VILNIUS TECH
Vilnius Gediminas Technical University

Journal of Business Economics and Management
ISSN 1611-1699 / eISSN 2029-4433
2022 Volume 23 Issue 2: 451–481
https://doi.org/10.3846/jbem.2022.15634

CAPITAL STRUCTURE AND TAXATION OF COMPANIES OPERATING WITHIN NATIONAL AND MULTINATIONAL CORPORATE GROUPS: EVIDENCE FROM THE VISEGRAD GROUP OF COUNTRIES

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Received 11 February 2020; accepted 25 May 2021; first published online 25 February 2022

Abstract. The aim of this study is to review the level of debt and the impact of taxation on the capital structure of companies operating within national and multinational corporate groups in the countries of the Visegrad Group. In the research, financial data was used from 2012–2018 regarding entities forming part of corporate groups, and panel regression models with fixed effects were applied. According to the results of the research, domestic corporations are generally more leveraged and have a lower effective tax rate than multinational corporations. At the same time, the effective tax rate was significant only in six models out of sixteen, and mostly in the case of multinational corporations. The direction of impact was inhomogeneous. Other determinants of the financing structure which most often appeared as significant, in the case of companies operating both within domestic and international capital groups, include sales profitability as well as the tangibility and the age of the company. An additional analysis made for Poland and Slovakia determined that a change in the law on thin capitalization influenced entities' capital structure determinants, but had no significant impact on the companies' level of debt.

Keywords: corporate group, capital structure, leverage, domestic corporations, multinational corporations, tax avoidance.

JEL Classification: G32, F23, H25.

Introduction

A typical form of economic cooperation among companies which proved to work well in economic systems are groups of companies, which are also referred to as corporations, business or corporate groups. It is widely understood that the emergence of such structures results from market imperfections and the insufficient institutional development of econo-

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mies (Gaur & Delios, 2015; Hsieh et al., 2010; Khanna & Rivkin, 2001; Pattnaik et al., 2018; Wandel, 2011). This problem is particularly relevant in relation to developing countries in which "business groups are a transitory organisational structure that substitutes for institutional development" (Poczter, 2018, p. 1150). Bearing this in mind, it seems crucial to analyse companies that belong to corporate groups and are active on the territories of developing economies. This involves companies doing business in post-communist countries. And while the history of corporate groups in these countries begins quite recently in the 1990s, it was in the period of transition from a centrally controlled economy to a market economy (for more on political transformation see Winiecki (2012)) that favourable systemic conditions were created capable of stimulating free business activity in different organisational forms, including the creation and development of national and multinational corporate groups.

Nonetheless, it should be borne in mind that the financial decisions of companies belonging to national corporate groups may be influenced by forces other than those which shape the capital structure of entities operating within international structures (Arena & Roper, 2010; Avarmaa et al., 2011; Michel & Shaked, 1986; Singh & Nejadmalayeri, 2004). The main reasons for these differences are financial considerations at the group level, corporate governance issues, tax aspects (for instance differences in tax rates), regulations, the general economic climate and differences in access to finances.

Taking into account the characteristics of national and international groups, the lack of current and comprehensive research, as well as the uniqueness of post-communist economies, a research gap on the capital structure of national and international groups has been noticed, the filling of which seems to be important in the era of progressing globalisation. Thus, the aim of this study is to review the level of debt and the impact of taxation on the capital structure of companies operating within national and multinational corporate groups included in countries of the Visegrad Group. The special emphasis of the importance of the level of corporate taxation and its impact on the structure of capital stems from the authors' conviction about the importance of this factor for economic entities, and of the competitive advantage it can give to companies doing business within multinational corporations in comparison with entities operating within national structures.

The paper is divided into five parts. In the first part, the authors present a review of the existing research on the capital structure and corporate groups, with particular attention to research discussing the capital structure of companies operating within corporate groups. The second part focuses on the presentation of data, variables and the econometric method used in the study. The third part is a review of the results. The fourth part presents a comparison and interpretation of the results obtained for individual economies, and a review of the research hypotheses that have been put forward. In the final part, the authors provide a summary of the study and point to issues that may benefit from further in-depth analyses.

1. Literature review

The capital structure of business entities is one of the most popular topics discussed by economists. Particular attention was paid to this area due to research published by Modigliani and Miller (1958, 1963) who, with their quite controversial models for those times, began a

discussion in the world of economics and finance that continues to this day. Over the years, economists have discovered other factors that may affect corporate decisions in the field of capital structure, formulating the trade-off theory (Kraus & Litzenberger, 1973; Jensen & Meckling, 1976 – modification in terms of agency costs), the pecking order theory (Myers & Majluf, 1984) or market timing theory (Baker & Wurgler, 2002). While taking into consideration the costs of bankruptcy, the effect of the tax shield, agency costs or asymmetry of information, it is extremely difficult to clearly determine why any given entity has a particular capital structure. In addition to the above factors, a number of macro- and micro-economic determinants were verified (Bopkin, 2009; de Jong et al., 2008; Frank & Goyal, 2009; Huang & Song, 2006; Rajan & Zingales, 1995; Titman & Wessels, 1988; Wald, 1999) that may affect the capital structure of business entities. It was noted that the size of the company, its age, liquidity and profitability, as well as its growth opportunities and the structure of its assets are significant for the selection of financing sources. In addition, financial leverage depends on the degree of development of the capital market, the banking sector, interest rates or inflation as well as a country's GDP. A significant and valuable discovery was made by Lemmon, Roberts, and Zender (2008), who found that companies that are heavily indebted (poorly indebted) remain so for over two decades. This discovery means that the capital structure of companies is relatively stable in the long run.

Nevertheless, the issue of determinants shaping the initial level of financial leverage in the enterprise remains key, which means that research in this area still requires exploration. There is another area worth analysing, which is created by globalisation and contributes to the emergence of the complex structures that are capital groups. That area is the impact of new financing options, complex international mechanisms and the possibility of using differences in tax systems on the structure of capital by companies belonging to these structures. It seems that the question of whether capital groups are national or international groups has a significant impact on the capital structure of companies, as well as on the strategies implemented by companies to achieve financial leverage. Given this diversity and the capabilities of individual structures, the authors decided to focus on capital groups and differences in the area of capital structure between companies belonging to national and international groups. The area selected for analysis is all the more valuable given that in many studies carried out so far (Bonacchi et al., 2019; Castaldi et al., 2019; Chacar & Vissa, 2005; Chakraborty, 2015; Dewaelheyns & Hulle, 2012; Khanna & Palepu, 2000; Saona et al., 2018), the focus has been on analysing the differences between companies operating within corporate groups and non-associated companies, i.e., those which did not operate within any formalised or informal structures. However, over time it was observed that fewer and fewer companies operate on their own (Guillén, 2000; Schmidt & Gajtkowski, 2020; Singh et al., 2018), and the main feature differentiating companies was the type of corporate group to which a given entity belonged. As some authors rightly note (Aggarwal & Kyaw, 2008; Desai et al., 2004), the capital structure can be used as a competitive advantage for entities working within multinational corporations (MNCs). The advantages of such an organisational structure include the opportunity of conducting a diversified capital policy (e.g., taking advantage of the differences in the regulations of individual countries, easier access to international capital markets) or temporary financing the activities of group companies by using funds of some entities for the

benefit of others (internal financing), as well as obtaining financing at lower weighted average cost of capital. On the other hand, the most frequently cited weakness of MNCs is that they must operate in a complex, multidimensional and often incomprehensible international environment, which is not true of DMCs (Michel & Shaked, 1986).

In our analysis of the structure of capitals of MNCs and DMCs, it was decided to focus primarily on one of the competitive advantages of MNCs that can occur – the taxation rates – and verify whether there are differences in this area between entities operating within national and multinational capital groups. Taking into consideration the specific strengths and capabilities of multinational corporations, it was decided to put forward two research hypotheses related to entities from the Visegrad Group:

H1: Entities operating within multinational corporations have a higher financial leverage than entities operating within national corporations.

H2: The effective tax rate is a significant driver that shapes the capital structure in the case of entities forming part of multinational corporations, while it is insignificant in the case of entities operating within national corporations.

Studying the literature on the subject matter, it was noted that there are very few studies on entities from developing countries, especially in recent years, which would allow a verification of analogous or similar hypotheses. At the same time, it was determined that in the context of hypothesis 1, important research had been done by Avarmaa, Hazak, and Männasoo (2011), Akhtar (2005) as well as Lee and Kwok (1988). In research conducted by Avarmaa, Hazak, and Männasoo (2011) on a set of companies operating in the Baltic States and using data for the period 2000–2008, it was shown that the level of debt for domestic companies was higher than that of MNCs. At the same time, the researchers indicated that MNCs had better access to external financing, which resulted in a competitive advantage over DMCs, particularly during periods when financial institutions tightened credit conditions. However, both types of companies reduced their debt over time, i.e., the older the company was, the less debt it had. At the same time, the size of the entity had greater impact on the debt of MNCs than that of companies operating locally.

