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CAPITAL STRUCTURE VS FINANCING RULES – THE VISEGRAD GROUP COUNTRIES

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Purpose: The purpose of this paper is to investigate whether the capital structure of stock exchange listed companies in individual countries of the Visegrad Group differs significantly, and whether these entities can be considered to be organizations implementing the principles of the golden and silver rules of accounting.
Design/methodology/approach: The research hypotheses assumed were verified using appropriate statistical tools. Calculations were per-formed using the Gretl software and MS Excel.
Findings: The basis for operating activity financing in the companies under examination mainly entailed equity. In practice, this means that most of the entities surveyed follow the silver, less frequently the golden (the more restrictive), rule of accounting. The results obtained for each country of the Visegrad Four differed significantly. The research conducted provides a basis for determining whether the golden and silver rules of accounting constitute factors affecting the decision-making regarding capital structure formation in companies listed in the Visegrad Group countries. The study covers companies listed in the four countries and provides a basis for further research in this area, with respect to both the sample size and the time series length.
Research limitations/implications: The paper takes into account only listed companies, so its results do not explain capital structure behavior of other companies. The research is a contribution to further analyses of the capital structure, which covers all types of enterprises.
Practical implications: The research conducted provides a basis for determining whether the golden and silver rules of accounting constitute factors affecting the decision-making regarding capital structure formation in companies listed in the Visegrad Group countries. The study covers companies listed in the four countries and provides a basis for further research in this area, with respect to both the sample size and the time series length.
Originality/value: The most important principle of financing is that firms should try to match the characteristics of the financing as closely as possible to the characteristics of the assets being financed. Unfortunately, only a few studies on this subject can be found, especially internationally. Our research aims to fill a gap in the literature on the subject. It made possible to identify financing rules characterizing capital structure of the companies operating in different economic conditions. The study may be addressed to analysts, investors and managers of companies as well as researchers conducting research in corporate finance area.

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Category of the paper: research paper.

1. Introduction

The primary source of operating activity financing for any business entity is equity, which constitutes a determinant of enterprise development potential. The amount of a business entity's equity capital thus determines its economic strength as well as its asset and capital standing. The relationships between the capital structure and the assets structure are determined by balance sheet rules. Asset and capital structure shaping in accordance with these rules enables any enterprise's financial balance to be maintained. This structure, however, is affected by various, both macro and microeconomic, conditions. One of such conditions entails the so-called 'country factor'. The varying degree of capital market development, under the differing economic conditions in individual countries, is one of the reasons behind the diversity in asset and capital structure. The Visegrad Group (V4) can serve as an example here. In the 14th century, during a congress held at the Visegrad Castle, the rulers of Poland, the Czechia, historically known as Bohemia, and Hungary undertook close cooperation on political and economic matters, which inspired the signing of a declaration, in the early 1990s, on cooperation on the path to European integration of Poland, Hungary and initially Czechoslovakia, later the Czechia and Slovakia. These countries were at a similar level of socio-economic development at the time. The four countries did not develop at the same pace thereafter, however. The differences became visible, inter alia, in the levels of capital market development. Moreover, V4's countries participation in the EU can be called difficult. However, the countries managed to advance in further integration into the EU while maintaining the heterogeneity of economic results within the Visegrad Group itself (Chetverikova, 2020). The article thus aims is to ex-amine whether the capital structure of stock exchange listed companies in the Visegrad Group countries is maintained at proportions accordant with the rules of accounting, and whether relations exist between the assets structure and these rules. If the company follows the golden balance rule, then the fixed assets are financed by equity. Many companies are not able to meet such a restrictive rule. In this case, companies apply a silver financing rule, which means that the fixed assets are financed by equity plus long-term debts. Therefore, it is worth checking whether the analyzed companies shape the capital structure according to the rules of financing, and if so, according to which of them. Thanks to this study, it will be possible to determine what dependencies are characteristic of the Visegrad Group companies and on this basis to determine their financial stability, which is reflected into the level of attractiveness of these entities for business partners and investors.

Implementation of a such formulated research objective involved verification of the following hypotheses:

1. The capital and asset structure of stock exchange listed companies in individual countries of the Visegrad Group differs significantly.
2. The stock exchange listed companies of the Visegrad Group strive to synchronize the maturity of their sources of financing with the period in which the assets financed via those sources are used.

The above hypotheses were verified by appropriate statistical tests. The calculations were carried out using the Gretl software.

The assets structure was expressed by the ratio of fixed assets to total assets. The golden balance rule was determined by the ratio of equity to fixed assets, and the silver rule by the ratio of fixed capital to fixed assets. The analysis covered 259 non-financial companies listed in the Visegrad Group countries between 1998 and 2020.

The article consists of an introduction, four parts and a conclusion. The second part is theoretical in nature and presents a description of the concept, importance and types of capital involved in business entity activity. The third part entails an overview of the existing research on the formation of the age structure of assets and the term structure of liabilities. The fourth part is methodological in nature and includes a description of the measures used in the study of the asset and capital structure and dataset. In the last section, the results of the research and discussion are presented, followed by a conclusion summarizing those results.

