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Determinants of S.M.E.s capital structure in the Visegrad group

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ABSTRACT

In this article, we investigate the capital structure determinants of the Visegrad group, namely the Czech Republic, Slovakia, Hungary, and Poland for small- and medium-sized enterprises (S.M.E.s) from 2011 to 2018. We compare the capital structures of S.M.E.s across all mentioned countries and define how these may impact capital structure choices. The results show S.M.E.s in these countries determine their capital structure in similar ways and all the factors analysed in this study (except for growth opportunity) provide robust explanatory power for companies across all four countries. We find that profitability, liquidity, firm size, assets structure, and non-debt tax (depreciation of total assets) have a significant negative impact on capital structure for all four countries. Our study should be of interest to policymakers and companies who want to optimise their capital structure in order to improve company performance.

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1. Introduction

The topic of capital structure determination of small- and medium-sized enterprises (S.M.E.s) has attracted research interest during the last two decades. A large number of empirical studies have studied the debt determinants of large and listed companies. Most S.M.E.s are however unquoted firms as they do not meet the requirements to be listed in the stock market and/or due to their owners' reluctance, in order to avoid losing firm control and independence. The modern financial theory is shown to be incomplete in explaining S.M.E.s' capital structure decisions, since the orientations provided for this type of decision-making are based on maximising the firm's market value (Belas et al., 2018; Mateev et al., 2013).

Only more recently, numerous empirical studies (Belkhir et al., 2016; Daskalakis et al., 2017; McNamara et al., 2017 among others) have analysed S.M.E.s' capital structure decisions. S.M.E.s are prominent in the business sector in most developed countries. For example, in 2018, S.M.E.s in the E.U. 28 accounted for 99.8% of all the

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non-financial business sectors, generating 56.4% of value-added and 66.6% of employment (European Commission, 2018). Micro S.M.E.s are by far the most common type of S.M.E.s, accounting for 93% of all enterprises and 93.2% of all S.M.E.s. However, the rate of growth of S.M.E.s value added varied greatly among the Member States (regional differences) in Europe. Micro S.M.E.s represent the largest segment of S.M.E.s in all Member States. Small S.M.E.s account for more than 10% of all enterprises (European Commission, 2018). Despite the importance of S.M.E.s for job creation and production, most of the S.M.E. literature points to the fact that S.M.E.s face higher barriers to external financing than large firms, which limits their growth and development (Ardic et al., 2012).

Mateev et al. (2013) state that small firms find it difficult to obtain commercial bank financing, especially long-term loans, for several reasons, including lack of collateral, difficulties in proving creditworthiness, poor cash flows, inadequate credit history, high-risk premiums, underdeveloped bank–borrower relationships and high transaction costs. Thereby, understanding the determinants of capital structure is essential to apply the correct measures to encourage the availability of capital to S.M.E.s, subsequently accelerating the growth and development of these firms. Furthermore, it is well established that capital structure determinants are different in different countries. Particularly, Czerwonka and Jaworski (2021) state that although previous works show that some capital structure differences can be explained by modern capital structure theory in mature market economies, the capital structure decision in transition markets is still an open question for investigation.

In the paper by Kumar et al. (2020) using 'Web of Science' database in 2019 and a bibliometric analysis of the literature on capital structure of S.M.E.s of only 262 relevant articles over 20+ years of research they explained ongoing trend of publication on this topic. Through this comprehensive review of the literature, they have found still significant research gaps, which impedes the growth of the subject. The paper highlights the gap in the current body of knowledge and proposes five research gaps for future research on the Capital Structure of S.M.E.s. In our research area, we focus on two of them.

Martinez et al. (2019) explore the filtered Scopus database to detect papers referring to small firms, a filter of 'Pecking Order', 'Trade-Off' and 'Business Cycle' is applied. As a result, 100 articles are obtained. All of them are empirical works that study S.M.E. capital structure in European countries, especially with applications to Portugal (30.4%) and Swedish, Greece, and Italy (13% for each country). Also, there are empirical works for Vietnam, India, Turkey, Australia, New Zealand, and Austria. One research gap found relate to the lack of studies related to emerging economies. This result is in line with our own findings and allows us to state that there are no works that analyse the S.M.E.'s capital structure in the Visegrad Group and there are also scarce theoretical works that intend to improve the capital structure theories in emerging/transition markets. Hasan et al. (2017) state that the successful transition of Central and Eastern European (C.E.E.) countries from planned economies towards market-oriented economies would not have been possible without the increased number of S.M.E.s. The two most up-to-date research papers on the systematic literature review of the Capital structure of S.M.E.s also suggest there are still gaps in this topic.

The only research, which is similar to our work is a paper by Czerwonka and Jaworski (2021). Even though they have a comparable approach, our research includes a more updated data set and more importantly, our research also includes micro enterprises, whereas the research of Czerwonka and Jaworski (2021) excludes micro-enterprises from the sample. However, since microenterprises are the dominant group for S.M.E.s in the Visegrad group, we think including them in our data set is appropriate. We also provide additional empirical tests – G.M.M. with lags of the dependent variable to rule out the possibility of endogeneity and autocorrelation concerns.

There is clear evidence, that only two papers (including ours) directly related to the capital structure of the Visegrad Group are not enough to fill the research gap mentioned in the paper by Martinez et al. (2019) and Kumar et al. (2020). Therefore, the objectives of this study are to seek and explore the main determinants of capital structure in S.M.E.s in Visegrad countries and if these determinants support the traditional capital structure theory established to explain capital structure in developed economies. We focus on firm-specific characteristics such as future growth opportunities, liquidity, sales growth, size, and asset structure.

We believe that the article contributes to the recent firms' capital structure determinants in several ways: The first objective is that we broaden the scope of the debate to the limited empirical research regarding capital structure determinants of S.M.E.s in emerging/transition economies. To the best of our knowledge, this is one of the first comprehensive studies of capital structure choice in the Visegrad region (multi-countries) for S.M.E.s. There is no prior research on firm capital structure decisions dedicated specifically to this region for S.M.E.s (except for Czerwonka and Jaworski 2021).

Secondly, this research provides a comprehensive study of capital structure choices with the latest data set and empirical evidence on the determinants of capital structure. Furthermore, the results of our study add and strengthen some of the findings to date. We established S.M.E.s' debt as being mainly determined by firm-specific factors. Overall, we believe that the paper makes a significant contribution to understanding S.M.E. finance in the context of Visegrad Group.

The remainder of the article is structured as follows. In Section 2, theoretical discussions and empirical hypotheses are presented. Section 3 presents data analysis and regression is performed, and the results are reported. Section 4 summarises the main findings and concludes.

2. Theoretical discussions and empirical hypotheses

2.1. What determines capital structure? A brief literature review

Empirical research on S.M.E.s capital structure decisions is relatively recent, and the first studies on this topic have focused on the differences between small firms and large firms. More recently, various studies have focused S.M.E. capital structure decisions. There are two main theoretical approaches explaining firm-level determinants of capital structure: the trade-off and the pecking order hypotheses. The trade-off theory assumes that firms have one optimal capital structure that maximises the value of the firm since the cost of debt is always lower than the cost of equity because interest from debt is tax deductible. The pecking order theory is an alternative to the trade-off theory of capital structure.

The pecking order theory postulates that the cost of financing increases with asymmetric information which occurs between either shareholders/managers and investors. Mateev et al. (2013) suggest that in such cases, a company should prefer to finance itself first internally through retained earnings, followed by debt and, lastly, equity.