A similar analysis was conducted by Akhtar (2005), who reviewed the capital structure of Australian multinational and domestic corporations in the period from 1992 to 2001. On the basis of the obtained results, it was concluded that there are no statistically significant differences between the levels of debt of multinational and domestic corporations, while profitability, size and growth opportunities were significant factors determining the capital structure for both categories of entities. However, the author noted some differences in the costs of bankruptcy which, while significant for multinational companies, turned out to be insignificant for companies limiting their business to the domestic market.

In contrast, Lee and Kwok (1988) compared the capital structure of U.S.-based multinational corporations and domestic corporations in the U.S., finding lower debt ratios in the former and interpreting them as being agency costs. At the same time, the authors showed that MNCs have lower bankruptcy costs, and that these depended on company size ("the difference largely disappeared when the size effect was controlled" (Lee & Kwok, 1988, p. 214)).

In the case of hypothesis 2 what was noted were studies by Su and Tan (2018), Desai, Folei, and Hines (2004), as well as Arena and Roper (2010) and Janský (2019). Su and Tan

(2018, p. 12), having studied the top 100 Taiwanese capital groups, observed that "when strategies of business groups become more complex, it is natural for them to seek mechanisms that can reduce explicit transaction costs and facilitate business operations". This enabled the authors to ascertain that the use of tax heavens for financial benefits is more a strategic decision than an ethical one. At the same time, it was noted that the social focus of capital groups, especially ones with international reach, can weaken their motivation to use tax heavens.

Desai, Foley, and Hines (2004) analysed the impact of local tax rates and conditions on the capital market on the level and type of loans taken out by foreign subsidiaries of American MNCs. They reported that a 10 percent higher local tax rate increases the general level of debt of American subsidiaries by 2.8 percent, and that loans from associates are particularly sensitive to tax rates. This means that multinational groups are able to structure their funding sources in individual subsidiaries by replacing external with internal debt in response to tax and market conditions, thus creating opportunities that are not available to many local competitors.

Tax was also an area of focus for Arena and Roper (2010), who concluded that "tax factors significantly affect multinational firms' decisions of where to locate debt as well as the proportion of debt that they locate abroad" (Arena & Roper, 2010, p. 2). Multinational corporations are more willing to become indebted when their subsidiaries operate in countries where regulations offer significant tax benefits.

A very interesting observation was also made by Janský (2019), who found that the effective tax rate differs significantly between countries from the EU and pointed out that many multinational corporations do not pay much tax in many countries. Janský (2019, p. 19) indicated that "the larger the multinational enterprise, the lower the effective tax rate".

Considering the heterogeneity of the results obtained so far, as well as the extremely modest achievements of scientists in the area regarding the capital structure of such diverse structures which are MNCs and DMCs, it was considered that the issues mentioned above require further study. The lack of current research in this area and the shortage of analyses related to multinational and domestic corporations, which have been and continue to be formed at a surprisingly fast pace in post-communist countries, is puzzling. At the same time, it seems that the increasing share and importance of corporate groups in economies add to the significance of the matter the authors decided to explore.

2. Data and methodology

In this chapter, the authors present the data used in the study, the selected response and explanatory variables, as well as the applied research method.

2.1. Data

The study uses data based on information from the Amadeus database published by Moody's Analytics and from Bureau van Dijk. This database includes both financial and business data on public and private companies of European origin. The study focused on the four economies from Central Europe that constitute the Visegrad Group (V4): Poland, the Czech

Republic, Slovakia and Hungary. The main reason for the creation of the Visegrad Group was to deepen the cooperation between these countries. What they have in common is not only geographical vicinity and geopolitical conditions, but also a common history, tradition, culture and values (Visegrad Group, 2019). Moreover, since the early 1990s, these countries have attracted the largest percentage of foreign capital from countries of the Eastern Bloc, which has resulted in the creation of many companies that operate within domestic and multinational corporations (UnctadStat). Despite the above similarities, these countries differ from each other in many aspects. For example, Poland has a greater area and population than Slovakia. But both countries have a similar number of inhabitants per square kilometre, and this number fluctuated between 107 and 138 inhabitants per 1 km^2 in 2018. In the past 20 years, the GDP per capita in PPS has been the highest in the Czech Republic, while the highest increases were recorded in Poland and Slovakia. And in 2018, this indicator was 91 in the Czech Republic, 73 in Slovakia (where in the last 5 years a decrease in this indicator has been noted), and 71 in Hungary and Poland. Compared to EU Member States, all four V4 countries are characterised by a relatively high real GDP growth rate. In 2018, this ranged from 2.8 in the Czech Republic to 5.3 in Poland, with the average rate for the 2001–2018 period being the highest for Poland and Slovakia. Employment and average wages looked slightly different. In 2018, unemployment rates in the V4 countries were among the lowest in the entire European Union and amounted to 2.2 in the Czech Republic, 3.7 in Hungary, 3.9 in Poland and 6.5 in Slovakia. The average monthly salary was slightly different – the highest in the Czech Republic and the lowest in Hungary. The figure of exports of goods and services as a percentage of GDP varies considerably, as it is the lowest in Poland (although quite high increase in this index in 2012–2018 was recorded from 44.4% to 55.5%), and the highest in Slovakia, as it was 96.2% in 2018. However, it is worth noting that in all of the analysed countries, the greatest export was made to Germany (Eurostat, n.d.; UNCTAD, n.d.). Generally, it may be stated that the Czech Republic was characterised by the best economic situation among the V4 countries, although the selected macro-economic variables were most favourable in the case of Poland and Slovakia (economic growth rate and the largest decrease in unemployment). Many of the analysed indices resulted in the worst rates for Hungary (Grabia, 2014), although up until 2006 they were ahead in terms of FDI resources per capita.

The selected indicators for V4 countries in 2018 are presented in the Table 1.

Table 1. The selected macroeconomic indicators for V4 economies in 2018

Country	GDP per capita (PPS)	GDP growth rate (%)	Unemployment rate (%)	Average monthly net salary (EUR)	Exports of goods and services (% of GDP)	Imports of goods and services (% of GDP)
Poland	71	5.3	3.9	776	55.5	52.0
Czech Republic	91	2.8	2.2	919	78.5	72.1
Hungary	71	5.1	3.7	569	84.9	80.6
Slovakia	73	4.1	6.5	783	96.2	94.2

The study covered a 7-year-long time series encompassing data from the period 2012–2018.

All companies that were reported as active were analysed in individual countries. An additional limiting factor was a company's operations within a corporate group. Consequently, the study excluded all entities which operated as non-affiliated undertakings. Data from the Amadeus database do not unambiguously specify whether the company belongs to a corporate group, only indicating the number of entities included in it. On the basis of this information, it is possible to determine whether an entity belongs to a corporate group. In case the number of companies participating in a corporate group is equal to zero, it can be concluded that the entity does not belong to any corporate group (Schmidt & Gajtkowski, 2020).

Once the sample of companies belonging to corporate groups for each economy was specified, the authors divided the companies into two categories:

- economic entities acting within national corporate groups, i.e., domestic corporations (DMCs);
- economic entities acting within multinational corporate groups, i.e., multinational corporations (MNCs).

The determination of which entities should fall into the relevant category was made based on the country of origin of the Global Ultimate Owner (GUO). Information on a company's GUO is available in the Amadeus database. In this case, a GUO is a company that holds at least 50.01% of the shares in a selected entity and itself does not have any identified shareholders, or the percentage of shares is unknown (consequently, a GUO can be colloquially called a parent company). At the same time, it was determined that the sample under review was to consist of only those entities whose GUOs have the form of a corporate company. Taking into account the above, it was assumed that if an entity's GUO comes from the same country as the entity itself, then the entity operates within a domestic corporation. If, on the other hand, the GUO of a given entity is from another country, the entity in question is considered to be operating within a multinational corporation. In their research, the authors considered data obtained from companies' non-consolidated financial statements, eliminating 1% of the companies for which the variables selected and discussed below showed extreme values (very high or very low, which distorted the sample). The sample contains only non-financial companies. The final number of entities and observations that qualified for further analysis is presented in Table 2.

Table 2. The research sample

Country	DMCs number/% of companies		DMCs number of observations	MNCs number/% of companies		MNCs number of observations
Poland	1,706	32%	6,817	3,668	68%	15,072
Czech Republic	4,708	51%	20,549	4,439	49%	21,935
Hungary	123	13%	544	819	87%	3,594
Slovakia	2,213	36%	10,616	3,922	64%	20,469

On the basis of preliminary analysis, it is clear that most of the entities operating within the DMCs are located in the Czech Republic, as they comprise 51% of the total selected sample. At the same time, the highest number of companies operating within MNCs are located in Hungary, at almost 87%. Similar percentages of entities operating within DMCs and MNCs are found in Poland and Slovakia, with 32% and 36% for DMCs and 68% and 64% for MNCs, respectively.

