

What Firm-Specific and Macroeconomic Determinants of Financial Structure Affect Transport and Storage Companies from Selected European Countries?

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Abstract:

A number of indicators can be assessed for a company's financial health, with indebtedness indicators being one of the important ones. The formation of the financial structure is influenced by a huge number of factors. The subject of this research is the indebtedness of companies in the Transportation and storage industry. The companies come from the V4 countries, Austria, Bulgaria, Slovenia, and Romania, between 2010 and 2018. In total 25,246 companies are analysed according to their size for medium and large companies. The aim of the research is to find out whether profitability, liquidity, asset structure, non-debt tax shield, GDP growth rate, reference interest rate, and inflation rate affect the level of total, long-term and short-term debt. The main finding is that corporate debt is significantly affected (measured by the value of coefficients) by non-corporate determinants and specifically the development of the reference interest rate. However, if we look at the most numerous determinants, it is profitability. Companies in the selected industry should focus primarily on the various forecasts within the external environment of the company and include them in their analyses when financing their activities.

Keywords: Asset Structure; Financial Structure; GDP Growth Rate; Inflation Rate; Interest Rate; Liquidity; Non-debt Tax Shield; Profitability.

JEL classification: G31; G32.

1 Introduction

Each phase of the company's life cycle is associated with the need for different amounts of financial sources. Financial sources usually come from several sources,

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either based on own finances or finances coming from the outside of the company; this represents capital structure or financial structure. The difference in these terms is that the capital structure includes only long-term sources, while the financial structure includes all the sources. Finding the optimal ratio of own and external funding sources is one of the key activities in the company. In case the company sets this ratio inappropriately, its existence can be jeopardised and it can lead to bankruptcy. The importance of corporate finance is also evidenced by the number of studies that deal with this topic. The first studies date back to the beginning of the last century. In the middle of it, a fundamental study was created becoming the cornerstone of this issue and making the topic more important. This is the work by Modigliani and Miller (1958) – “The Cost of Capital, Corporation Finance and the Theory of Investment”. The authors focused on the company’s indebtedness and aspects affecting it. Their fundamental finding was that whether the company was indebted or not, this had nothing to do with the company’s value and its cost of capital. The study was followed by other authors, from whom have emerged several additional theories of the capital structure; the fundamental two are the trade-off theory (Brealey *et al.*, 2019) and the pecking order theory (Myers, 1984). The first one seeks the optimum debt level by balancing the tax benefits with the cost of possible financial distress; the second theory assumes that a “ladder” of funding sources would be created, from which it is clear that own resources are preferred over external sources. Every year there are published countless studies that follow the three basic theories mentioned above, and new perspectives on the given area are thus discovered along with the new determinants that influence the financial structure formation.

Based on the description above it may seem that there are already enough studies in which all the essentials have been said, but the opposite is true. The first reason is no one has yet been able to create a universal theory that would apply to all businesses in the world. The reason can be seen in Myers’ (2001) statement about the existence of many factors affecting the structure of the funding sources. The second reason is that the initial studies looked at companies with available data; those were mostly the large listed companies of highly developed economies such as the United States. The third reason is the fact that the results of the studies strongly depend on the geographical, size and industrial affiliation. At the same time, the size of the examined sample is also important. For many areas or countries and industries, there are still not enough studies and the resulting findings on impacts.

It is the lack of corresponding studies that has motivated this research which focuses on companies from eight selected European countries. For companies from Eastern and Central Europe, there is a complete lack of published studies. Also, the selected

industry is not widely represented in the previous studies. The authors have found not even a dozen of previous studies where the impacts or the financial structure of a given industry can be seen separately (*e.g.* Akgül and Sigali, 2018) since many studies examine several industries at once and their results apply to the general sector instead of the separate, individual industries (*e.g.* Graham and Harvey, 2001; De Jong *et al.*, 2008; Mateev *et al.*, 2013; or Matemilola *et al.*, 2019). Thus, there is considerable scope for research to examine this industry separately. The analysis of the Transportation and storage industry is part of a broader research, which focuses on individual industries mainly from the primary, secondary and tertiary economic sectors. In addition, the selected industry continues to grow on a larger scale as companies begin to realise that the near-zero inventory strategies may not work well. Therefore, a large number of companies presently need and, in the future, will need to grow more dynamically, which may translate into a higher rate of the use of external sources of funding. Although a very important industry that is closely linked to almost all the other industries, according to the European Commission data it still accounts for only around 5% of the European Union's GDP.

The research focuses on companies of the Visegrad Group and Austria, Bulgaria, Slovenia, and Romania and covers the years 2010–2018. The aim of the research is to determine whether profitability, liquidity, asset structure, non-debt tax shield, GDP growth rate, reference interest rate, and the rate of inflation affect the level of total, long-term, and short-term debt. The contribution of this research is the size of the analysed sample which includes over 25,000 companies from eight economies operating in the Transportation and storage industry. For each economy, two panels are compiled considering the size of the companies, which are within this research divided into medium and (very) large companies.

The structure of the article is as follows. Section 2 outlines earlier studies on the financial structure. Section 3 refers to the research methodology and variables and provides a description of the industry and examined economies. Section 4 interprets the results of the analysis. Section 5 contains the conclusions.

2 Literature Review

A significant activity requires considerable effort, and optimisation of financial structure is. The reason to say so is the fact that this process is influenced by many factors coming from both the external and internal environment. While internal factors can influence the company to a certain extent, external ones cannot be influenced easily and can rather often act unexpectedly. In the frame of this study, attention is paid to both groups. Factors of internal environment in this study represent profitability, liquidity, asset structure and non-debt tax shield in companies. Development of GDP growth, inflation rate and a level of reference

interest rate in particular economies are the factors of the external environment. The influence of individual determinants having been researched by studies in the past is summarised in the following text. An analysed relationship of the dependent and independent variable is important here and the fact of whether the impact on indebtedness is positive or negative is not primarily dealt with.

