus it may be stated that if there was an increase in using external finance sources in the previous period, then

Tab. 2:	Debt/equity ratio as dependent variable			
	Czech Republic	**Hungary**	**Poland**	**Slovakia**
β_1	−0.003111[a]	0.53[a]	0.028[a]	0.6576[a]
β_2	22.4754[a]	0.82[a]	3.071[a]	−18.817[a]
S.E. of regression	5.38	3.38	4.394	6.022

Source: own

Note: Symbol a means statistical significant coefficient at 1% level

in the oncoming period there was a tendency to keep the values or to slightly decrease them. The situation in Slovakia in the sample of 83 companies is somewhat different. When monitoring the functional influence of return on equity onto the use of external sources, there was found a negative functional relation on the level of significance of 1%. This actually means that companies in the sample go for the use of external finance source at that time if their reached efficiency is insufficient and they have to seek for alternative financing to financing from profit. At the sample of Slovak companies it also holds true that the use of external sources in the previous period does not have a negative affect on their use in the oncoming year. In Hungary and Poland, thought the size of the sample of companies was different, there was proven a positive functional relation of return on equity on the use of external finance sources, which confirmed that when the efficiency grows, the willingness to use external finance sources grows as well. Unlike in the Czech Republic, the use of external finance sources did not limit the use of other external finance sources in the oncoming period. Thus the first hypothesis was not proven for the Slovak Republic which was the only one in the building industry to prove the pecking order theory, where internal finance sources are preferred to the external ones. At the same time, the second hypothesis was studied, the influence of return on equity reports the same functional dependency in all the countries monitored. The second hypothesis was not proven either, as the sample of Slovak companies reported a different functional dependency in the building industry.

The tendency of countries to the finance sources management from the view of the pecking order theory is not clear in the building industry. For this reason, the contrary relation was also studied – it comes from the compromise theory. The use of tax benefit from the debt should lead to the growth of return on equity. Another subject of the research was the turn of the relation of both monitored variables. In order to prove this, a positive functional dependency may be expected. The relation is expressed by the following equation (3):

$$ROE_{it} = \alpha_1 + \beta_1 * \Delta ROE_{it-1} + \beta_2 * DER_{it} + \varepsilon_{it}$$

(3)

where the endogenous dependent variable represents return on equity of it variable in time t, the exogenous independent variables being the delayed ROE value from the previous period and the development of return on equity. Symbols and are constants of the model and residual part in the GMM model. Again, the situation is modelled for the sample of companies of all the Visegrád Group countries.

From the view of approval or disproval of the above mentioned hypothesis H3 it may be stated that the positive functional dependency between the use of external finance sources and return on equity is apparent in Czech, Hungarian and Polish companies. In these countries, when using more external finance sources, the companies reported the growth of return on equity. The hypothesis was not proven in the sample of Slovak companies. In the sample of Slovak companies there was a negative functional dependency reported. Regarding the relation of profitability of the existing period and the profitability of the previous period, in the sample of all the countries, there was a negative functional

Tab. 3: ROE as dependent variable

	Czech Republic	Hungary	Poland	Slovakia
β_1	−0.002255[a]	−0.151979[a]	−0.8751[a]	−0.077614[a]
β_2	0.041419[a]	0.011159[a]	0.06572[a]	−0.035937[a]
S.E. of regression	2.304536	0.633383	6.1834	2.692037

Source: own

Note: Symbol a means statistical significant coefficient at 1% level

dependency reported. It is most significant in Poland and the least significant in the Czech Republic. All the values were with a very high statistic significance, which could tempt us to generalizations in the whole business branch. However, the model also reports a relatively high error rate (similar in all the countries), which means that generalization could lead to wrong decisions. At the same time it should be noted that the reported dependency of the independent quantity D/E ratio and dependent quantity ROE is significantly lower than in the contrary relation in all the countries monitored.

Conclusion

The aim of the paper was to evaluate whether there is a functional dependency between the used finance sources and reported rate of return on equity in the selected sample of companies from the area of building of the Visegrád Group, and to do such evaluation on the basis of a performed analysis. By researching the studies related to this topic, three hypotheses were made. The first hypothesis – The rate of external finance sources in the building branch is positively affected by return on equity – was disproven, as the same functional dependency was not reached in all four monitored countries. A different tendency was shown by the sample of companies in Slovakia. It also means that the second hypothesis – The affect of return on equity reports the same functional dependency in all monitored countries – needs to be rejected, too.

The last hypothesis – The use of external finance sources has a positive affect on ROE growth – was formulated in this way in order to find whether the affect of the use of external sources on ROE is the same as the affect of ROE on the use of external sources. Again, it was not possible to confirm the hypothesis in the sample of Slovak companies, as there was a negative functional dependency reported. If we are to compare the functional affect of the reciprocal relation of quantities, then we need to state that there was the same functional affect reported, however, the size of the reached profitability is of greater affect on decision-making about the use of external finance sources rather than the situation when the use of external finance sources would reflect in the return on equity. In this context there is potential for further study from the point of view of other factors affecting the rate of the use of external finance sources, such as the fixed assets of companies and liquidity rate of companies.

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Abstract

DEPENDENCY OF RETURN ON EQUITY AND USE OF FINANCE SOURCES IN BUILDING COMPANIES IN V4 COUNTRIES

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The aim of the paper is to evaluate whether there is a functional dependency between the used financial sources and reported rate of return on equity in the selected sample of companies from the area of building of the Visegrád Group, and to do such evaluation on the basis of a performed analysis. We will also examine the reverse relation, i.e. how the rate of use of external finance sources affects the return on equity. The research is performed at two levels. In the first level, the data are mutually compared on the basis of average values of ratio indicators in individual countries. From the methodological view, there are mainly two commonly-used ratio indicators used. The use of return on equity as well as debt/equity ratio comes from studies which are listed below in the text. The other level of research is focused on data of concrete companies, which is the basis for panel data regression processing. The attention is paid to the area of building. From this business branch, there were gained data for individual companies in categories: very large, large and middle-sized companies from the Amadeus database. From the view of the studied topic, the text will be focused on the dynamic theory of the capital structure – the pecking order theory. The reason for using just this theory is the fact that measurability of tax savings from the debt in context with financial distress costs, which is the core of static trade off theories, is problematic in conditions of the Czech Republic.