2. The essence, importance and types of capital in business activity

The concept of capital is most commonly understood as the financial or material (in-kind) contribution to the economic process. Along with labor and land, capital is the third factor of production imperative to undertaking and upholding business activity. Capital can be defined as the totality of the internal and external, own and debt, term and perpetual resources engaged in a business entity. This means that the category can be equated with the sources of asset financing, i.e., the balance sheet liabilities (Gabrusewicz, 2014). Capital can be subdivided based on the criterion of its ownership structure, by which the following can be distinguished:

a) equity capital,
b) debt capital.

The Polish Accounting Act does not define the concept of equity directly, but only specifies that, in value terms, equity is equal to net assets, i.e., it entails an entity's assets less debts, corresponding in value to equity (own funds). In the broadest sense, thus, equity corresponds to that part of assets, which is owned by the business entity. These assets can be covered by equity in a twofold manner: first, the company founders can contribute adequate funds to

finance these assets, and thereby create share (paid-in/initial) capital; second, equity capital can be accumulated from the net profit earned in previous years. Capital sourced in such manner is referred to as self-financing (internal financing) and constitutes the most important financing resource enabling further company growth. The key importance of equity capital is signified by the functions it performs in a business entity, which according Gabrusewicz (2014) entail: a founding function, a financing function, a revenue function, a warranty function, a protection function, a motivational function, a controlling function.

Undoubtedly, the most important of the above categories are the financing and the warrantee functions. In terms of the financial function, equity is identified as any financing vehicle that has a residual claim for the firm, does not create a tax advantage from its payments, has an infinite life, does not priority to bankruptcy, and provides management control to the owner (Damodaran, 2017).

The second of those categories (warrantee function), on the other hand, represents a liability repayment guarantee. Accordingly, it can be concluded that the amount of a company's equity reflects its value (Adamczyk, 2007).

Equity financing brings both benefits and costs. A high proportion of a company's equity capital increases the security of its investments. This type of capital is costly, however. The higher the value of equity, the lower its profitability, compared to enterprises with high pro-portions of interest-bearing debts in the structure of liabilities and the same rates of return on total assets (Pomykalska, Pomykalski, 2017). Different conclusions were drawn by Guliyev and Najafov (2019) who analyzed the impact of equity financing on firm efficiency. Their research shows that the strongest positive impact on firm efficiency is provided by equity financing.

The concept of debt capital, in turn, refers to a company's debts. Debt capital can be raised through borrowing, issuing bonds, using leases or financing via trade payables (Maćkowiak, 2009). All debts constituting the source of debt capital are of term nature. This means that these assets are granted to an enterprise for a specific period of time, after the expiration of which, they must be paid back to the creditor, with interest. With regard to the criterium of the length of the time after which these assets must be repaid, short-term liabilities (up to 1 year) and long-term debts (more than 1 year) are distinguished. Equity plus long-term debts is referred to as the so-called fixed capital.

Pederzini and Taniolo (2020) emphasize that lack of appropriate financing is a major issue for European small or medium-sized enterprises. They are highly dependent on bank lending for external funding, while there is a strong need for wider use of equity capital. In order to reduce this equity gap new mechanisms and financing methods are continuously created and implemented, such as: state and EU programs improving the access to private equity financing, alternative investment markets (AIM) dedicated to medium-sized companies or equity crowdfunding platforms. These initiatives have special importance for SMEs in the early stages of life cycle (Wieczorek-Kosmala, Błach, Trzesiok, 2020). Especially equity crowdfunding

seems to be a promising venue for financing entrepreneurs, democratizing demand and supply side of investments and contributing to economic growth (Yasar, 2021).

Equity financing is considered a particularly important and appropriate source of funding for innovative and growth-oriented firms. Moreover equity financing, which has higher risk tolerance, has a more positive impact on innovation than debt financing in terms of both economic uptrend and economic downtrend (Zhang, Zhang, Guo, 2019). According to research the innovating firms, export-oriented firms operating in niche markets, and firms with high levels of human capital have a greater probability of being equity financed (Power, J., Power, B., Ryan, 2022).

3. Overview of studies on the term structure of liabilities

The term structure of capital and reserves is an important aspect constituting the subject of corporate finance research and business practice. The average values of total debt ratio vary in different countries or regions of the world. The smallest share of debts in total asset financing was recorded in Japanese companies. The average value of this indicator across all sectors of the economy in Japan was slightly below 50%. In the United States, the ratio reached a value of slightly above 50%, while in the United Kingdom - about 60%. Globally, the most heavily indebted companies were those operating in the European Union (approx. 65%). The studies analyzed the food, pharmaceutical, retail and machinery sectors. The highest values of the total debt ratio were observed in the food sector, in the UK and the US in particular, where the value of this indicator reached as high as approximately 70% (Walsh, 2008).