The literature on capital structure characterises various factors related to the firm capital structure decisions that are empirically robust and financially significant: profitability, size, asset tangibility and growth, in explaining firm capital structure decisions. Psillaki and Daskalakis (2009) report that firm size is positively correlated with leverage while asset structure, profitability, and risk are negatively explained capital structure. The main conclusion of this study is that firm-specific rather than country characteristics explain differences in capital structure choices of S.M.E.s. Similarly, Kayo and Kimura (2011) analysed capital structure determinants across 40 countries and found out that firm-specific factors are more important determinants than the industrial or macroeconomic variables. In the research of Mateev et al. (2013), using the cash flow as an explanatory variable, they found that that larger firms with sufficient internal funds use less external funding than comparable smaller firms. Their results indicate evidence to support the pecking order theory. The paper reports a negative and significant correlation between profitability and leverage. Czerwonka and Jaworski (2021) also confirmed the dominant role of firm-specific factors. Industry and country variables explain only 4% of the debt variability of the surveyed companies. The direction of influence of the diagnosed firm-specific factors is consistent with the pecking order theory. About one-fourth of S.M.E.s in C.E.E. holds a stock of debt capacity. It negatively affects the share of debt in the capital.

More recently, several studies have investigated the determinants of capital structure in international samples involving firms from different countries. Pepur et al. (2016), Li et al. (2019) and Kenourgios et al. (2019) analyse S.M.E. capital structure decisions for European countries and identify differences in the determinants of firms' capital structure across the various countries. Those authors suggest the differences are probably better explained by firm-specific factors than by country-specific factors. Furthermore, these studies provide interesting results. Some firm-level factors are associated with corporate leverage similarly no matter which country or region the firm is located in. For instance, in line with the trade-off theory of capital structure, firm size and asset structure are positively associated with leverage ratios. On the contrary, following the pecking order theory of capital structure, firm profitability is likely to be negatively correlated with leverage ratios in most of these studies.

2.2. Visegrad group economic situation[1]

In this section, we provide the explanation why it is important to focus on Visegrad countries and provide a description of the quality of the economic environment in Visegrad countries, which may help in predicting and understanding capital structure decisions of firms located in this region:

> Visegrad Group become lately the crucial part of the European Union and might be considered as a new economic heart of Europe. If counted as a single nation-state, the V4 would be the fifth-largest economy in Europe and 12th globally. Its population of

64 million would rank it 22nd-largest in the world and 4th in Europe. Most live in Poland (38 million), followed by the Czech Republic (nearly 11 million), Hungary (nearly 10 million), and Slovakia (5.5 million).

2.3. Empirical hypothesis

In this section, we formulate several empirical hypotheses to examine which of the two capital structure theories, trade-off and pecking order theory better explains the capital structure of S.M.E.s in the Visegrad Group. Our research used leverage as the dependent variable. Following, Bonfim and Antão (2012), Mateev et al. (2013) and Matias and Serrasqueiro (2017) we measure it by the total leverage ratio (TT_LEV) – total debt to total assets, long-term leverage ratio (LT_LEV), defined as long-term debt to total assets, and short-term leverage ratio (ST_LEV), defined as short-term debt to total assets.

2.4. Explanatory variables

This research article utilised five independent variables involving five firm-specific factors i.e., profitability, growth opportunities, current liquidity, firm size, assets structure, and Non-debt_tax (depreciation of total assets). All these variables are firm-specific and vary through time.

2.4.1. Profitability (Profit_RATIO)

Return on assets (R.O.A.) as a proxy for profitability is the ratio of earnings before interest and tax (E.B.I.T.) over total assets. External equity is not usually available as a funding source for S.M.E.s since most of these firms are outside the stock market. According to trade-off theory, more profitable firms are likely to increase their target leverage ratios. On the contrary, the pecking order theory indicates that firms prefer internal funds over external ones to finance their investments. In an environment where institutions are not well developed to help mitigate information asymmetry between lenders and firms, raising debt can be costly for firms (Belkhir et al., 2016). Thus, firms raise less debt if their profitability allows them to meet their investment needs. We, thus, expect that more profitable firms have less leverage within each of our Visegrad countries.

H1. There is a negative relationship between profitability and debt in Visegrad S.M.E.s.

2.4.2. Growth opportunities (INTA_ASSETS)

Future growth opportunities are defined as the ratio between intangible assets to total assets (Mateev et al., 2013). The trade-off theory predicts that firms with more growth opportunities tent to have less leverage and therefore there should be a negative relationship between growth opportunities and leverage (Myers, 1984).

H2. There is a negative relationship between growth and debt in Visegrad S.M.E.s.

2.4.3. Liquidity (CURR_RATIO)

Current liquidity is calculated as the ratio of current assets to current liabilities and is used to control short-term liquidity effects. Firms with more liquid assets face lower

bankruptcy costs and can raise more debt and is also a source of agency costs (Belkhir et al., 2016). As the trade-off theory states, more liquid assets will result in more leverage. However, in the pecking order theory, more liquid assets indicate less information asymmetry and, hence, a better ability to raise equity. This implies that higher asset liquidity is conducive to less leverage. Similar to previous research (Belkhir et al., 2016; Bonfim & Antão, 2012), we expect short-term liquidity to be negatively correlated with a firm's leverage ratios.

H3. There is a negative relationship between liquidity and debt in Visegrad S.M.E.s

2.4.4. Size (TOT_ASSETS)

Size is measured as the natural logarithm of a firm's total assets, with the aim of controlling a possible non-linearity in the data and the consequent problem of heteroscedasticity (Sbeiti 2010). He concludes that firm size is especially relevant in explaining S.M.E.s' capital structure since larger, more diversified firms are expected to have higher target leverage ratios because they have lower monitoring costs, fewer agency costs of debt, and need more debt to fully benefit from the tax shield.

H4. There is a positive relationship between firm size and debt in Visegrad S.M.E.s

2.4.5. Assets structure (TAN_ASSETS)

Assets structure is calculated as the share of a firm's fixed assets to total assets. By reducing expected bankruptcy costs and agency costs, tangible assets are expected to raise a firm's target leverage (Frank & Goyal, 2009).

H5. There is a positive relationship between growth and debt in Visegrad S.M.E.s

2.4.6. Non-debt_Tax

Non-debt tax shield is measured as depreciation of total assets. It is suggested that firms with large non-debt tax shields will issue less debt.

H6. There is a negative relationship between non-debt tax and debt in Visegrad S.M.E.s

Table 1 shows a summarised description of both dependent and explanatory variables.

3. Empirical tests and results

3.1. Sample set

The sample of S.M.E.s tested in our research has been obtained from the AMADEUS database for companies from the Visegrad group. We choose the time period 2011–2018 so our data set would not be influenced by the financial crisis and to have the latest data set with the most recent number of firms with complete data. Following (Mateev et al., 2013) to gets the best regression results possible we applied some filters to the data. We remove companies with missing observations or lack of full data records (for any variables in the analysing period). We also excluded financial institutions from the sample, since the financial statements of the firms in the financial sector (banks,

Table 1. Table shows a summarised description of both dependent and explanatory variables.