Profitability is the first determinant being addressed the most often when it comes to optimisation of the level of indebtedness. Regarding this issue, it can be said that the impact is to a certain extent conditioned by the fact whether the optimisation is being solved by the trade-off or pecking order theory. In the case of the trade-off theory, its advocates expect a positive impact, which means that with the profitability growth the will to finance other businesses through external financial sources would grow as well. Studies supporting the trade-off theory also indicate that the financial straits of a more profitable company decrease along with the likelihood of bankruptcy. This is a positive signal for the creditors who do not face a high risk of default and in return provide finances both more willingly and under better terms. Out of older studies, which proved a positive impact of profitability on indebtedness, Klapper *et al.* (2002), Pinková (2012), Aulová and Hlavsa (2013), Mokhova and Zinecker (2013) in Slovenia, or Růčková (2015a; 2015b; 2017) in the Czech Republic and Hungary can be mentioned. It is necessary to mention that the negative impact on indebtedness is a more frequent result, which, at the same time, is based on the pecking order theory's philosophy. As for the financing, this theory prefers retained profit and external sources are used only in case of wider investments. This connection was stated *e.g.* by Nivorozhkin (2002; 2005), Bauer (2004), Weill (2004), De Haas and Peeters (2006), Delcours (2007), Črnigoj and Mramor (2009), Hernádi and Ormos (2010; 2012), Hanousek and Shamshur (2011), Jõeveer (2013), Mateev *et al.* (2013), or Mokhova and Zinecker (2013) except Slovenia, Prędkiewicz and Prędkiewicz (2015), Růčková (2015b; 2017) for Poland and Slovakia.

The existence of the creditor's risk leads to a necessity to include the company's liquidity in analyses, too, which has an indisputable impact on external finances accessibility. The probability of problem-free repayment increases with ensured liquidity. A company should possess not only assets, which can be perceived as the guarantee for provided credit but also such assets, which primarily do not work in profitability's favour but can support it indirectly. It means that those assets enable to gain external sources, which will be used for investments, which ensure profitability growth. In addition, securing solvency will help the company overcome a period of failure. The fact that companies finance their long-term assets by equity and short-term assets by debt indicates it. Positive relation, thus that with liquidity growth the usage of external sources grows as well can be found in the studies of

Williamson (1988), Shleifer and Vishny (1992), and Mateev *et al.* (2013) for long-term indebtedness, Růčková (2015b) for the Czech Republic. Studies, in which the negative impact of liquidity on used financing sources can be found, also exist; this negative impact is in below mentioned studies caused by a conflict between managers and company owners. Having company assets at free disposal can indicate a negative signal for company owners. By selling the company possessions, a manager could achieve an expropriation. Such impact is supported by Myers and Rajan (1998), Morellec (2001), Frieder and Martell (2006), De Jong *et al.* (2008), Lipson and Mortal (2009), and Mateev *et al.* (2013) for short-term indebtedness, Pinková (2012), Aulová and Hlavsa (2013), and Růčková (2015b) for Poland and Slovakia.

It is necessary to consider the fact that there are business fields, which need long-term assets to be a part of possession; those ensure mainly the production. It means that also long-term assets play a role when gaining external financial sources. In our case, it is the share of fixed assets in the total volume of assets. Fixed assets have the function of collateral in obtaining loans. We do not find a match in the results of the studies for this determinant either. However, there is a difference in the time for which external sources of funding are obtained. It has a negative effect on short-term sources of financing, and a positive effect on long-term external sources of financing. The reason is simple. Mainly banks do not demand collateral for short-term loans. On the other hand, they demand it when providing long-term loans; usually, properties and estates are required. However, intangibles are not accepted as collateral because those are of difficult sale when problems with repayment occur. Positives can be found *e.g.* in studies of Michaelas *et al.* (1999), Klapper *et al.* (2002), Nivorozhkin (2002), Delcours (2007), De Jong *et al.* (2008), Hernádi and Ormos (2010; 2012), Kayo and Kimura (2011), Mokhova and Zinecker (2013), or Vo (2017). Contrarily, the negative impact was discovered by Klapper *et al.* (2002), Nivorozhkin (2002), Bokpin (2009), Mokhova and Zinecker (2013), or Vo (2017). When it comes to collateral, it is necessary to consider that its significance increases in bank-oriented financial systems and when talking about the size of companies, middle and large ones are considered, as stated by Michaelas *et al.* (1999), Klapper *et al.* (2002), Onofrei *et al.* (2015), and Lourenço and Oliveira (2017). Financial systems oriented to gaining sources out of the capital market do not monitor collateral impact. The impact of collateral is assessed also in context with the business field. There are also business fields, which can use some types of reserves as collateral, as *e.g.* the results of Aulová and Hlavsa (2013) or Růčková (2015a) show. To make it clear, reserves as current assets are not usually used as collateral for long-term liabilities.

The last internal determinant, the non-debt tax shield is. It should have a negative impact on external financial sources usage. Depreciations thus function as one of the internal financing sources and also, it can be presumed that depreciations increase only after the realisation of investments, which is preceded by the drawing (growth) of debt financing. The negative impact was proved *e.g.* by Michaelas *et al.* (1999) for long-term indebtedness, Wald (1999), Klapper *et al.* (2002), or Song (2005) for long-term indebtedness, Hernádi and Ormos (2012), or Acedo-Ramírez and Ruiz-Cabestre (2014). However, as with other determinants, studies with the opposite effect can be found here. Positive effect was found *e.g.* by Delcours (2007), Hernádi and Ormos (2010), Aulová and Hlavsa (2013), or Mokhova and Zinecker (2013). Such impact is often explained by differences in tax regulation in particular countries.

As said above, this study involves also external factors influencing the use of external financing sources. It is also necessary to mention that many provided studies included statistically insignificant results. Such fact has served as the impulse to find out in our study whether in this time period and in chosen countries more statistically significant results can be found. This is one of the reasons why determinants, for which studies with statistically significant results could be found, are included. The impact of GDP development is connected with the development of the economic cycle. Often, studies provided in the past involve a positive impact. At a time of economic growth in pro-cyclical industries, growth in corporate investment and a growing willingness of creditors to provide finance can be expected. The opposite is true in the case of recession. The positive impact was proved *e.g.* in the studies of Gajurel (2006) for long-term indebtedness, Hanousek and Shamshur (2011) for unlisted companies, Salehi and Manesh (2012), Çekrezi (2013), or Mursalim *et al.* (2017) for Malaysia, Yinusa (2017). The negative impact can be at the same time explained by the economic cycle. However, if we consider retained profits, then profitability increase within the good times can be connected with less willingness to become indebted. The negative impact was proved *e.g.* by Cheng and Shiu (2007) or Gajurel (2006) for total and short-term indebtedness, Bastos *et al.* (2009), Bokpin (2009), or Hanousek and Shamshur (2011) for listed companies, Jõeveer (2013) or Mursalim *et al.* (2017) for Indonesia.