2.2. Variables

On the basis of a literature review, the authors selected a number of variables for further examination. Response variables that qualified for research include debt-to-debt & equity ratio (Bauer, 2004; Bevan & Danbolt, 2002; Rajan & Zingales, 1995) and debt-to-equity ratio (Noulas & Genimakis, 2011). Due to the nature and purpose of the study, the analysis focuses only on response variables which include interest-bearing liabilities. Indeed, according to tax regulations, interest on liabilities reduces the tax base and can therefore be readily used as an element reducing the tax burden (Arena & Roper, 2010; Dine & Koutsias, 2019). Consequently, group entities may lend cash to each other to reduce their liabilities to the State. At the same time, however, it should be borne in mind that group companies are subject to thin capitalisation regulations (Buettner et al., 2012; de Mooij & Liu, 2021) and transfer pricing regulations (de Mooij & Liu, 2020; Hiemann & Reichelstein, 2012). These limit the value of interest that may be considered as a tax deductible expense, and force companies to use market prices in intragroup transactions. Nevertheless, a corporate group has more options to use internal debt financing, and the nature of the group may determine the size of the borrowed capital.

On the other hand, there was one main explanatory variable, namely the effective tax rate, and five control variables[1] which included tangibility, age, size, profitability and liquidity. The effective tax rate was the main explanatory variable due to the importance of a tax regime for corporate groups and the expected influence of the effective tax rate on financial leverage. On the other hand, the control variables make up a catalogue of the most frequent capital structure determinants used in research (Avarmaa et al., 2011; de Haas & Peeters, 2006; Frank & Goyal, 2009; Mazur, 2007; Nivorozhkin, 2002; Pinková, 2012; Sheikh & Wang, 2011). The list of selected variables together with the calculation methodology and expected sign is presented in Table 3.

2.3. Model

Due to the form of the data received, it was decided that panel data regression would be the most suitable tool to achieve the stated objective. Panel models are used when the dataset contains $N > 1$ units and when these individuals are observed over time. The authors verified a short, constant and unbalanced panel.

[1] Control variables enable one to determine whether there is an actual analyzed relationship between dependent and independent variables, or if it is only apparent (Zakrzewska-Bielawska, 2018). Control variables "enable accurate interpretation of researched phenomena and provide explanation whether a dependent variable is under the influence of a single specific independent variable, a completely different variable, or else a few or a dozen or so independent variables at the same time" (Schjoedt & Bird, 2014, as cited in: Zakrzewska-Bielawska, 2018, p. 15).

Table 3. Description of selected variables

Variable	Abbreviation	Measurement	Expected sign
Debt-to-debt&equity ratio	LEV_A	(interest bearing liabilities[2])/ (shareholder funds+interest-bearing liabilities)	
Debt-to-equity ratio	LEV_B	interest-bearing liabilities/shareholder funds	
Effective tax rate	TAX	taxation/profit before tax	+
Tangibility	TANG	tangible fixed assets/total assets	+
Age	AGE	number of years from incorporation	–
Size	SIZE	natural logarithm of sales[3]	+
Profitability	PROF	EBIT/sales	–
Liquidity	LIQ	current assets/current liabilities	–

Due to the specificity of the study, a panel regression model was built for each of the economies and split into two specified categories. Consequently, eight models were obtained in total, two for each of the Visegrad Group countries. Moreover, it was decided to perform an additional analysis for Poland and Slovakia, due to the change of regulations related to thin capitalisation which took place in both countries on 1 January 2015. This resulted in the construction of additional models based on two shorter time series, i.e., 2012–2014 and 2015–2018.

In all of the analysed models, F statistics showed that the classic pooled OLS model should be rejected in favour of a model with fixed effects. The statistics of the Breusch-Pagan test results showed an advantage of the random effects model over the classical one. Finally, the Hausman test results proved in each case that the zero hypothesis should be rejected in favour of an alternative, stating that a fixed effects model is more appropriate than a random one.

Considering the foregoing, the general form of the model can be presented as follows:

$$LEV_{it} = \beta_0 + \beta_1 TAX_{it} + \beta_2 TANG_{it} + \beta_3 AGE_{it} + \beta_4 SIZE_{it} + \beta_5 PROF_{it} + \beta_6 LIQ_{it} + \alpha_i + \varepsilon_{it}. \quad (1)$$

3. Results

The presentation of the results begins with showing descriptive statistics for selected economies and variables. Then, the authors present results of panel regression for each country with an additional analysis for Poland and Slovakia. The correlation matrices can be found in the Appendix 1.

[2] Data presented in the Amadeus database are standardized data, consequently interest-bearing liabilities included subjectively: long term debt + other non-current liabilities + loans.

[3] Sales in thousand EUR.

3.1. Descriptive statistics

The average level of debt of Polish companies operating within DMCs was ca. 0.31 and higher than the debt of companies forming part of MNCs, whose average LEV_A ratio was 0.26. The LEV_B ratio was also higher. The effective tax rate was slightly higher for MNCs (18.61% vs. 18.12%). The share of tangible fixed assets among the total assets was higher in the case of DMCs. The latter were also, on average, older. However, MNCs were larger, and had on average slightly better return on sales as well as higher liquidity levels. The existing differences between DMCs and MNCs are statistically significant according to Mann-Whitney U test.

As in the case of Polish companies, Czech entities belonging to DMCs had on average a higher level of interest bearing debt than entities belonging to international structures. For DMCs, the LEV_A ratio was ca. 0.24, while for MNCs, it totalled ca. 0.19. Czech companies forming part of MNCs averaged a higher effective tax rate than entities forming part of DMCs. Entities operating in DMCs had a slightly higher level of tangible fixed assets, but on average these assets were younger and had lower return on sales. The companies operating within international structures had lower liquidity. The existing differences between DMCs and MNCs are statistically significant according to Mann-Whitney U test.

Hungarian entities operating within their DMCs had a significantly higher level of interest-bearing debt than entities operating within MNCs (0.43 vs. 0.23). This trend is consistent with the observations reported for Polish and Czech entities. In general, MNCs, as in the case of other economies, had a higher effective tax rate. Moreover, MNCs were slightly older, larger and had higher liquidity than DMCs, but they offered a lower return rate and had a lower share of tangible fixed assets within the total assets. The existing differences between DMCs and MNCs are statistically significant according to Mann-Whitney U test.

In line with the trends observed in other economies, in the case of Slovak entities in DMCs, on average, the higher level of interest-bearing debt may also be noticed. However, the difference in LEV_A is not as significant as in the case of Hungarian entities, being only 0.06. On average, in Slovak entities belonging to DMCs, the level of the LEV_B variable was higher, though a high level of standard deviation suggests that an analysis of the median is required. The level of median of the LEV_B was higher for entities forming part of MNCs, equalling ca. 0.018. As in the case of Polish, Czech and Hungarian entities from MNCs, in Slovakia they also had a higher effective tax rate. DMCs had a higher level of tangibility, and while they were younger, smaller and less profitable, they were more liquid than MNCs. According to the Mann-Whitney U test existing differences between DMCs and MNCs were statistically insignificant in the case of LEV_A, tangibility and profitability. The discussed results are presented in Table 4.

3.2. Regression results

The next step of the study was a panel regression analysis for each of the economies. Tables 5 through 8 present the results of fixed effects regression for selected countries.

In the case of Polish entities, in none of the analysed models did the effective tax rate variable show statistical significance. This means that the key explanatory variable, i.e., ef-

