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DEBT STRUCTURE AND ITS IMPACT ON FINANCIAL PERFORMANCE: AN EMPIRICAL STUDY ON THE ENTERPRISES OPERATING IN THE VISEGRAD GROUP COUNTRIES

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Abstract:

Research background: In recent years, debt financing has gained popularity as companies seek additional resources to fund their expansion and investment initiatives. Monitoring corporate indebtedness is related to corporate debt, which is a crucial aspect of assessing the overall financial health of the enterprise and will occur if an enterprise does not have enough equity. Rising indebtedness can be a difficult financial situation for enterprises in the form of default and an inability to meet their emerging liabilities.

Purpose of the article: Given that the composition of a firm's debt structure holds substantial importance when assessing the financial performance of businesses varying in size, the primary objective of this paper is to perform a comprehensive debt analysis on enterprises operating within the Visegrad Group countries. Subsequently, the authors will explore whether the enterprise's size exerts an influence on the utilization of short-term and long-term debt.

Methods: The Kruskal-Wallis test was used to determine if there were any significant variations in the monitored indebtedness ratios based on firm size.

Findings & Value added: Since there are differences in indebtedness indicators due to firm size, post hoc analysis results indicated that in Visegrad Group countries, the debt structure of small enterprises is significantly different not only from medium-sized but also from large and very large enterprises. Based on the results, the existence of differences between small and very large enterprises can be pointed out. Since some firm-specific features may be considered proxies for default probability, comprehending the effect of particular determinants on the corporate debt structure is crucial since it simplifies the decision-making process of creditors and stakeholders.

Keywords: financial performance; corporate debt structure; firm size; analysis of variance

JEL Classification: D22; G33; L25

1. Introduction

The corporate performance of each enterprise is influenced by its financial performance, which is a significant aspect of every business entity operating in the market (Freeman et al., 2021). The concept of business performance is presently one of the most frequently used terms, and it is no longer clearly defined in theory. The primary reason is the complexity of corporate performance and its very general conclusion. According to Rey-Ares et al. (2021), corporate performance can be identified at the most general level as the overall nature of the enterprise's existence and its success in the future. Corporate performance is understood by Khan and Wang (2021) and Michulek et al. (2023) as a characteristic that describes how a certain activity is carried out by the firm. According to Mazanec (2022), the quantification of selected indicators may be used to assess corporate performance, and this abstract concept is referenced in a variety of situations, as demonstrated by the definitions mentioned. Ullah and Sun (2021), on the contrary, make the point that corporate performance is primarily related to the ability of a firm to maximize the investments made in its business activities. Corporate performance leads to the mistaken belief that only firms reporting a profit from their economic activities can be considered efficient (Kliestik et al., 2022). This viewpoint does not take into consideration the significant fact that corporate performance is assessed from various perspectives, which also fundamentally determine the applied performance evaluation criteria. Nevertheless, the assessment of corporate performance is deemed essential, but due to its complexity, it constitutes a challenging process that relies on values derived from financial accounting (Riyadh et al., 2019; Khan et al., 2020). In the past, the impact of various factors on corporate performance has been examined by numerous authors (Myskova and Hajek, 2020; Yousaf et al., 2021; Durisova et al., 2019). In their study, Dimitric et al. (2019) and Maity et al. (2019) stressed that corporate performance is significantly influenced by age, total asset value, and corporate indebtedness. According to Altaf and Ahmad (2019), the computation of the ratio of short-term debt or long-term debt is the primary method used to assess an undertaking's financial performance. The ratio of total debt as well as the ratio of short-term debt both negatively affect the financial performance of the firm, according to the authors and their conclusions using their panel regression estimate approach. Xu et al. (2021) also used panel data to examine how the capital structure of Chinese agricultural listed companies affected their financial performance. The empirical findings show that while long-term debt ratio has no discernible effect on ROA and ROE, the total debt ratio and short-term debt ratio have a negative impact on the financial performance of Chinese agricultural listed firms.

For instance, it is asserted by Vieira (2017), Shahzad et al. (2015), Grega et al. (2021) and Potkany et al. (2022) that a gradual decline in corporate performance is initiated when the debt ratio is excessively high. Despite numerous studies on the impact of debt financing on corporate performance, contradictory results have been yielded. Indebtedness can currently be regarded as one of the most significant economic concerns for business entities (Stefko et al., 2021) and is an economic term that implies the utilization of external financial sources for the financing of corporate assets (Kovacova et al., 2022). The selection of an appropriate capital structure, such as the choice between equity financing, debt financing, or a combination of both (Nagy and Valaskova, 2022), is considered one of the most challenging decision-making processes because it indirectly influences the enterprise's level of indebtedness (Karas and Reznakova, 2023).