P. Figura (2011) has proposed recommended values of the total debt and the fixed asset coverage by fixed capital ratios for individual sectors of the economy in Poland. The author additionally took three different overriding objectives of company operation into account in his study, namely: profit maximization, survival and value maximization. The recommended values of the two indicators are characterized by significant variation between both the overarching goals and the sectors of the economy. Considering the objective of value maximization, for instance, the recommended value of the indicator ranges between 0.35 and 0.6 in the construction industry and 0.2-0.4 in the chemical sector. For the objective of profit maximization, in turn, the ratio of fixed asset coverage by fixed capital ranges between 1.1 and 1.85 in the construction industry, whereas in the IT sector, this value ranges from 1.40 to as high as 2.85. It is worth noting here that the value of Polish enterprises' debt is affected by their size. As such, Polish micro and small enterprises show lower levels of both long-term and calculated-in-years debt, compared to medium and large-sized businesses.

The study of sectoral differentiation of equity ratios in business activity financing constituted the subject of a research conducted by Szczepaniak (2014), who determined that the highest share of equity in total assets prevailed in the following sectors: light industry, energy, pharmaceuticals, information technology and metals.

Wypych (2012), who analyzed 117 Warsaw Stock Exchange listed companies, obtained different results. The author states that the structure of assets should not be treated as a feature determining sector specificity. The study also shows that the golden rule of accounting serves as a useful tool for assessment of company's financial balance, as it is intended to align the structure of liabilities with the structure of assets, so that capital is no longer tied to the asset components, for a period not longer than the disposition thereof. It should be noted here that such conduct is independent of economic fluctuations and the related changes in the macro-economic conditions of business operation. The study has also exposed the relationship between the structure of assets and the manner of financing thereof. This means that the share of fixed assets in total assets is one of the factors determining the choice of enterprise financing strategy.

The research on the capital and asset structure of enterprises operating in Poland shows that equity capital constitutes the most important source of enterprise activity financing. Figura (2018) analyzed 97,471 financial statements of Polish enterprises. The conducted research proved that Polish small enterprises are characterized by lower level of tangible assets to long term debt ratio as well as higher level of equity or fixed capital to fixed assets ratio then medium and large enterprises. Marzec (2010) analyzed and assessed the mutual relations between the assets structure and the capital structure in Polish small and medium-sized enterprises. Her research shows that in Poland, the most important source of SME activity, including investments, is equity. Similar conclusions were drawn by Różański and Bogołębska (2022), Sierpińska (2021), Janus (2006), Lisińska (2012), Barburski (2014) and Wrońska-Bukalska (2014), who have pointed to equity as the primary source of financing in Polish enterprises. The conservative financing structure has been identified as a factor immunizing these entities to the risks associated with economic changes.

Studies on the formation of Polish enterprises' capital structure indicate that these entities follow the assumptions of the pecking order theory (Białek-Jaworska, Nehrebecka, 2016). This means that Polish companies prefer internal sources of financing. This aspect distinguishes Polish entities from German or Portuguese enterprises, which make much greater use of external, particularly debt capital, capital for asset financing. Similar regularities were observed in the Czechia in 2007-2011 (Konečný, 2013), where majority of the automotive companies financed their activity via debt capital, which constituted the main source of asset coverage. Kluzek and Schmidt-Jessa (2022) analyzed 8120 domestic and multinational enterprises operating in the Visegrad Group countries used data from 2012-2018. Among internal determinants of the capital structure in the case of all companies in all countries analyzed was sales profitability. Moreover, a negative relation was observed between this factor and the level of debt what is in line with pecking order theory. It means that V4's companies prefer internal

sources of financing. In the contrary, asset structure and the level of debt were positively related. This means that in companies with a large share of tangible assets in the asset structure were characterized by a higher level of debt. Similar conclusions were drawn by Fenyves et al. (2020). Their results show that more profitable V4's companies were less dependent on debt finance. In turn, Wieczorek-Kosmala et al. (2021) obtained slightly different results. As with previous studies their results support the inversed relationship for debt in total and long-term debt, which are consistent with the assumptions of the pecking order theory. However, for short-term debt, they have found a positive relationship, which confirms the assumptions of the trade-off theory of capital structure.

4. Data and methodology

The maturity structure of the sources of business activity financing is closely linked to the age structure of assets. For this reason, the maturity of individual categories making up liabilities must be synchronized with the useful life of the assets financed via those sources (Duliniec, 2011; Damodaran, 2017). The starting point in the study of asset and capital structure entails determination of the share of equity in the financing of a company's fixed assets:

$$EFA = \frac{equity}{fixed\ assets} \tag{1}$$

where EFA – the ratio of fixed assets coverage by equity.

If equity fully covers fixed asset components, then the so-called golden rule of accounting has been maintained. In accordance with the golden balance rule, a business entity's fixed assets should be financed by equity, as this part of assets and capital remains at the company's disposal over a long-term period (Sierpińska, Jachna, 2012). Fixed assets are more risky than current assets. It should therefore be financed to a greater extent through equity. This reduces the financial risk. That being the case, the equity to fixed assets ratio should be at a level of not less than 1:

$$\frac{equity}{fixed\ assets} \geq 1 \tag{2}$$

The golden rule of accounting corresponds to the golden rule of financing, according to which the value of total debt capital should not exceed the value of equity. Accordingly, it is assumed that the level of a company's indebtedness should not exceed the value of 50% (Skowronek-Mielczarek, Leszczyński, 2008). Many business entities, however, are not able to meet such a restrictive rule. They use debt capital to source the financing of long-term development. The value of the debt ratio in enterprises maintaining balance between the proportion of equity and external capital is should fall within the range of 0.57-0.67 (Sierpińska, Jachnna, 2012; Gabrusewicz, 2014). Since long-term debts and equity are tied to a business entity over an extended period of time, it is permissible for fixed assets to be financed by equity

plus long-term debts (collectively referred to as fixed capital) (Bień, 2018), in which case, the silver rule of accounting is maintained.

