

The factors shaping the capital structure of the stock-exchange-listed companies in the Visegrad Group countries

Magdalena Gostkowska-Drzewicka¹, Ewa Majerowska²

Abstract

The purpose of this paper is an analysis of the impact of selected internal factors on the capital structure of the companies listed on the stock exchanges in the Visegrad Group countries. Using a dataset of the stock-exchange-listed entities in 1998–2016, we argue that the shaping of the capital structure in these companies is explained by the pecking order theory. The results of panel data modelling highlight that, despite the fact that the examined entities operate in one geographical region, in developing economies with the EU, impact of internal factors affecting the capital structure of the stock-exchange-listed companies in the Visegrad Group countries is not the same.

Keywords: *capital structure, pecking order theory, trade-off theory, transition economies, panel data estimation*

JEL Classification: *G32, C23*

1. Introduction

The issue of shaping the capital structure has been the subject of numerous studies for nearly 60 years. Despite the fact that so many years have passed, it remains a valid subject and is considered one of the key research trends in the area of corporate finance. Research results on the selection of financing sources are ambiguous and often mutually exclusive. Many theories explaining the issues related to shaping the structure of capital are known presently,, however, science has not developed any unambiguous solutions that could be used in economic practice. Most studies have recognized that companies act differently depending on their size, growth opportunities, debt cost, liquidity, industry effect, etc., which leads them to display different financial behaviors (Koralun-Bereźnicka, 2018; Acedo-Ramirez et al., 2017). New factors affecting the decisions regarding the shape of the capital structure are still being identified. It leads to modification of the existing concepts and development of the new ones, based on separate assumptions. One of the reasons behind the diversity of the factors shaping the capital structure are the different economic conditions and the diversified degree of development of the capital markets in individual countries or groups of countries, as exemplified by the Visegrad Group. During the period of economic transformation, these countries represented a similar level of socio-economic development. However, despite all the similarities, later on, these countries did not develop at the same pace. These differences concerned, among others, the conditions and the level of financial market development. Therefore, the aim of the article is as follows:

1. Analysis of the impact of selected factors, i.e. the growth rate, liquidity, the non-debt tax shield, profitability, company size and the structure of assets, on the capital structure of the companies listed on the stock exchanges in the Visegrad Group countries.

¹ Corresponding author: University of Gdansk, Department of Corporate Finance, 101 Armii Krajowej, 81-824 Sopot, magdalena.gostkowska-drzewicka@ug.edu.pl.

² University of Gdansk, Department of Econometrics, 101 Armii Krajowej, 81-824 Sopot, ewa.majerowska@ug.edu.pl.

2. To obtain an answer to the question whether the capital structure of stock-exchange-listed companies in the Visegrad Group countries is shaped in accordance with the assumptions of the trade-off theory or the pecking order theory.

Implementation of the aim formulated as such required verification of the following hypotheses:

1. The growth rate is negatively related to the amount of debt.
2. The relation between financial liquidity and the amount of debt is negative.
3. The non-debt tax shield is negatively related to the amount of debt.
4. There is a negative relation between profitability and the amount of debt.
5. The size of an enterprise is positively related to the amount of debt.
6. The structure of assets and the amount of debt are positively related.

The above hypotheses were verified using appropriate statistical tests. Calculations were carried out using the Gretl package. The analysis covered 328 companies listed on the stock exchanges in the countries of the Visegrad Group, during the years 1998–2016.

The article consists of an introduction, three parts and an ending. The first part deals with the shaping of the capital structure, in the context of the trade-off theory and the pecking order theory. The second part is an overview of the studies based on these concepts. Further, the methodology and the results of the research are presented, summarized in the conclusion part.

2. The shaping of the capital structure in the light of the trade-off theory and the pecking order theory

The static trade-off theory of capital structure is a development of the work by Modigliani and Miller (1958, 1963). In the following years it was modified multiple times, inter alia by Jensen and Meckling (1976) and Myers (1977, 1984). The static trade-off theory assumes that the optimal structure of capital in an enterprise results from balancing the interest-rate tax benefits with the so-called costs of financial difficulties (costs of bankruptcy), along with the agency costs related to equity and foreign capital. An optimal capital structure ensures maximisation of the market value of an enterprise, and at the same time – a minimal weighted average cost of capital. In the trade-off theory, an optimal ratio of interest-bearing liabilities to equity, i.e. the financial leverage, is determined. In practice, however, a fixed, optimal structure of capital is not possible, because a company's financial situation and the market environment are subject to constant changes.