Various determinants that impact corporate capital composition are influenced by corporate indebtedness in different ways (Culkova et al., 2018), such as the prioritization of financing business activities, particularly through debt financing. Corporate growth potential (Malkowska and Uhruska, 2022), the inherent quality of the enterprise itself (Nagy and Lazaroiu, 2022; Nagy

et al., 2023), the change in the environment (Valaskova and Nagy, 2023), and managerial ownership expressed as a percentage of shares owned by owners (Nemteanu et al., 2022; Vatamanescu et al., 2023) at the conclusion of the fiscal year also exert a significant influence on corporate indebtedness (Valaskova et al., 2018). However, one of the most crucial determinants affecting an enterprise's debt is its size. In general, small enterprises encounter limitations when seeking bank loans. As stated by Blazkova and Dvoulety (2019), small enterprises secure debt at considerably higher costs compared to larger ones. Alfaro et al. (2019) emphasize that firm size assumes a pivotal role in determining whether to fund its activities through debt, thus making it another noteworthy determinant of indebtedness. In general, it is assumed that small businesses have a lower proportion of external sources in their passive structure compared to large businesses. The availability and cost of various forms of debt financing have been the subject of research by Cline et al. (2020). These authors concluded that small firms obtain less debt or obtain debt at higher costs than large businesses, which may manifest in their lack of interest in external financing. Chernenko and Sunderam (2014) argues that, among other factors, the reason for the lower debt levels of small businesses may also be their attempt to maintain higher liquidity during financial difficulties. Authors such as Cline et al. (2020), Dvoulety et al. (2021) and Mundi et al. (2022) have also commented on this issue. These authors examined the relationship between a firm size and its debt in the form of long-term obligations, bank loans, and other external financing. They concluded that there is a significant positive relationship between a company's size and its indebtedness. Therefore, the larger the company, the more inclined it is to finance its activities with external sources (Blazek et al., 2023). Cassell et al. (2012) state that large companies are more heavily indebted, which, according to them, is due to better debt diversification and, therefore, a lower risk of business bankruptcy compared to smaller businesses. Such companies are regarded as less risky by banking institutions, and their overall access to loans is generally better (Szyszko and Rutkowska, 2022). Supporters of the trade-off theory also lean towards this assertion, according to which large companies that generate a sufficiently high profit have better creditworthiness, and therefore, banking institutions consider them less risky and do not anticipate sudden financial difficulties caused by insolvency. In contrast to previous authors, Saif-Alyousfi et al. (2020) examined the relationship between a firm size and short-term obligations. They arrived at the conclusion that there is a negative relationship between short-term obligations and the size of the enterprise. The larger the company, the lower the proportion of short-term obligations to total assets. This phenomenon can be explained by the fact that long-term assets, including a portion of current assets tied up in the business in the long term, grow faster than current assets financed by short-term sources. business practices confirm this assertion, showing that small companies have limited access to obtaining long-term bank loans.

The issue of indebtedness and the selection of an appropriate financing method is a matter that enterprises consistently grapple with. In general, debt enhances the return on equity when the interest rate is lower than the enterprise's profit. This phenomenon, known as financial leverage, is associated with debt use. However, it is crucial to note that the involvement of debt also heightens its associated risk (Mouandat, 2022). Consequently, determining the optimal debt structure for the enterprise becomes highly significant. Throughout the 20th century, various theories for optimizing capital structure were gradually developed by scholars in financial management. Models for determining the appropriate capital structures have been a subject of research for many decades. Over time, different capital structure theories have emerged in financial ideology, and these theories have been variably embraced in academic, professional, and practical settings (Cerkovskis et al., 2022). The pecking order theory, trade-off theory, and M&M theory, to some extent, provide explanations for debt structure and

financial decision-making (Myers et al., 1984; Modigliani and Miller, 1958; 1963). However, it is evident that there is no theory that comprehensively elucidates the complete impact of debt structure on financial performance (Kljucnikov et al., 2022; Kristof and Virag, 2022). As the composition of debt structure serves as a crucial metric for evaluating the financial performance of companies of different sizes, the main aim of this paper is to conduct a debt analysis of enterprises operating in the Visegrad Group countries and subsequently investigate whether the size of the enterprise influences the utilization of short-term and long-term debt. This paper contributes to the scientific thought in the field of finance since it deals with the structure of debt-financing and the relationship between the size of the enterprises and their utilization of debt, for which this issue remains largely unexplored, while a debt analysis of enterprises operating in Visegrad Group countries makes it a valuable regional study. At the same time, the paper employs the Kruskal-Wallis test to determine significant variations in monitored indebtedness ratios based on firm size, providing a rigorous and quantitative approach to the research.

The paper is divided into the following sections. The first section, dedicated to a literature review, offers the reader an overview of the fundamental theoretical background of the issue alongside the most relevant and recent publications in the field. The methods employed for achieving the aim of this paper, which involves conducting a debt analysis focused on the detection of statistically significant differences in the values of computed indicators resulting from changes in the evolution of critical indebtedness financial ratios, are expounded upon in the second section. The third section delivers a summary of the outcomes of the prior computation of several chosen debt indicators and their subsequent statistical validation, along with a comparison of the results to those of other appropriate research published worldwide. The most noteworthy discoveries from this study, along with the limitations and for future research on this issue, are presented the end of the paper.

2. Methodology

To analyse the indebtedness of businesses operating in the Visegrad Group countries from 2016 to 2021, this research paper employs three crucial indebtedness indicators and appropriate quantitative methods and examines whether there are any statistically significant differences in the use of long-term and short-term debt due to firm size.