As per the silver balance rule, the ratio of fixed capital to fixed assets should equal to minimum 1 (Korol, 2013):

$$\frac{fixed\ capital}{fixed\ assets} \geq 1 \tag{3}$$

When the above relation is maintained, the excess of fixed capital over the value of fixed assets can be used to finance a portion of current assets. This is conducive to financial stability. The portion of fixed capital covering current assets is referred to as net working capital or working assets. This category should be positive in value, i.e., it should exceed the value of current (short-term) debts, which helps maintain liquidity.

The subjects of the analysis entailed non-financial-sector companies listed in the years 1998 to 2020 on the main Stock Exchange Markets of the Visegrad Group countries, i.e., Po-land, the Czech Republic, Slovakia and Hungary, as of November 19, 2021. The study encompassed 487 entities, out of which 259 companies (i.e., 53%) were qualified for the survey. The reasons for the removal of the companies from the research group of individual countries are explained below. Referring to previous studies (including those carried out by the already mentioned M. Wypych), the empirical analysis includes all companies in a given country together. Sectoral affiliation is not a determinant of the shaping of the capital structure.

The Warsaw Stock Exchange research sample included 415 listed companies. Financial sector entities (97 companies), as well as the companies which did not publish full financial statements during the period under investigation (15 companies), were excluded from the sur-vey. Furthermore, since only companies listed on the Warsaw Stock Exchange for a period of at least 5 consecutive years were included in the study, 91 entities were additionally excluded. Ultimately, 212 companies, i.e., 51% of the initially selected entities, were qualified for the analysis.

Another stock exchange covered by the study was the Budapest Stock Exchange. Equities listed companies, i.e., 34 entities, were selected for the survey. Again, financial sector companies (6 entities) and companies listed for less than 5 consecutive years (4 entities) were excluded from the research. Ultimately, 24 entities, i.e., 70% of the initially selected companies, were qualified for the survey.

Out of the 16 companies listed on the Prime and Standard Markets of the Prague Stock Exchange, 9 companies, i.e., 56% of the total number of entities, were qualified for the survey. Companies listed for less than 5 consecutive years (1 entity), as well as financial sector companies (6 entities), were excluded from the sample.

The Bratislava Stock Exchange is the smallest stock exchange in the Visegrad Group. Out of the 22 entities included in the study, 8 financial sector companies were excluded from the survey. The sample ultimately included 14 entities, i.e., 64% of the total number of listed companies.

The conducted empirical analysis is closely related to the research hypotheses set out in the introduction, which assumed that:

1. In each of the countries of the Visegrad Group, companies shape their capital and as-sets structure in a different way.
2. Companies listed on the stock exchanges of the Visegrad Group countries try to synchronize the maturity periods of financing sources and assets financed with their help.

The first step of the analysis aims calculations of the fixed asset overage with equity ratio that represents the golden balance rule of accounting. Then the ratios of the fixed capital to fixed assets are found. Such relations represent the silver balance rule. Next the companies are grouped according to their value of ratios and country they operate. In the second step the Pearson correlation coefficients were calculated between asset structure and the golden and silver rules of financing.

5. Results and discussions

The values of the fixed asset coverage with equity ratio for the stock exchange listed companies operating in the Visegrad Group were characterized by significant variation, as evidenced by the standard deviation values of the indicator. The greatest variation in the coverage of fixed assets by equity was recorded for the Warsaw Stock Exchange listed companies (Table 1).

Table 1.
The fixed asset coverage by equity ratio for the Visegrad Group companies listed in 1998-2020