When it comes to the inflation rate, it is necessary to differentiate the period of external financing sources used. Together with inflation increase, indebtedness decreases and, at the same time, real interest rate decreases, too, meaning that a negative impact is expected. Studies with those results can be found *e.g.* in Gajurel (2006) for total indebtedness, Cheng and Shiu (2007), Jõeveer (2013), or Mokhova and Zinecker (2014) for France and the Czech Republic, Öztekin (2015). A positive effect is seen for short-term external sources of financing, as creditors can ensure

a decline in the real interest rate, *e.g.* by linking the interest rate to inflation. This is thus possible only in a short period of time, which is proved *e.g.* by the studies of Hanousek and Shamshur (2011) or Mokhova and Zinecker (2014) for France, Yinusa (2017).

The last determinant, the impact of the reference interest rate is. The assumption is that with the rising reference interest rate there is an increase in the cost of debt, which should lead to less use of debt. However, *e.g.* Yinusa (2017) state that developed economies with a high-quality institutional environment, a high level of legal enforcement of liabilities and good creditor protection should have a positive effect of the reference interest rate on the use of external sources of financing. However, this cannot be confirmed in economies where at least one of the above-mentioned conditions is disrupted.

To the macroeconomic external factors, it should be added that a number of studies found some link that was unfortunately not statistically significant. That is why it is very important to include these factors regularly in studies in order to obtain as many statistically significant results as possible.

3 Research Design

The object of this research is a sample of companies from eight selected European countries. Specifically, these are countries of the extended Visegrad Group, which includes the Czech Republic (CZ), Slovakia (SK), Poland (PL), Hungary (HU), Austria (AT), Slovenia (SI), Romania (RO), and Bulgaria (BG). The intention to include Austria, Slovenia, Romania and Bulgaria was based on the fact that the governments of these countries cooperate with the V4 governments in a number of areas (*e.g.* energy or agriculture) and this designation is commonly used by media in reference to these economies.

The examined industry, Transportation and storage, concerns according to the NACE classification to Section H. The analysed industry is one of the most significant industries both in Europe and the world because it is a part of our daily lives – any transport to/from work, storage of anything, travel in leisure time, or ordering and the related delivery of packages. Although it is a very important industry with close links to almost all other industries, it is interesting that according to the European Commission, this industry accounts for only around 5% of the European Union's GDP. In addition, the industry is proving to grow on a larger scale and will continue to do so as companies begin to realise that near-zero inventory strategies may not work well. Therefore, a large number of companies need and will need to grow more dynamically over time, which fact may mean a higher rate of use of external sources of funding. The individual divisions of

Section H include the following sub-industries: land transport and transport via pipelines, water transport, air transport, warehousing and support activities for transportation, postal, and courier activities. Within the research, the companies are not divided according to individual divisions; however, it is appropriate to characterise the composition of the industry.

The analysed sample contains all the companies listed in the Orbis (2019) database that belong to the given industry. The sample consists of a total of 25,246 companies, of which 22,348 are medium-sized and 2,898 are large and very large companies (size assumed based on the Orbis database's classification). When looking at the Orbis user guide (Bureau van Dijk, 2019), we can see the specific values based on which the companies are divided into the individual size categories. The company must always meet at least one of the following conditions to be included in the category:

- Very large companies – operating revenue greater than or equal to EUR 100 million, total assets greater than or equal to EUR 200 million, number of employees greater than or equal to 1,000, and listed.
- Large companies – operating revenue greater than or equal to EUR 10 million, total assets greater than or equal to EUR 20 million, number of employees greater than or equal to 150, and not very large.
- Medium-sized companies – operating revenue greater than or equal to EUR 1 million, total assets greater than or equal to EUR 2 million, number of employees greater than or equal to 15, and not very large or large.
- Small companies – are not included in the Orbis database.

Tab. 1 shows the number of companies in each economy. The financial series for macroeconomic variables come from the World Bank and national central banks' databases. The research covers the period 2010–2018.

Tab. 1 Number of companies in the Transportation and storage industry in individual size categories

Category	CZ	SK	PL	HU	AT	SI	BG	RO
Medium-sized companies	3,937	1,904	5,932	2,176	2,155	918	2,128	3,198
Large and very large companies	434	214	920	256	421	89	229	335

Source: Orbis, 2019 + authorial computation.

The aim of the research is to find out whether profitability, liquidity, asset structure, non-debt tax shield, GDP growth rate, reference interest rate, and inflation rate affect the level of total, long-term, and short-term debt. Within this goal, the following two research questions were formulated:

1. Are there differences in impacts in terms of the different maturities of the funding sources being used?
2. What is the impact of the external financing sources' price on the used financing sources?

Based on the literature review, it is possible to assume the resulting relations for the individual determinants. These assumptions can be observed in Tab. 2, while there is no need to divide the assumptions according to the size of the companies, as the differences would only arise if we included small and micro companies.

Tab. 2 Expected effects of individual determinants on the amount of debt

Determinant	Total debt	Long-term debt	Short-term debt
Profitability	–	–	–
Liquidity	–	–	–
Asset structure	+/-	+	–
Non-debt tax shield	–	–	–
GDP growth rate	+/-	+	–
Inflation rate	+/-	–	+
Reference interest rate	–	–	–

Source: Authorial computation based on literature review.

3.1 Methodology

A single method was chosen to analyse the dependencies between the individual determinants and the debt level, namely panel regression, which was selected with respect to the amount of analysed data. However, the basic regression – adopting the ordinary least squares method – is not entirely suitable because of the need for stationary time series, which condition may not be satisfied by macroeconomic series and would thus eliminate the variables (Prucha, 2014). From a number of modified regression analyses, the two-stage Generalized Method of Moments (GMM) system was finally chosen, the development of which had a major impact on the research in finance. This method overcomes a number of limitations of other methods – *e.g.* there is no need for stationary data, no need to make assumptions for the distribution – variables can show serial correlation and conditional heteroskedasticity (Jagannathan *et al.*, 2002).