For a comprehensive debt analysis, it was required to use financial characteristics from the ORBIS database, which is recognized as a source of business and financial data on more than 400 million private and public enterprises operating internationally. Financial data on 100,057 firms operating in Visegrad Group countries for the monitored period of 2016–2021 is contained in the database, which formed the basis for a debt analysis. Because not all firms were suitable for the debt indicator calculation, the data from the database had to be appropriately adjusted. Enterprises that did not provide all the required input data for the debt analysis throughout the monitored period were eliminated. The dataset had its outlying values removed in order to improve the informativeness of the results obtained from the calculated debt analysis using Z-Score method. By employing this approach, it becomes possible for the difference between each receive signal strength observation and the time-series mean receive signal strength observation to be determined. Subsequently, the result is divided by the standard deviation of the observation. When the Z-Score is 0, it signifies that the mean of the time-series observation and the receive signal strength observation are considered equal. A positive and a negative Z-Score indicate that the received signal strength measurement is positioned above and below the mean. An outlier status is ascribed to a receive signal strength observation when

its Z-Score value exceeds an established threshold. Generally, the most commonly utilized threshold for outlier detection is ± 3 , as outlined by Anagnostou et al. (2021). Consequently, in this research paper, any receive signal strength observation with a Z-Score value exceeding ± 3 was categorized as an outlier. The final dataset encompasses financial data for 12,816 enterprises (including 6,048 Slovak enterprises, 1,626 Czech enterprises, 3,851 Polish enterprises, and 1,291 Hungarian enterprises). The elementary identification data of these enterprises, such as firm size, legal form, ownership structure, firm age, and economic sector, are summarized in Table 1.

Table 1: Firm-specific features of the sample

COUNTRY	SK	CZ	PL	HU
FIRM SIZE				
Small enterprise	2,138	160	460	54
Medium sized enterprise	3,278	789	2,100	623
Large enterprise	534	518	1,045	491
Very large enterprise	98	159	246	123
LEGAL FORM AND OWNERSHIP STRUCTURE				
Private limited companies	5,294	1,043	2,576	1,256
Public limited companies	514	487	484	7
Partnerships	236	88	742	27
Other legal form	4	8	49	1
FIRM AGE				
<10	383	45	222	33
10-20	3,022	441	1,206	285
20-30	2,167	766	1,470	551
30-40	355	317	648	376
40-50	82	43	76	9
50-60	14	9	27	8
>60	25	5	202	29
ECONOMIC SECTOR (NACE CLASSIFICATION)				
A. Agriculture, forestry and fishing	515	178	127	84
B. Mining and quarrying	16	6	22	6
C. Manufacturing	1,291	567	1,178	437
D. Electricity, gas, steam and air conditioning supply	98	42	110	13
E. Water supply; sewerage, waste management, etc.	68	30	218	20
F. Construction	554	126	263	54
G. Wholesale and retail trade, repair of motor vehicles/motorcycles	1,606	337	1,066	366
H. Transportation and storage	540	93	201	100
I. Accommodation and food service activities	124	6	60	17
J. Information and communication	141	43	93	36
K. Financial and insurance activities	9	1	26	9
L. Real estate activities	290	57	171	52
M. Professional, scientific and service activities	405	80	104	39
N. Administrative and support service activities	238	24	69	36
O. Public administration and defence; compulsory social security	2	0	4	1
P. Education	8	4	18	1
Q. Human health and social work activities	86	22	97	6
R. Arts, entertainment and recreation	31	4	15	8
S. Other service activities	26	6	9	6
Total	6,048	1,626	3,851	1,291

Source: own elaboration

The final dataset, required for the debt analysis of enterprises operating in the Visegrad Group countries, is comprised of the final data. In accordance with the conditions outlined in the ORBIS database for determining firm size characteristics, a very large enterprise is defined as one where at least one of the following conditions is met: operating revenue ≥ 100 million EUR, total assets ≥ 200 million EUR, and employees $\geq 1,000$. A large enterprise is categorized as having an operating revenue ≥ 10 million EUR, total assets ≥ 20 million EUR, and employees ≥ 150 . A medium-sized enterprise is one that satisfies at least one of the following criteria:

operating revenue \geq 1 million EUR, total assets \geq 2 million, and employees \geq 15. Enterprises that do not meet these criteria are classified as small enterprises. The majority of enterprises included in the final dataset fall within the medium-sized enterprise category. Conversely, except for Hungary, where small enterprises are underrepresented, the category with the lowest representation is very large enterprises.

The following legal form categories are determined by the ORBIS database. Four ownership structures, namely partnerships, private limited companies, public limited companies, and other legal forms, are utilized by enterprises operating in the Visegrad Group countries. Supplementary legal identities have been legally incorporated into a private limited company, and limited liability for any debts incurred by the enterprise is held by its shareholders (Schiepers, 2023). Enterprises with the legal form of a private limited company constitute the most numerous category within the Visegrad Group countries. A public limited company, often confused with a private limited company (Schmidt, 2013), differs in its ability to offer shares of the enterprise to the general public, potentially benefiting the firm in terms of fundraising (Brandth and Bjorkhaug, 2015). Partnerships, another legal form, are established by a few individuals involved not only in the ownership and decision-making of the business but also in its earnings. Each individual may contribute a distinct specialization to enhance the ability of the enterprise to operate in the market (Giunnane and Martinez-Rodriguez, 2018). The category with the least representation consists of enterprises operating under other legal forms, including branches or solo traders.