A different approach to shaping of the capital structure is presented in the pecking order theory. This concept was first introduced by Donaldson (1961) and later on confirmed by Myers and Majluf (1984). In the same year, this theory was further refined by Myers (1984). The pecking order theory refers to the preferences of enterprises regarding the use of particular sources of financing. The order is as follows: first, internal sources are used, i.e. retained earnings as well as surpluses of cash and short-term financial assets. After exhaustion of these, enterprises reach for external sources. They issue debt securities in the first place,, followed by hybrid securities,

and only at the end – shares. In this theory, the target capital structure is not defined. The choice of individual sources of financing has decisive impact on the capital structure (Duliniec, 2015).

3. Overview of the research based on the trade-off theory and the pecking order theory

Mazur (2007) and Jaworski and Czerwinka (2017) confirmed that under the Polish conditions the pecking order theory serves as best explanation of the capital structure shaping in the entities examined. Hartwell and Malinowska (2018) argued that neither the trade-off nor the pecking order theories fully explain corporate capital structure in Poland. The authors indicate that the strength of property rights and stock market capitalization are driving forces behind corporate financing decisions. Majerowska and Gostkowska-Drzewicka (2017) found that the corporate performance of the companies is in line with pecking order theory.

Czech enterprises operating in the agricultural, industrial and construction sectors shaped the capital structure in accordance with the presumptions of both the pecking order theory and the trade-off theory. The size of these companies' debt was affected by the sectoral affiliation and the type of the ownership structure (Poulová, 2017). Bauer (2004) arrived at more definite conclusions, analysing Czech stock-exchange-listed companies from the non-financial sector. According to the author's research, the size of debt in the examined entities was negatively related to profitability, which is in line with the pecking order theory.

The capital structure of Slovakian enterprises from the non-financial sector is best explained by the trade-off theory (Režňáková et al., 2010). Research has shown a positive relation between the amount of debt and the structure of assets, the profitability and the company size. In turn, debt and growth opportunities, liquidity, and non-debt tax shield were related negatively.

In the 1990s, Hungarian public companies shaped the capital structure in accordance with the pecking order theory (Nivorozhkin, 2002; Dević and Krstić, 2001). Similar conclusions follow from a later research (De Jong et al., 2008). They showed a negative relation between the amount of debt and profitability, liquidity and the income tax rate. In turn, debt and company size were positively related.

4. Methodology and research results

On December 15th, 2017 there were 542 companies listed on the Stock Exchanges of the Visegrad Group countries. The sample excluded entities that did not submit complete financial statements during the period considered. Companies in bankruptcy or under restructuring were also rejected. In addition, only the entities that were continuously listed for a period of at least 5 years were admitted to the study. Ultimately, 328 enterprises were qualified for the research, i.e. almost 61% of the pre-selected entities (Table 1).

Based on the above-mentioned literature, to verify the hypotheses listed above, estimation of a linear model of panel data was proposed, in the following form:

$$Y_{it} = f(X_{1it}, \dots, X_{6it}, Z_{1it}, \dots, Z_{4it}, \xi_{it}) \quad (1)$$

where the endogenous variable Y is the amount of debt (D) represented by the ratio of total debt to total assets. The exogenous variables of the model are: X_1 – growth rate (GR), percentage change in sales revenues, in relation to the previous year; X_2 – financial liquidity (LIQ), the ratio of current assets to current liabilities; X_3 – non-debt tax shield (NDTS), the depreciation to total assets ratio; X_4 – profitability (ROA), the ratio of total assets to total equity; X_5 – size (SIZE), a natural logarithm from total assets; X_6 – asset structure (TANG), the ratio of tangible assets to the to total assets. The variables $Z_1, \dots, Z_4$ are the dummy variables that take the value of 1 when the company comes from the country selected, zero in other cases. The subscript i denotes the number of the company under consideration, t the number of the period, while is the random component. The proposed model (1) was estimated using a pooled OLS, taking into account all the selected factors shaping the capital structure. The results of the estimation are included in tab. 2.