Table 4. Descriptive statistics

Variable	DMCs			MNCs		
	mean	SD	median	mean	SD	median
Poland						
LEV_A	0.3075	0.2823	0.2359	0.2632	0.2763	0.1642
LEV_B	0.8105	2.2103	0.2869	0.6699	2.1591	0.1795
TAX	0.1813	0.2073	0.1943	0.1861	0.1853	0.1988
TANG	0.3130	0.2805	0.2413	0.2520	0.2405	0.1824
AGE	19.2450	16.3390	16.0000	17.4560	11.0630	17.0000
SIZE	15.6510	1.4871	15.6760	16.3690	1.5386	16.2890
PROF	0.0724	0.1409	0.0430	0.0762	0.1009	0.0557
LIQ	2.1070	2.3219	1.4193	2.5887	2.6466	1.7175
Czech Republic						
LEV_A	0.2352	0.4302	0.0139	0.1908	0.3432	0.0061
LEV_B	0.5773	2.2059	0.0033	0.4102	2.5134	0.0020
TAX	0.1236	0.1451	0.1584	0.1501	0.1625	0.1899
TANG	0.2725	0.3047	0.1375	0.2691	0.2897	0.1605
AGE	13.8640	7.1141	14.0000	15.0410	7.0140	16.0000
SIZE	13.1930	2.2828	13.3600	15.1740	2.2370	15.3620
PROF	0.0274	0.5062	0.0438	0.0455	0.3146	0.0505
LIQ	4.5537	9.8105	1.7402	3.3137	4.9348	1.8130
Hungary						
LEV_A	0.4298	0.3325	0.3985	0.2347	0.2764	0.0978
LEV_B	3.1097	11.8690	0.5869	0.8357	2.3637	0.1051
TAX	0.0645	0.1009	0.0460	0.1014	0.1249	0.0905
TANG	0.4551	0.3323	0.4760	0.2656	0.2602	0.1831
AGE	15.9980	10.4940	14.0000	16.4010	1.8297	16.3920
SIZE	15.011	2.1499	15.0820	18.1100	8.6705	18.0000
PROF	0.1012	0.7144	0.0629	0.0738	0.1038	0.0461
LIQ	1.7379	2.1566	1.1416	2.1513	1.9706	1.5693
Slovakia						
LEV_A	0.2879	0.5901	0.0286	0.2231	0.4699	0.0288
LEV_B	0.9706	5.7912	0.0074	0.5999	3.2427	0.0182
TAX	0.1624	0.3454	0.1802	0.1759	0.2791	0.2104
TANG	0.2598	0.3181	0.0883	0.2195	0.2752	0.0806
AGE	11.0130	6.4585	10.0000	12.0560	6.3858	11.0000
SIZE	12.1560	2.2781	12.1510	13.9270	2.3135	14.0750
PROF	-0.1012	1.0676	0.0342	0.0084	0.4185	0.0364
LIQ	3.2520	7.2379	1.1590	2.7274	4.5258	1.3846

Note: The authors tested the difference between DMCs and MNCs using the Mann-Whitney U test. Obtained results show that in each country there are statistically significant differences ($\rho < 0.05$) between DMCs and MNCs except Slovakia where in the case of some variables the difference was statistically insignificant. For specific statistics see Appendix 2.

fective tax rate, had no influence on companies' decisions on the shaping of the structure of capitals in the case of both DMCs and MNCs. Analyzing results obtained for control variables, it was noted that in the case of Polish entities comprised in DMCs in model (I), four variables showed significance at the level of $\rho < 0.01$, namely tangibility, size, profitability and liquidity. The same level of significance, also for four variables, was identified in model (III) for entities from MNCs. But in this case, the significant variable was age, while the size variable was insignificant. The control variables' direction of influence was the same in models (I) and (III). The tangibility variable had the highest strength of influence on the debt of DMCs, and the relationship was positive. In the case of MNCs, the highest strength of influence came from the profitability variable; and the higher the profitability of an entity, the lower the debt level. Analysing the results of models (II) and (IV), we can notice the lower significance of variables. In model (II), three variables were significant, namely tangibility, age and profitability, with the tangibility variable having the highest significance. In model (IV), the same three control variables showed significance, but at a higher level, namely for $\rho < 0.01$. In general, the best match among the four analysed models was demonstrated by model (III), which was built on the basis of data concerning Polish entities operating within MNCs ($LSDV\ R^2 = 0.83$).

Analysis of regression results for Czech entities presented in Table 6 disclosed that in the case of both entities operating within DMCs and within MNCs, among models in which the response variable was LEV_A, all explanatory and control variables were statistically significant

Table 5. Regression results: Poland

Variable	DMCs		MNCs	
	(I) LEV_A	(II) LEV_B	(III) LEV_A	(IV) LEV_B
TAX	–0.0119 (–1.2050)	0.1526 (1.4480)	–0.0076 (–1.0550)	0.0810 (0.9460)
TANG	0.3106*** (12.3400)	2.1553*** (8.0350)	0.2512*** (13.6900)	0.8775*** (4.0430)
AGE	–0.0014 (–1.2860)	–0.0221* (–1.9370)	–0.0090*** (–13.0200)	–0.0465*** (–5.6540)
SIZE	0.0268*** (4.8100)	0.0360 (0.6054)	0.0064 (1.5000)	0.0382 (0.7611)
PROF	–0.1976*** (–8.3020)	–0.4466* (–1.7600)	–0.3419*** (–15.3800)	–0.9230*** (–3.5090)
LIQ	–0.0129*** (–8.5060)	–0.0232 (–1.4300)	–0.0048*** (–5.6730)	0.0047 (0.4612)
Const	–0.1395 (–1.6200)	0.0518 (0.0564)	0.2937 (4.4080)	0.6776 (0.8599)
LSDV R^2	0.8225	0.6710	0.8319	0.6151
Fixed effects	yes	yes	yes	yes
Random effects	no	no	no	no

Note: *,** and *** indicate significance at 10%, 5% and 1% levels respectively. In the parentheses t–statistics are provided.

at the level of $\rho < 0.01$. The direction of influence regarding the variables is also consistent in models (I) and (III). In both of these analysed models, the effective tax rate had a negative influence on the structure of capital of analyzed companies (being stronger in the case forming DMCs), which means that an increase in the effective tax rate led to a decline of the debt ratio calculated with the formula to LEV_A. Analyzing control variables for models (I) and (III) it was noted that tangibility had the highest influence on the debt of Czech companies. The higher the share of tangible fixed assets in the total assets, the higher was the debt of the entities. In the case of models (II) and (IV), the main explanatory variable was statistically significant only in the case of companies belonging to MNCs. However, this time the direction of influence was positive. In models (II) and (IV), respectively, four and two control variables were significant. In model (II), the highest statistical significance was attributed to tangibility, age, size and liquidity, while in model (IV), it was credited to tangibility and age. The best matching, as in the case of Polish companies, applied to model (III), $LSDV\ R^2 = 0.79$.

Interesting results can be observed when analysing Hungarian companies, which are presented in Table 7. Firstly, it should be mentioned that the effective tax rate was statistically significant in only one model – created for MNCs and variable LEV_B. This explanatory variable had a quite relevant and positive impact on the capital structure of Hungarian companies, what means that the higher the effective tax rate, the higher the indebtedness of entities. Interpreting control variables in model (I), it is worth noting that this is the only case, out

Table 6. Regression results: Czech Republic

Variable	DMCs		MNCs	
	(I) LEV_A	(II) LEV_B	(III) LEV_A	(IV) LEV_B
TAX	−0.0764*** (−4.3500)	0.0049 (0.0510)	−0.0364*** (−3.7910)	0.3741*** (3.7990)
TANG	0.3161*** (14.6900)	1.0077*** (8.4080)	0.2701*** (14.6000)	0.4513** (2.3780)
AGE	−0.0072*** (−6.2950)	−0.0282*** (−4.4430)	−0.0092*** (−12.6500)	−0.0209*** (−2.8090)
SIZE	0.0142*** (3.8300)	0.0978*** (4.7470)	0.0154*** (4.9380)	0.0237 (0.7393)
PROF	−0.0188*** (−3.2980)	−0.0492 (−1.5520)	−0.0273*** (−4.1120)	−0.0344 (−0.5041)
LIQ	0.0008** (2.4860)	0.0044*** (2.5780)	0.0019*** (4.4100)	0.0002 (0.0543)
Const	0.0679 (1.3530)	−0.6162** (−2.2020)	0.0226 (0.4829)	0.1886 (0.3927)
LSDV R^2	0.7181	0.6674	0.7931	0.5942
Fixed effects	yes	yes	yes	yes
Random effects	no	no	no	no

Note: *,** and *** indicate significance at 10%, 5% and 1% levels respectively. In the parentheses t-statistics are provided.

of the economies examined so far, in which the tangibility variable is insignificant. Those showing significance were the age, profitability and liquidity variables. In model (III), three variables also showed significance, but in this case these were tangibility, size and profitability. It is also worth noting that the majority of the control variables had a different direction of influence in models (I) and (III). For example, the older the Hungarian entity operating within a DMC was, the higher its debt level. On the other hand, in the case of companies operating within MNCs, this dependence was the opposite. In turn, a different catalogue of statistically significant variables was recorded for models (II) and (IV). In the model built for DMCs, two variables were significant, namely age and profitability. In contrast, in the model for MNCs, the variables showing significance were size and profitability. The one matching Hungarian companies best was model (I), for which $LSDV\,R^2 = 0.84$.

Table 7. Regression results: Hungary

Variable	DMCs		MNCs	
	(I) LEV_A	(II) LEV_B	(III) LEV_A	(IV) LEV_B
TAX	−0.0289 (−0.3260)	6.6415 (1.1500)	0.0344 (1.4590)	1.2608*** (4.4840)
TANG	0.0999 (1.1850)	3.2822 (0.5977)	0.1115*** (2.8150)	−0.5425 (−1.1470)
AGE	−0.0153*** (−3.9030)	−0.4959* (−1.9390)	0.0080 (0.8567)	0.1535 (1.3760)
SIZE	0.0041 (0.3174)	−1.2757 (−1.5110)	−0.0149*** (−10.5200)	−0.0886*** (−5.2070)
PROF	−0.0429*** (−2.6770)	2.8485*** (2.7320)	−0.2612*** (−5.1730)	−1.7855*** (−2.9610)
LIQ	−0.0197*** (−2.7160)	−0.1775 (−0.3766)	0.0009 (0.4025)	0.0365 (1.3050)
Const	0.6082 (2.9820)	28.2907** (2.1320)	0.3589** (2.4400)	−0.0079 (−0.0045)
LSDV R^2	0.8375	0.4599	0.8200	0.6489
Fixed effects	yes	yes	yes	yes
Random effects	no	no	no	no

Note: *,** and *** indicate significance at 10%, 5% and 1% levels respectively. In the parentheses t-statistics are provided.