Information regarding the number of years on the market is also furnished by the ORBIS database. It is observed that enterprises that have been in operation for the longest period have the smallest share (over 50 years). In Slovakia, dominance is held by firms that have been active on the market for 10–20 years, whereas in the Czech Republic, Poland, and Hungary, the most represented group consists of companies that have been operating on the market for 20–30 years. These enterprises are sufficiently stable and will be able to provide the research with ideal data because they are predominant and have been in the market for more than ten years.

In Slovakia, the category G – Wholesale and retail trade; repair of motor vehicles and motorcycles is the one in which most enterprises operate. The first position is attributed to this category because of the Slovak Republic's reputation in automobile manufacturing. The subsequent sale and provision of services are closely linked to car production. Upon gaining independence, the other countries of the Visegrad Group promptly established themselves as global leaders in the manufacturing industry, with category C – Manufacturing emerging as a significant economic sector. Manufacturing continues to hold a paramount position in these countries today. Conversely, the category with the fewest enterprises in the sample is category O - Public administration and defense; compulsory social security.

The basis for the calculation of debt indicators was financial data (in thousands of euros), and its descriptive statistics, including average, median, standard deviation, minimum, maximum, and coefficient of variation, are summarized in Table 2.

A comprehensive analysis focused on the indebtedness of enterprises operating in the Visegrad Group countries during the monitored period was conducted, involving the utilization of three crucial debt indicators. The formulas required for the subsequent calculation are summarized in Table 3.

The financial analysis concerning the indebtedness of enterprises was conducted using several methodological steps.

1. Firstly, it was required to calculate the individual monitored debt indicators separately for enterprises operating in the Visegrad Group countries within the specified monitoring time frame from 2016 to 2021.

Table 2: Descriptive statistics of input data necessary for indebtedness ratios calculation (6-year average values)

Slovakia						
	avg.	med.	std. dev.	min.	max.	CV
TOAS	6,364.295	1,250.359	53,599.869	213.984	3,642,422.167	8.422
NCLI	1,296.428	113.667	22,274.006	-7.768	1,761,986.667	17.181
CULI	2,317.172	518.406	11,201.788	-1.858	439,759.978	4.834
Czech Republic						
	avg.	med.	std. dev.	min.	max.	CV
TOAS	50,092.635	5,232.419	662,325.656	225.441	29,558,304.549	13.222
NCLI	10,725.552	407.448	215,237.257	-93.583	9,776,086.027	20.068
CULI	17,027.526	1,399.297	234,326.955	5.762	10,678,633.074	13.762
Poland						
	avg.	med.	std. dev.	min.	max.	CV
TOAS	47,432.923	4,169.058	497,685.212	222.773	17,579,560.909	10.492
NCLI	9,803.665	408.799	123,099.366	0.000	4,321,778.872	12.556
CULI	14,022.320	1,363.554	119,076.084	3.082	4,578,111.404	8.492
Hungary						
	avg.	med.	std. dev.	min.	max.	CV
TOAS	38,714.094	7,119.013	385,881.926	237.772	14,914,156.424	9.967
NCLI	6,800.031	551.032	94,500.500	0.000	3,679,378.276	13.897
CULI	14,100.915	2,478.816	111,370.364	29.245	4,213,824.340	7.898

Note: TOAS Total Assets, NCLI Non-Current Liabilities, CULI Current Liabilities

* values are given in thousands of euros

Source: own elaboration

Table 3: Summarized formulas of indebtedness indicators

Ratio	Algorithm
Total indebtedness ratio (TI)	Current and non-current liabilities to total assets
Current indebtedness ratio (CI)	Current liabilities to total assets
Non-current indebtedness ratio (NCI)	Non-current liabilities to total assets

Source: Gajdosikova et al. (2023)

- Subsequently, normality tests were utilized to determine whether a dataset is well represented by a normal distribution. The use of a statistical test for normality is valuable because distinguishing between systematic deviations from linearity and deviations arising from sample variation can be challenging (Yusuf et al., 2014). The p-values from the normality test are frequently provided in the output of statistical software, with a low p-value suggesting that the sample does not follow a normal distribution. In general, since numerous statistical techniques (such as t-tests and analysis of variance) assume a normal distribution of variables, this parametric hypothesis test is related to nonparametric methods when the data deviates from normality. Nonparametric methods may be required in such cases.
- To determine whether statistically significant differences exist between two or more groups of an independent variable, the Kruskal-Wallis test, a nonparametric test based on ranking, was employed. The Kruskal-Wallis test is named after Kruskal and Wallis, who jointly developed it in 1952 (Kruskal and Wallis, 1952). When the assumptions necessary for a one-way ANOVA are not met, the nonparametric Kruskal-Wallis test is utilized. In ANOVA, it is assumed that each group follows a normal distribution with approximately equal variance in the scores. The Kruskal-Wallis test, a non-parametric approach for comparing k independent samples (Van Hecke, 2012), is employed to test the equality of medians or even means (Hettmansperger et al., 1998). However, the Kruskal-Wallis test result indicates whether differences exist among the medians of some of the k groups, but it does not specify which groups differ from the others.
- The groups that differ from each other can be identified using the Bonferroni adjustment. Due to its simplicity, the Bonferroni method is the most commonly employed approach for multiplicity adjustment. The basis for the Bonferroni adjustment is the method initially

proposed by Neyman and Pearson (1928) for aiding decisions in studies involving repetitive sampling, and it is named after the Italian statistician Carlo Bonferroni. However, the method is frequently utilized in research papers to correct probability values when conducting numerous statistical tests in any context, and this application is primarily attributed to Dunn (1961). The Bonferroni correction was developed to address the issue that as the number of tests increases, the probability of a type I error also increases, falsely indicating the existence of a significant difference when there is none. Consequently, the Bonferroni adjustment is applied to the probability values associated with each individual test to maintain a 0.05 level of significance across all tests.

