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# Comparison of Methods of Evaluation of the Financial Structure in Selected Industry and Countries

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**Abstract**

**Purpose of the article:** The issue of capital or financial structure is still a very current topic, the beginning of which dates back to the middle of the last century. Despite such a long time, there is still no universal theory that would help us understand the behaviour of companies in this area. This is due to the fact that each industry, sector, economy, and even the company itself has a different strategy, and therefore a different financial structure. Unfortunately, it is not possible for researchers to analyse all the companies in the world individually, but it is at least possible to examine individual industries and economies. The purpose of this research is to expand knowledge about the financial structure in the industry – Accommodation and Food Service activities in 8 selected countries of Central and Eastern Europe during the period 2010–2018. A total of 23,991 companies are analysed, which are divided into medium and large. Due to the fact that research in this industry in selected economies was not found, this research could significantly expand knowledge about the financial structure in selected economies and the sizes of companies individually.
**Methodology/methods:** Two methods were chosen to meet the aim – the least squares method and the Generalized Method of Moments. It is a comparison of two regression analyses, a simple one, in which several assumptions must be met, and a modified one, in which only one test follows to verify the credibility of the resulting model.
**Scientific aim:** The aim of this research is to determine whether profitability, liquidity, asset structure, non-debt tax shield, the GDP growth rate, inflation rate, and reference interest rate affect the level of total, long-term and short-term debt.
**Findings:** The main finding of the research is the limitation in the use of the least squares method in terms of fulfilling the basic assumptions and the fact that both internal and external determinants have an influence on the formation of financial structure, however, in terms of significance, the influence of external determinants clearly prevails.
**Conclusions:** The main conclusion is that non-corporate determinants have the most significant impact on the level of indebtedness, with the influence of the reference interest rate clearly dominating in terms of the value of coefficients; while in terms of the frequency of coefficients the GDP growth rate is significant.

**Keywords:** Financial structure, profitability, liquidity, non-debt tax shield, asset structure, GDP, inflation, interest rate.

**JEL classification:** G30, G32

## Introduction

The length of the lifecycle of individual companies always depends on the amount of funds available to the company and can thus finance its business and investment activities. Financial sources can be divided according to various aspects, while the two basic ones are in terms of time (short-term and long-term) and ownership (own and debt). This breakdown can be found in the basic financial statement – balance sheet, on the liabilities side, where these funds form the capital or financial structure. The key concept for this research is the financial structure, which, unlike the capital structure, which includes only long-term sources of financing, includes all sources of financing.

The issue of shaping and optimising the financial structure began to be explored at the beginning of the last century. Since then, economists have been trying to answer the question: "What is the right ratio of own and debt sources of funding?" To date, no universal theory has been found that tells us how companies choose a specific financial structure. According to Myers (2001), this may be due to the fact that countless factors influence the formation of the financial structure. Therefore, new and new studies dealing with this issue are constantly emerging, attempting to find that universal theory. The only thing so far from previous research is that the formation of the financial structure depends on the size of the companies, industries, countries, and the size of the analysed sample.

All the mentioned facts are the motivation for this research, which deals with the Accommodation and Food Service activities industry in eight selected countries of Central and Eastern Europe. The main benefit should be the dissemination of knowledge in the field of financial structure for specific economies, which are not examined so frequently. The dissemination of knowledge lies in the fact that selected countries are analysed individually from the perspective of the industry and their size. The companies analysed are divided into medium and large, with each country and size forming one panel (two panels per country), which may not be a matter of course. This will give us slightly more detailed results than if we combined all the countries into a single panel. At the same time, the authors did not find any study that would deal with this industry in the given economies. The authors found several studies involving this industry, but the researches were either focused on a different economy as in the case of Bhaird, Lucey (2010) for Ireland, Mangafić, Martinović (2015) for Bosnia and Herzegovina, Li, Singal (2019) for United States, Sikveland *et al.* (2022) for Norway. Or the researches included selected industry in one panel together with a number of other industries, and therefore we cannot see the effects of determinants on the financial structure directly in this industry – for example in studies of Šarlija, Harc (2012), Mateev *et al.* (2013), Strýčková (2015), Lourenço, Oliveira (2017), Yildirim *et al.* (2018), Matemilola *et al.* (2018), Matemilola *et al.* (2019), or Moradi, Paulet (2019). Thus, there is a considerable scope for researchers to examine the industry separately and in all selected economies. The analysis of industry Accommodation and Food Service activities is part of broader research, which focuses on individual industries, primarily from the primary, secondary and tertiary economic sectors. The benefit is also the size of the analysed sample consisting of almost 24,000 companies, all of which are found in the Orbis database for the selected industry. Last but not least, the research attempts to compare two selected methods, namely simple panel regression (least squares method) and modified panel regression using the Generalised Method of Moments. This is an example of the fact that basic statistical methods with all plausibility tests may not always be the right choice and another method can be found and used (especially in the field of finance).

This paper is organised as follows. Section 1 defines earlier research on the financial structure and selected determinants put forward by this study. Section 2 presents the research methodology, data, and variables and provides the characterisation of the industry, examined economies, and endogenous variable. Section 3 describes the results of the analysis of variable dependencies using the least squares method and Generalized Method of Moments. Section 4 presents the conclusions.

## 1. Literature overview

Forming and optimising the financial structure of a company is a demanding activity due to the number of determinants that can have a significant impact on this process. We can divide these determinants into in-house and out-of-company. The first group of determinants is based on the internal environment of the company and is in a position to influence these determinants. In this research, we will rank profitability, liquidity, asset structure, and non-debt tax shield. The second group of determinants consists of factors that come from the external environment of the company and are often macroeconomic indicators whose impact cannot be influenced by the company. From this group of determinants, this research includes the GDP growth rate, the inflation rate and the reference interest rate of selected economies. In the following paragraphs, the assumptions and previous studies for the individual determinants will be mentioned in turn. Before searching the literature, it is worth mentioning that all determinants can have a positive and negative impact on the level of debt. Literature overview may only be a list of a few studies without further information, but the studies have been selected to include at least one of the selected economies, as most of the studies do. Unfortunately, for all determinants, there are no studies that have analysed selected countries, and therefore studies dealing with different economies are presented also (especially for external determinants). It was important to find out what researches have revealed so far and what results can be expected. Therefore, it is irrelevant to provide more detailed information for the studies, as the impact of a spoecific determinant on the level of indebtedness is important. The rationale for the impacts must be determined by each researcher; it does not matter how the identified impacts were justified by other authors in in the different samples analysed.

It was stated in the Introduction that there is room for research in a selected industry in selected economies. The literature overview confirms this statement, as we can see that the studies end in 2017. Thus, there is room for new research in these economies as well, as most of these studies relate to selected economies and we see that the studies are rather outdated.