Country	Equity/Fixed Assets	1998	2000	2002	2004	2006	2008	2010	2012	2014	2016	2018	2020
Czechia	Mean	1.04	1.31	1.38	1.43	1.28	1.21	1.22	1.07	0.94	0.84	0.84	0.88
	Median	0.71	0.73	0.85	0.94	0.96	0.91	0.98	1.04	0.93	0.79	0.60	0.91
	First quartile	0.63	0.61	0.72	0.69	0.82	0.81	0.60	0.60	0.37	0.46	0.42	0.35
	Third quartile	1.79	2.59	2.29	1.89	1.55	1.08	1.74	1.06	1.09	1.06	1.01	1.10
	Standard dev.	0.53	0.90	1.10	1.27	0.89	0.87	0.87	0.71	0.64	0.45	0.57	0.65
Slovakia*	Mean	-	-	-	-	-	-	-	2.03	0.73	0.78	1.53	1.45
	Median	-	-	-	-	-	-	-	1.21	0.68	0.67	0.82	0.95
	First quartile	-	-	-	-	-	-	-	1.08	0.22	0.42	0.39	0.58
	Third quartile	-	-	-	-	-	-	-	2.06	1.08	1.04	1.72	1.90
	Standard dev.	-	-	-	-	-	-	-	2.32	0.64	0.42	1.80	1.34
Hungary	Mean	1.42	1.54	1.19	1.07	1.19	1.23	1.03	1.02	0.88	0.84	1.56	1.03
	Median	1.48	1.35	0.92	0.85	1.18	0.92	0.81	0.83	0.78	0.77	1.02	0.75
	First quartile	0.92	0.77	0.65	0.60	0.77	0.58	0.46	0.55	0.52	0.44	0.71	0.60
	Third quartile	1.74	2.45	1.63	1.60	1.67	1.89	1.27	1.15	1.28	1.15	1.79	1.59
	Standard dev.	0.56	0.85	0.62	0.71	0.54	0.83	0.76	0.87	0.61	0.43	1.60	0.58
Poland	Mean	1.54	1.39	1.17	1.47	1.42	1.37	1.35	1.21	1.14	1.15	1.09	1.04
	Median	1.31	1.15	0.99	1.18	1.27	1.17	1.13	1.01	1.00	0.98	0.92	0.94
	First quartile	0.93	0.82	0.66	0.76	0.90	0.83	0.85	0.84	0.75	0.73	0.66	0.64
	Third quartile	1.86	1.73	1.54	1.71	1.72	1.66	1.49	1.42	1.26	1.24	1.33	1.30
	Standard dev.	0.91	1.02	0.97	1.21	0.87	1.13	0.87	0.87	0.79	0.94	1.04	1.17

* For Slovakia data from 2012 is available.

Source: Own calculation based on the data obtained from the Notoria and Reuters databases.

The lowest average values of the indicator analyzed were recorded in Czech companies. In 1998-2012, these values were slightly higher than 1, which indicates that the golden rule of accounting was satisfied in this period. Contrastingly, in 2014-2020, the indicator values were below unity, which means that the source of financing for a significant portion of these companies' assets entailed debts. What is more, the indicator values, particularly in relevance to the median, were lower than unity throughout the entire period under evaluation. This means that 50% of the companies under examination were financing their assets not only by equity, but via debt funds as well.

Different results were noted in the case of Slovakian, Hungarian and Polish companies. The golden rule of accounting was satisfied by all entities of the third quartile. In contrast, the first quartile companies were financing their fixed assets by equity to a small extent only, as evidenced by the values of the fixed asset coverage with equity ratio reaching levels lower than unity. The companies listed on the Bratislava and the Budapest stock exchange markets met the golden rule of financing in some years only during the period under examination. In the case of Slovak stock exchange listed entities, a single such instance was recorded, whereas in the case of Hungarian listed companies, a likewise situation transpired four times. This indicates that those entities mainly used debt funds to finance their fixed assets.

A different situation was noted with regard to the Warsaw Stock Exchange listed companies. In this case, the median values are mostly greater than unity. Only in the period covering the years 2002 and 2016-2020, the median of the fixed asset coverage with equity ratio was slightly lower, nevertheless, its value did not fall below 0.92. This result indicates that the Polish listed companies show the highest extent of respecting the golden rule of financing, pursuant to which the total value of debt capital should not exceed the value of equity. The above observations are in line with the studies referenced earlier, according to which equity constitutes the primary and preferred source of financing in Polish companies.

As mentioned already, the golden rule of accounting is very restrictive, given that it assumes full coverage of fixed assets by equity. This can be very difficult to realize, especially in entities characterized by high capital intensity, such as companies engaged in innovative activities with long operating cycles. In such cases, the equity resources held are usually insufficient to finance the fixed assets needed in the course of operation, which forces the companies to use long-term debt instruments, generally loans and bonds. In the set of the companies listed in the Visegrad Group countries, the values of the fixed asset coverage by equity ratio plus long-term debts, i.e., fixed capital, varied across the V4 countries (Table 2).

Table 2.
The fixed asset coverage by fixed capital ratio for the Visegrad Group companies listed in 1998-2020