Table 1. Numerical amounts of the companies listed on the Stock Exchanges of the Visegrad Group countries during the years 1998–2016 (as of December 15th, 2017)

Specification	Total number of companies	Number of the companies qualified for the analysis	Number of the companies that were rejected
stock-exchange-listed companies (Poland)	477	280	197
stock-exchange-listed companies (Hungary)	40	30	10
stock-exchange-listed companies (Czech Republic)	21	15	6
stock-exchange-listed companies (Slovakia)	4	3	1
Total	542	328	214

Statistical tests indicated existence of some statistically non-significant variables at the level of 0.05. Also the diagnostic tests suggested introducing a fixed effect model. Ultimately, by including all companies from all the countries under examination, it can be concluded that profitability has significant negative impact on the level of indebtedness. It means that the capital structure shaping in the companies listed on the Stock Exchanges in the Visegrad Group countries is best illustrated by the pecking order theory. Firstly, according to this concept, entities achieving high profitability usually show lower level of indebtedness, because they have large possibilities of financing their activity using internal sources. Secondly, the pecking order theory does not clearly indicate the direction of the relation between the size of an enterprise and its debt. This dependence can be both positive and negative. In the case of the examined

entities, it is positive, which is consistent with the assumptions of this concept. Thirdly, the relation between the debt ratio and the non-debt tax shield is positive, which is consistent both with the trade-off theory and the pecking order theory, but it is not statistically significant. Furthermore, dummy variables which identify the company's affiliation to a given country were introduced to the model. The results (presented in the table 1) point to statistically significant differences in the level of indebtedness of the companies from the Czech Republic and Hungary, in relation to Polish companies (lower level of indebtedness). Taking into account only the model's statistically significant variables, it can be concluded that, in general, the level of indebtedness of Hungarian companies was higher than that of the companies from other countries. The negative relation between two of the selected factors of capital structure and the level of indebtedness was also confirmed, which is consistent with the pecking order theory. In turn, the positive relationship between the level of indebtedness and the structure of assets is consistent with the trade-off theory.

Table 2. Estimates of the panel regression for the entire sample

	pooled	pooled	pooled	fixed effects	fixed effects
const	-2.2592***		-2.2862***	-10.1414***	-11.1380***
GR	0.0000	0.0000		0.0000	
LIQ	0.0004	-0.0004		0.0010	
NDTS	0.0549	0.0549		-4.3949	
ROA	-6.9919***	-6.9719***	-6.9918***	-7.0555***	-7.0607***
SIZE	0.2254***	0.2254***	-0.2335***	0.8546***	0.9173***
TANG	0.2650	0.2650		-0.3466	
CZECH	0.0231	-2.2362***			
SLOVAKIA	0.0681	-2.1911**			
HUNGARY	-1.7838***	-4.0431***	-1.7888***		
POLAND		-2.2592***			
Joint significance test	1.8736#	na	1.8662#	1.9869#	1.9820#
Breusch-Pagan test	8.3574#	na	8.6841#	12.6463#	12.8939#
Hausman test	39.4238#	na	29.6675#	47.0778#	40.2492#

*)***) statistically significant at the significance level of 0.1; 0.05 and 0.01

#) at 0.05 significance level, the null hypothesis should be rejected

In the next step, the proposed model for the companies coming from each country was estimated separately. The rationale for this was the significant differences in the number of

the companies in each country under analysis. Estimates of the best models are included in tab. 3.