At the beginning of this part, it is appropriate to briefly mention the fundamental studies, as the assumptions of some determinants are derived from them. As mentioned in the introduction to the article, economists have been working on the issue of financial structure since the beginning of the last century, with "The Cost of Capital, Corporation Finance and the Theory of Investment" by Modigliani, Miller (1958) being considered a key study. This study has become a basic source followed by all other economists. At the same time, two basic theories of capital structure emerged from this study, *i.e.* the trade-off theory and pecking order theory. In the trade-off theory, Brealey *et al.* (2020) seek the optimum of capital structure through a balance between the tax advantage of debt and the cost of financial distress. In the pecking order theory, Myers (1984) creates a hierarchy of sources of funding, concluding that equity should be preferred to external ones. These two basic theories are then followed by other authors and extended. As the number of studies grows, so do the

number of known determinants, the number of countries studied, and the industry.

The positive impact of profitability on the level of debt is linked to the above-mentioned trade-off theory (Brealey *et al.*, 2020), which states that if companies are more profitable, their financial distress costs decrease, which reduces the likelihood of bankruptcy and companies are more attractive for lending. This relationship has been confirmed by Klapper *et al.* (2002), Pinková (2012), Aulová, Hlavsa (2013) and Mokhova, Zinecker (2013) for Slovenian companies, and Růčková (2015a, 2015b, 2017) in the Czech Republic and Hungary. The negative impact of profitability, on the other hand, is associated with the pecking order theory (Myers, 1984), which argues that as profits grow, so do its various parts, such as retained earnings, which are a cheap means of financing. This link is far more common in previous research. The negative link also prevails when divided into total, long-term and short-term debt. This association was stated by Nivorozhkin (2002, 2005), Bauer (2004), Weill (2004), Črnigoj, Mramor (2009), Hernádi, Ormos (2010, 2012), Hanousek, Shamshur (2011), Jõeveer (2013), Mateev *et al.* (2013), Mokhova, Zinecker (2013), Prędkiewicz, Prędkiewicz (2015), and Růčková (2015b, 2017) for Poland and Slovakia.

The positive impact of liquidity on the level of debt is associated with the amount of liquid assets (*e.g.* marketable securities, bills of exchange), which can be sold relatively easily in the event of an unfavourable period. However, in order for a company to sell such assets, it must own a certain amount of those assets. Unfortunately, illiquid assets (*e.g.* fixed assets) are difficult to sell and their sale usually carries a higher loss. At the same time, it should apply in the case of (non)liquid assets, liquid assets should be financed by debt, illiquid assets with equity. This impact is supported by the results of, for example, Williamson (1988), Shleifer, Vishny (1992), Mateev *et al.* (2013) for long-term debt, and Růčková (2015b) for the Czech Republic. There are several explanations for the negative impact of liquidity. The basic explanation is the potential conflict between managers and owners in the event that if managers could freely dispose of corporate assets, they could expropriate the owners through a gradual sale. The second and simpler explanation is that the more liquid the company's assets, the more its debt would decrease, as higher liquidity can lead to low investment activities and therefore no debt financing is needed. This influence is supported by the results of Myers, Rajan (1998), Morellec (2001), Frieder, Martell (2006), De Jong *et al.* (2008), Lipson, Mortal (2009), Mateev *et al.* (2013) for short-term debt, Pinková (2012), Aulová, Hlavsa (2013), and Růčková (2015b) for Poland and Slovakia.

The impact of the asset structure depends on the selected variables, the form of indebtedness and certain special cases. As for the variable, the most common indicator is the share of tangible fixed and total assets. Tangible fixed assets are used because they are assets that are used as collateral to obtain debt financing. Therefore, the more such assets a company has, the more room it has for debt financing. According to a study by Titman, Wessels (1988), intangible assets are not used as collateral and, moreover, as has been said for liquidity, these assets are very difficult to sell in the event of existential problems. In terms of the form of indebtedness, long-term debt is expected to have a positive impact, given that fixed assets (*e.g.* real estate, machinery) are usually used as collateral. Conversely, short-term debt is expected to have a negative impact, as inventories and similar assets are not theoretically used as collateral, although of course there is collateral in practice in the form of inventories or unmined minerals, *etc.* A positive impact can be found in Michaelas *et al.* (1999), Klapper *et al.* (2002), Nivorozhkin (2002), Delcoure (2007), De Jong *et al.* (2008), Hernádi, Ormos (2010, 2012), Kayo, Kimura (2011),

Mokhova, Zinecker (2013), and Vo (2017). On the other hand, there are studies by Klapper *et al.* (2002), Nivorozhkin (2002), Bokpin (2009), Mokhova, Zinecker (2013), and Vo (2017). The latter are special cases in which the previous assumption settings may differ slightly. The first case is the financial system of the analysed economy, because in the case of a financial system oriented to financial markets, the collateral cannot be expected, as it is used only in bank-oriented financial systems, as stated by Antoniou *et al.* (2008) and Acedo-Ramírez, Ruiz-Cabestre (2014). The size of the company also has a significant effect on the assumptions, as large amounts of tangible assets are usually held by medium-sized and especially large companies, as stated by Michaelas *et al.* (1999), Klapper *et al.* (2002), Onofrei *et al.* (2015) and Lourenço, Oliveira (2017). Last but not least, it depends on the choice of the sector examined, as sectors with a large amount of inventories, such as agriculture or construction, should not, in theory, use stocks as collateral; as reported by Aulová, Hlavsa (2013) and Růčková (2015a).

The non-debt tax shield is considered a substitute for the tax shield and should reduce the level of debt compared to it. This expectation stems from a variable consisting of depreciation, which acts as an own source of financing that can be used for corporate financing. A negative relationship has been confirmed, for example, by Michaelas *et al.* (1999), Wald (1999), Klapper *et al.* (2002), Song (2005), Hernádi, Ormos (2012), and Acedo-Ramírez, Ruiz-Cabestre (2014). The positive impact on the level of debt is explained either by the equality of depreciation with the value of tangible fixed assets (if there are almost same values, companies would rather use fixed assets as collateral than depreciation) or by the existence of differences in tax regulations in the countries analysed. Delcoure (2007), Hernádi, Ormos (2010), Aulová, Hlavsa (2013), and Mokhova, Zinecker (2013) found a positive effect.

The development of the economic cycle is linked to the impact of the development of the GDP growth rate on the level of debt. The positive impact of GDP on debt can be explained, for example, by the period of economic growth, when, in addition to the economy, profits to individual companies usually grow and everyone has optimistic expectations, so creditors are willing to lend to almost anyone and debt can rise. In a recession, the opposite is true. The positive impact was confirmed in these studies, *e.g.* Gajurel (2006), Hanousek, Shamshur (2011), Salehi, Manesh (2012), Çekrezi (2013), Mursalim, Kusuma (2017), and Yinusa *et al.* (2017). The economic cycle can also explain the negative impact of GDP growth on the level of debt. At the beginning of the paragraph, we mentioned that in a period of economic growth, companies usually grow profits that can be used as their own source of financing for investment activities, and therefore there is no need for debt financing. The negative impact has been confirmed, for example, by Cheng, Shiu (2007), Gajurel (2006), Bastos *et al.* (2009), Bokpin (2009), Hanousek, Shamshur (2011), Jõeveer (2013), or Mursalim, Kusuma (2017).