Variable	Definition	Explanation	Expected sign
Dependant variables			
TT_LEV	Total leverage ratio	Total debt to total assets, in period t	
LT_LEV	Long-term leverage ratio	Long-term debt to total assets, in period t	
ST_LEV	Short-term leverage ratio	Short-term debt to total assets, in in period t	
Explanatory variables			
Profit_RATIO	EBIT/Total assets, proxy for Profitability	The ratio of earnings before interest and taxes to total assets in period t (ROA)	−
INTA_ASSETS	Intangible assets/Total assets, proxy for future growth opportunities	The ratio of intangible assets to total assets in period t	−
CURR_RATIO	Current assets/Current liabilities, proxy for short-term liquidity	The ratio of current assets to current liabilities in period t	−/+
TOT_ASSETS	Book value of total assets, proxy for firm size (in euro)	Log of firm's total assets in period t	+
TAN_ASSETS	Tangible assets/Total assets, proxy for assets structure	The ratio of tangible assets to total assets in period t	+
Non-debt_TAX	Depreciation to total assets, proxy for non-debt tax shield	Depreciation to total assets in period t	−

Source: Own construction.

insurance companies) have a different structure from those of nonfinancial companies. We also remove from the data set observations with a negative value of assets and negative book equity and observations with missing or non-positive value of operating revenues. As a result, the final sample set consists of a balanced panel with a total number of 53,704 observations. This observation corresponds to about 6713 firms over a period of eight years.

In Table 2, we divided the firms in our sample into three size classes (following the European Commission's S.M.E. definition), the biggest percentage of all companies in the sample are micro firms (68%) having less than 10 employees. As would be expected, about 39% of these firms do use external financing, more specifically short-term loans, and trade credits. The median leverage ratio for this group is 40% during the sample period. Small-sized firms are the second-largest share of all firms in our sample (28%) with a median leverage ratio of 47%. Medium-size firms account for only 4% of the total sample and are the most leveraged ones (with a median leverage ratio of 49%). We also group firms according to economic sectors (see Table 3, Panel B). The most leveraged sectors (median values) are construction (50.3%), wholesale and retail trade (48.8%), and manufacturing (45.1%). What is important to point out is the number of firms and observations for Poland in our data set. Although Amadeus is one of the most comprehensive databases in terms of the financial data for European countries, only 67 Polish firms in Amadeus have complete data for our analysis (608 observations). Many S.M.E.s in Poland have no requested data in their financial statements and evidently do not submit a full annual report to the National Court Register (N.C.R.) as requested by authorities.

We use a panel data methodology for our empirical research, so we can control firm heterogeneity and reduce collinearity among the variables since the sample contains data across firms and over time. Furthermore, this method allows more precise

Table 2. Sample breakdown by firm size and sector.

	Number of observations					Number of firms					Leverage ratio (median)				
	CZ	SK	HU	PL	Total	CZ	SK	HU	PL	Total	CZ	SK	HU	PL	Total
Panel A															
Size (as of 2018)															
Micro (<10 employees)	3992	22,456	10,032	112	36,592	499	2807	1254	14	4574	0.349	0.469	0.291	0.517	0.398
Small (<50 employees)	3320	6040	5240	312	14,912	415	755	655	39	1864	0.446	0.562	0.393	0.507	0.470
Medium (<250 employees)	672	688	656	184	2200	84	86	82	23	275	0.453	0.599	0.462	0.352	0.4884
Total sample	7984	29,184	15,928	608	53,704	998	3648	1991	76	6713	0.403	0.495	0.336	0.446	0.4247
Panel B															
Sector															
Manufacturing (10)	1536	3264	2320	40	7160	192	408	290	5	895	0.442	0.539	0.359	0.148	0.4508
Agriculture, fishing & mining (3)	296	640	784	8	1728	37	80	98	1	216	0.367	0.547	0.285	0.747	0.3632
Construction (5)	1120	2848	1776	16	5760	140	356	222	2	720	0.466	0.602	0.398	0.860	0.503
Transport, storage and communication (15)	600	2176	1528	0	4304	75	272	191	0	538	0.436	0.498	0.333	0.000	0.4184
Accommodation and food service activities (1)	216	528	552	16	1312	27	66	69	2	164	0.429	0.534	0.266	0.677	0.3923
Wholesale and retail trade (17)	1592	6048	3920	0	11,560	199	756	490	0	1445	0.473	0.574	0.392	0.000	0.4875
Real estate, renting and business activities (14)	464	1088	1384	0	2936	58	136	173	0	367	0.270	0.500	0.162	0.000	0.2706
Professional, scientific and technical activities (13)	704	4680	1264	112	6760	88	585	158	14	845	0.291	0.462	0.350	0.424	0.4132
Human health and social work activities (8)	544	3744	704	136	5128	68	468	88	17	641	0.223	0.304	0.212	0.460	0.2803
Other	912	4168	1696	280	7056	114	521	212	35	882	0.386	0.467	0.344	0.406	0.4167
Total sample	7984	29,184	15,928	608	53,704	998	3648	1991	76	6713	0.403	0.495	0.336	0.446	0.425

Source: AMADEUS database (2020); authors calculations.
Note: Leverage ratio is taken as ratio of total debt to total assets.

Table 3. Summary statistics of explanatory variables.

	Czech Republic			Slovakia			Hungary			Poland			TOTAL		
	Obs. = 7984			Obs. = 29,184			Obs. = 15,928			Obs. = 608			Obs. = 53,704		
	Mean	Std. Dev.	Median	Mean	Std. Dev.	Median	Mean	Std. Dev.	Median	Mean	Std. Dev.	Median	Mean	Std. Dev.	Median
Total assets, EUR'000	1364.956	2356.501	570.318	633.2508	1507.150	208.425	1558.965	764.9619	262.345	4824.617	5286.454	2377.069	828.5468	1828.114	262.3559
TD/TA, %	0.4190	0.3386	0.4026	0.4867	0.2731	0.4946	0.3583	0.2258	0.3357	0.5099	1.0520	0.4457	0.4388	0.2975	0.4247
LTD/TA, %	0.0490	0.1218	0.0000	0.0311	0.0969	0.0000	0.0086	0.0539	0.0000	0.1725	1.0385	0.0377	0.0287	0.1442	0.0000
STD/TA, %	0.3700	0.3337	0.3283	0.4556	0.2720	0.4495	0.3497	0.2208	0.3272	0.3374	0.2254	0.2937	0.4101	0.2726	0.3865
Profit_RATIO, %	0.1290	0.1800	0.0888	0.1450	0.2021	0.0966	0.1047	0.1517	0.0732	0.0851	0.1473	0.0622	0.1300	0.1855	0.0868
INTA_ASSETS,%	0.0047	0.0359	0.0000	0.0020	0.0316	0.0000	0.0086	0.0520	0.0000	0.0259	0.0787	0.0008	0.0046	0.0402	0.0000
CURR_RATIO; %	4.1708	35.1523	1.7172	3.5886	25.0479	1.3760	3.8450	19.3404	1.5363	2.8515	10.5371	1.2508	3.7428	25.2368	1.4596
TOT_ASSETS	2.7417	0.6057	2.7561	2.3615	0.5929	2.3189	2.4597	0.5846	2.4189	3.4124	0.5199	3.3760	2.4591	0.6143	2.4189
TAN_ASSETS, %	0.3088	0.2687	0.2267	0.3403	0.2618	0.2801	0.4727	0.2825	0.4706	0.5016	0.3315	0.5630	0.3767	0.2778	0.3242
Non-debt_TAX, %	0.0600	0.0580	0.0441	0.0870	0.0817	0.0635	0.0626	0.0607	0.0466	0.0479	0.0426	0.0358	0.0753	0.0735	0.0543

Source: Own calculation; the variables are defined in Table 1.

and powerful statistical tests and measurement of the importance of non-observable individual effects. Our panel data model may be represented as follows:

$$y_{it} = \alpha + X'_{it}\beta + u_{it}\, \mathrm{i} = 1;\ \ldots\ldots;;\ \mathrm{t} = 1$$

y_{it} is one of three debt ratios where i implies the cross-section dimension and t indicates the time dimension, X'_{it} is a 1 x k vector of observations on k explanatory variables for the ith firm in the tth period, β is a k x 1 vector of parameters, u_{it} is a disturbance term and is defined as:

$$u_{it} = u_i + v_{it}$$

where u_i denotes the unobservable individual effect and v_{it} denotes the remainder disturbance. Three methods, pooled O.L.S., fixed effects, and random effects are used for individual countries and for the whole sample.