Arellano and Bond (1991), Arellano and Bover (1995), and Blundell and Bond (1998) included our selected method in their studies. These studies defined the general assumptions of this method: shorter time series with many observations,

linear functional relationship, one endogenous variable on the left-hand side that is dynamic depending on its lagged values, exogenous variables that may not be strictly exogenous (correlation with the past or present errors), fixed individual effects, and the aforementioned autocorrelation and heteroskedasticity within the individual observations, but not across them. The GMM model also solves the endogeneity problem (Roodman, 2009).

Heryán (2020) also mentions the first reason for not using the ordinary least squares method on a short time series. However, the presence of endogeneity, which can be talked about when one equation does not explain the situation, is mentioned as a far more important fact. According to the author, this situation occurs when the exogenous variable on the right-hand side of the equation can also be an endogenous variable. The author further states that if only two variables are analysed, the 2SLS (Two-Stage Least Squares) method can be used. However, if the multivariate analysis is performed, the Three-Stage Least Squares (3SLS) or Generalized Least Squares (GLS) methods can be used. Unfortunately, these methods suppose the absence of heteroskedasticity, which fact must be taken into account for panel data and short time series. Therefore, the author claims that the use of the GMM method is the most appropriate one.

Ullah *et al.* (2018) add that endogeneity can cause bias, inconsistent estimates, and incorrect conclusions in the form of wrong signs. However, the GMM method uses certain internal tools (lagged value of the endogenous variable, internal transformation processes) in solving unobserved heterogeneity, simultaneity and dynamic endogeneity, which are sources of endogeneity.

However, as already mentioned, variables may exhibit autocorrelation and heteroskedasticity, which is not desirable and the results may be skewed. Therefore, it is necessary to test the plausibility of the resulting models and whether the instruments were correctly specified. There are several tests that serve this purpose. In this research, the Sargan test is used to show whether we achieve the same results with a slight change in parameters. If its value is higher than 0.05, the model has been compiled correctly and we can trust its results (Ullah *et al.*, 2018).

The equation for this research takes the following form:

$$DER_{it} = \alpha_0 + \beta_1 DER_{it-1} + \beta_2 ROE_{it} + \beta_3 L2_{it} + \beta_4 SA_{it} + \beta_5 NDTs_{it} + \beta_6 GDP_{it} + \beta_7 INF_{it} + \beta_8 IR_{it} + \varepsilon_{it}, \quad (1)$$

where the endogenous variable is debt; precisely DER_{it} , which denotes the debt-to-equity ratio for the i -th company in a given economy in a particular sector during the period t (2010–2018). The right-hand side of the equation consists of the individual determinants (the way they are measured is specified in the following

text), where *ROE* is the return on equity, *L2* is the quick ratio, *SA* is the structure of assets, *NDTS* is the non-debt tax shield, *GDP* is the GDP growth rate at market prices, *INF* is the inflation rate, *IR* is the reference interest rates of the individual analysed company, and automatic components of the model – the annual lagged value of debt, the constant α , and the so-called random component ε , which includes all other factors that affect the amount of debt.

The variables were selected based on the frequency of occurrence in the previous studies, while many authors divide debt into three forms, and profitability or asset structure are a part of most of the previous studies. On the contrary, *e.g.* external determinants are often statistically insignificant and therefore it is necessary to include them in the research in order to obtain as many statistically significant results as possible to be able to draw some conclusions. The variables were also selected in view of the tendency to expand business activities, as mentioned in Section 1.

Within the adopted method (panel regression), we divide the variables into endogenous and exogenous. The endogenous variable is the companies' level of indebtedness represented by the debt-equity ratio. With regard to the research aim, this indicator is represented in three forms, namely *DER* represents the ratio of total liabilities to equity, *DER_L* represents the ratio of long-term liabilities to equity, and *DER_S* the ratio of short-term liabilities to equity.

The *ROE* indicator is a frequent expression of profitability and it is the ratio of earnings before interest and taxes to equity (in order to abstract from diverse taxation in selected countries). The *L2* indicator was selected from the liquidity indicators – the ratio of current assets excluding inventories to short-term liabilities. The *SA* indicator is constituted by the share of tangible fixed assets in total assets. The *NDTS* indicator is represented by the ratio of depreciation to total assets. The remaining three variables, *GDP*, *INF*, and *IR*, represent the external environment of companies.

3.2 Economic development in individual economies

This subsection deals with a brief summary of the economic development of the examined economies during the period 2010–2018. A more detailed description of the events is included in Section 4 with regard to the interpretation of the results. The analysed period includes several important economic events. At the beginning of the period, the world economy has begun to recover from the global financial crisis of 2008/2009, which transformed into the European debt crisis. This crisis in 2012/2013 was exacerbated by the global economic slowdown and in 2018 the global demand declined. In addition to these world events, each of the examined

economies also had some internal economic issues and crises. With regard to this brief list of events, it is clear that the input dataset can be divided according to the individual events – *e.g.* into the crisis and post-crisis periods. However, the primary goal of the research is to determine the impact of the selected determinants on the financial structure of companies, regardless of the impacts of the individual events with respect to the distribution of the dataset. This issue may be the subject of future and follow-up research.

The examined economies should be divided into two groups – one that has been hit hard by the global financial crisis and the other one that has been hit slightly or not at all by the events in question. The first group includes Poland, Bulgaria, the Czech Republic, Austria, and Slovakia. The Polish economy, as one of the few economies in the world, did not decline in GDP during the whole analysed period and showed a good growth rate throughout. The Bulgarian and Slovak economies were affected by the financial crisis but only insignificantly so and grew about 2.5% per year. The Czech economy declined in 2012/2013 when there has fallen in particular household expenditure and companies' investments. In Austria, the development of the main economic indicators (debt, unemployment) was not favourable, but apart from the introduction of a deposit guarantee, the economy was no longer constrained.

The second group includes Hungary, Romania and Slovenia. All these economies except for Slovenia have been hit by the financial crisis so much that the local governments have had to apply for international assistance. In Romania, financial assistance helped restart the credit market and strengthen foreign exchange reserves. The Hungarian economy was struggling with the mismanagement of the government and with loans in foreign currencies (euro, Swiss franc), which appreciated against the forint during the crisis. The last country is Slovenia, which has gone through the real estate, mortgage, and banking crises. However, the Slovenian government has overcome all these crises without international assistance and the economy managed to stabilise.