The impact of the inflation rate on the level of debt is also expected to differ with regard to the form of debt. Long-term debt is expected to have a negative impact, as the inflation rate should reduce existing debt together with a decline in the real interest rate. This relationship can be found, for example, in Gajurel (2006), Cheng, Shiu (2007), Jõeveer (2013), Mokhova, Zinecker (2014), or Öztekin (2015). Short-term debt is expected to have a positive impact, given that creditors can hedge against lower real interest rates, but the hedging is short-term. This relationship can be found in Hanousek, Shamshur (2011), Mokhova, Zinecker (2014), and Yinusa *et al.* (2017).

The influence of the price of external sources of financing can be based on a logical assumption – the higher the interest rate

(debt financing costs), the more expensive and less preferred debt financing is, and vice versa. However, Yinusa *et al.* (2017) found other possible explanations, namely the impact of the quality of the institutional, legal and regulatory environment. In their study, they divide economies into developed and developing. The result of the study is that developed economies have a high-quality institutional environment, good creditor protection and legal enforcement of liabilities, *etc.*, while developing economies may lack quality in these areas. It follows that developed economies should have a positive impact and emerging economies a negative impact.

## 2. Data and methodology

The subject of this research includes companies classified in Section I – Accommodation and Food Service activities according to the NACE classification. The input time series come from the Orbis and World Bank databases. A total of 23,991 companies were analysed, of which 22,973 are medium-sized and 1,018 are large and very large companies. The selected industry includes facilities that provide customers with short-term accommodation or the preparation of food, snacks and beverages for immediate consumption. The industry includes both accommodation and catering facilities, as the two activities are often combined in the same facility. The analysis covers the period 2010–2018.

Eight economies from Central and Eastern Europe were selected for the analysis of the selected industry, namely the Czech Republic (CZ), Slovakia (SK), Poland (PL), Hungary (HU), Austria (AT), Slovenia (SI), Bulgaria (BG), and Romania (RO). These countries belong to the so-called extended Visegrád Group. It might seem that Austria, Slovenia, Bulgaria, and Romania are not members of the original V4, but these countries are very often associated with this group, as representatives of these countries attend various meetings of this group and cooperate with it in different areas (*e.g.* ministry of agriculture, energy, climate policy, or territorial development coordination). It is clear from the values of economic indicators that, for example, the Austrian economy is somewhere other than the Romanian or Bulgarian economy in terms of the level of indicators, but it is a relatively well-established merger of these economies into an extended Visegrád Group, whose companies have therefore become the subject of this research. At the same time, the countries concerned were selected due to the lack of studies within these countries for the sector.

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

*Table 1. Expected impacts of individual determinants on the amount of individual forms of debt.*

| | 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: authors' calculations.*

- Are there differences in impacts in terms of the different maturities of the used funding sources?
- What impact does the price of financial external sources have on the used sources of financing?

Due to the literature search of previous studies, we can create assumptions of the resulting impacts for individual determinants within the research questions. The examined companies belong to the group of medium and large companies, so there is no need to divide the assumptions according to the size of the companies, as there should be no difference between these companies. Table 1 shows the expected impacts for each determinant. A sign "+" indicates a positive impact of a given determinant on the level of the selected form of indebtedness, while a sign "–" indicates a negative impact and a sign "–/+" indicates the possibility of both positive and negative impact.

### 3.1 Variables

In the Results section, several variables are used within the least squares method and the Generalized Method of Moments, which will be described in this subchapter. The endogenous variable is represented by debt, which comes in three forms. Total debt (DER) is the ratio of total liabilities to equity. Long-term (DER_L) and short-term (DER_S) debt differ from total debt in that, instead of total liabilities, there are long-term or short-term liabilities.

The right side of the regression equations is made up of seven exogenous variables that take the form of individual determinants. Profitability takes the form of a return on equity (ROE), which in this case is the ratio of earnings before interest and taxes and equity. Profit before tax was selected to abstract from divergent taxation, as each of the eight selected economies has a different tax policy. The L2 indicator (quick ratio) was selected from the liquidity indicators, *i.e.* the ratio of current assets adjusted for inventories and short-term liabilities. The structure of assets can also be expressed by a number of indicators. In this research, this is the most common share of tangible fixed and total assets. The non-debt tax shield is represented by the ratio of depreciation and total assets. The remaining three variables represent the external environment of companies and are the GDP growth rate at market prices, the inflation rate and the reference interest rate of the given economy.

### 3.2 Methodology

Two methods were chosen to analyse the influence of individual determinants on the level of debt, both of which are regression analyses. In the first case, it is the least squares method and in the second case it is the Generalized Method of Moments (GMM), which is a modified basic regression analysis. The article tries to compare these two methods with regard to the difficulty of verifying their results from the point of view of plausibility. The resulting models of the least squares method must meet several basic assumptions and tests, while the GMM method only needs to perform a single test after analysis.

The default equation for both methods looks like this:

$$Y_{it} = \alpha_0 + \beta_1 \cdot ROE_{it} + \beta_2 \cdot L2_{it} + \beta_3 \cdot SA_{it} + \beta_4 \cdot NDTS_{it} + \beta_5 \cdot GDP_{it} + \beta_6 \cdot INF_{it} + \beta_7 \cdot IR_{it} + \varepsilon_{it} \quad (1);$$

where:

| | |
|---|---|
| $Y_{it}$ | characterizes endogenous variables, *i.e.* debt in three forms ($DER_{it}$, $DER\_L_{it}$, $DER\_S_{it}$), where *DER* denotes the debt-to-equity ratio for the *i*-th number of companies in a given economy in a particular sector during period *t* (2010–2018); |
| $\alpha$ | constant; |
| *ROE* | return on equity; |
| *L2* | liquidity – quick ratio; |
| *SA* | asset structure; |
| *NDTS* | non-debt tax shield; |

| | |
|---|---|
| *GDP* | GDP growth rate; |
| *INF* | inflation rate; |
| *IR* | reference interest rate; |
| $\varepsilon$ | random component, which includes all other factors that affect the amount of debt. |

The following two subchapters will mention the basic characteristics of the two selected methods.

### 3.2 Least squares method

The results of the least squares method need to be verified by some tests and at the same time the time series should meet certain specifics.

The input time series should be stationary, which means that their probability distribution is constant over time. A number of tests can be used to verify this assumption; in this research, the Augmented Dickey-Fuller test is used, whose null hypothesis states that there is a unit root that indicates non-stationarity. The resulting p-value can be tested at the most common values of significance levels 0.01 and 0.05. If the resulting p-value is smaller, the null hypothesis is rejected and the time series is stationary (Enders, Lee, 2012).

A normal distribution of residues in time series is also assumed. According to Asteriou, Hall (2021), residues should be independent and identically distributed with a mean of zero. Determination of skewness and sharpness values is often used to assess normal distribution, but complex tests such as the Jarque-Bera test can also be used. The null hypothesis of this test states a normal distribution of residues. The resulting p-value can be tested again on the most common values of significance levels 0.01 and 0.05. If the resulting p-value is higher, the null hypothesis cannot be rejected and the residues have a normal distribution.