Analysing the regression results for Slovak entities operating within DMCs and MNCs (Table 8), it can be seen that in each group the effective tax rate was statistically significant ones: for DMCs it was significant in the case of LEV_A and for MNCs in the case of LEV_B. The direction of influence of the variable was also different, where in model (I) the effective tax rate had a negative influence on the debt ratio, while in model (IV) the influence was positive. Interpreting control variables, it was noticed that in model (I) a very high statistical significance $(\rho < 0.01)$ was reported for tangibility and size, while high significance $(\rho < 0.05)$ was reported for age and profitability. At the same time, for model (III), all control variables were

statistically significant. The greatest strength of influence in models (I) and (III) applied to the tangibility variable, which is consistent with the trends occurring among Czech companies. In both analysed models applying to LEV_A, all control variables presented the same direction of influence. Model (II), based on the LEV_B response variable, showed significance in the case of two control variables, namely tangibility and profitability. In the case of the same model built for MNCs, three variables have shown significance. It is unquestionable that the highest strength of influence in the case of models (II) and (IV) also applied to the tangibility variable. Taking into account matching of the constructed models, it should be noted that it was worse than in the case of other Visegrad Group countries, as the maximum was $LSDV\ R^2 = 0.64$ for model (III).

Table 8. Regression results: Slovakia

Variable	DMCs		MNCs	
	(I) LEV_A	(II) LEV_B	(III) LEV_A	(IV) LEV_B
TAX	−0.0483*** (−3.2740)	0.1028 (0.6323)	−0.0111 (−1.1500)	0.2599*** (3.5090)
TANG	0.2738*** (7.3350)	2.9818*** (7.2520)	0.3311*** (12.8100)	1.1889*** (5.9880)
AGE	−0.0048** (−2.0230)	0.0230 (0.8731)	−0.0090*** (−7.3950)	−0.0396*** (−4.2330)
SIZE	0.0277*** (4.4520)	0.1001 (1.4600)	0.0137*** (3.3320)	0.0201 (0.6379)
PROF	−0.0122** (−2.0750)	0.14078** (2.1710)	−0.0332*** (−4.1170)	0.4313*** (6.9570)
LIQ	0.00051 (0.5519)	0.0020 (0.1994)	0.0018** (2.2350)	0.0083 (1.3260)
Const	−0.0617 (−0.7862)	−1.2833 (−1.4850)	0.0661 (1.1540)	0.4649 (1.0560)
LSDV R^2	0.5692	0.4570	0.6396	0.5538
Fixed effects	yes	yes	yes	yes
Random effects	no	no	no	no

Note: *,** and *** indicate significance at 10%, 5% and 1% levels respectively. In the parentheses t-statistics are provided.

3.3. Additional analysis: Poland and Slovakia

On 1 January 2015, changes were made to thin capitalisation regulations in Poland and Slovakia. These changes brought new restrictions concerning the method of calculating interest constituting a tax cost. In view of the above, it was decided to verify whether the new regulations affected the level of debt of group entities, and how particular determinants influenced the structure of corporate capitals in both sub-periods, i.e., 2012–2014 (before the changes in law), and 2015–2018 (after the changes).

Analysing descriptive statistics of the level of debt of Polish entities operating in DMCs presented in Table 9, it may be noted that the changes in regulations did not significantly

affect the LEV_A variable. A small positive change occurred in the case of the LEV_B variable, which was 0.76 before and 0.85 after the change in law. No significant changes were noted in the group of Polish companies operating within international structures. The lack of statistical significance was also confirmed by the Mann-Whitney U test.

Analogous testing conducted for Slovakia showed that there are statistically significant differences in leverage between periods. In the case of DMCs a slight negative change in the level of debt characterised by the LEV_A variable occurred within the 2015–2018 period when this ratio averaged 0.28, while in 2012–2014 it averaged 0.31. Some change appeared also in the average level of LEV_B but in this instance, after implementing the new thin capitalization rules the leverage increased. In the case of MNCs, a decrease in the average level of LEV_A between periods can be observed and the relatively similar average level of LEV_B before, as well as after the change of the tax law.

Table 9. The level of indebtedness 2012–2014 and 2015–2018: Poland and Slovakia

Variable	DMCs 2012–2014			DMCs 2015–2018			MNCs 2012–2014			MNCs 2015–2018		
	mean	SD	median	mean	SD	median	mean	SD	median	mean	SD	median
Poland												
LEV_A	0.3005	0.2762	0.2324	0.3124	0.2864	0.2377	0.2691	0.2801	0.1734	0.2587	0.2732	0.1572
LEV_B	0.7564	2.0541	0.2807	0.8484	2.3132	0.2926	0.6923	2.2604	0.1901	0.6526	2.0770	0.1744
Slovakia												
LEV_A	0.3080	0.6090	0.0504	0.2758	0.5782	0.0174	0.2391	0.4870	0.0477	0.2124	0.4579	0.0182
LEV_B	0.8486	5.7331	0.0152	1.0442	5.8251	0.0046	0.6030	3.3225	0.0329	0.5977	3.1886	0.0115

Note: The authors tested the differences between DMCs in the period 2012–2014 and 2015–2018, as well as MNCs 2012–2014 and MNCs 2015–2018 with the use of the Mann-Whitney U test. Obtained results show that in the case of Poland there are no statistically significant difference in leverage between periods whereas there are statistically significant differences in leverage between periods in the case of Slovakia (tested for $\rho < 0.05$). For specific statistics see Appendix 3.

Examining the results of panel regression (Table 10), it was identified that there were some differences between particular periods within the analysed categories. The main explanatory variable, i.e., the effective tax rate, was insignificant for companies forming part of DMCs in 2012–2014, but it became significant after the changes in the law. At the same time, this significance was shown only in the case of LEV_B. In the case of control variables, in the group of entities operating in DMCs, four were significant for model (I), namely tangibility, size, profitability and liquidity; while in model (III) built on the basis of data for the years after the changes in the law, only three control variables were significant (variable size lost its significance). In the case of models created on the basis of the response variable LEV_B, there were also some changes. In model (II), only one variable was statistically significant, namely tangibility, while in model (IV) two control variables demonstrated statistical significance, namely tangibility and age.

Interesting observations can also be made for the second category of entities. The effective tax rate lost its importance in the second sub-period, i.e., after the change of legal regulations

related to thin capitalization. In the years 2012–2014, this variable was significant in both constructed models and had a negative effect on debt ratios. In the years 2015–2018, only in the model built on the basis of the LEV_B variable did the effective tax rate variable show significance; however, its direction of influence was contrary to the one from the first subperiod. In this case, the growth of the effective tax rate led to an increase of the LEV_B ratio. On the other hand, it was noticed in analyzing the models from the perspective of control variables that Polish companies operating within MNCs before and after the changes in tax law made their decision on incurring interest-bearing debt (calculated with LEV_A) contingent on such ratios as tangibility, age and profitability. The situation was a little bit different in the case of models constructed with the use of variable LEV_B. Analysing models (VI) and (VIII), it appeared that in the period 2015–2018 the profitability variable lost its significance in favour of tangibility. However, the age variable still maintained its significance.