3.3 Development of endogenous variables in individual economies

Before analysing the resulting dependencies between determinants and the indebtedness level, it is appropriate to analyse the endogenous variable – indebtedness. Tab. 3 shows the average values for the medium- and large companies in terms of non-current liabilities (*NCL*), current liabilities (*CL*), debt, equity, and *DER*. Non-current liabilities include debts with a maturity of more than 1 year (bonds, loans, trade debts, social security, deferred taxes, ...). Current liabilities consist of debts with a maturity of up to 1 year (loans, trade debts, personnel costs, taxes, ...). Debt is the value of all the company's liabilities (non-current + current liabilities). Equity consists of capital and other shareholders' funds.

Tab. 3 Composition of liabilities and DER indicator (average values in %)

	CZ	SK	PL	HU	AT	SI	BG	RO
A_NCL_medium	29	28	29	30	98	43	37	39
A_NCL_large	50	70	41	53	90	80	29	64
A_CL_medium	71	72	71	70	2	57	63	61
A_CL_large	50	30	59	47	10	20	71	36
A_Equity_medium	40	25	45	45	32	40	48	34
A_Equity_large	62	47	38	31	45	48	48	35
A_Debt_medium	60	75	55	55	68	60	52	66
A_Debt_large	38	53	62	69	55	52	52	65
A_DER_medium	148	301	122	124	210	151	110	197
A_DER_large	62	112	164	225	123	110	110	184

Source: Orbis, 2019 + authorial computation.

First we will focus on the composition of liabilities. In Tab. 3, it can be seen that the composition of liabilities varies considerably in terms of the company size (with two exceptions). For medium-sized companies, the share of long-term liabilities is around 34% on average, excluding Austrian companies, which deviate significantly with 98%. The range is 28–43%. Medium-sized transport and storage companies, therefore, prefer to use short-term debt sources of financing. This is a little bit different for large companies. These companies on the contrary prefer to use long-term debt sources of financing. This can be clearly stated again for Austrian and, in addition, Slovenian companies with values of 90 and 80%. In contrast, Bulgarian companies in both size categories prefer short-term debt sources of financing.

If we focus on the ratio of equity to debt financing, then companies do not differ much in size. For Czech large companies, we see there is a tendency to finance with equity, while for the remaining companies there is a tendency to debt financing. Therefore, the values of the debt-equity ratio exceed 100% in all the cases, except for the aforementioned Czech large companies, which value of 62% is within the generally accepted optimal range (30–80%) for debt values that do not threaten the company's existence. On the contrary, the highest value of 301% can be found in the case of Slovak medium-sized companies. It should be added that the value of this indicator should ideally not exceed 100%. However, even higher values do not necessarily mean existential problems for companies; it can only be a more aggressive financial policy. Regarding the results of the previous studies, Mahmud (2003) found that companies in selected industries in Japan, Malaysia and Pakistan

tend to have lower debt ratios, and Li and Islam (2019) revealed that the average debt ratio of Australian companies operating in this sector is 100.6%.

4 Results and Discussion

In Tab. 4 and Tab. 5 we can see the results of panel regression using the GMM method for companies of both sizes. At first glance, the tables seem to include results for all the economies, but the opposite is true. In the tables we can see economies that have met and did not meet the basic premise of the GMM models – Sargan test – which was mentioned as the one to verify the plausibility of the resulting model with respect to the presence of autocorrelation or heteroskedasticity. The values of this test (J -stat.) can be seen in the last column. Credible models are those for which the value of J -stat. exceeds the minimum required limit of 0.05. Models that did not exceed this limit cannot be considered credible and their results are not discussed in the following paragraphs.

In the following paragraphs, the individual determinants for the individual companies will be analysed according to the size, but some results can be summarised for all the companies together because the values of the coefficients reach very low values (with one exception) and there is basically no significant effect on the debt level. The first determinant is the lagged value of debt. Regarding the relationship between the current and past indebtedness, a positive impact clearly prevails in both size categories of the companies. Given the size of the coefficients, we can only talk about an indication of the effect of this variable. A positive relationship means that if companies used debt financing in the previous period, they are likely to use it in the following period as well, and the debt level will increase. On the contrary, the negative impact means the exact opposite, namely if companies used debt financing in the previous period, they are unlikely to use it in the following period and the debt level will thus decrease.

In terms of liquidity, it depends on the size of the companies, as for the medium-sized companies a predominantly negative impact on the indebtedness level was found, while for the large companies a rather positive impact was revealed. A negative impact on medium-sized companies can mean that companies do not have highly liquid assets, as these assets are usually acquired on debt. To confirm this statement, it would be appropriate to look at the detailed structure of assets. It can also be conflicts between owners and managers and expropriate owners in some cases. However, as mentioned previously, the values of the coefficients are very low, and therefore it is not possible to speak about a significant effect and a detailed analysis is therefore not even needed. This result is in line *e.g.* with the results of Myers and Rajan (1998), Mateev *et al.* (2013), or Aulová and Hlavsa (2013). On the contrary, a positive impact on the indebtedness level of large companies would

mean a higher amount of liquid assets, as stated *e.g.* by Williamson (1988) or Shleifer and Vishny (1992). Again, these are more or less very low values of the coefficients, with one exception, namely the large Hungarian companies, for which a coefficient of 1.55 was found. In this case, an additional asset analysis was performed; it was found that, on average, 21% of total assets are represented by liquid assets in the form of current assets without inventories, which may not always be easy to sell in case such need occurs. The established average is not an overly low number and therefore the share could have a positive impact. If we look at the share of the most liquid assets (cash and cash equivalents), in this case, the average value is 9%.

According to the previous studies, profitability should rather have a negative impact on the indebtedness level. This impact was found only in the medium-sized Slovak companies and the large Austrian, Slovenian, Romanian and Hungarian companies. The remaining identified impacts are positive. The identified negative effects are followed by studies such as Črnigoj and Mramor (2009), Hernádi and Ormos (2010; 2012), Mokhova and Zinecker (2013), or Růčková (2015b; 2017). The negative impact means that if these companies grow profits, they should prioritise them to become a source of financing in order to decrease the debt level. For the Slovenian, Slovak and Hungarian companies, the negative impact of profitability is also supported by the negative impact of GDP. The negative impact of GDP is linked to the claim that, during a boom, companies usually grow profits, which can be a suitable source of financing.