3. Results and Discussion

The structure of the corporate financial resources, impacting its financial stability, is the primary focus of a debt analysis. Within the debt analysis, the combination of equity and debt was monitored through debt indicators, which were observed to decrease debt repayment from sold assets (Gomes et al., 2023). Additionally, the ability of enterprises to bear indebtedness between 2018 and 2020, both before and after the COVID-19 pandemic, was assessed.

Table 4: 6-year average values of selected indebtedness indicators for enterprises operating in the Visegrad Group countries

	Slovakia			Czech Republic		
	TI	CI	NCI	TI	CI	NCI
Small enterprise	0.632	0.471	0.161	0.519	0.281	0.238
Medium-sized enterprise	0.622	0.485	0.137	0.497	0.337	0.160
Large enterprise	0.603	0.468	0.135	0.507	0.389	0.118
Very large enterprise	0.619	0.471	0.148	0.572	0.457	0.115
	Poland			Hungary		
	TI	CI	NCI	TI	CI	NCI
Small enterprise	0.484	0.267	0.217	0.531	0.388	0.143
Medium-sized enterprise	0.520	0.381	0.139	0.513	0.393	0.120
Large enterprise	0.517	0.394	0.123	0.542	0.431	0.111
Very large enterprise	0.536	0.396	0.140	0.606	0.491	0.115

Source: own elaboration

The total indebtedness ratio is an indicator of indebtedness that compares current and non-current liabilities to total assets, and its complementary indicator is the self-financing ratio. In Slovakia, the total indebtedness averaged around 61.9%, with small enterprises achieving the highest level of indebtedness. Conversely, the lowest level of corporate debt was observed in large Slovak enterprises, which, on average, utilize 60.3% of their debt to finance their corporate assets. In the case of the Czech Republic, the average debt level from 2016 to 2021 was 52.4%. Notably, very large enterprises primarily employed debt financing for their business activities, with levels reaching as high as 57.2%. The lowest debt level, at 49.7%, was observed among medium-sized enterprises in the Czech Republic. Consequently, these firms predominantly used equity financing for their activities compared to debt financing. A firm with a high amount of equity is frequently associated with stability and independence, whereas an enterprise with a low proportion of equity is generally related to financial instability (Dabi et al., 2023). Due to the average debt level of 48.4%, which indicates the lowest debt use in Poland when considering firm size, small enterprises are also significantly more inclined to use equity financing. Very large enterprises in Poland had the highest levels of debt during the monitored period, using up to 53.6% of debt as financing, similar to the Czech Republic. In Hungary, the average corporate debt level reached 54.8% during the monitored period. Medium-sized enterprises achieved the lowest debt level, utilizing 0.513 € of debt to finance 1 € of corporate

assets, while very large enterprises were, on average, indebted to the extent of 60.6%. According to Michalski et al. (2018), the optimal level of indebtedness for enterprises is considered to range from 50% to 75%. Simultaneously, from a pure risk perspective, lower debt ratios are regarded as more favorable, whereas a higher debt ratio renders the enterprise less likely to secure borrowing (Miskufova et al., 2022). The presence of risk is associated with an enterprise having too little debt, while a lower total indebtedness ratio value implies greater creditworthiness (Bhattacharya and Sharma, 2019). The current indebtedness ratio and non-current indebtedness ratio, which have been examined and assessed by numerous authors (Valaskova et al., 2021; Valls Martinez et al., 2020), ought to be employed for capital structure monitoring when the firm has a significant reliance on debt. In Slovakia, all firms categorized by size predominantly utilize short-term debt for financing, with levels ranging from 46.8% to 48.5%, but these enterprises also do not neglect the use of long-term debt in the range of 13.5% to 16.1%. In Slovakia, large enterprises utilized both short-term and long-term debt financing to various extents. Medium-sized enterprises, on the contrary, had the greatest level of short-term debt on average, while small enterprises predominantly supported their business activities through long-term debt. In the Czech Republic, firms also preferred financing their activities primarily through short-term debt, with very large enterprises using it at a level of 45.7% and small enterprises at 28.1%. Conversely, financing through long-term debt was widely favored by small businesses in the Czech Republic, reaching up to 23.8%, while very large enterprises had the lowest long-term indebtedness, averaging 11.5%. In Poland and Hungary, the utilization of short-term and long-term debt is similar across different firm size categories, as all companies primarily use short-term debt for financing, with levels ranging from 26.7% to 39.6% in Poland and from 38.8% to 49.1% in Hungary. These enterprises also did not disregard long-term debt, which falls within the range of 12.3% to 21.7% in Poland and 11.1% to 14.3% in Hungary. Small enterprises in both countries utilized the least short-term debt for financing, and they also made the most use of long-term debt. On average, the highest proportion of short-term debt is observed in very large enterprises, and in terms of long-term indebtedness, medium-sized enterprises least prefer financing their business activities through long-term debt.