As for the tests after the compilation and acquisition of the resulting models, the basic test to verify the overall significance of the model is the F-statistics. This test tests whether an endogenous variable is a linear combination of selected functions of an exogenous variable. The null hypothesis states that the regression parameters are zero and there is no statistically significant relationship between the endogenous and exogenous variables, *i.e.* the regression model is inappropriately selected. The resulting p-value can be tested at the most common values of significance levels 0.01 and 0.05. If the resulting p-value is smaller, the null hypothesis is rejected and the regression model is chosen correctly (Jamshidian *et al.*, 2007).

Another assumption concerns multicollinearity, which means a correlation between exogenous variables. It is necessary to perform a correlation analysis if we have more than one exogenous variable in the model. If the correlation coefficient is high, the quality of the regression model is reduced. A value of –0.9 or 0.9 is considered high in many studies. A correlation coefficient that reaches such a value indicates that one of the exogenous variables is redundant in the model. The presence of multicollinearity can cause an artificial increase in the coefficient of determination, which would state that the model explains more of the behaviour of the endogenous variable, when in fact it would not. There are several correlation coefficients, in this research Pearson's correlation coefficient will be used, which characterises only the linear relationship, in other words it reflects only the variability around the linear trend. The coefficient can take values in interval <–1; 1> (Asteriou, Hall, 2021).

Serial independence states that residues are independently distributed and not correlated. A frequently used test to verify autocorrelation is Durbin-Watson statistic, whose null hypothesis states that there is no autocorrelation between residues (Yin, 2020). The resulting p-value can be tested at the most common values of significance levels 0.01 and 0.05. If the resulting p-value is higher, the null hypothesis cannot be rejected and

the residues are not autocorrelated. In addition to using p-value results, the value of the coefficients of this statistic can be used. The coefficients are in the interval <0; 4> and ideally the value of the coefficient should be as close as possible to 2. If the value is less than 2, it is called a positive autocorrelation; conversely, if the value is greater than 2, it is a negative autocorrelation. However, a value of 2 is very rarely obtained, so researchers use certain intervals within which it is claimed that residues are not autocorrelated. There is no given interval, we can find *e.g.* these intervals: <1.8; 2.2> or <1.6; 2.4> (Asteriou, Hall, 2021).

The last basic assumption is homoskedasticity, whose null hypothesis states that the variance of residues is constant. To verify this assumption, tests are used to detect the presence of heteroskedasticity, which tells us that the dispersion of residues is not constant. There are a number of tests, such as the Breusch-Pagan test, whose null hypothesis states homoskedasticity. The resulting p-value can be tested at the most common values of significance levels 0.01 and 0.05. If the resulting p-value is higher, the null hypothesis cannot be rejected and the residues have normal variance (Greene, 2020).

Last but not least, another coefficient can be used to determine the quality of the regression model, namely the determination coefficient (R2), which, as stated by Kurz-Kim, Loretan (2014), expresses what proportion of the variability of the endogenous variable the given model explains. The value of the coefficient should be in the range from 0 to 1. The higher the value we get, the better the model we hypothetically constructed. However, this indicator is not very reliable because it can be skewed, *e.g.* if we add more exogenous variables that are not necessarily related to the problem, it may seem that the model contains a lot of exogenous variables that explain the behaviour of the endogenous variable and the coefficient. The determination can be almost 1. A similar bias can be caused by the presence of multicollinearity.

### 3.2 Generalized method of moments

Simple panel regression is a suitable method with respect to the amount of input data. However, the often-used least squares method is not entirely appropriate, as the basic premise of this method is stationary time series, which macroeconomic series in particular may not meet, and thus we could eliminate some variables from our models (Průcha, 2014).

Therefore, a modified panel regression was selected in the form of a two-stage Generalized Method of Moments (GMM) system, the development of which had a major impact on research in finance. This method overcomes a number of limitations of other methods – for example, there is no need for the already mentioned stationary data, nor is there a need to create distribution assumptions, which means that variables can show serial correlation and conditional heteroskedasticity (Jagannathan *et al.*, 2002).

The GMM method can be found for the first time in the studies: Arellano, Bond (1991), Arellano, Bover (1995), and Blundell, Bond (1998). These studies contain general assumptions of this method: short time series and many observations, linear functional relationship, one endogenous variable on the left that is dynamic depending on its past values, exogenous variables that may not be strictly exogenous (correlation with past or current errors), fixed individual effects and the mentioned autocorrelation and heteroskedasticity within individual observations, but not across them. The GMM model thus solves the endogeneity problem, which means the correlation between the explanatory variable and the error term (Roodman, 2009).

The GMM method includes certain internal tools (lagged value of the dependent variable, internal transformation processes) in solving unobserved heterogeneity, simultaneity and

dynamic endogeneity, which are sources of endogeneity (Ullah *et al.*, 2018).

The plausibility of the resulting model must always be tested with respect to the fact that variables can show autocorrelation and heteroskedasticity. The presence of these phenomena can skew the results. There are several tools to test credibility. In this research, the Sargan test is used to show whether we achieve the same results with a slight change in parameters. If its final value is higher than 0.05, the model has been compiled correctly and we can interpret its results (Ullah *et al.*, 2018).

It should be added that in this method there is a slight adjustment of the original initial equation (1), by adding the variable $Y_{it-1}$ on the right side, which indicates the already mentioned lagged value of the dependent variable and is generated automatically by the model and allows modelling the mechanism of partial adaptation in a dynamic model.

### 3.3 Economic development in individual countries

When we have characterised the industry, it is appropriate to characterise the development in selected economies. Despite the fact that there are eight different countries and each of these countries has had a different development, there are several events that have affected all of these countries. These are key events that have affected the European and world economy. The beginning of the period under review is associated with the repercussions of the global financial crisis of 2008/2009. This crisis has turned into a global economic crisis and few countries have remained untouched. In Europe, this crisis was followed by the debt crisis, which is mainly associated with the countries of southern Europe and Ireland. Other events were the global slowdown in economic growth in 2012/2013 and the global decline in demand in 2018.

In addition to these very significant events, each of the selected countries had its own internal problems, which had a variety of impacts on economic development. Given that it is not clear at this time whether macroeconomic determinants have an impact or not on the level of debt, the specific development and problems of individual economies will be analysed and commented only if we obtain statistically significant coefficients for these variables.

Regarding the economic development in the selected eight economies, it can be said that despite the occurrence of certain problems in some economies, especially at the beginning of the analysed period, all of them showed more or less satisfactory economic growth during the period under review.

### 3.4 Development of endogenous variables in individual countries

Before interpreting the results, it is necessary to analyse the endogenous variable, *i.e.* debt. In Table 2 we can see the average values for medium and large companies in terms of non-current liabilities (NCL), current liabilities (CL), debt, equity and debt-equity ratio (DER).

Non-current liabilities are composed of long-term liabilities of the company, which include long-term financial debts (*e.g.* loans, credits, or bonds), other long-term liabilities (trade debts, group companies, pension loans, *etc.*), provisions (social security, taxes, *etc.*), and deferred taxes. Current liabilities are composed of loans (*e.g.* to credit institutions, part of long-term financial debts payable within the year, bonds, *etc.*), debts to suppliers and contractors (trade creditors), and other current liabilities (pension, personnel costs, taxes, intragroup debts, accounts received in advance, *etc.*). Debt is then the sum of the non-current and current liabilities. Equity includes capital and other shareholders funds.