If we look at the prevailing positive impact of profitability on the debt level, here too are most of the results supported by the same effects within the impact of GDP. These positive effects mean that, *e.g.* in the case of economic growth, companies usually grow profits and thrive overall, which reduce the risk of bankruptcy and therefore lenders are willing to lend them additional funds. A positive impact can be found *e.g.* in the studies of Klapper *et al.* (2002), Pinková (2012), or Aulová and Hlavsa (2013). There is only one discrepancy in the results, namely in the case of large Bulgarian companies, which have a positive impact on the indebtedness level in terms of profitability. However, a negative impact on the indebtedness level was found within GDP. A positive impact on profitability means the use of debt sources of financing at higher profitability, while a negative impact on GDP claims that if the economy and subsequently also the companies are doing well, then the use of their own sources of financing is preferred. All the economies for which statistically significant coefficients were found were more or less successful for at least half of the period under review, and therefore the negative and positive impacts are not surprising. More than ever, companies could choose whether to use their own sources of financing or debt financing.

Tab. 4 GMM results for medium-sized companies

	<i>DER</i> (-1)	<i>ROE</i>	<i>L2</i>	<i>SA</i>	<i>NDTS</i>	<i>GDP</i>	<i>INF</i>	<i>IR</i>	<i>J-stat.</i>
Total debt									
CZ	0.0172 ^a		-0.0004 ^a	-19.4756 ^b		49.1721 ^c	78.9823 ^b		0.3580
SK	0.0078 ^b	-11.5279 ^a		114.1197 ^c	-116.7430 ^a				0.2263
PL	-0.0137 ^a	2.5590 ^a					81.5920 ^c		0.0061
HU	-0.0167 ^a	7.9714 ^a			-1.1791 ^a				0.0137
AT	0.0409 ^a						-377.7089 ^a	871.2092 ^a	0.0013
SI	0.1099 ^a			2.9074 ^c		-17.6086 ^b		39.3436 ^a	0.4082
BG	0.0138 ^b	2.4904 ^a		7.8978 ^c	-6.4001 ^b				0.0043
RO		4.5079 ^a	-0.0780 ^a				196.8537 ^a	-378.9304 ^b	0.2557
Long-term debt									
CZ	0.0612 ^a			5.9619 ^b	-6.0467 ^a	-1.5841 ^a		-54.4095 ^a	0.6853
SK	-0.0115 ^a	-3.5377 ^a			-6.3506 ^b		-44.5253 ^a	187.6991 ^c	0.0020
PL		1.8389 ^a	-0.0006 ^a	17.1917 ^a	-19.7468 ^a		-28.0366 ^a		0.3343
HU	-0.0227 ^a	-1.7376 ^a					-10.3591 ^b	15.6465 ^a	0.0009
AT	0.0307 ^a				20.5919 ^a	-57.6562 ^c		779.9438 ^a	0.2178
SI	0.2466 ^a			2.0527 ^b		-2.9582 ^c		21.6361 ^b	0.0036
BG	0.0380 ^a	1.6239 ^a	0.0017 ^c			9.8123 ^b			0.3301
RO	0.0208 ^a	1.7921 ^a		1.3834 ^b			-33.4480 ^a	-65.4659 ^b	0.2892
Short-term debt									
CZ	0.0202 ^a	3.2979 ^a	-0.0003 ^a				103.9533 ^c		0.1432
SK	0.0481 ^a			115.1657 ^c		-605.6401 ^b		346.6540 ^b	0.6035
PL		1.4041 ^a	-0.0006 ^b			11.3926 ^b	52.8928 ^c	-68.4434 ^b	0.6678
HU	-0.0173 ^a	10.1421 ^a			-1.2558 ^a	10.1726 ^a		-20.0779 ^a	0.5411
AT	0.4325 ^a	1.4023 ^a		2.3932 ^a	-5.6755 ^c	24.2537 ^a	51.8434 ^a	51.9910 ^a	0.0000
SI	0.0170 ^a	0.3514 ^a	-0.0105 ^c			-20.9845 ^a	-20.1422 ^c	61.4275 ^a	0.0320
BG				6.4898 ^a	-5.0317 ^b		8.6971 ^b		0.6999
RO	-0.0034 ^a	2.7933 ^a	-0.0004 ^c				261.7693 ^c		0.0084

Source: Orbis, 2019 + authorial computation.

Note: ^a, ^b, and ^c indicate significance at 1%, 5%, and 10%.

As part of the results for profitability, we have already analysed a significant part of the results for the effect of GDP on the debt level. In order to make the interpretation of the results complete, it is advisable to immediately analyse the remaining result coefficients for GDP. These results are for the Czech companies, Slovenian and Austrian medium-sized companies and Polish large companies. A positive impact

on the debt level of Polish companies is expected, as the Polish economy was one of the economies with a non-negative GDP growth rate during the period under review. At the same time, Poland co-organised the European Football Championship in 2012, which brought many opportunities to most industries. Last but not least, Poland has a huge internal market and it is not as dependent on the outside world as some other world economies, which are heavily dependent on foreign trade. Positive effects can also be found in the studies by Salehi and Manesh (2012), Mursalin *et al.* (2017), and Yinusa (2017). A negative impact was found on Slovenian and Austrian companies. These economies did not suffer from major problems which would have plagued them for most of the period under review; thus their companies, together with a certain GDP growth rate, were more successful and profitable; such a situation allowed them to reduce their debt and use the rising profits to finance their activities. The negative effects follow from the results of studies by Bastos *et al.* (2009), Bokpin (2009), and Jõeveer (2013). The results for the Czech companies showed that the indebtedness of large companies is negatively affected by the GDP growth rate, while the indebtedness of medium-sized companies is affected rather positively. The Czech economy, similarly to the remaining selected economies, did not have major problems and since 2014 it has been growing at an average rate of 3.5% year-on-year. The local companies thus had free hands to choose how to finance their activities.