3.2. Empirical results

Table 3 presents summary statistics for the whole sample of 53,704 observations (6713 firms). The total average debt ratio for all countries is 44%. The average debt ratio is 0.42 for the Czech Republic, 0.49 for Slovakia, 0.36 for Hungary, and 0.51 for Poland. S.M.E.s in our sample reveal a low degree of long-term leverage, with the ratio of long-term debt to total assets (a mean of 2.9%), (5% for the Czech Republic, 3% for Slovakia, 1% for Hungary and 12% for Poland) far lower than the short-term leverage ratio. Numbers indicate that companies in these countries are mainly equity capital or short-term financed. The main reason for the lack of long-term debt might be the size of companies (68% of companies are micro-sized firms). Banks in these countries provide mostly short-term working capital financing rather than resources for long-term investments for S.M.E.s. Another reason might be that the domestic bond markets in these countries are still developing when compared with those in the more advanced, western world. The averages for the short-term debt vary from a low of 33.74% for Poland to a high of 45.56% for Slovakia. The median of PROFIT_RATIO is 8.6% for sample firms during the examined period. The CURR_RATIO (short-term liquidity), is high (a median of 1.46), and indicates that the average firm in our sample has no problem with meeting its current obligations. Also, the ratio of INTA_ASSETS to total assets (future growth opportunities) is very low (a median of 0.0000). The reason might be that micro and small-sized firms do not invest funds in R&D, patents, and copyright. The data for assets structure shows that, on average, the share of tangible assets in a firm's total assets is 37.67%.

Table 4 shows the correlation matrix of all variables in the study and is used to test the possible degree of collinearity among these variables. Table 4 indicates the correlations between independent variables are very low to cause collinearity problems.

Tables 5 and 6 report estimation results for total, long-, and short-term leverage for individual countries and the whole sample. The fixed-effects model has a statistical advantage over the random effects and pooled models. It has a higher adjusted

Table 4. Correlation matrix of model variables.

	Profit_RATIO	INTA_ASSETS	CURR_RATIO	TOT_ASSETS	TAN_ASSETS	Non-debt_TAX
Czech Republic						
Profit_RATIO	1.000					
INTA_ASSETS	0.0043	1.000				
CURR_RATIO	0.0703***	−0.0308**	1.000			
TOT_ASSETS	−0.1830***	0.0370***	−0.0194	1.000		
TAN_ASSETS	−0.2400***	−0.0886***	−0.0635***	0.2250***	1.000	
Non-debt_TAX	0.0305**	0.1200***	−0.0318**	−0.2940***	0.2490***	1.000
Slovakia						
Profit_RATIO	1.000					
INTA_ASSETS	−0.0250***	1.000				
CURR_RATIO	0.1890***	−0.0387***	1.000			
TOT_ASSETS	−0.1890***	0.1010***	−0.0542***	1.000		
TAN_ASSETS	−0.2370***	−0.0492***	−0.2070***	0.1410***	1.000	
Non-debt_TAX	−0.0272***	−0.0093	−0.0923***	−0.3640***	0.3070***	1.000
Hungary						
Profit_RATIO	1.000					
INTA_ASSETS	−0.0341***	1.000				
CURR_RATIO	0.0328***	−0.0356***	1.000			
TOT_ASSETS	−0.103***	0.0529***	−0.115***	1.000		
TAN_ASSETS	−0.172***	−0.122***	−0.171***	0.0826***	1.000	
Non-debt_TAX	0.0533***	0.0676***	−0.0821***	−0.240***	0.218***	1.000
Poland						
Profit_RATIO	1.000					
INTA_ASSETS	−0.00517	1.000				
CURR_RATIO	0.1540***	0.1180**	1.000			
TOT_ASSETS	−0.2850***	0.0657	−0.0313	1.000		
TAN_ASSETS	−0.2910***	−0.2370***	−0.3250***	0.2990***	1.000	
Non-debt_TAX	−0.0453	0.1130**	−0.1400***	−0.1180**	0.1470***	1.000
Total						
Profit_RATIO	1.000					
INTA_ASSETS	−0.0339***	1.000				
CURR_RATIO	0.1320***	−0.0318***	1.000			
TOT_ASSETS	−0.1740***	0.0821***	−0.0533***	1.000		
TAN_ASSETS	−0.2340***	−0.0655***	−0.1760***	0.1310***	1.000	
Non-debt_TAX	0.0133**	0.0181***	−0.0819***	−0.3390***	0.2340***	1.000

Source: Own calculation; the variables are defined in Table 1.
**Indicates that correlation is significant at the 10% level.
***Indicates that correlation is significant at the 1% level.
='*$p < 0.05$, **p < 0.01, ***$p < 0.001$'.

R2, and for the joint test, all of the three models for total, long- and short-term leverage are significant at a 5% or better critical level. There are similar results for size, non-debt tax shield, profitability, and taxes.

The empirical results have suggested that all coefficients except for growth opportunities are significant for the total leverage regression (Table 5). The coefficients of profitability, liquidity, size, asset structure, and Non-debt TAX are significant also for the long-term and short-term leverage and all countries (Tables 5 and 6). It shows that the three models offer quite similar results but slightly different levels of significance for all leverage estimators. The significant exception is long-term leverage estimation. The growth opportunity is significant in the long-term leverage estimation but not significant in the total and short-term leverage estimation. Furthermore, liquidity, size, asset structure is positive and highly significant in the long-term leverage estimation but negative in the total and short-term leverage estimation. To sum up, based on our results, it is found that:

Table 5. Three different estimators of total, long- and short-term leverage.

Dependent variable:	Total leverage			Long-term leverage			Short-term leverage		
Independent variables:	Fixed effects	Random effects	Pooled OLS	Fixed effects	Random effects	Pooled OLS	Fixed effects	Random effects	Pooled OLS
Profit_RATIO	−0.270***	−0.289***	−0.368***	−0.008***	−0.008***	−0.007***	−0.261***	−0.282***	−0.362***
	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.000
INTA_ASSETS	0.024	−0.099*	−0.730***	0.073***	0.044*	−0.046**	−0.051	−0.158***	−0.678***
	0.705	0.095	0.000	0.005	0.067	0.04	0.419	0.007	0.000
CURR_RATIO	−0.016***	−0.017***	−0.025***	0.001***	0.001***	0.000***	−0.017***	−0.018***	−0.025***
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOT_ASSETS	−0.026***	−0.004*	0.025***	0.028***	0.026***	0.024***	−0.055***	−0.029***	−0.001
	0.000	0.096	0.000	0.000	0.000	0.000	0.000	0.000	0.502
TAN_ASSETS	−0.087***	−0.124***	−0.226***	0.059***	0.058***	0.055***	−0.149***	−0.190***	−0.287***
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Non-debt_TAX	−0.226***	−0.170***	0.049***	−0.026***	−0.017***	0.022***	−0.194***	−0.142***	0.031**
	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.037
Constant	0.639***	0.602***	0.587***	−0.064***	−0.058***	−0.055***	0.704***	0.660***	0.648***
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Observations	53,663	53,663	53,663	53,663	53,663	53,663	53,663	53,663	53,663
R-squared	0.197	0.196	0.329	0.036	0.036	0.068	0.213	0.359	0.358
F statistic	1013.43***	–	3125.14***	294.95***	–	655.15***	2113.68***	–	4996.67***
Probability > F	0.000	–	0.000	0.000	–	0.000	0.000	–	0.000
Wald $\chi 2$	1544.02			43.92			1613.95		
Probability > $\chi 2$	0.000			0.000			0.000		
Number of cc_id	6713	6713	6713	6713	6713	6713	6713	6713	6713

Source: Own calculation.
***Significant at 1% significance level; **significant at 5% significance level, *significant at 10% significance level.
The Hausman specification test is employed to test the fixed and random effects model.
The random effect model is rejected in favor of the fixed effect model at a 1%.