We will first look at the composition of liabilities. It can be observed in Table 2 that the composition of liabilities does not differ much with respect to the size of companies.

*Table 2. The amount and composition of liabilities and financial structure.*

| | CZ | SK | PL | HU | AT | SI | RO | BG |
|---|---|---|---|---|---|---|---|---|
| NCL_mediumium | 55 % | 30 % | 60 % | 49 % | 98 % | 61 % | 58 % | 62 % |
| NCL_large | 52 % | 62 % | 68 % | 65 % | 90 % | 55 % | 71 % | 67 % |
| CL_medium | 45 % | 70 % | 40 % | 51 % | 2 % | 39 % | 42 % | 38 % |
| CL_large | 48 % | 38 % | 32 % | 35 % | 10 % | 45 % | 29 % | 33 % |
| Debt_medium | 71 % | 76 % | 56 % | 61 % | 81 % | 63 % | 69 % | 59 % |
| Debt_large | 77 % | 65 % | 49 % | 54 % | 65 % | 49 % | 49 % | 42 % |
| Equity_medium | 29 % | 24 % | 44 % | 39 % | 19 % | 37 % | 31 % | 41 % |
| Equity_large | 23 % | 35 % | 51 % | 46 % | 35 % | 51 % | 51 % | 58 % |
| DER_medium | 251 % | 309 % | 130 % | 157 % | 428 % | 172 % | 228 % | 143 % |
| DER_large | 336 % | 182 % | 95 % | 120 % | 183 % | 96 % | 95 % | 72 % |

*Source: authors' calculations.*

In all cases, long-term sources of financing predominate in large companies; for medium-sized companies, it is similar except for Slovak and Hungarian companies, where short-term sources of financing predominate. On average, non-current liabilities account for 63 % and current liabilities for 37 % of total liabilities.

In terms of debt financing to equity ratio, debt financing prevails over equity on average, regardless of the size of the companies. For medium-sized companies, this method of financing accounts for an average of 67 % of funding sources, while for large companies only 56 %, however, for Polish, Slovenian, Romanian and Bulgarian companies, equity slightly predominates.

We see the debt-equity ratio values in the last two lines and we can observe differences. Apart from Czech large companies, large companies have a lower debt ratio, and even in the case of Polish, Slovenian, Romanian and Bulgarian companies, this value is less than the maximum recommended value of 100 %. However, not a single value is in the range of 30–80 %, which is considered the optimal level of indebtedness based on the common practice of companies. It must be added that even higher values do not necessarily mean existential problems for companies; it can only be a more aggressive financial policy.

## 4. Results and discussion

This section contains the results of certain methods and their interpretation. There are two methods chosen, the least squares method and the Generalized Method of Moments. This is a comparison of two types of regression analyses, with the first method involving five different tests to verify the accuracy and plausibility of the results, while the second method requires only one test. The use of these methods should indicate an occasional limitation when using regression analysis and that some modification can achieve better results. In the following two subchapters, the specific results of these methods will be discussed on our data and with all the necessary tests.

### 4.1 Least squares method

This section includes the results of the least squares method and all the necessary tests to verify the plausibility of the resulting models, which we can see in Tables 5 and 6. We will first analyse the results of each test and then interpret the results if the resulting models pass all tests and we can consider credible.

Table 3 shows the results of the Augmented Dickey-Fuller test, which is used to verify the stationarity of time series. In order to satisfy the condition of time series stationarity,

*Table 3. Results of Augmented Dickey-Fuller Test (p-values).*

| | DER | DER_S | DER_L | ROE | L2 | SA | NDTS | GDP | INF | IR |
|---|---|---|---|---|---|---|---|---|---|---|
| CZ_MEDIUM | **1.71E–14** | **4.78E–12** | **0.0000** | **0.0000** | **0.0000** | **5.86E–25** | **0.0000** | 0.5163 | 0.9269 | 0.5318 |
| CZ_LARGE | **0.0000** | **1.59E–26** | **0.0000** | **0.0000** | **1.82E–25** | **4.40E–12** | **1.00E–26** | 0.2893 | 0.4295 | **0.0063** |
| SK_MEDIUM | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **7.44E–29** | **2.08E–21** | **0.0000** | 0.1695 | 0.5800 | 0.4648 |
| SK_LARGE | **6.54E–25** | **6.52E–25** | **4.08E–28** | **4.71E–28** | **4.38E–28** | **1.34E–29** | **8.19E–07** | 0.1746 | 0.5864 | 0.5082 |
| PL_MEDIUM | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **5.08E–28** | **9.63E–26** | **1.18E–22** | 0.4753 | 0.5706 | 0.7074 |
| PL_LARGE | **0.0000** | **0.0000** | **1.83E–08** | **0.0000** | **0.0000** | **2.51E–19** | **1.14E–05** | 0.4804 | 0.5903 | 0.7394 |
| HU_MEDIUM | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **4.27E–28** | **0.0000** | 0.5212 | 0.4418 | 0.6668 |
| HU_LARGE | **0.0000** | **1.21E–06** | **0.0000** | **0.0000** | **0.0000** | **1.17E–20** | **1.33E–13** | 0.5543 | 0.4737 | 0.7435 |
| AT_MEDIUM | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **4.54E–17** | **3.40E–16** | 0.5639 | 0.4678 | 0.4535 |
| AT_LARGE | **0.0000** | **0.0000** | **3.50E–17** | **5.58E–19** | **1.55E–25** | **2.62E–10** | **0.0000** | 0.5448 | 0.4603 | 0.4680 |
| SI_MEDIUM | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **6.98E–12** | **0.0000** | 0.7026 | 0.6187 | 0.4849 |
| SI_LARGE | **1.07E–24** | **0.0566** | **8.35E–25** | **1.84E–24** | **4.24E–06** | **1.18E–09** | **6.54E–22** | 0.7237 | 0.6210 | 0.5406 |
| BG_MEDIUM | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **1.37E–21** | **1.02E–26** | 0.6664 | 0.6025 | 0.2097 |
| BG_LARGE | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **2.54E–09** | **5.13E–14** | 0.6862 | 0.6058 | 0.3548 |
| RO_MEDIUM | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | 0.2387 | 0.5028 | 0.6545 |
| RO_LARGE | **0.0000** | **0.0000** | **1.34E–29** | **0.0000** | **1.82E–22** | **2.61E–22** | **0.0000** | 0.0998 | 0.5388 | 0.5061 |