The relationship between the asset structure and the indebtedness level should be positive for long-term indebtedness and negative for short-term indebtedness, as stated *e.g.* by Klapper *et al.* (2002), Nivorozhkin (2002), Song (2005), Cheng and Shiu (2007), Mateev *et al.* (2013), or Vo (2017). The positive impact means that the higher the share of tangible fixed in total assets, the higher the value of debt. This relationship assumes that tangible fixed assets can be used as collateral, usually for long-term debt; as for short-term debt, it is not customary. However, the results of this research show that the debt levels of medium-sized companies, regardless of the form of debt, are positively affected by the structure of assets. The only negative impact can be found in the Czech companies, for which we have no result for short-term debt. With regard to long-term debt, the impact is positive, which means that the value of the coefficient for the total debt should be affected by short-term debt, as short-term liabilities significantly predominate in the composition of liabilities of these companies (71% on average) and the share of these assets 37%. The results for the medium-sized companies are quite surprising, as almost all the companies (except for the Austrian) clearly outweigh short-term liabilities, although on the other hand the share of tangible fixed assets in total assets is on average 45%, which is high and companies can use these assets to obtain additional debt financing.

For large companies, the results are practically the same; again, with one exception, there are positive effects in all the cases. The Czech companies are an exception in the context of short-term debt, where our assumption of a negative impact is met. For these companies, the liabilities are on average exactly half and half. Overall, long-term liabilities predominate in large companies (on average 60% of total liabilities) and at the same time the ratio of tangible fixed assets to total assets reaches higher values (on average 65%) than in medium-sized companies. Positive effects on the debt level in both forms of debt can be seen *e.g.* in Michaelas *et al.* (1999), Chen (2004), Delcoure (2007), Pinková (2012), or Handoo and Sharma (2014).

The non-debt tax shield should have a negative effect on the debt level. We confirmed this result in all the cases except for the Austrian medium-sized and large Czech and Bulgarian companies. For most companies, we confirmed the assumption and followed the results of studies such as Wald (1999), Klapper *et al.* (2002), or Hernádi and Ormos (2012). Companies with negative coefficients benefit from depreciation, which serves as their own source of funding, and should therefore acquire more assets that can be depreciated and, if possible, assets that have higher depreciation rates. On the other hand, three identified positive impacts confirm *e.g.* the results of Delcoure (2007), Hernádi and Ormos (2010), or Mokhova and Zinecker (2013). One possible explanation for the positive impact is roughly the same value of tangible fixed assets and depreciation. If these two groups of assets were more or less equal, it would be more advantageous for the companies to use collateral than a non-debt tax shield. However, following an additional analysis, it was found that the value of tangible fixed assets and depreciation did not equal nor even approached it. Therefore, the differences in tax regulations may be the explanation, as we do not have detailed internal accounting of all the Austrian, Czech and Bulgarian companies in which the answer could probably be traced.

The resulting coefficients for the impact of the inflation rate on the debt level more or less fulfil the expected effects. For medium-sized companies, the results for long-term and short-term debt are exactly as expected based on the studies by Gajurel (2006), Cheng and Shiu (2007), Hanousek and Shamshur (2011), Mokhova and Zinecker (2014), Öztekin (2015), and Yinusa (2017). For total debt, we can see three positive coefficients, which are probably based on the fact that short-term debt is expected to have a positive impact, and for the Czech and Romanian companies, short-term debt has clearly prevailed. The expected positive effect on the amount of short-term debt was thus reflected in total debt. However, the results are interesting because, apart from the Romanian rate of inflation (2.7% on average), the remaining inflation rates were not high enough to be hedged in advance, so in theory, in all the cases, except for the Romanian companies, there could have rather been a negative

impact. The inflation rates of the companies for which we see coefficients were in the range of 1.3–1.6%.

Tab. 5 GMM results for large and very large companies

	<i>DER</i> (-1)	<i>ROE</i>	<i>L2</i>	<i>SA</i>	<i>NDTS</i>	<i>GDP</i>	<i>INF</i>	<i>IR</i>	<i>J-stat.</i>
Total debt									
CZ	0.0083 ^a	0.1030 ^c		-1.4497 ^b		-8.6152 ^a		-82.7828 ^a	0.0001
SK	-0.0126 ^a	8.2247 ^a	2.3223 ^a		14.8223 ^a		424.1862 ^a		0.0000
PL	-0.1242 ^a		-0.0004 ^b		-19.7974 ^b	54.4174 ^b		-67.9480 ^c	0.4892
HU	-0.1847 ^a	-67.6040 ^a	8.7252 ^a		-397.2631 ^b			771.3446 ^c	0.0000
AT	-0.0425 ^a	-4.6114 ^a		3.3282 ^b	-48.6106 ^a		-47.8995 ^a		0.6995
SI	0.0245 ^a	-10.5899 ^a	0.0380 ^a			-12.9697 ^b	-82.0218 ^a		0.2946
BG	0.3352 ^a	8.2808 ^a	0.5719 ^a	36.5410 ^a	24.1938 ^c				0.0001
RO		-6.1296 ^a		8.7518 ^a	-14.9791 ^c			-171.3694 ^c	0.6549
Long-term debt									
CZ	0.0089 ^a			1.9462 ^b	2.8389 ^a		-4.0284 ^a	81.2832 ^a	0.1140
SK		1.5131 ^a	0.4210 ^a			21.8464 ^a		250.7772 ^a	0.3214
PL	0.0520 ^a			4.5426 ^a	-7.6374 ^c		-8.7152 ^c		0.5348
HU	-0.1715 ^a	-654.6940 ^a	69.4676 ^a	-703.1360 ^b		-2,031.4000 ^a			0.0000
AT	-0.0449 ^a	-4.4609 ^a		4.7240 ^a	-44.2810 ^a		47.1736 ^c		0.0042
SI	0.0217 ^a	-8.2136 ^a		84.5127 ^a	-17.7972 ^b			46.1404 ^a	0.2029
BG	0.1722 ^a	7.6331 ^a	0.1115 ^a			-6.6514 ^c	-8.5044 ^a		0.5840
RO	-0.2267 ^a			10.3664 ^a	-10.8980 ^b	71.4967 ^c			0.0008
Short-term debt									
CZ	0.0084 ^a			-1.7366 ^b		-13.0292 ^a			0.1493
SK	-0.0271 ^a		1.7209 ^a	87.9656 ^a	15.8001 ^a		403.2769 ^a	-1,660.6460 ^a	0.0000
PL	-0.1305 ^a	-0.5947 ^a	-0.0003 ^c			27.5849 ^c			0.0188
HU		-148.4911 ^a	0.1550 ^a			-422.2240 ^a	-29.2806 ^a	-110.1370 ^a	0.1123
AT	-0.0195 ^a	-0.0273 ^a			-2.3543 ^a	13.4494 ^a		-42.7931 ^a	0.0174
SI	0.0191 ^a	-2.2983 ^a	0.0094 ^a		35.7031 ^a		76.7184 ^a		0.0115
BG	0.3475 ^a		0.3384 ^b		34.7423 ^a			466.4540 ^a	0.6964
RO		-5.6605 ^a							0.0266

Source: Orbis, 2019 + authorial computation.