Table 6. Three different estimators of total, long- and short-term leverage.

	Czech Republic			Slovakia			Hungary			Poland		
Independent variables:	Fixed effects	Random effects	Pooled OLS	Fixed effects	Random effects	Pooled OLS	Fixed effects	Random effects	Pooled OLS	Fixed effects	Random effects	Pooled OLS
Panel A. Total leverage												
Profit_RATIO	−0.249***	−0.279***	−0.416***	−0.294***	−0.322***	−0.402***	−0.215***	−0.214***	−0.220***	−0.185***	−0.199***	−0.169**
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.028
INTA_ASSETS	−0.01	−0.018	−0.262*	0.411**	0.314*	−0.267	−0.081	−0.097	−0.277***	−0.108	−0.142	−0.335***
	0.951	0.903	0.089	0.000	0.073	0.139	0.241	0.117	0.000	0.300	0.168	0.007
CURR_RATIO	−0.010***	−0.011***	−0.017***	−0.019***	−0.021***	−0.028***	−0.013***	−0.015***	−0.021***	−0.026***	−0.029***	−0.050***
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOT_ASSETS	−0.056***	−0.034***	−0.007	−0.017***	0.003	0.017***	−0.034***	0.001	0.040***	0.125***	0.063***	−0.123***
	0.000	0.000	0.137	0.000	0.315	0.000	0.000	0.718	0.000	0.000	0.006	0.000
TAN_ASSETS	−0.032**	−0.065***	−0.155***	−0.049***	−0.064***	−0.101***	−0.205***	−0.231***	−0.283***	0.144***	0.097**	0.041
	0.035	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.026	0.207
Non-debt_TAX	−0.394***	−0.349***	−0.103*	−0.204***	−0.214***	−0.281***	−0.277***	−0.189***	0.022	−1.238***	−1.114***	−0.905***
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.463	0.000	0.000	0.000
Constant	0.686***	0.641***	0.622***	0.662***	0.630***	0.648***	0.617***	0.542***	0.479***	0.104	0.340***	1.041***
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.251	0.000	0.000
R-squared	0.156	0.155	0.289	0.227	0.2266	0.386	0.188	0.184	0.325	0.285	0.2743	0.319
F statistic	214.66	–	540.49	1251.3	–	3052.04	535.18	–	1278.72	35.01	–	46.86
Probability > F	0.000	–	0.000	0.000	–	0.000	0.000	–	0.000	0.000	–	0.000
Wald $\chi 2$	2187.68			669.18			551.05			43.08		
Probability > $\chi 2$	0.000			0.000			0.000			0.000		
Panel B. Long-term leverage												
Profit_RATIO	−0.015*	−0.013*	−0.009	−0.008***	−0.009***	−0.010***	−0.002	−0.002	−0.006**	−0.023	−0.034	0.002
	0.065	0.085	0.257	0.008	0.001	0.000	0.435	0.312	0.016	0.587	0.420	0.977
INTA_ASSETS	0.02	−0.008	−0.026	0.271***	0.232***	0.143*	−0.002	0.006	0.011	0.102	0.097	0.056
	0.808	0.921	0.725	0.000	0.001	0.051	0.867	0.666	0.327	0.232	0.246	0.534
CURR_RATIO	0.000	0.000	−0.000***	0.001***	0.001***	0.001***	0.000	0.000	0.000	0.009***	0.007***	−0.001
	0.966	0.928	0.008	0.000	0.000	0.000	0.961	0.862	0.589	0.000	0.001	0.772
TOT_ASSETS	0.065***	0.041***	0.020***	0.034***	0.026***	0.017***	0.002**	0.008***	0.015***	0.079***	0.024	−0.101***
	0.000	0.000	0.000	0.000	0.000	0.000	0.046	0.000	0.000	0.000	0.191	−0.014
TAN_ASSETS	0.144***	0.142***	0.144***	0.065***	0.073***	0.093***	0.004**	0.004***	0.006***	0.491***	0.409***	0.338***
	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.003	0.000	0.000	0.000	0.000
Non-debt_TAX	0.043	0.047*	0.038	−0.035***	−0.044***	−0.075***	−0.007	−0.002	0.017**	−0.565***	−0.506***	−0.735***
	0.132	0.076	0.144	0.000	0.000	0.000	0.329	0.782	0.010	0.001	0.002	0.000
Constant	−0.176***	−0.110***	−0.049***	−0.071***	−0.055***	−0.035***	0.001	−0.013***	−0.034***	−0.377***	−0.144**	0.342***
	0.000	0.000	0.000	0.000	0.000	0.000	0.737	0.000	0.000	−0.074	0.03	0.000

(*continued*)

Table 6. Continued.

	Czech Republic			Slovakia			Hungary			Poland		
Independent variables:	Fixed effects	Random effects	Pooled OLS	Fixed effects	Random effects	Pooled OLS	Fixed effects	Random effects	Pooled OLS	Fixed effects	Random effects	Pooled OLS
R-squared	0.089	0.086	0.141	0.046	0.045	0.092	0.001	0.001	0.053	0.244	0.235	0.301
F statistic	113.66	–	218.75	203.99	–	493.77	2.21	–	149.18	28.34	–	43.11
Probability > F	0.000	–	0.000	0.000	–	0.000	0.000	–	0.000	0.000	–	0.000
Wald $\chi 2$	67.34			90.06			95.06			55.29		
Probability > $\chi 2$	0.000			0.000			0.000			0.000		
Panel C. Short-term leverage												
Profit_RATIO	−0.233***	−0.269***	−0.408***	−0.286***	−0.315***	−0.391***	−0.213***	−0.211***	−0.213***	−0.158***	−0.165***	−0.167***
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.001	0.007
INTA_ASSETS	−0.034	−0.019	−0.239	0.132	0.072	−0.401**	−0.061	−0.093	−0.290***	−0.210**	−0.253***	−0.389***
	0.827	0.898	0.101	0.477	0.682	0.024	0.364	0.123	0.000	0.039	0.008	0.000
CURR_RATIO	−0.010***	−0.011***	−0.016***	−0.020***	−0.022***	−0.029***	−0.013***	−0.015***	−0.021***	−0.035***	−0.038***	−0.050***
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOT_ASSETS	−0.123***	−0.077***	−0.028***	−0.052***	−0.023***	−0.001	−0.034***	−0.007*	0.022***	0.045*	0.022	−0.023
	0.000	0.000	0.000	0.000	0.000	0.814	0.000	0.059	0.000	0.063	0.284	0.147
TAN_ASSETS	−0.179***	−0.216***	−0.306***	−0.116***	−0.142***	−0.203***	−0.212***	−0.238***	−0.291***	−0.345***	−0.317***	−0.296***
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Non-debt_TAX	−0.427***	−0.380***	−0.130**	−0.164***	−0.166***	−0.199***	−0.259***	−0.181***	0.002	−0.634***	−0.534***	−0.161
	0.000	0.000	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.004	0.384
Constant	0.865***	0.756***	0.676***	0.735***	0.687***	0.689***	0.612***	0.556***	0.519***	0.479***	0.545***	0.698***
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
R-squared	0.193	0.188	0.341	0.238	0.236	0.393	0.198	0.196	0.335	0.338	0.335	0.373
F statistic	276.94	–	687.05	1327.93	–	3143.57	572.83	–	1333.18	44.79	–	59.59
Probability > F	0.000	–	0.000	0.000	–	0.000	0.000	–	0.000	0.000	–	0.000
Wald $\chi 2$	293.89			721.78			508.96			13.15		
Probability > $\chi 2$	0.000			0.000			0.000			0.041		

Source: Own calculation.