*Source: authors' calculations.*

*Table 4. Results of Jarque-Bera Test (p-value).*

| | DER | DER_S | DER_L | ROE | L2 | SA | NDTS | GDP | INF | IR |
|---|---|---|---|---|---|---|---|---|---|---|
| CZ_MEDIUM | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| CZ_LARGE | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.40E–11 | 0.0000 | 2.97E–05 | 2.57E–08 | 0.0000 |
| SK_MEDIUM | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| SK_LARGE | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.05E–06 | 0.0000 | 0.0359 | 2.51E–05 | 2.59E–10 |
| PL_MEDIUM | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| PL_LARGE | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.000 | 0.0000 | 1.51E–14 | 9.65E–14 | 0.0000 |
| HU_MEDIUM | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.00000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| HU_LARGE | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.28E–10 | 0.0000 | 1.20E–10 | 3.06E–09 | 0.0000 |
| AT_MEDIUM | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.00000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| AT_LARGE | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.80E–14 | 0.0000 | 5.26E–14 | 0.0032 | 0.0000 |
| SI_MEDIUM | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.00000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| SI_LARGE | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 8.01E–13 | 9.48E–10 | 0.0000 | 0.0023 | 0.0004 | 7.06E–07 |
| BG_MEDIUM | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| BG_LARGE | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 9.69E–14 | 0.0000 | 3.33E–16 | 6.67E–13 | 0.0000 |
| RO_MEDIUM | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| RO_LARGE | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.75E–14 | 0.0000 | 0.0000 | 2.26E–10 | 0.0000 |

*Source: authors' calculations.*

the p-value must be less than the usual significance level of 0.05. Time series that meet this condition are highlighted in bold. We see that in almost all cases the time series for the GDP growth rate, the inflation rate and the reference interest rate are not stationary, and therefore the first problem of all models already arises here. Time series would have to be either adjusted or deleted. However, if we removed them, we would not know whether these determinants affect the financial structure of companies. On the other hand, if we adjusted the time series (*e.g.* differentiation, logarithmisation *etc.*), the time series would probably become stationary, but the impact of the adjusted determinants would be difficult to explain and interpret.

Another test is the Jarque-Bera test to verify the normal distribution of data, the results of which are shown in Table 4. In order to satisfy the condition of time series stationarity, the p-value must be higher than the usual significance level of 0.05. What is obvious from the table is the fact that not a single time series meets this condition, and the resulting models are thus very burdened and untrustworthy by this shortcoming.

The test of stationarity and normality showed that the input assumptions are not met. The remaining tests from the Methodology section are already linked to the resulting models. In Table 5 and 6, we see the results for individual types of companies within their size and at the same time for individual forms of debt. Each part for individual forms of debt consists of two parts. The first part contains regression coefficients for individual determinants and a constant and their statistical significance. If we look at the statistical significance of the coefficients, we see that we have obtained very few results from this method (bold highlighted), with most of the statistically significant coefficients related to profitability, which is only one of the seven determinants analysed. Therefore, we did not get much out of the number of results obtained from the least squares method.

The second part contains the results of the remaining tests to verify the plausibility of the resulting regression models. We can first see the coefficients for the Durbin-Watson test (DW), which verifies the autocorrelation of residues. The value of the coefficient should be as close as possible to the value 2. If the value was in the interval <0; 2) residues are positively autocorrelated; conversely, if the value is in the interval (2; 4>, the residues are negatively autocorrelated. According to a test performed in Python, it can be seen that the values of the coefficients are between 1.9320 and 2.1470, which is not the value 2. As mentioned in the Methodology section, we get the value 2 very rarely, and therefore researchers use certain intervals within which residues are not autocorrelated. There is no given interval, we can find *e.g.* the following intervals: <1.8; 2.2> or <1.6; 2.4>. Our values are very close to 2 and are in the first mentioned interval, and therefore the bold residues can be considered uncorrelated.

Next, we see the value of F-statistics (F-stat. p-value). If we compare its values with the most common level of significance 0.05, then only 12 models out of 48 do not meet the criterion of a lower value than the selected level of significance. The models meeting this criterion have the F-stat. value highlighted in bold. Therefore, most regression models are constructed and selected correctly.

The F-statistic is followed by a coefficient of determination, which expresses what proportion of the variability of the endogenous variable the given model explains. Here we will focus only on statistically significant models according to the results of F-statistics and at the same time, we will divide the companies according to their size. Selected determinants explain 0.20–31.80 % (on average 6.74 %) of the corporate debt behaviour of medium-sized companies. On the other hand, these determinants explain 0.80–57.50 % (on average 17.58 %) of the corporate debt

*Table 5. Results of the least squares method for medium-sized companies of individual economies.*

| | Medium-sized companies | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **CZ** | **SK** | **PL** | **HU** | **AT** | **SI** | **BG** | **RO** |
| | **Short-term debt** | | | | | | | |
| α | 0.3686 | 20.6633 | –6.0669 | 3.4593 | –1.155 | 4.4136[b] | 0.4153 | –8.9868 |
| ROE | 9.67E–06 | –4.5370[a] | 0.5013[a] | 2.1524[a] | 1.5725[a] | –0.2187[a] | –0.1531[c] | 1.3004[a] |
| L2 | –0.0021 | –0.0130 | 0.0006 | –0.0023 | –3.13E–08 | –7.58E–06 | –0.0024 | –3.34E–05 |
| SA | 5.6751 | –8.7009 | 17.6655 | –1.4138 | 0.0149 | –0.1171 | –7.5282 | 4.3075 |
| NDTS | X | 31.5101 | 6.0338[c] | 2.3261 | 0.4559 | –1.2887 | 0.4276 | –8.1391 |
| GDP | –57.8050 | –228.6533 | –16.8636 | –47.3191 | 33.9420 | 4.1163 | 23.8481 | 122.6041 |
| IR | –109.3520 | –3,534.6693 | 149.4755 | 6.8883 | –176.8464[c] | 12.1551 | 963.9305[c] | 305.4848 |
| INF | 873.8611 | 496.7165 | –57.1761 | –45.8804 | 74.8585 | –104.9426 | 11.6231 | –50.0914 |
| DW | **2.0130** | **2.0010** | **2.0700** | **2.0000** | **2.0030** | **1.9960** | **2.0020** | **1.9960** |
| F-stat. p-value | 0.6660 | **0.0000** | **5.95E–05** | **0.0000** | **0.0148** | **2.87E–06** | 0.1590 | **1.49E–122** |
| $R^2$ | 0.20 % | 31.80 % | 0.40 % | 12.90 % | 0.40 % | 1.50 % | 0.10 % | 3.40 % |
| BP p-value | **0.3273** | 1.00E–06 | **0.3737** | 9.31E–17 | **0.8365** | 1.80E–08 | 0.0010 | 0.0004 |
| | **Long-term debt** | | | | | | | |
| α | –0.0031 | 14.2642[a] | –0.7336 | –7.0162 | –14.6077 | –9.4186 | –1.1352 | –7.3105 |
| ROE | 3.23E–06 | 0.0394[a] | 0.7106[a] | 3.0648[a] | 3.4367 | X | 0.9627[a] | 0.6349[a] |
| L2 | 0.0076 | –0.0038 | 0.0045 | 0.0065 | –1.23E–06 | –2.49E–05 | 0.0115 | 0.0032[c] |
| SA | 1.4040 | 3.5312 | –1.8353 | 4.4025 | –124.3037 | 16.9154[c] | –7.4972 | –6.9893 |
| NDTS | X | 1.4490 | 5.0888[b] | –0.1325 | 16.0589 | 52.8869 | 2.9216[b] | 8.4162[b] |
| GDP | 15.3442 | –410.3606[a] | –4.7748 | 190.4037 | –163.5119 | –640.9608 | 26.1158 | 46.9524 |
| IR | –52.7882 | 468.1437 | –58.1034 | 24.7320 | 538.7014 | –7,232.9097[c] | –196.2531 | 68.5390 |
| INF | 202.4580 | –101.8159 | 29.4313 | 7.7928 | 1,003.7206 | 382.9285 | 32.7359 | 35.4881 |
| DW | **2.0420** | **2.0030** | **2.0420** | **1.9820** | **2.0030** | **2.0040** | **1.9980** | **2.0000** |
| F-stat. p-value | 0.9710 | **1.53E–05** | **2.25E–18** | **1.31E–157** | 0.8770 | 0.3280 | **3.34E–12** | **7.32E–108** |
| $R^2$ | 0.10 % | 0.30 % | 1.40 % | 5.70 % | 0.10 % | 0.30 % | 0.40 % | 3.00 % |