Note: ^a, ^b, and ^c indicate significance at 1%, 5%, and 10%.

The results for the large companies also more or less meet our expectations based on the studies by Gajurel (2006), Cheng and Shiu (2007), Hanousek and Shamshur

(2011), Mokhova and Zinecker (2014), Öztekin (2015), and Yinusa (2017), but there are also a few deviations. The unexpected result is a negative impact on the level of short-term debt of the Hungarian companies. The Hungarian inflation rate was among the higher during the period under review, averaging 2.4%. In 2012, the inflation rate was even 5.65%. Given that these are higher values of inflation, creditors should hedge against its growth; however, it seems to be the exact opposite case, when the rate of inflation reduces the level of current debt by reducing the real interest rate. The remaining output coefficients are according to our assumptions; for the total debt is likely to be outweighed by the impact on the long-term debt, which clearly dominates in the Austrian and Slovenian companies. The remaining economies also had inflation rates between 1.4–1.9%.

The last determinant is the reference interest rate, which was expected to have a negative impact on the indebtedness level. We see that the resulting impacts are diverse. First, we will focus on the positive influences that we can see in the Slovenian, Austrian, Slovak, large Czech and large Bulgarian companies. The first four are members of the euro area and therefore subjected to the monetary policy of the European Central Bank; during the period under review, they sought utmost assistance because of the various crises and economic problems; their reference interest rate stood on average at 0.34%. The Czech and Bulgarian central banks also wanted to help their economies as the interest rate in these countries was also very low and averaging 0.44% in the case of the Czech Republic and 0.05% in the case of Bulgaria, respectively. Such low-interest rates brought very low costs of debt financing, which thus became very attractive and, therefore, the companies' debt level rose. On the other hand, we see negative impacts on the Romanian, Polish, Hungarian and medium-sized Czech companies. The result for the Czech companies is surprising and difficult to explain, as the average interest rate was low. However, in the remaining economies, interest rates were high leading to higher debt financing costs, which meant a decline in the debt. The Romanian reference interest rate averaged 3.56% with a peak of 6.25% in 2010. The Polish interest rate averaged 2.53%, with a peak of 4.5% in 2011. The Hungarian interest rate averaged around 3.07% with a peak of 7% in 2011. We can see that these values are really high compared to the rest of the economies. However, it must be added that they have gradually decreased since their peaks in 2010/2011 and *e.g.* the Hungarian interest rate in 2016–2018 reached 0.9%, which brought the advantage of lower costs for debt financing. Unfortunately, interest rates were higher for most of the period under review, and their resulting development outweighed the resulting coefficient.

The main finding of the research is that the indebtedness level of the transport and storage companies regardless of their size is very significantly influenced by environmental determinants (as measured by the values of the respective

coefficients); at the same time, though, it is necessary to consider the effect of profitability, which was found in most of the resulting coefficients (measured by the frequency of the coefficients).

For the sake of clarity and coherence, Tab. 6 is created, which contains the general results for individual determinants.

Tab. 6 Summary research results

Determinant	Company size	Long-term debt	Short-term debt
Profitability	Medium-sized	+	+
	Large and very large	+	+
Liquidity	Medium-sized	+/-	-
	Large and very large	+	+
Asset structure	Medium-sized	+	+
	Large and very large	+	+
Non-debt tax shield	Medium-sized	-	-
	Large and very large	-	+/-
GDP growth rate	Medium-sized	+	+
	Large and very large	+	+
Inflation rate	Medium-sized	-	+
	Large and very large	-	+/-

Source: Authorial computation.

5 Conclusion

This research dealt with the financial structure of companies operating in the Transportation and storage industry, which is one of the most significant industries in Europe and in the world as it is a part of our daily lives – any transport to/from work, storage of anything, travelling in leisure time, ordering and the related delivery of packages. The analysed companies operate in eight selected European economies, specifically in the Czech Republic, Slovakia, Poland, Hungary, Austria, Bulgaria, Romania, and Slovenia. The aim of the research was to find out whether profitability, liquidity, asset structure, non-debt tax shield, GDP growth rate, reference interest rate, and inflation rate affect the level of total, long-term and short-term debt. Within this goal, the following two research questions were formulated:

1. Are there differences in impacts in terms of the different maturities of the funding sources being used?
2. What is the impact of the external financing sources' price on the used financing sources?

A total of 25,246 companies were analysed, of which 22,348 were medium-sized companies and 2,898 were large and very large companies. The research was conducted for the period 2010–2018. The Generalized Method of Moments was used to determine the impacts of selected factors.

Regarding the answer to the first research question, some determinants were found to have differences in the effects on the level of debt according to its maturity.

The last determinant answers the second research question. The second main finding of the research was that the level of indebtedness of transport and storage companies, regardless of their size, is very significantly influenced by the determinants of the external environment of companies (as measured by the value of the respective coefficients). Of these determinants, the highest values were achieved by the reference interest rate of the economy, while the impacts vary from economy to economy. However, it can be stated that the impact follows the basic assumption – the higher the cost of debt financing, the less this form of funding is going to be used. The reference interest rate thus has a positive impact on the indebtedness level in economies with interest rates being zero or very low for most of the period under review and which have been supported by central banks. These are the Czech Republic, Slovakia, Slovenia and Austria and Bulgaria. In contrast, in economies with higher rates, the impact of the interest rate on the debt level was negative. These are Romania, Poland and Hungary.

In conclusion, it should be added that the results of this research cannot be generalised to the Transportation and storage industry as a whole. The results of the capital or financial structure research should not be generalised, as the results in this area depend very much on the sample – which country we choose, which industry we choose, which companies, how big these companies are, or how many companies are in the sample. Therefore, we cannot generalise any result to the whole country or the entire industry worldwide. Each result concerns only the companies in the analysed sample. Further research might consider adding other determinants and countries.

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