1. there is a negative relationship between profitability and debt;
2. there is a negative relationship between liquidity and debt;
3. there is a negative relationship between a firm's size and debt;
4. there is a negative relationship exists between an asset structure and debt;
5. there is a negative relationship between Non-debt TAX and debt.

3.2.1. Profitability

Profitability and total debt, long-term debt, and short-term debt are negative and significant in total and for all four sample countries. The negative and significant results are in line with the pecking order theory that firms tend to use internal sources of financing when profits grow. Furthermore, our finding provides the similar results as the findings of other studies using international samples (Belkhir et al., 2016; Kenourgios et al., 2019), suggesting that firms become less dependent on debt as they become increasingly reliant on retained earnings. Moreover, this negative relationship between profitability and debt can be explained by the desire of S.M.E.s' owners/managers for control of their business and independence (Fan et al., 2012). In transition economies shareholders' protection laws are still weak and managers prefer retained earnings as a financing resource. Therefore, based on our results, we can accept the hypothesis H1.

3.2.2. Growth opportunity

Another factor affecting the capital structure, is growth potential. An insignificant positive relationship between growth opportunities and debt in the Visegrad group is found (except for long-term leverage in Slovakia) in our sample. This insignificant positive coefficient is not consistent with the trade-off theory, that as the companies grow more, less debt they use. One reason may be that most of the sample firms are micro-firms and are in the manufacturing, wholesale, and heavy industry sectors. They tend to possess more tangible assets and less intangible assets such as goodwill, advertising, and R&D, and thus have limited growth opportunities. Moreover, according to the trade-off theory, firms holding future growth opportunities, which are a form of intangible assets, tend to borrow less than firms holding more tangible assets because growth opportunities cannot be collateralised. Our finding, therefore, does not support our hypothesis (H2) that there is a negative relationship between growth and debt in Visegrad S.M.E.s.

3.2.3. Liquidity

Our results support our hypotheses (H3) that there is a negative and significant relation between firm liquidity and total and short-term leverage in sample countries. This inverse relation between a firm's asset liquidity and leverage is consistent with (Belkhir et al., 2016; Mateev et al., 2013). Higher liquidity reduces the risk of economic failure and lowers the potential costs of bankruptcy. This notion is relevant for micro firms, where firms have faced a problem with poor corporate governance practices and the risk of expropriation is usually high.

3.2.4. Size

Firm size has a statistically significant and negative influence on capital structure for all total, long- and short-term leverage all the countries and does not support our

hypothesis (H4) for the Visegrad countries. Our finding is opposite to studies of Mateev et al. (2013) and Psillaki and Daskalakis (2009), they mentioned that large firms are more diversified thus less exposed to bankruptcy risk, have lower bankruptcy costs, and have higher debt capacity. Furthermore, laws dealing with financial distress are still developing, leaving debt holders unprotected in case of distress and pushing companies to acquire funds through short-term loans.

3.2.5. Asset structure

Assets structure is a significant determinant of total debt, short-term debt, and medium to long term debt, considering the total sample and for all countries. According to the pecking order theory, a positive relationship is expected between a firm's level of tangible assets and debt ratio, because tangible assets are easy to collateralise for debt. The relation between asset tangibility/structure and corporate leverage in our research is negative and significant in all countries. Thus, we must reject the hypothesis (H5) and state that firms with high percentage of tangible assets in their total assets are likely to use less debt. A possible explanation is that firms with lots of tangible assets may have already found a stable source of return which provides them with more internally generated funds and discourage them from turning to external financing (Psillaki & Daskalakis, 2009). Furthermore, these results suggest that Visegrad countries face moral hazards, agency problems, and information asymmetry. Those S.M.E.s need tangible assets to serve as collateral when obtaining long-term debt. Our results suggest that Visegrad S.M.E. capital structure decisions are in accordance with the predictions of trade-off theory.

3.2.6. Non-debt tax shield

The depreciation of total assets as a non-debt tax shield has a statistically significant and negative relationship with leverage for all four countries. Our result is in line with the trade-off theory that focuses on the substitution between non-debt and debt tax shields and support hypothesis H6. Companies with higher depreciation to total assets indicate that non-debt tax shields will have less need to utilise the debt tax shield because the tax advantage of leverage is less valuable. Thus, the trade-off theory predicts that depreciation to total assets has a negative relationship with leverage.

3.3. Robustness checks

To check the robustness of our results, and also take into account any dynamic effects or endogeneity problems, we repeat our estimation procedures by using the G.M.M. method (see Table 7) developed by Arellano and Bover (1995), and Blundell and Bond (1998). We run the regression for three different model specifications using total, long-term and short-term leverage as dependent variables. Tables 7 and 8 present the dynamic estimates with associated tests. We used DRt-1 (lag1) and TOT_ASSETS (lag1) and we also created a Years dummy for all tested years. As we can see, for all variables, the results are generally consistent with those observed in the previous regressions and we can rule out the possibility of endogeneity and autocorrelation concerns and don't need to reconsider our model or instruments. However, as we can observe,

Table 7. GMM-system results for total, short- and long-term leverage.

Dependent variable:	Total leverage	LT leverage	ST leverage
Independent variables:			
Total LEV (lagged1)	0.6591***		
	(0.000)		
LT LEV (lagged1)		0.6754***	
		(0.000)	
ST LEV (lagged1)			0.6714***
			(0.000)
Profit_RATIO	−0.2919***	−0.0109***	−0.1138***
	(0.000)	(0.000)	(0.000)
INTA_ASSETS	−0.1119**	0.0331	−0.1539*
	(0.032)	(0.101)	(0.006)
CURR_RATIO	−0.0099***	0.0003***	−0.0100***
	(0.000)	(0.000)	(0.000)
TOT_ASSETS	−0.0215***	0.0044***	0.0082***
	(0.000)	(0.000)	(0.000)
TAN_ASSETS	−0.0775***	0.0241***	−0.0914***
	(0.000)	(0.000)	(0.000)
Non-debt_TAX	−0.1966***	−0.0276***	−0.0633***
	(0.000)	(0.000)	(0.000)
Number of observations	46,963	46,963	46,963
Arellano–Bond test (AR1)	0.000	0.000	0.000
Arellano–Bond test (AR2)	0.022	0.823	0.006
Sargan test	0.366	0.170	0.134
Hansen test	0.371	0.491	0.132

Source: Own calculation.
*, **, and *** represent significance at 10, 5 and 1%, respectively.
p-values in brackets.
For Arellano–Bond test Ho is: no autocorrelation. Rejecting the null hypothesis (p-value < 0.05) of no serial correlation at order one in the first-differenced errors does not imply that the model is misspecified. Rejecting the null hypothesis at higher orders implies that the moment conditions are not valid.
Sargan test is a test for the validity of instruments and is asymptotically distributed as $\chi 2$ under the null of valid instruments. Rejecting the null hypothesis implies that we need to reconsider our model or our instruments.

the AR(2) for Total leverage in Table 7 and for Hungary in Table 8 as well as the Sagan test for LT_LEV in Hungary is lower than 0.05. Nevertheless, after the conducting DRt-2 (lag2) above mentioned results – unreported for the sake of space – are qualitatively acceptable (>0.005).