Table 10. Regression results 2012–2014 and 2015–2018 Poland

Variable	DMCs 2012–2014		DMCs 2015–2018		MNCs 2012–2014		MNCs 2015–2018	
	(I) LEV_A	(II) LEV_B	(III) LEV_A	(IV) LEV_B	(V) LEV_A	(VI) LEV_B	(VII) LEV_A	(VIII) LEV_B
TAX	0.0022 (0.1506)	−0.1152 (−0.7023)	−0.0158 (−1.2520)	0.3225** (2.1060)	−0.0235** (−2.1150)	−0.2466* (−1.8200)	0.0078 (0.8331)	0.3562*** (2.9130)
TANG	0.2727*** (5.5790)	1.6126*** (2.9240)	0.2856*** (7.9350)	3.0314*** (6,9590)	0.1566*** (4.3780)	0.1281 (0.2940)	0.2839*** (10.2800)	0.8670** (2.3990)
AGE	−0.0016 (−0.5528)	0.0259 (0.8101)	−0.0032 (−1.3560)	−0.0582** (−2.0410)	−0.0118*** (−6.1910)	−0.0466** (−2.0060)	−0.0090*** (−6.2110)	−0.0471** (−2.4730)
SIZE	0.0308*** (3.0920)	0.0124 (0.1100)	0.0123 (1.3520)	0.1102 (1.0010)	0.0121 (1.3450)	0.1476 (1.3420)	−0.0007 (−0.1214)	0.0085 (0.1071)
PROF	−0.1351*** (−3.3260)	−0.7103 (−1.5490)	−0.2124*** (−6.3160)	−0.5705 (−1.4010)	−0.4031*** (−10.2900)	−1.4687*** (−3.0770)	−0.3493*** (−11.6200)	−0.6242 (−1.5850)
LIQ	−0.0081*** (−2.8380)	−0.0106 (−0.3284)	0.0116*** (−5.3330)	−0.0173 (−0.6596)	−0.0013 (−0.9549)	0.0215 (1.2890)	−0.0018 (−1.4830)	0.0197 (1.2270)
Const	−0.2149 (−1.3160)	−0.3567 (−0.1935)	0.1373 (0.9924)	−0.6591 (−0.3937)	0.2652* (1.8040)	−0.8767 (−0.4894)	0.3941*** (4.1970)	1.0798 (0.8784)
LSDV R^2	0.9154	0.8053	0.8996	0.7744	0.9117	0.7987	0.9159	0.7505
No. of observation	2,810	2,810	4,007	4,007	6,585	6,585	8,487	8,487
No. of companies	1,277	1,277	1,625	1,625	2,952	2,952	3,489	3,489
Fixed effects	yes	yes	yes	yes	yes	yes	yes	yes
Random effects	no	no	no	no	no	no	no	no

Note: *,** and *** indicate significance at 10%, 5% and 1% levels respectively. In the parentheses t-statistics are provided.

Interesting observations can also be made regarding models built for two sub-periods concerning Slovak entities (Table 11). In the case of companies operating within DMCs, the effective tax rate explanatory variable was significant in both the first and second sub-periods. However, in both cases this significance was shown for models constructed on the basis of the LEV_A variable. In both models, i.e., model (I) and (III), the link between the response and explanatory variable was negative, with low force of influence. When analyzing control variables, it was noticed that in model (I), only one variable showed statistical significance, namely age. On the other hand, in model (III), i.e., after the changes in law, significance was given to tangibility, size and profitability. A noticeable change also occurred in models based on the LEV_B dependent variable. Before the change in law, only the profitability variable had a significant influence on the debt-to-equity ratio, while after the change, it was the tangibility variable.

Table 11. Regression results 2012–2014 and 2015–2018 Slovakia

Variable	DMCs 2012–2014		DMCs 2015–2018		MNCs 2012–2014		MNCs 2015–2018	
	(I) LEV_A	(II) LEV_B	(III) LEV_A	(IV) LEV_B	(V) LEV_A	(VI) LEV_B	(VII) LEV_A	(VIII) LEV_B
TAX	−0.0901** (−2.5420)	−0.2095 (−0.5900)	−0.0360** (−2.2310)	−0.0652 (−0.3597)	−0.0048 (−0.2718)	0.0734 (0.5494)	−0.0061 (−0.5469)	0.2564*** (2.9060)
TANG	0.0361 (0.4110)	0.7418 (0.8423)	0.3134*** (5.7410)	2.4049*** (3.9280)	0.3374*** (6.1910)	1.4178*** (3.4160)	0.2938*** (8.0340)	0.7944*** (2.7420)
AGE	−0.0189** (−2.0360)	−0.0255 (−0.2740)	0.0019 (0.4274)	−0.0085 (−0.1686)	−0.0089** (−2.1400)	−0.1450*** (−4.5780)	−0.0065*** (−2.8310)	−0.0596*** (−3.2620)
SIZE	0.0151 (0.9844)	−0.0556 (−0.3617)	0.01525* (1.7550)	0.0433 (0.4438)	0.0125 (1.3980)	−0.0979 (−1.4410)	0.0044 (0.7689)	0.1231*** (2.6920)
PROF	0.0054 (0.4857)	0.2522** (2.2500)	−0.0176** (−2.2220)	−0.1222 (−1.3740)	−0.0542*** (−3.5830)	0.5941*** (5.1610)	−0.0332*** (−3.1150)	0.2717*** (3.2190)
LIQ	0,0001 (−0.0344)	0.0194 (1.0250)	0.0001 (0.1218)	−0.0098 (−0.7200)	0.0023 (1.4360)	0.0045 (0.3682)	0.0005 (0.4826)	0.0039 (0.4763)
Const	0.3223 (1.5500)	1.5948 (0.7654)	−0.0057 (−0.0490)	0.0454 (0.0350)	0.0825 (0.6252)	3.2231*** (3.2080)	0.1706** (2.0510)	−0.5929 (−0.8998)
LSDV R^2	0.7033	0.6639	0.7167	0.6489	0.7888	0.7368	0.7703	0.7028
No. of observation	3,994	3,994	6,622	6,622	8,181	8,181	12,288	12,288
No. of companies	1,683	1,683	2,121	2,121	3,219	3,219	3,763	3,763
Fixed effects	yes	yes	yes	yes	yes	yes	yes	yes
Random effects	no	no	no	no	no	no	no	no

Note: *,** and *** indicate significance at 10%, 5% and 1% levels respectively. In the parentheses t-statistics are provided.

In the case of companies forming part of MNCs, the effective tax rate variable was insignificant for economic entities before changes in legal regulations. However, after the change in law, significance was seen for variable LEV_B. This time, the dependence was positive. An analysis of control variables allowed us to ascertain that in models (V) and (VII) three variables were statistically significant, namely tangibility, age and profitability, while their strength and direction of influence were identical. Some differences can still be noticed when analysing models (VI) and (VIII), which are based on the LEV_B response variable. In the first model, three variables showed the highest significance, i.e., tangibility, age and profitability. In the second model, not only those variables but also size was statistically significant. It is also worth noting that the division of data into two time series led to a significant improvement in the matching of models, as now the maximum total.

4. Breakdown of results and discussion

There are differences between the capital structure of DMCs and that of MNCs, but they are not very important. Domestic entities have higher levels of debt, which does not allow of a positive verification of hypothesis 1. In every analyzed case, i.e., for every economy from the Visegrad Group, DMCs had on average higher debt ratios than MNCs. At the same time, an additional analysis conducted for Poland and Slovakia determined that the change in the law on thin capitalization had no significant impact on the Polish companies' levels of debt but might have had some influence on the Slovak companies' level of debt (as the Mann-Whitney U test proved statistical significance for the difference in the level of leverage between periods).

The results obtained from the major analysis seem to be in contradiction with the postulated arguments appearing in the relevant literature. At the same time, a review of sources indicates that the authors are not isolated in their observations. Avarmaa, Hazak, and Männasoo (2011), studying a group of companies from Baltic States, as well as Lee and Kwok (1988), verifying international and national corporations in the United States, also postulated that higher debt ratios are represented by entities operating within national structures. The reason for these observations may be the very structure of national and international groups. Very often, national groups include many small entities, with the lowest possible personal contribution legally required, while international groups are formed by larger entities, and therefore with higher levels of equity, which are also confirmed by descriptive statistics obtained for the independent variable of entity size. In accordance with descriptive statistics, DMCs are smaller than MNCs in every analyzed economy.

In the case of hypothesis 2, it is not possible to fully reject or confirm it. The effective tax rate was a significant variable for Czech based MNCs (for both capital structure ratios), as well as those from Hungary and Slovakia (only in the case of the ratio calculated using the LEV_B formula), but it was insignificant for the shaping of the capital structure by Polish MNCs. In the case of DMCs, the effective tax rate variable was significant only in two models, i.e., in the models constructed on the basis of the LEV_A variable for the Czech and Slovak entities. In the other six models, this variable proved to be insignificant. At the same time, an interesting observation is the different direction of influence of the variable, which

was not always as expected. It was expected that with the growth of the effective tax rate, the indebtedness of companies would grow as companies seeking to avoid excessive costs would use the tax shield to reduce tax liabilities. This dependence was confirmed for the LEV_B ratio calculated for the Czech, Hungarian, and Slovak MNCs. It was noticed that the variable had an inverse influence on ratio LEV_A calculated for the Czech DMCs and MNCs, as well as for the Slovak DMCs[4]. Quite a surprising observation is also the fact that MNCs have on average a higher effective tax rate than DMCs. This is surprising as it seemed that multinational corporations, having the opportunity to use global markets, would construct their strategies to limit tax liabilities, which was highlighted by, e.g., Su and Tan (2018). The results of additional analysis made for Poland and Slovakia do not allow to draw coherent conclusions about the importance of the effective tax rate as a determinant of capital structure. In some models, the variable lost statistical significance over the period of time and gained in the others. The presented heterogeneity of results, and consequently the lack of direct influence of the effective tax rate variable on the structure of capital may result from the normalisation of tax rates in the studied countries over the years, and thus the lack of benefits resulting from the transfer of profits. It seems that the tax factor has small significance in the context of this study due to the fact that it was carried out for a period of years in which the scale of tax preferences was significantly reduced, with no specific tax reliefs applied to foreign capital, as was the case in the 1990s. Corporate tax rates have been reduced over the last thirty years, and in the analysed countries the rates were more or less in the middle of the range. The regulatory changes resulting from OECD and EU recommendations on the reduction of harmful tax competition also played a role.