Table 3. Panel regression estimates for each country separately

	CZECH REPUBLIC	SLOVAKIA	HUNGARY	POLAND
	fixed effects	pooled	fixed effects	fixed effects
const	−1.7331***	3.4403***	0.6077***	0.1369***
GR		0.0721*	−0.0000***	
LIQ		0.2593***	−0.004**	
NDTS			−2.9339***	−8.1535***
ROA	−0.2129***	−1.8262***	−1.9654***	−7.6549***
SIZE	0.1395***	−0.2297***		
TANG				
Joint significance test	49.1380#	0.0498	2.7012#	1.8663#
Breusch-Pagan test	547.180#	1.5726	26.5406#	79.6269#
Hausman test	24.0261#	na	19.2485#	38.7805#

*)***) statistically significant at the significance level of 0.1; 0.05 and 0.01

#) at 0.05 significance level, the null hypothesis should be rejected

The above estimates, only in the case of the data concerning the companies from Slovakia, indicated correctness of the pooled OLS estimation method. With regard to other countries, the use of a fixed effects estimator turned out to be most proper. In the case of the companies from the Czech Republic, the level of indebtedness is negatively affected by the level of ROA, while the company size is affected positively. It means that these companies shape their capital structure in accordance with the pecking order theory.

The debt of Slovakian companies is positively influenced by their liquidity and growth rate, and negatively by the ROA and the company size. It should be noted that the positive direction of the relation between liquidity and indebtedness is consistent with the trade-off theory. Other dependencies, however, are characteristic of the pecking order theory. It can be therefore assumed that this concept best describes the shaping of the capital structure in Slovakian companies.

Companies from Hungary show a decline in debt due to the increase in such factors as the growth rate, liquidity, the non-debt tax shield and the ROA. In the case of these entities, the negative direction of the relation between the growth rate and indebtedness suggests that they

shape their capital structure in accordance with the assumptions of the trade-off theory. However, the other dependencies are specific of the pecking order theory. It means that this concept quite better describes the shaping of the capital structure in Hungarian companies.

With regard to Polish companies an increase in the value of such factors as the non-debt tax shield and the ROA cause a decline in corporate debt. The direction of these dependencies clearly confirms that for these entities the pecking order theory is applicable. This conclusion is consistent with the study on the capital structure of Polish enterprises carried out by other authors.

Conclusions

The empirical analysis of the capital structure factors in the companies listed on the Stock Exchanges of the Visegrad Group countries indicates that the shaping of the capital structure in these entities is explained by the pecking order theory. Thus, with regard to the Czech companies, it was proved that the level of indebtedness is negatively influenced by the level of ROA, while the company size is positively affected by it. In Polish companies, the level of indebtedness was negatively related to the non-debt tax shield and profitability. It can be therefore assumed that in both countries, the stock-exchange-listed companies shape their capital structure in accordance with the pecking order theory.

In the case of Hungarian and Slovakian companies, inconclusive results were obtained. In Slovakian companies, the level of indebtedness is positively affected by the growth rate, while profitability and the company size affect it negatively, which is consistent with the pecking order theory. Conversely, the positive relation between financial liquidity and indebtedness is characteristic of the trade-off theory. In contrast, in Hungarian companies, the negative relations between indebtedness and such factors as financial liquidity and profitability are consistent with the pecking order theory. The negative relation between the non-debt tax shield and debt is consistent with both concepts. In turn, the negative relation between the growth rate and indebtedness points to substitution theories.

It can be concluded that out of the six hypotheses set out in the introduction, only in the case of Hungarian companies there are no reasons for rejecting the first and the second hypotheses, since the growth rate and the financial liquidity are negatively related to the amount of debt. There are no reasons to reject the third and the fourth hypotheses, i.e. the tax shield and profitability are negatively related to the level of indebtedness, in terms of Hungarian and Polish companies. The fifth hypothesis, assuming a positive relation between the size of the enterprise and its debt, was not rejected in the case of the companies from the Czech Republic. The last hypothesis, assuming a positive relation between the structure of assets and indebtedness, with regard to the companies from all countries, analysed separately, was rejected.

Analysing the models estimated for all the companies and taking into account the “country effect”, there are no reasons for rejecting the fourth and the fifth hypotheses, while the first, the second, the third and the sixth one should be rejected.

Ultimately, it follows that, despite the fact that the examined entities operate in one geographical region, in developing economies with the EU, impact of individual factors affecting the capital structure of the stock-exchange-listed companies in the Visegrad Group countries is not the same.

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