*Table 5. Results of the least squares method for medium-sized companies of individual economies. (Continuation)*

| | Medium-sized companies | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **CZ** | **SK** | **PL** | **HU** | **AT** | **SI** | **BG** | **RO** |
| BP p-value | **0.4785** | 3.80E–05 | 4.00E–05 | 7.77E–203 | **0.8706** | **0.3053** | 5.69E–07 | 2.33E–26 |
| | | | | **Total debt** | | | | |
| α | 0.3654 | 34.9275 | –6.8005 | –3.5569 | –15.7629 | –5.3069 | –0.7199 | –16.2974 |
| ROE | 1.29E–05 | –4.4975[a] | 1.2119[a] | 5.2172[a] | 5.0092 | X | 0.8096[a] | 1.9353[a] |
| L2 | 0.0055 | –0.0168 | 0.0051 | 0.0042 | –1.26E–06 | –3.25E–05 | 0.0090 | 0.0320 |
| SA | 7.0792 | –5.1697 | 15.8302 | 2.9887 | –124.2888 | 16.9918 | –15.0254 | –2.6817 |
| NDTS | X | 32.9592 | 11.1225[b] | 2.1936 | 16.5147 | 52.1469 | 3.3492[c] | 0.2772 |
| GDP | –42.4609 | –639.0139 | –21.6384 | 143.0846 | –129.5699 | –641.2237 | 49.9638 | 169.5565 |
| IR | –162.1402 | –3,066.5257 | 91.3720 | 31.6203 | 361.8550 | –7,270.3045[c] | 767.6774 | 374.0239 |
| INF | 1,076.3191 | 394.9006 | –27.7448 | –38.0875 | 1,078.5790 | 283.1800 | 44.3590 | –14.6033 |
| DW | **2.0290** | **2.0010** | **2.0530** | **1.9840** | **2.0020** | **2.0040** | **2.0000** | **1.9940** |
| F-stat. p-value | 0.6540 | **0.0000** | **1.18E–12** | **0.0000** | 0.8750 | 0.3400 | **0.0001** | **1.26E–186** |
| $R^2$ | 0.20 % | 30.40 % | 1.00 % | 11.60 % | 0.10 % | 0.30 % | 0.20 % | 5.10 % |
| BP p-value | **0.2310** | 7.09E–07 | **0.5558** | 8.44E–200 | **0.8819** | **0.3045** | 0.0143 | 5.73E–07 |

*Source: authors' calculations.*

*Symbols [a], [b] and [c] indicate significance at 1%, 5% and 10%.*

*Table 6. Results of the least squares method for large companies of individual economies.*

| | Large companies | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **CZ** | **SK** | **PL** | **HU** | **AT** | **SI** | **BG** | **RO** |
| | **Short-term debt** | | | | | | | |
| α | 0.6930 | 119.4207 | 16.3185 | 11.7986 | 48.7142 | 9.206[a] | 3.8468[a] | 0.1061 |
| ROE | 3.8891[a] | –36.9403 | 42.0318[a] | 3.5013[a] | 5.2917 | –0.823 | 2.3782[a] | 1.0324[a] |
| L2 | –0.0510 | –20.3979 | –0.0004 | –2.4746 | 0.0005 | –1.7362[b] | –0.0014 | –0.0002 |
| SA | –27.1508[c] | –630.0940 | –294.3458[b] | –51.0841[b] | 56.8629 | –5.614 | –12.6813 | 0.4186 |
| NDTS | 2.1716 | –12.8321 | –17.3085 | –5.9230[b] | 54.7948 | –7.019 | –1.9565 | 0.2438 |
| GDP | –10.3628 | 1,046.7345 | –365.2321 | –86.2626 | 2,016.5907 | –5.616 | –28.1489 | –1.8632 |
| IR | –70.4731 | 28,300.000 | 486.0959 | –16.3175 | –4,522.5757 | –26.046 | –178.0959 | –13.5153 |
| INF | 5.1337 | –9,553.8708 | –179.7909 | –45.7174 | –3,018.6877 | –64.4103 | 34.2959 | 41.4908 |
| DW | **1.9910** | **2.0100** | **2.1470** | **2.0350** | **2.0250** | **2.107** | **1.9790** | **1.9320** |
| F-stat. p-value | **7.66E–40** | 0.2752 | **1.02E–79** | **9.91E–14** | 0.2990 | **0.0056** | **9.51E–119** | **2.13E–12** |
| $R^2$ | 28.30 % | 0.80 % | 34.00 % | 12.90 % | 1.10 % | 11.40 % | 51.30 % | 10.00 % |
| BP p-value | 0.0014 | **0.0915** | 1.59E–105 | 7.01E–09 | **0.358** | **0.703** | 1.73E–04 | 0.0315 |
| | **Long-term debt** | | | | | | | |
| α | –4.8670 | 1.3750 | 6.0076 | 11.2399 | 3.5370 | 0.4907 | 2.8422 | –1.3488 |
| ROE | 22.8419[a] | 0.5974 | 0.0494 | –58.5515[a] | 5.3917[a] | –1.8507[a] | 0.4112[c] | 0.0862 |
| L2 | 0.2385 | –0.5378 | 0.0805[a] | 6.9901 | –1.16E–05 | 0.2749 | –0.0041 | –0.0005 |
| SA | –99.2385[c] | –12.7710 | –10.1369 | –325.9859 | 3.5740 | –10.7683 | –59.9353[b] | 0.6999 |
| NDTS | 12.7213 | –3.8975 | –0.0352 | 37.6857 | 12.1390[c] | 0.6488 | 8.6482[b] | –1.3262 |
| GDP | –16.8841 | 117.9274 | 41.8460 | 326.2077 | –361.8124 | 17.8653 | –6.9127 | 19.3159 |
| IR | –545.8545 | –676.0491[c] | –313.3192 | 608.8441 | –147.5838 | 226.4462 | –3,014.4809 | 51.4282 |
| INF | 180.7798 | 49.8471 | 101.0668 | –398.8043 | –149.9852 | –35.2555 | –46.0758 | –0.5561 |
| DW | **1.9670** | **1.9880** | **2.1340** | **2.0360** | **2.0110** | **2.0230** | **2.0400** | **2.0270** |
| F-stat. p-value | **1.94E–91** | 0.3230 | **6.96E–37** | **1.67E–17** | **3.62E–17** | **2.34E–05** | **0.0207** | 0.5720 |
| $R^2$ | 51.90 % | 3.20 % | 18.10 % | 15.80 % | 12.00 % | 18.20 % | 2.10 % | 0.90 % |
| BP p-value | 1.57E–39 | **0.7358** | **0.0543** | 4.80E–05 | 0.0341 | **0.1443** | 0.0045 | **0.6648** |