In addition to verifying the hypotheses put forward, a pooled analysis of control variables' vectors was also performed. It was noticed that the variables most frequently appearing as significant for both DMCs and MNCs include sales profitability, tangibility and the age of the enterprise. At the same time, among the indicated variables, the same direction of impact concerned tangibility (positive in both groups) and the age of the company (negative in both groups). The results obtained mean that the more tangible fixed assets company possess that might be considered as collateral, the higher the companies' debt ratios. On the other hand, the older the entity, the less its debt.

The largest differences in determinants of capital structure appeared in the case of Hungarian companies. Hungarian DMCs did not consider the structure of assets at all when making decisions regarding the choice of financing sources, while MNCs did so in only one case. Moreover, only for Hungarian MNCs was the insignificant variable in both models the age of the company. It is also worth noting that Hungary is where the largest percentage of MNCs functioned, as it was 87% (in other countries it was below 70%). The authors believe that the existing differences may be due to three different factors. First, the research sample selected for the Hungarian economy was the smallest; second, the development of the Hungarian economy was slower than that of the other three countries selected for analysis; and third, this was the country which, of all the post-communist countries, obtained foreign capital to the greatest extent in the first years of the transformation using various types of incentives,

[4] Only significant variables were subject to interpretation.

even if these led to some discrimination of the domestic entities. However, verifying the indicated conclusions would require the introduction of macroeconomic determinants into the model. This would allow for a more thorough analysis of the differences between individual economies and the expansion of the research sample so that countries with different levels of development could be included.

A summary of discussed results is presented in the Table 12.

Table 12. Summary of data panel regression

	Poland				Czech Republic			
	DMCs		MNCs		DMCs		MNCs	
	LEV_A	LEV_B	LEV_A	LEV_B	LEV_A	LEV_B	LEV_A	LEV_B
TAX	–	+	–	+	–	+	–	+
TANG	+	+	+	+	+	+	+	+
AGE	–	–	–	–	–	–	–	–
SIZE	+	+	+	+	+	+	+	+
PROF	–	–	–	–	–	–	–	–
LIQ	–	–	–	+	+	+	+	+
	Hungary				Slovakia			
	DMCs		MNCs		DMCs		MNCs	
	LEV_A	LEV_B	LEV_A	LEV_B	LEV_A	LEV_B	LEV_A	LEV_B
TAX	–	+	+	+	–	+	–	+
TANG	+	+	+	+	+	+	+	+
AGE	–	–	+	+	–	+	–	–
SIZE	+	–	–	–	+	+	+	+
PROF	–	+	–	–	–	+	–	+
LIQ	–	–	+	+	+	+	+	+

Note: significant variables were shaded in gray, the higher the significance of a variable, the darker the cell.

Conclusions

The main aim of the research was to review the level of debt and the impact of taxation on the capital structure of companies operating within national and multinational corporate groups in the countries of the Visegrad Group. Two hypotheses were put forward, the first one being that *entities forming part of multinational corporations have a higher financial leverage than entities operating within national corporations*, and the second one that *the effective tax rate is a significant driver that shapes the capital structure in the case of entities forming part of multinational corporations, while it is insignificant in the case of entities operating within national corporations.* In order to meet the main objective and verify the hypotheses put forward, the authors performed an analysis of data covering 2012–2018 using the panel

regression econometric tool. In the creation of the models, the authors used two differently calculated debt ratios – which were the response variables, one explanatory variable in the form of the effective tax rate, and five control variables, namely: tangibility, age, size, profitability, and liquidity.

In accordance with the results, for the whole Visegrad Group, i.e., Poland, the Czech Republic, Hungary, and Slovakia, it was shown that companies forming domestic corporations have on average higher debt ratios than companies forming multinational structures. This dependence was true in the case of both response variables. Due to the above, hypothesis 1 put forth in the beginning of the analysis by the researchers turned out to be false and had to be rejected.

Analyzing the matter from the perspective of the importance of the effective tax rate on companies' decisions about how to shape the capital structure, a significant disparity of results was noted. Thus, hypothesis 2 could neither be fully confirmed nor fully rejected. The effective tax rate was a significant variable for Czech based MNCs (for both capital structure ratios), as well as for those from Hungary and Slovakia (only in the case of the ratio calculated using the LEV_B formula), but it was insignificant for the shaping of the capital structure by Polish MNCs.

The presented study has significant theoretical and practical implications. First, it shows that the behaviour of company operating in multinational corporations as described in the literature are not always reflected in reality (lower level of debt, and higher effective tax rate in the case of MNCs than DMCs). Second, it was noticed that despite macroeconomic, social, and historical similarities existing among studied economies, the results obtained differ among them (e.g., in the case of Hungary). The above means that aggregation of data, quite often practiced by scientists in the case of economies regarded as similar (to obtain a larger research sample, for instance), and a pool analysis of such data can distort the end results leading to erroneous conclusions. Third, it seems that over the years (since the political transformation up to the present) legal regulations related to the tax law existing in Visegrad Group countries have been developed in a proper way, limiting – or at least not encouraging – companies' use of aggressive tax optimization strategies under which they would become excessively debt-laden, being driven in decisions on how to shape the capital structure by the level of effective tax rate.

Undoubtedly however, it should be remembered that the presented study suffers from a number of limitations. As mentioned earlier, it would be beneficial in expanding the analysis to include not only microeconomic drivers, but also macroeconomic variables that would enable a better comparison of results obtained for entities from different economies. Another significant limitation the authors encountered was the inability to verify the level of interest paid by companies within the group and to the financial institutions, which stemmed from the lack of access to such data. This type of data would provide very insightful information about the extent of internal financing within MNCs and DMCs. It seems that only further in-depth analyses would allow a better understanding of the differences and mechanisms regarding the operation of national and multinational corporate groups.

At the same time, the whole area of corporate groups seems to be becoming more and more important. The authors believe that every single piece of information providing an

answer to the question of how to operate in a world dominated by corporate groups would be most valuable. This would be invaluable for governments with respect to creating law, for financial institutions in the area of financial sources and for other companies, especially those unaffiliated.

Author contributions

The contribution of the authors is equal.

Disclosure statement

The authors declare no conflict of any competing financial, professional, or personal interests.

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APPENDIX

Correlation matrices

Poland DMCs

	LEV_A	LEV_B	TANG	AGE	SIZE	PROF	LIQ	TAX
LEV_A	1.0000	0.4068	0.1380	–0.1168	–0.0190	–0.0183	–0.3069	–0.0185
LEV_B	0.4068	1.0000	0.1218	–0.0705	–0.0348	0.0617	–0.1309	0.0353
TANG	0.1380	0.1218	1.0000	0.0951	–0.0314	0.0223	–0.2111	–0.0120
AGE	–0.1168	–0.0705	0.0951	1.0000	0.2664	–0.0976	0.0094	–0.0295
SIZE	–0.0190	–0.0348	–0.0314	0.2664	1.0000	–0.1981	–0.1366	0.0275
PROF	–0.0183	0.0617	0.0223	–0.0976	–0.1981	1.0000	0.1086	0.0503
LIQ	–0.3069	–0.1309	–0.2111	0.0094	–0.1366	0.1086	1.0000	0.0161
TAX	–0.0185	0.0353	–0.0120	–0.0295	0.0275	0.0503	0.0161	1.0000

Note: correlation coefficients were calculated using Pearson's linear correlation coefficient.

Poland MNCs

	LEV_A	LEV_B	TANG	AGE	SIZE	PROF	LIQ	TAX
LEV_A	1.0000	0.3862	0.1741	–0.0960	–0.0213	–0.0494	–0.2625	–0.0277
LEV_B	0.3862	1.0000	0.0765	–0.0499	–0.0061	0.0325	–0.1064	–0.0042
TANG	0.1741	0.0765	1.0000	0.1144	0.0876	0.0676	–0.1804	–0.0954
AGE	–0.0960	–0.0499	0.1144	1.0000	0.2792	–0.0322	0.0033	–0.0234
SIZE	–0.0213	–0.0061	0.0876	0.2792	1.0000	–0.1374	–0.2262	–0.0537
PROF	–0.0494	0.0325	0.0676	–0.0322	–0.1374	1.0000	0.1863	0.0517
LIQ	–0.2625	–0.1064	–0.1804	0.0033	–0.2262	0.1863	1.0000	0.0357
TAX	–0.0277	–0.0042	–0.0954	–0.0234	–0.0537	0.0517	0.0357	1.0000

Note: correlation coefficients were calculated using Pearson's linear correlation coefficient.