Country	Fixed capital/ Fixed assets	1998	2000	2002	2004	2006	2008	2010	2012	2014	2016	2018	2020
Czechia	Mean	1.20	1.46	1.45	1.48	1.33	1.23	1.39	1.25	1.17	1.10	1.12	1.15
	Median	1.00	0.94	0.93	0.96	0.97	1.04	1.03	1.07	1.02	1.05	1.02	1.04
	First quartile	0.81	0.85	0.88	0.82	0.91	0.94	0.98	0.95	0.92	0.87	0.82	0.79
	Third quartile	1.79	2.59	2.29	1.89	1.59	1.08	1.81	1.14	1.10	1.10	1.09	1.23
	Standard dev.	0.42	0.80	1.06	1.24	0.86	0.83	0.75	0.58	0.48	0.31	0.45	0.54
Slovakia*	Mean	-	-	-	-	-	-	-	2.06	1.04	0.85	1.62	1.60
	Median	-	-	-	-	-	-	-	1.25	0.68	0.83	0.89	0.98
	First quartile	-	-	-	-	-	-	-	1.14	0.31	0.48	0.68	0.72
	Third quartile	-	-	-	-	-	-	-	2.06	1.17	1.08	1.75	2.16
	Standard dev.	-	-	-	-	-	-	-	2.31	1.23	0.41	1.75	1.31
Hungary	Mean	1.58	1.64	1.25	1.15	1.29	1.46	1.28	1.21	1.11	1.08	1.70	1.36
	Median	1.54	1.34	1.05	1.03	1.20	1.21	1.11	0.96	1.03	1.08	1.20	1.15
	First quartile	1.19	1.09	0.73	0.81	0.91	0.94	0.88	0.89	0.76	0.80	0.90	0.97
	Third quartile	1.98	2.45	1.63	1.60	1.67	1.91	1.39	1.15	1.29	1.24	1.79	1.70
	Standard dev.	0.50	0.76	0.59	0.68	0.49	0.67	0.74	0.78	0.54	0.31	1.53	0.54
Poland	Mean	1.74	1.63	1.41	1.68	1.64	1.58	1.55	1.41	1.36	1.38	1.28	1.26
	Median	1.45	1.39	1.17	1.37	1.44	1.32	1.28	1.20	1.16	1.13	1.11	1.12
	First quartile	1.14	1.09	0.97	1.00	1.10	1.02	1.06	1.01	1.01	1.01	0.89	0.91
	Third quartile	1.92	1.86	1.61	1.87	1.79	1.89	1.68	1.54	1.45	1.43	1.44	1.49
	Standard dev.	0.92	0.99	0.92	1.19	0.88	1.12	0.90	0.84	0.76	0.86	1.02	1.17

* Certain data is not available for Slovakia.

Source: Own calculation based on the data obtained from the Notoria and Reuters databases.

Half of the Czech companies followed the silver rule of accounting in 1998 and be-tween 2008 and 2020. In 2000-2006, however, these entities showed problems with maintaining financial balance. The values of the fixed assets to fixed capital ratio were below unity during this period. This means that the entities were using current debts, in addition to long-term debts, to finance their fixed assets during this period. In contrast, all Czech companies of the third quartile met the requirements of the silver balance rule.

The companies listed on the Budapest and the Bratislava stock exchanges showed correct capital and asset structure relations for the third quartile entities, throughout the period under examination. In the set of Hungarian companies, the median of the fixed asset coverage by fixed capital ratio was at a level above unity in most cases. The median of the fixed assets to fixed capital ratio in Slovakian companies, in turn, reached a value exceeding 1 only once, i.e., in 2012.

Polish companies should be rated the highest, since the fixed assets at their disposal were fully covered by fixed capital throughout the entire period under examination. One exception entails the companies for which the fixed assets to fixed capital ratio was below unity in the first quartile of 2002 and in 2018-2020.

Difficulties with financial sustainability tend to intensify during periods of downturn. The companies listed in the Visegrad Group countries were forced to operate under unfavorable economic conditions three times during the period under examination. First, in 2001-2003,

then for six consecutive years, i.e., from 2008 to 2013 (Central Statistical Office of Poland, 2016), and in 2020 due to the COVID-19 pandemic. In this respect, the study of the links between the structure of assets and the relationships describing the golden and silver rules of financing offers an opportunity for assessment of whether these entities have maintained financial balance. In the vast majority of the companies under examination, a negative correlation between the categories analyzed was observed in each of the Visegrad Group countries. This result indicates that an increase in the share of fixed assets in total assets results in a de-crease in the ratio of fixed asset coverage by equity and fixed capital. In consequence, these types of capital covers current assets to a greater extent, which is quite favorable, taking liquidity into account (Table 3).

Table 3.
Dependencies between the asset structure and the relations expressing the golden and silver rules of financing in companies listed the Visegrad Group countries

Value of the correlation coefficient	Fixed Capital/Fixed Assets (silver rule)				Equity/Fixed Assets (golden rule)			
	Number of companies				Number of companies			
	Czechia	Slovakia	Hungary	Poland	Czechia	Slovakia	Hungary	Poland
From -1 to -0.75	3	6	11	106	4	5	7	95
From -0.75 to -0.5	3	3	7	55	1	5	7	59
From -0.5 to -0.25	-	1	3	23	-	2	4	23
From -0.25 to 0	-	1	1	12	1	1	3	18
From 0 to 0.25	1	-	1	7	-	-	1	8
From 0.25 to 0.5	-	2	1	7	1	1	2	4
From 0.5 to 0.75	2	1	-	1	-	-	-	4
From 0.75 to 1	-	-	-	1	2	-	-	1
sum	9	14	24	212	9	14	24	212

Source: Own calculations based on the data obtained from the Notoria and Reuters databases.