The main aim of conducting a more extensive debt analysis of enterprises operating in the Visegrad Group countries was to ascertain whether statistically significant differences could be observed in the utilization of long-term and short-term debt based on factors such as firm size (small, medium-sized, large, and very large enterprises) or the individual values of the indicators differ significantly.

Firstly, the confirmation of dataset normality was necessitated using the Kolmogorov-Smirnov and Shapiro-Wilk tests, despite the rejection of the assumption of a normal distribution in the test results. Subsequently, the Kruskal-Wallis test was employed to assess whether statistically significant differences could be detected among the calculated ratios pertaining to firm size, as it does not necessitate a normal distribution of the dataset, in contrast to an equivalent one-way ANOVA, and is also less susceptible to the influence of outliers. The results of the Kruskal-Wallis test, which examined statistically significant differences in debt ratios concerning firm size, are summarized in Table 5. Based on the findings, statistically significant differences were observed between all debt indicators in Slovakia, the Czech Republic, and Poland. In Hungary, statistically significant differences were detected between all debt ratios except for the non-current indebtedness ratio.

Due to the presence of statistically significant differences among several indebtedness ratios, a post hoc analysis was conducted as the subsequent step. The outcomes of the post hoc analysis revealed which debt ratios concerning firm sizes were identified as the most statistically significant. The results of the pairwise comparison of sizes are presented in Table 6. In Slovakia,

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Table 5: The output of the Kruskal-Wallis test concerning the firm size for enterprises operating in the Visegrad Group countries

	Slovakia			Czech Republic		
	TI	CI	NCI	TI	CI	NCI
Kruskal-Wallis H	13.054	11.116	15.087	31.128	110.522	139.997
Asymp. Sig.	0.005	0.011	0.002	0.000	0.000	0.000
	Poland			Hungary		
	TI	CI	NCI	TI	CI	NCI
Kruskal-Wallis H	20.921	108.233	119.789	43.137	38.895	4.067
Asymp. Sig.	0.000	0.000	0.000	0.000	0.000	0.254

Source: own elaboration

statistically significant differences were identified between small and large enterprises, specifically between two carefully analyzed debt ratios, as well as between medium-sized and large enterprises and between small and medium-sized enterprises. In the context of the Czech Republic, statistically significant differences were primarily observed between small and very large enterprises, medium-sized and very large enterprises, and also between large and very large enterprises. Notably, differences in the current indebtedness ratio were identified across all compared pairs of firm sizes. In Poland, distinctions were primarily noted between small and medium-sized enterprises, small and large enterprises, and small and very large enterprises, based on the pairwise comparison results. In Hungary, statistically significant differences were primarily observed between small and very large enterprises, medium-sized and very large enterprises, and large and very large enterprises.

Generally, the main difference between short-term and long-term debt is the repayment period. Any debt due within one year is considered short-term debt (Lofton and Kioko, 2021), whereas any debt due beyond one year is classified as long-term debt (Amosh et al., 2022), and this repayment period can have a significant impact on the interest rate paid by the firm. Short-term debt typically has a higher interest rate than long-term debt because of the higher risk taken by lenders (Khoo and Cheung, 2022).

The relationship between business size and short-term debt can be influenced by several factors, such as the industry (Erhemjamts et al., 2010), financial strategy (Liang et al., 2015), and the specific circumstances of the business (An et al., 2021). Typically, short-term debt can be obtained on more favourable terms by larger corporations in the capital markets because of their size and established creditworthiness. On the contrary, Bagwell (2023) argues that smaller businesses may encounter difficulties in accessing capital markets and may have fewer choices for short-term financing. According to Tanaka (2006), traditional bank loans or trade credit from suppliers may be more relied upon by them. Another crucial factor is creditworthiness (Gubareva and Borges, 2022). Stronger credit ratings are typically held by larger enterprises, leading to lower interest rates and more favorable terms for short-term debt. It was found by De Marco et al. (2021) that an increase in bank-specific capital requirements resulted in a reduction in corporate debt and investment, but only for firms with short bank relationships. Munoz-Cancino et al. (2022) concluded in their study that the assessment of creditworthiness by credit rating agencies often involves considerations of size, financial stability, and the track record of larger firms. Smaller enterprises sometimes have lower credit scores or limited credit histories, which leads to greater limitations and higher interest rates when they apply for short-term debt. The securing of financing may require them to rely on personal guarantees or collateral. Maes et al. (2019) in their study point to the fact that the relationship between the size of the company and the level of indebtedness is also influenced by working capital needs. Strategically, short-term debt can be employed by large corporations with diverse operations to manage their working capital needs. Through these corporations, their financial resources can

Table 6: The output of the pairwise comparison concerning the firm size for enterprises operating in the Visegrad Group countries