4. Conclusions and discussion

Given the increasing importance of transition economies, the investigation of financing decisions in these economies is always an interesting topic on its own merits. Despite a broad volume of research in the literature concerning capital structure determinants, there is still a huge gap in investigating this issue for S.M.E.s in transition economies, especially the Visegrad group. Although capital structure decision can be described and explained by capital structure theory in developed economies, capital structure decisions in transition economies are still an open question for investigation. In this article, we explore and analyse the determinants of capital structure for the Visegrad group, namely the Czech Republic, Slovakia, Hungary, and Poland using panel data methods for a set of 6 713 S.M.E.s. Our results indicate a significant negative correlation between Profitability, Liquidity, Size, Asset structure (tangible assets), and Non-debt tax (as represented by the ratio of Depreciation of total assets) on all three leverage ratios (total, long-, and short-term)

Table 8. GMM-system results for total, short- and long-term leverage: total sample.

Independent variables:	Czech Republic				Slovakia				Hungary				Poland		
	Total LEV	LT LEV	ST LEV		Total LEV	LT LEV	ST LEV		Total LEV	LT LEV	ST LEV		Total LEV	LT LEV	ST LEV
Total LEV (lagged1)	0.6251***				0.6230***				0.6940***				0.6975***		
	(0.000)				(0.000)				(0.000)				(0.000)		
LT LEV (lagged1)		0.6371***				0.6640***				0.8448***				0.8085***	
		(0.000)				(0.000)				(0.000)				(0.000)	
ST LEV (lagged1)			0.7016***				0.6105***				0.6840***				0.5390***
			(0.000)				(0.000)				(0.000)				(0.000)
Profit_RATIO	−0.2888***	−0.0173***	−0.2608***	−0.3095***	−0.0149***	−0.2956***		−0.2614***	0.0001	−0.2595***		−0.2107***	−0.0095	−0.2059***	
	(0.000)	(0.001)	(0.000)		(0.000)	(0.000)	(0.000)		(0.000)	(0.914)	(0.000)		(0.000)	0.754	(0.000)
INTA_ASSETS	−0.0065	0.0550	−0.0468*		0.3197*	0.2437**	0.0572		−0.091*	0.0063	−0.1026*		−0.1108	−0.0211	−0.1376
	(0.956)	(0.186)	(0.0659)		(0.058)	(0.003)	(0.755)		(0.093)	(0.210)	(0.057)		(0.205)	0.626	(0.166)
CURR_RATIO	−0.0066***	0.0005	−0.0059***	−0.012***	0.0006***	−0.0128***		−0.0089***	0.0000	−0.0090***		−0.0187**	0.0004	−0.2711**	
	(0.000)	(0.706)	(0.000)		(0.000)	(0.000)	(0.000)		(0.000)	(0.733)	(0.000)		(0.028)	0.878	(0.002)
TOT_ASSETS	−0.0257***	0.0095	−0.0279***	−0.2740***	0.0000	−0.0277***		−0.0090**	0.0029**	−0.0145***		−0.0647*	−0.0147	−0.0352*	
	(0.000)	(0.754)	(0.000)		(0.000)	(0.980)	(0.000)		(0.007)	(0.024)	(0.000)		(0.008)	0.484	0.081
TAN_ASSETS	−0.0504***	0.0638***	−0.0101***	−0.0329***	0.0409***	−0.0810***		−0.1144***	0.008	−0.1187***		.00434	0.0647	−0.1428**	
	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)		(0.000)	(0.301)	(0.000)		(0.891)	(0.371)	(0.004)
Non-debt_TAX	−0.2022***	−0.0327	−0.1599***	−0.3178***	−0.0677***	−0.2464***		−0.1036***	0.002	−0.1086 ***	−0.5384***	−0.3534**	−0.2331		
	(0.000)	(0.267)	(0.000)		(0.000)	(0.000)	(0.000)		(0.000)	(0.742)	(0.000)		(0.000)	(0.011)	(0.105)
Number of observations	6977	6977	6977		3648	3648	3648		13,923	13,923	13,923		532	532	532
Arellano–Bond test (AR1)	0.000	0.000	0.000		0.000	0.000	0.000		0.000	0.000	0.000		0.000	0.019	0.005
Arellano–Bond test (AR2)	0.149	0.859	0.279		0.671	0.802	0.180		0.004	0.121	0.002		0.216	0.869	0.110
Sargan test	0.113	0.276	0.238		0.680	0.119	0.503		0.693	0.030	0.966		0.057	0.125	0.972
Hansen test	0.178	0.503	0.320		0.678	0.399	0.504		0.704	0.499	0.967		0.525	0.060	0.969

Source: Own calculation.

*, **, and *** represent significance at 10, 5 and 1%, respectively.

p-values in brackets.

For Arellano–Bond test Ho is: no autocorrelation. Rejecting the null hypothesis (p-value < 0.05) of no serial correlation at order one in the first-differenced errors does not imply that the model is misspecified.

Rejecting the null hypothesis at higher orders implies that the moment conditions are not valid.

Sargan test is a test for the validity of instruments and is asymptotically distributed as $\chi 2$ under the null of valid instruments. Rejecting the null hypothesis implies that we need to reconsider our model or our instruments.

Profitability is negatively related to leverage which is consistent with the pecking order theory that states that firms prefer internal financing to external. Profitable firms are likely to use less debt than less profitable ones since they are more able to maintain profits over time, and therefore they become less dependent on debt. Furthermore, according to the assumptions of Pecking Order Theory, a greater firm's size can lead to fewer problems of information asymmetry, and lower costs of debt, allowing easier access to debt and more favourable terms for those firms (Serrasqueiro & Caetano, 2014).

We find evidence for a statistically insignificant relationship between leverage and growth opportunities of S.M.E.s, therefore, we cannot agree with the assumption of the Trade-Off Theory. For example, in the work of Jaworski and Czerwonka (2019), they conclude that the size of the company and its growth have a positive impact on capital structure, because the larger the company or faster the company grows, the bigger portion of debt are obtained in the capital structure. However, these relationships have not been fully supported by statistical tests. It means that some features of the economy can have a certain impact on the strength and direction of these dependencies.

The results obtained a negative and statistically significant relationship between size and debt in our S.M.E.s samples, so Hypothesis 4 not is accepted. These results contradict with the assumptions of the Trade-Off Theory and Pecking Order Theory. According to Serrasqueiro and Caetano (2014), increased size has two main advantages, allowing greater diversification of activities in S.M.E.s, which potentially can lower bankruptcy costs and better possibility of obtaining profits, and consequently obtain debt for taking advantage of the debt tax shields.

The empirical results show a statistically negative and significant relationship between a variable tangibility and debt, opposite to our prediction in Hypothesis 5. The result indicates that tangible assets have low importance for S.M.E.s to acquire debt, since it does not provide an efficient guarantee against bankruptcy.

For liquidity, our result is in line with the pecking order theory, which conclude that higher asset liquidity contribute to less leverage. Firm size has a negative and statistically significant impact on capital structure for total, long, and short-term leverage in all the countries in our sample and does not support our hypothesis for the trade-off theory that there is a positive relationship between firm size and debt. For the last variable, we find a negative and statistically significant relationship between effective tax rate and debt in S.M.E.s in line with the forecast of Trade-off Theory, therefore Hypothesis 6 is accepted.