The vast majority of the companies listed in the Visegrad Group countries show relatively high values of the correlation coefficients. This applies to the coefficients between the structure of assets and the relations expressing both the golden and silver rules of financing. These results indicate that entities shape their capital and asset structure in a manner allowing the maturity of the financing sources to be matched with the useful life of the assets financed via those sources. Maintenance of such correlation ensures financial balance. Characteristics of the correlation indicators are provided in the appendix. Figures 1 and 2 show the correlations be-tween the structure of assets and the silver and golden rules of financing in the companies operating in the countries under analysis. The vertical axis of individual figures shows the values of the correlation coefficients between the asset structure and the selected financing rule, while the horizontal axis is the company number of a given country. Each of the correlation coefficients was determined for the time series analyzed for it. Grouped values of the correlation coefficients, divided into appropriate quartiles, are presented in Table 3 above.

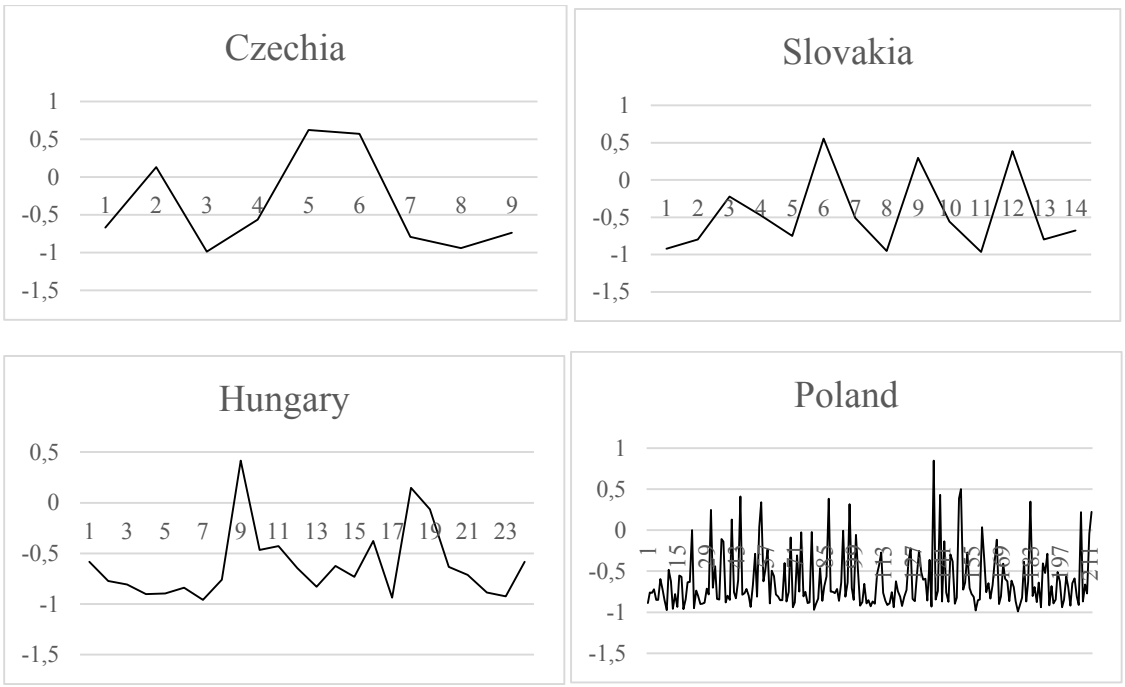

Figure 1. Values of correlation coefficients between the asset structure and the silver rule of financing.
Source: Own calculations based on the data obtained from the Notoria and Reuters databases.