Slovakia		Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig.
TI	Small-Large	324.923	91.779	3.540	0.000	0.002
CI	Medium-sized-Large	259.453	87.855	2.953	0.003	0.019
NCI	Small-Medium-sized	176.612	55.293	3.134	0.001	0.008
	Small-Large	281.422	91.779	3.066	0.002	0.013
Czech Republic		Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig.
TI	Small-Very large	-193.575	60.603	-3.194	0.001	0.008
	Medium-sized-Very large	-251.252	45.940	-5.469	0.000	0.000
CI	Large-Very large	-253.030	47.821	-4.915	0.000	0.000
	Small-Medium-sized	-202.926	-4.210	0.000	0.000	0.000
	Small-Large	-338.237	49.999	-6.765	0.000	0.000
	Small-Very large	-572.448	60.603	-9.446	0.000	0.000
	Medium-sized-Large	-135.312	30.623	-4.419	0.000	0.000
	Medium-sized-Very large	-369.522	45.940	-8.044	0.000	0.000
	Large-Very large	-234.211	47.821	-4.898	0.000	0.000
NCI	Small-Medium-sized	256.873	48.199	5.329	0.000	0.000
	Small-Large	492.398	49.995	9.849	0.000	0.000
	Small-Very large	528.990	60.597	8.730	0.000	0.000
	Medium-sized-Large	235.525	30.620	7.692	0.000	0.000
	Medium-sized-Very large	272.117	45.936	5.924	0.000	0.000
Poland		Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig.
TI	Small-Medium-sized	-263.855	85.434	-3.088	0.002	0.012
	Small-Very large	-399.201	99.778	-4.001	0.000	0.000
	Large-Very large	-230.893	68.486	-3.371	0.001	0.004
CI	Small-Medium-sized	-834.418	85.434	-9.767	0.000	0.000
	Small-Large	-837.495	88.533	-9.460	0.000	0.000
	Small-Very large	-963.686	99.778	-9.658	0.000	0.000
NCI	Small-Medium-sized	757.987	85.434	8.872	0.000	0.000
	Small-Large	957.269	88.533	10.813	0.000	0.000
	Small-Very large	689.780	99.778	6.913	0.000	0.000
	Medium-sized-Large	199.282	45.096	4.419	0.000	0.000
	Large-Very large	-267.489	68.486	-3.906	0.000	0.001
Hungary		Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig.
TI	Small-Very large	-219.911	70.977	-3.098	0.002	0.012
	Medium-sized-Very large	-273.544	41.677	-6.563	0.000	0.000
	Large-Very large	-229.608	42.113	-5.452	0.000	0.000
CI	Small-Very large	-282.450	70.977	-3.979	0.000	0.000
	Medium-sized-Very large	-253.874	41.677	-6.091	0.000	0.000
	Large-Very large	-198.450	42.113	-4.712	0.000	0.000

Source: own elaboration

be harnessed to optimize cash flow, and gaps between revenue collection and expenses can be bridged using short-term debt. For smaller businesses, the primary utilization of short-term debt may be for covering immediate working capital needs, such as payroll or inventory purchases. Ughetto et al. (2017) concluded that engagement in extensive financial management strategies may not be possible due to their lack of a financial cushion or liquidity. Zeitun and Goaid (2022) argued that the influence on the relationship between business size and short-term debt can be exerted by the industry in which a company operates. Regardless of firm size, seasonal businesses often heavily depend on short-term debt to finance inventory build-up during peak seasons. According to Huang et al. (2023), risk management represents another crucial factor.

Short-term debt, when utilized for risk management purposes like interest rate hedging, may be employed by large businesses with more intricate financial structures. Such strategies can be engaged in by them due to their possession of resources and financial expertise. In contrast, smaller companies may place greater emphasis on their day-to-day operational requirements and possess limited capacity for managing financial risk through short-term debt, which is also confirmed by Bontempi et al. (2020) in their research findings. The investigation conducted by Koralun-Bereznicka (2018) aimed to determine whether the relationship between capital structure and its main determinants is also influenced by firm size and debt maturity. Panel data models were employed to compare the influence of the principal factors on leverage among three size categories of firms and different debt measurement criteria to detect the effects of size and debt maturity on these associations. The results reveal that the financing decisions made by small firms tend to align more with the pecking-order theory, whereas medium and large-sized firms tend to adhere to the trade-off theory's predictions regarding leverage. It was also observed that the trade-off theory is more applicable to short-term debt, while the pecking-order theory is better suited to long-term debt.