Our research findings add to the capital structure literature in two important ways. Firstly, we expand the growing cross-country capital structure body of research by presenting evidence from the Visegrad group. The research indicates that S.M.E.s in the Visegrad group still face the difficulties in obtaining external financing for their investment activities and still prefer internal capital. Furthermore, because of the limited access to the financial market, banks are still the main sources for obtaining long term debts for the firms. Therefore, there should be actions or incentives that will support and improve countries' institutional environments and facilitate the access of S.M.E.s to external, mostly bank financing.

This article has laid some groundwork to helps to reveal the nature of corporate financing in the Visegrad group upon which further detailed research for Visegrad economies and other research in other developing countries could be based. Future

research would focus more on macroeconomic variables such as exchange rate volatility, culture differences and/or openness for the economy. Furthermore, the model could be expanded by focusing on comparison of different industries.

Note

1. This whole section is taken over from website, https://www.dw.com/en/visegrad-group-a-new-economic-heart-of-europe/a-49483505

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Appendix

Tables A1–A5 present the summaries of the descriptive statistics of the independent variables for Czech Republic, Slovakia, Hungary, and Poland, respectively, over the period 2011–2018.

Table A1. Descriptive statistics of variables for Czech Republic.

	LEV	LT_ LEV	ST_ LEV	Profit_ RATIO	INTA_ ASSETS	CURR_ RATIO	TOT_ ASSETS	TAN_ ASSETS	Non-debt_ TAX
Mean	0.4190	0.0490	0.3700	0.1290	0.0047	4.1708	2.7417	0.3088	0.0600
Median	0.4026	0.0000	0.3283	0.0888	0.0000	1.7172	2.7561	0.2267	0.0441
Maximum	1.5418	1.0014	1.2032	2.2591	0.9784	1339.5556	4.5235	1.4986	0.6946
Minimum	−13.2601	−0.0368	−13.2601	−2.3651	−1.3875	−1900.9032	0.9412	−0.0471	−0.6724
Std. Dev.	0.3386	0.1218	0.3337	0.1800	0.0359	35.1523	0.6057	0.2687	0.0580
Skewness	−11.6775	3.2003	−11.9271	0.4932	0.7379	−10.1437	−0.0509	0.8906	2.0365
Kurtosis	421.1520	11.1911	439.3832	19.7618	473.3078	1738.8982	−0.3592	−0.2136	13.0429
Observations	7984	7984	7984	7984	7984	7984	7984	7984	7984

Source: Own calculation.

Table A2. Descriptive statistics of variables for Slovakia.

	LEV	LT_ LEV	ST_ LEV	Profit_ RATIO	INTA_ ASSETS	CURR_ RATIO	TOT_ ASSETS	TAN_ ASSETS	Non-debt_ TAX
Mean	0.4867	0.0311	0.4556	0.1450	0.0020	3.5886	2.3615	0.3403	0.0870
Median	0.4946	0.0000	0.4495	0.0966	0.0000	1.3760	2.3189	0.2801	0.0635
Maximum	1.2177	0.9676	1.2177	1.6919	0.7961	1766.0000	4.6860	1.9372	1.7846
Minimum	−2.7995	−0.1705	−2.7995	−3.2162	−2.2185	−790.9221	0.1830	−0.6691	−0.2681
Std. Dev.	0.2731	0.0969	0.2720	0.2021	0.0316	25.0479	0.5929	0.2618	0.0817
Skewness	−0.2030	4.1161	−0.0780	0.4698	−7.4173	40.0189	0.3135	0.6642	2.9101
Kurtosis	0.2402	19.3897	0.3173	10.8563	1111.3225	2428.3270	−0.1965	−0.5219	24.2507
Observations	29,184	29,184	29,184	29,184	29,184	29,184	29,184	29,184	29,184

Source: Own calculation.

Table A3. Descriptive statistics of variables for Hungaria.

	LEV	LT_ LEV	ST_ LEV	Profit_ RATIO	INTA_ ASSETS	CURR_ RATIO	TOT_ ASSETS	TAN_ ASSETS	Non-debt_ TAX
Mean	0.3583	0.0086	0.3497	0.1047	0.0086	3.8450	2.4597	0.4727	0.0626
Median	0.3357	0.0000	0.3272	0.0732	0.0000	1.5363	2.4189	0.4706	0.0466
Maximum	1.0229	0.8963	1.0229	1.8487	0.9981	1550.2632	4.3235	0.9995	3.1287
Minimum	0.0000	0.0000	0.0000	−3.6944	0.0000	−329.1250	0.4516	0.0000	0.0000
Std. Dev.	0.2258	0.0539	0.2208	0.1517	0.0520	19.3404	0.5846	0.2825	0.0607
Skewness	0.4237	8.1646	0.4366	−2.9272	11.1290	43.0883	0.3035	0.0710	9.9099
Kurtosis	−0.6341	77.0095	−0.6044	81.3664	151.7763	2964.3119	−0.1284	−1.1543	416.5792
Observations	15,928	15,928	15,928	15,928	15,928	15,928	15,928	15,928	15,928

Source: Own calculation.

Table A4. Descriptive statistics of variables for Poland.

	LEV	LT_ LEV	ST_ LEV	Profit_ RATIO	INTA_ ASSETS	CURR_ RATIO	TOT_ ASSETS	TAN_ ASSETS	Non-debt_ TAX
Mean	0.5099	0.1725	0.3374	0.0851	0.0259	2.8515	3.4124	0.5016	0.0479
Median	0.4457	0.0377	0.2937	0.0622	0.0008	1.2508	3.3760	0.5630	0.0358
Maximum	25.5778	25.3178	0.9716	0.7836	0.4857	153.0940	4.3972	0.9918	0.2819
Minimum	0.0010	0.0000	0.0010	−1.0373	0.0000	0.0135	1.7710	0.0020	0.0003
Std. Dev.	1.0520	1.0385	0.2254	0.1473	0.0787	10.5371	0.5199	0.3315	0.0426
Skewness	22.2450	23.3577	0.6255	−0.7685	4.0151	11.6704	−0.2236	−0.1457	2.2624
Kurtosis	531.5610	567.0860	−0.3953	12.3799	16.2419	149.8032	−0.3173	−1.4815	6.5119
Observations	608	608	608	608	608	608	608	608	608

Source: Own calculation.

Table A5. Descriptive statistics of variables for total.

	LEV	LT_ LEV	ST_ LEV	Profit_ RATIO	INTA_ ASSETS	CURR_ RATIO	TOT_ ASSETS	TAN_ ASSETS	Non-debt_ TAX
Mean	0.4388	0.0287	0.4101	0.1300	0.0046	3.7428	2.4591	0.3767	0.0753
Median	0.4247	0.0000	0.3865	0.0868	0.0000	1.4596	2.4189	0.3242	0.0543
Maximum	25.5778	25.3178	1.2177	2.2591	0.9981	1766.0000	4.6860	1.9372	3.1287
Minimum	−13.2601	−0.1705	−13.2601	−3.6944	−2.2185	−1900.9032	0.1830	−0.6691	−0.6724
Std. Dev.	0.2975	0.1442	0.2726	0.1855	0.0402	25.2368	0.6143	0.2778	0.0735
Skewness	8.6883	101.6927	−3.1876	−0.0149	5.7434	22.9554	0.2736	0.4987	4.1297
Kurtosis	1054.4463	17,624.7999	148.7780	22.2752	406.8351	2556.1422	−0.2623	−0.8627	78.6402
Observations	53,704	53,704	53,704	53,704	53,704	53,704	53,704	53,704	53,704

Source: Own calculation.