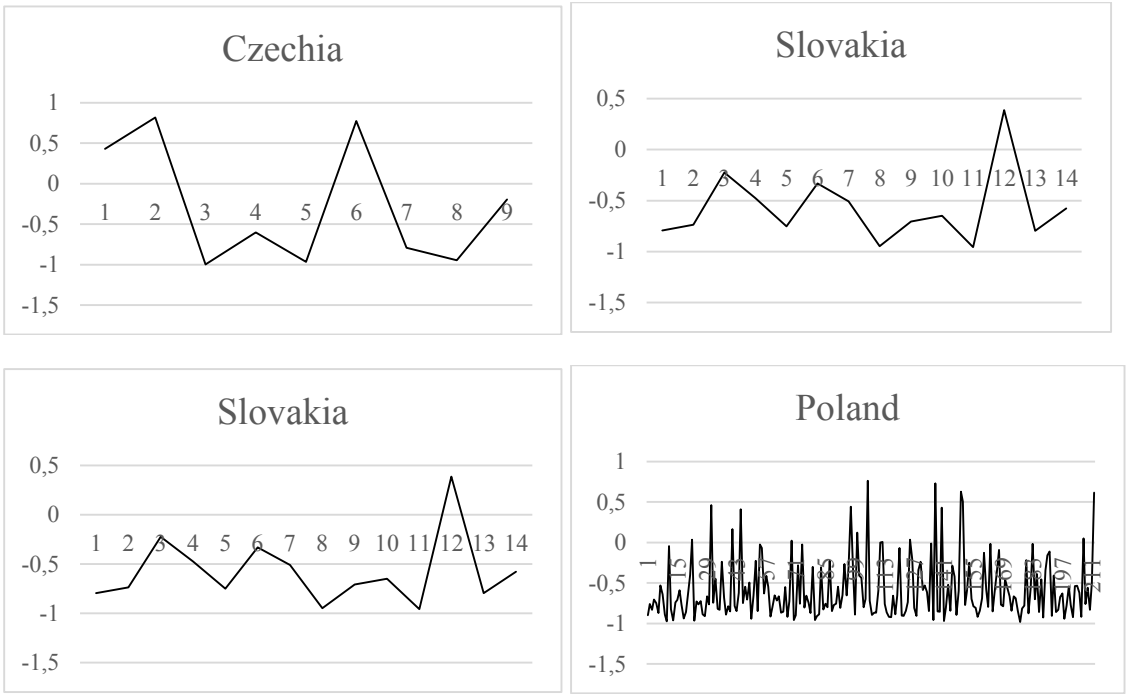

Figure 2. Values of correlation coefficients between the asset structure and the golden rule of financing.
Source: Own calculations based on the data obtained from the Notoria and Reuters databases.

The results obtained in the research generally confirm the earlier studies mentioned earlier. Referring to the research, for example, in Figura (2018), Sierpińska (2021), Różański and Bogołębska (2022) Polish companies prefer internal sources of financing. Moreover, it points out the conservative way of financing activity. It can be assumed as a factor limiting the level

of financial risk. Similar research results were obtained for companies from other countries of the Visegrad Group (Kluzek, Schmidt-Jessa, 2022).

It should be remembered that it is difficult to relate the obtained results to other studies for other Visegrad Group countries except Poland. The limitation is the lack of such research available in the literature on the subject.

6. Summary

The research carried out allows a conclusion that the first hypothesis posed in the introduction, assuming that the capital and asset structure of stock exchange listed companies in individual countries of the Visegrad Group differs significantly, has been confirmed. This mainly results from the different values of the fixed asset coverage by equity or fixed capital ratios in the Visegrad Group companies analyzed. It should be noted that the sample sizes of the entities under examination were not equal (by far the largest number of companies came from Poland). This results from the number of the companies listed on individual V4 stock exchange markets, and any attempt of standardization would not provide representative results.

The second hypothesis, assuming that the listed companies examined strive to synchronize the maturity of the financing sources with the useful life of the assets financed via those sources, has been confirmed as well. This has been confirmed despite the volatile economic situation during the period under examination. All the Visegrad Group companies sought to shape their asset and capital structure in a manner enabling adequacy between the maturity of capital and the period of asset use. Despite the differences in the capital and asset structure, the analyzed companies from all V4 countries are characterized by a high share of equity in the financing structure. This means that these entities have a strong capital base. From the economic point of view, the stability of financing their activities is not threatened, which gives them the possibility of obtaining external funds for further development.

The originality of the research is based on the analysis of relatively long time series, taking into account the same research period for all countries (except Slovakia), which allowed for direct comparison of companies' results. The research of other authors mentioned earlier concerned companies analyzed in different periods of time. Moreover, it is also original to deter-mine the relationship between the asset structure and the golden and silver financing rules with a quartile approach. This is because such an approach allows for the identification of companies for which these dependencies have extreme values.

Thanks to the analysis covering a relatively long period of time, it was also possible to determine long-term trends in the scope of changes in the capital and asset structure of the analyzed entities in the context of changes in the business cycle. The research shows that despite

the deterioration of the asset and capital situation during the economic slowdown and recession, the analyzed companies from all countries were able to maintain financial liquidity. This means that these entities can be recommended, first of all, as desirable business partners. Secondly, this recommendation may also be addressed to investors looking for attractive capital investments.

It can be therefore concluded that both the golden and the silver rules of financing company operations constitute important determinants of decision-making regarding the structure of capital.

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Appendix

Characteristics of the correlation coefficients for the silver and golden rules of financing

	Fixed Capital/Fixed Assets (silver rule)				Equity/Fixed Assets (golden rule)			
	Indicator values				Indicator values			
Charact.	**Czechia**	**Slovakia**	**Hungary**	**Poland**	**Czechia**	**Slovakia**	**Hungary**	**Poland**
Q1	-0.8670	-0.8295	-0.8761	-0.8571	-0.9564	-0.7949	-0.8049	-0.8485
Q2=Me	-0.6697	-0.6187	-0.7214	-0.7503	-0.6027	-0.6781	-0.5340	-0.7128
Q3	0.3498	-0.0943	-0.4965	-0.5133	0.6022	-0.4393	-0.1232	-0.4398
Mean	-0.3745	-0.4568	-0.6171	-0.6193	-0.2754	-0.5762	-0.4714	-0.5876
min	-0.9498	-0.9646	-0.9595	-0.9904	-0.9978	-0.9570	-0.9743	-0.9823
max	0.6201	0.5546	0.4156	0.8464	0.8155	0.3872	0.4126	0.7596
Standard dev.	0.6018	0.4969	0.3426	0.3479	0.7163	0.3365	0.3986	0.3638

Source: Own calculations based on the data obtained from the Notoria and Reuters databases.