The relationship between firm size and long-term debt is also influenced by many factors. Similar to the relationship between short-term debt and firm size, long-term debt can be considered a critical determinant of access to capital markets (D'Mello and Gruskin, 2021). According to Jadiyappa et al. (2021), access to capital markets is often more straightforward for larger enterprises, which can issue long-term debt under more favorable terms due to their size and established creditworthiness. Bradford et al. (2013) also state that bond issuance and securing long-term loans at lower interest rates can be accomplished with relative ease. Smaller enterprises, that Knill (2013) focused on in his study, might encounter difficulties in accessing capital markets for long-term debt, resulting in limited options. Generally, these enterprises may rely more on bank loans, personal financing, or alternative sources of long-term funding. Similar to the link between short-term debt and firm size, the importance of creditworthiness is emphasized with regard to long-term debt. Larger firms tend to have stronger credit ratings, leading to lower interest rates and more advantageous terms for long-term debt (Asgharian et al., 2018). Based on the research results, consideration of creditworthiness by credit rating agencies often involves the assessment of the size, financial stability, and track record of larger corporations. Lower credit ratings or limited credit histories may be associated with smaller companies, resulting in higher interest rates and stricter terms when seeking long-term debt. Personal guarantees or collateral might need to be provided by them to secure financing. The utilization of long-term debt can also be influenced by investor confidence, examined by Haque et al. (2011) in their research, with the size of the firm playing a pivotal role. Larger enterprises often inspire greater investor confidence, facilitating capital raising through long-term debt offerings. Well-established, larger enterprises are more likely to attract institutional investors and bondholders. Smaller businesses may need to put in extra effort to build investor confidence and attract long-term investors, potentially relying more on relationships with local banks and investors (Kozak and Wierzbowska, 2022). Strategic financing is another important aspect (Allen and Letdin, 2020), with larger enterprises frequently employing long-term debt strategically to finance major capital projects, acquisitions, or expansion plans. It can be concluded that these enterprises possess the financial resources and expertise to engage in long-term financial planning. Smaller businesses may be more cautious with long-term debt, using it primarily for essential growth initiatives or to address long-term financing needs while avoiding excessive debt to minimize financial risk. Furthermore, the relationship between firm size and long-term debt can be influenced by the industry in which a company operates. The investigation of debt as a financing source among small- and medium-sized enterprises,

specifically the impact of short-term debt, long-term debt, and profitability on the utilization of this debt, was carried out by Yazdanfar and Ohman (2017), with industry affiliation being a notable explanatory variable. For instance, companies in capital-intensive industries, irrespective of their size, often depend more on long-term debt to finance significant investments in infrastructure and equipment.

Although there are overarching patterns in the relationship between firm size and short-term or long-term debt, the particular strategy for debt financing can exhibit substantial variation across enterprises. Short-term debt may be relied upon more extensively by smaller firms to address immediate operational requirements, whereas large enterprises might employ it strategically for a range of financial objectives. Conversely, when it comes to the utilization of long-term debt, large enterprises often enjoy a broader array of options and more favorable terms because of their size and financial stability, whereas small enterprises may find it necessary to exercise greater caution and ingenuity in securing long-term financing.

4. Conclusions

The financial situation of every firm must be considered to compete in the market. Financial analysis is employed to ascertain financial performance, and its primary objective is the examination of not only the strengths and weaknesses of the firm but also the level of its financial health. The analysis employs ratios, which are used to provide more detailed information about the corporate financial health and to determine the level of indebtedness or the reason for its financial difficulties. A comprehensive debt analysis is focused on the primary use of corporate debt to finance its business activities. In the real economy, it is not possible for all corporate assets to be financed with equity or only with debt. The main objective of debt analysis is to determine the ideal combination of equity and debt financing. Nevertheless, for the overall assessment of the capital structure, the most crucial factor is the selection of an appropriate ratio between equity and debt financing, which is a fundamental requirement for the high-quality development of the firm and its healthy financial growth. Several studies have been conducted on preferences for debt financing, but the results are often contradictory. Debt financing represents an appealing option for enterprises to fund their business activities, but there is a risk of potential distress if the balance sheet is weaker. Furthermore, firms have the option of borrowing money through long-term as well as short-term debt. The repayment period and interest rate should be considered when deciding on the type of debt to be used.

It has been proven that the composition of the corporate capital structure is influenced by several determinants that affect the use of long-term and short-term debt in various ways. An analysis of variance was employed in this paper to examine the impact of the firm size of the enterprise operating in the Visegrad Group countries on the debt ratios themselves during the period 2016–2021 and to determine if there were statistically significant differences in the individual indebtedness ratios depending on the firm sizes (small, medium-sized, large, and very large enterprises) or if the individual values of the indicators differed significantly. Despite statistically significant differences identified in the calculated indebtedness indicators regarding the size of the firms operating in the Visegrad Group countries, the Kruskal-Wallis test confirmed the impact of firm size on debt ratios. Due to the statistically significant differences between debt ratios, post hoc analysis results indicated that in Slovakia, the statistically significant differences between small and large enterprises, specifically between two carefully examined debt ratios, as well as between large and medium-sized enterprises and between small and medium-sized enterprises, were all identified. In the Czech Republic, statistically significant differences primarily occurred between small and very large enterprises, medium-

sized and very large enterprises, as well as between large and very large enterprises. Notably, differences in the current indebtedness ratio were identified across all compared pairs of firm sizes. Based on the pairwise comparison results, differences between small and large enterprises, small and medium-sized enterprises, and small and medium-sized enterprises were primarily determined in Poland. In Hungary, statistically significant differences mostly occurred between small and large enterprises, medium-sized and very large enterprises, and large and very large enterprises. Based on the results, one of the most significant factors affecting the capital structure is firm size. It should be highlighted that no theory can forecast how a firm size could impact its leverage.

The following limitations should be emphasized regardless of the contribution of this paper to the existing literature. The scope of the paper, which only focuses on the cultural and political affiliations of four Central European countries, affects the extent to which the findings may be applied. Future research should consider this phenomenon in additional alliance countries (using panel data analysis) or over a longer time horizon than that set for this research in order to determine whether there will be differences in the findings and to enable greater generalization and applicability.

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