Czech Republic DMCs

	LEV_A	LEV_B	TANG	AGE	SIZE	PROF	LIQ	TAX
LEV_A	1.0000	0.2174	0.2912	–0.0600	0.0704	–0.0200	–0.0636	–0.0529
LEV_B	0.2174	1.0000	0.2370	–0.0468	0.0837	0.0807	–0.0394	0.0646
TANG	0.2912	0.2370	1.0000	0.0418	0.0277	0.0062	–0.0693	–0.0254
AGE	–0.0600	–0.0468	0.0418	1.0000	0.2827	0.0277	0.0130	0.0555
SIZE	0.0704	0.0837	0.0277	0.2827	1.0000	0.1636	–0.2087	0.2363
PROF	–0.0200	0.0807	0.0062	0.0277	0.1636	1.0000	0.0242	0.1805
LIQ	–0.0636	–0.0394	–0.0693	0.0130	–0.2087	0.0242	1.0000	0.0045
TAX	–0.0529	0.0646	–0.0254	0.0555	0.2363	0.1805	0.0045	1.0000

Note: correlation coefficients were calculated using Pearson's linear correlation coefficient.

Czech Republic MNCs

	LEV_A	LEV_B	TANG	AGE	SIZE	PROF	LIQ	TAX
LEV_A	1.0000	0.1636	0.3893	–0.1038	–0.0950	–0.0571	–0.0656	–0.1183
LEV_B	0.1636	1.0000	0.1293	–0.0420	0.0386	0.0884	–0.0373	0.0238
TANG	0.3893	0.1293	1.0000	0.0273	–0.0487	0.0111	–0.0574	–0.1025
AGE	–0.1038	–0.0420	0.0273	1.0000	0.3130	0.0478	0.0513	0.0656
SIZE	–0.0950	0.0386	–0.0487	0.3130	1.0000	0.1604	–0.1989	0.1626
PROF	–0.0571	0.0884	0.0111	0.0478	0.1604	1.0000	0.0619	0.1584
LIQ	–0.0656	–0.0373	–0.0574	0.0513	–0.1989	0.0619	1.0000	0.0270
TAX	–0.1183	0.0238	–0.1025	0.0656	0.1626	0.1584	0.0270	1.0000

Note: correlation coefficients were calculated using Pearson's linear correlation coefficient.

Hungary DMCs

	LEV_A	LEV_B	TANG	AGE	SIZE	PROF	LIQ	TAX
LEV_A	1.0000	0.3411	0.4635	–0.2888	–0.1961	–0.0851	–0.1758	–0.1713
LEV_B	0.3411	1.0000	0.1989	–0.1447	–0.1129	–0.0184	–0.0728	–0.0512
TANG	0.4635	0.1989	1.0000	–0.1742	–0.3064	0.0038	–0.1176	–0.2063
AGE	–0.2888	–0.1447	–0.1742	1.0000	0.3765	–0.0047	0.0661	0.0141
SIZE	–0.1961	–0.1129	–0.3064	0.3765	1.0000	0.0407	–0.0873	0.1041
PROF	–0.0851	–0.0184	0.0038	–0.0047	0.0407	1.0000	–0.0354	0.0312
LIQ	–0.1758	–0.0728	–0.1176	0.0661	–0.0873	–0.0354	1.0000	0.0250
TAX	–0.1713	–0.0512	–0.2063	0.0141	0.1041	0.0312	0.0250	1.0000

Note: correlation coefficients were calculated using Pearson's linear correlation coefficient.

Hungary MNCs

	LEV_A	LEV_B	TANG	AGE	SIZE	PROF	LIQ	TAX
LEV_A	1.0000	0.6199	0.2910	–0.0890	–0.1703	–0.0030	–0.1147	–0.0345
LEV_B	0.6199	1.0000	0.1597	–0.0523	–0.1126	–0.0054	–0.0480	0.0167
TANG	0.2910	0.1597	1.0000	–0.0313	0.0176	0.3005	–0.1610	–0.0746
AGE	–0.0890	–0.0523	–0.0313	1.0000	0.2807	–0.1763	–0.2506	0.0742
SIZE	–0.1703	–0.1126	0.0176	0.2807	1.0000	–0.0350	–0.0078	0.0226
PROF	–0.0030	–0.0054	0.3005	–0.1763	–0.0350	1.0000	0.1440	–0.0025
LIQ	–0.1147	–0.0480	–0.1610	–0.2506	–0.0078	0.1440	1.0000	–0.0026
TAX	–0.0345	0.0167	–0.0746	0.0742	0.0226	–0.0025	–0.0026	1.0000

Note: correlation coefficients were calculated using Pearson's linear correlation coefficient.

Slovakia DMCs

	LEV_A	LEV_B	TANG	AGE	SIZE	PROF	LIQ	TAX
LEV_A	1.0000	0.1180	0.2244	0.0442	0.1229	–0.0513	–0.0751	–0.0428
LEV_B	0.1180	1.0000	0.1515	0.0171	0.0897	0.0379	–0.0612	0.0339
TANG	0.2244	0.1515	1.0000	0.1592	0.0943	–0.1148	–0.1096	–0.0605
AGE	0.0442	0.0171	0.1592	1.0000	0.3212	–0.0246	–0.0284	0.0321
SIZE	0.1229	0.0897	0.0943	0.3212	1.0000	0.1758	–0.2159	0.0550
PROF	–0.0513	0.0379	–0.1148	–0.0246	0.1758	1.0000	0.0279	0.1335
LIQ	–0.0751	–0.0612	–0.1096	–0.0284	–0.2159	0.0279	1.0000	0.0180
TAX	–0.0428	0.0339	–0.0605	0.0321	0.0550	0.1335	0.0180	1.0000

Note: correlation coefficients were calculated using Pearson's linear correlation coefficient.

Slovakia MNCs

	LEV_A	LEV_B	TANG	AGE	SIZE	PROF	LIQ	TAX
LEV_A	1.0000	0.1595	0.2783	–0.0341	0.0581	–0.0326	–0.0518	–0.0568
LEV_B	0.1595	1.0000	0.2013	–0.0234	0.0637	0.0820	–0.0410	0.0277
TANG	0.2783	0.2013	1.0000	0.0542	0.0997	–0.0339	–0.1035	–0.0693
AGE	–0.0341	–0.0234	0.0542	1.0000	0.3430	0.0311	0.0416	0.0508
SIZE	0.0581	0.0637	0.0997	0.3430	1.0000	0.1427	–0.1733	0.1125
PROF	–0.0326	0.0820	–0.0339	0.0311	0.1427	1.0000	0.0706	0.1565
LIQ	–0.0518	–0.0410	–0.1035	0.0416	–0.1733	0.0706	1.0000	0.0206
TAX	–0.0568	0.0277	–0.0693	0.0508	0.1125	0.1565	0.0206	1.0000

Note: correlation coefficients were calculated using Pearson's linear correlation coefficient.

APPENDIX 2

Country	Test statistics								
		LEV_A	LEV_B	TAX	TANG	AGE	SIZE	PROF	LIQ
Poland	Mann-Whitney U	45 546 807.50	45 636 817.50	481 49312.00	45 579 579.50	50 138 846.00	38464386.50	46 140 525.00	42 393 704.50
	asymp. sig. (2-tailed)	0.0000	0.0000	0.0000	0.0000	0.0043	0.0000	0.0000	0.0000
Czech Republic	Mann-Whitney U	216 373 170.00	218 312 909.00	189 158 744.00	216 179 027.50	203 647 231.50	119499039.50	219 793 370.00	220 774 713.00
	asymp. sig. (2-tailed)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hungary	Mann-Whitney U	623948.00	665 560.00	671 452.50	658 257.00	808 599.00	733136.00	898 163.00	705 447.00
	asymp. sig. (2-tailed)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0022	0.0000
Slovakia	Mann-Whitney U	108229792.50	103 501 564.50	9 7457 853.50	108 177 029.00	97 643 614.50	63309553.00	107 350 299.50	96 811 895.00
	asymp. sig. (2-tailed)	0.5751	0.0000	0.0000	0.5253	0.0000	0.0000	0.0834	0.0000

APPENDIX 3

Country	Test statistics				
		DMCs		MNCs	
		LEV_A	LEV_B	LEV_A	LEV_B
Poland	Mann-Whitney U	5 518 443.50	5 548 046.50	27 554 093.50	27 652 247.50
	asymp. sig. (2-tailed)	0.1637	0.3065	0.1417	0.2717
Slovakia	Mann-Whitney U	12 544 273.00	12 825 019.00	45 902 865.50	46 797 417.50
	asymp. sig. (2-tailed)	0.0000	0.0087	0.0000	0.0000