*Table 6. Results of the least squares method for large companies of individual economies. (Continuation)*

| | Large companies | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **CZ** | **SK** | **PL** | **HU** | **AT** | **SI** | **BG** | **RO** |
| | **Total debt** | | | | | | | |
| α | –4.1741 | 120.7958 | 22.3261 | 23.0384 | 52.2512 | 9.6963[a] | 6.6890 | –3.1224 |
| ROE | 26.7310[a] | –36.3429 | 42.5256[a] | –55.0503[a] | 10.6834[b] | –2.6733[a] | 2.7895[a] | 2.1304[a] |
| L2 | 0.1875 | –20.9357 | 0.0800[b] | 4.5155 | 0.0005 | –1.45E+00 | –0.0055 | 4.65E–05 |
| SA | –126.3893[b] | –642.8651 | –304.4827[b] | –377.0701 | 60.4369 | –16.3826 | –72.6166[b] | 0.0831 |
| NDTS | 14.8930[c] | –16.7296 | –17.3437 | 31.7627 | 66.9338 | –6.3701[b] | 6.6917 | 0.3200 |
| GDP | –27.2469 | 1,164.6619 | –323.3861 | 239.9451 | –2,378.4031 | 12.2490 | –35.0617 | 26.1797 |
| IR | –616.3276 | 27,620.0000 | 172.7767 | 592.5266 | –4,670.1594 | 200.4000 | –3,192.5768 | 53.2375 |
| INF | 185.9135 | –9,504.0238 | –78.4241 | –443.8712 | –3,168.6729 | –99.6658 | –11.7799 | 39.2534 |
| DW | **1.9750** | **2.0100** | **2.1350** | **2.0360** | **2.0240** | **2.0960** | **2.0220** | **1.9590** |
| F-stat. p-value | **1.91E–107** | **0.2738** | **7.30E–77** | **1.63E–14** | 0.1550 | **0.0018** | **1.41E–22** | **2.75E–23** |
| $R^2$ | 57.50 % | 0.80 % | 33.00 % | 13.50 % | 1.50 % | 12.90 % | 13.90 % | 16.90 % |
| BP p-value | 6.84E–68 | **0.0912** | 3.59E–105 | 2.17E–04 | **0.3565** | **0.8653** | 0.0168 | 0.0048 |

*Source: authors' calculations.*

*Symbols [a], [b] and [c] indicate significance at 1%, 5% and 10%.*

behaviour of large companies. If we do not take into account the maxima, then less than 7 and 18% is not a very high value. Although the models explain some of the corporate debt behaviour of selected companies, especially in medium-sized companies, the models do not explain anything.

Another test that we can observe in the second part is the Breusch-Pagan test (BP p-value) to verify the presence of heteroskedasticity. In order to satisfy the condition of Breusch-Pagan test, the p-value must be higher than the usual significance level of 0.05. We see this condition that not even half of all the resulting models meet. Bold values indicate that this test has been completed. The presence of heteroskedasticity reduces the credibility of the models.

The last test is needed to verify multicollinearity. The correlation analysis is used to find out if there are unnecessarily many exogenous variables in the model. Some exogenous variables may develop similarly (*e.g.* macroeconomic time series) and therefore it is not necessary to include both time series in the model, as this could distort the resulting model and, for example, artificially increase the coefficient of determination. The correlation coefficients should be in the range (–0.9; 0.9) in order for this condition to be met and the model to be considered plausible. Since a total of 16 time series were analysed, 16 correlation matrices were obtained from the correlation analysis, which can be seen in the Annex. We see that there are several conflicts (bold coefficients). This is usually a correlation between endogenous variables, which does not matter, as each form of debt examined separately and whether the forms of debt are correlated with each other is irrelevant. However, we can observe three cases where exogenous variables correlate with each other or indebtedness with an exogenous variable. These are Czech medium-sized companies where there is a correlation between profitability and the non-debt tax shield. One of these variables should be removed for the model accuracy. As part of the regression analysis, the non-debt tax shield was removed, which indicates the letter X in Table 5. In the same table, we can see a second conflict, namely the correlation between profitability and total debt/long-term debt for Slovenian medium-sized companies. Therefore, profitability has been removed from the model for long-term and total debt, which again indicates the letter X.

An important conclusion of this section consists in the fact that although regression models may seem credible through F-statistics, which for most models have confirmed that they are compiled correctly, the opposite is true. After performing the basic tests, the models would have to be modified a lot, while some determinants would have to be removed, which would greatly change the original model and expectations. However, it may seem that we did not meet the assumptions that ensured that we did not reach any conclusions. The opposite is true, as the need to meet a number of requirements has shown well that this method is really very unsuitable for the analysis of corporate panel data.

### 4.2 Generalized method of moments

In Tables 7 and 8, we can see the results of panel regression using the GMM method for companies of both sizes. At first glance, it is clear from the tables that the results are not available for all countries, as the number of rows does not correspond to the numbers of selected economies. The reason is the fact that was discussed in the Methodology section, in which the Sargan test was mentioned, which serves to verify the plausibility of the resulting model with respect to the presence of autocorrelation or heteroskedasticity. Economies within the various forms of debt that we do not see in the tables did not pass this test – they did not exceed the limit of 0.05. The values for economies that have passed the Sargan test (J-stat.) can be seen in the last columns.

In the following paragraphs, the individual influences of determinants for individual

companies will be analysed according to their size, but some results can be summarised for all companies together, because the values of coefficients reach very low values and in fact there is no significant effect on debt. This is lagged value of the debt. In terms of the relationship between current and past debt, a positive impact prevails in both size categories of companies. Given the size of the coefficients, we can only talk about an indication of the effect of this variable. The positive effect implies that if companies used debt financing in the previous period, they are likely to use it in the following period as well, and the level of indebtedness will increase. On the contrary, the negative impact indicates the exact opposite, namely that if companies used debt financing in the previous period, they are unlikely to use it in the following period and the amount of debt will thus decrease.

According to previous studies, profitability should have a rather negative impact on the level of debt. This effect was found in medium-sized Slovak, Slovenian, Romanian companies and in large Czech, Slovenian and Bulgarian companies. The remaining impacts identified are positive. The negative effects of profitability are in line with the results of *e.g.* these studies Črnigoj, Mramor (2009), Hernádi, Ormos (2010, 2012), Mokhova, Zinecker (2013), Růčková (2015b, 2017) and GDP growth rates with the studies Bastos *et al.* (2009), Bokpin (2009) and Jõeveer (2013). The negative effect means that if these companies are growing in profits, the companies should prioritise rising profits as a source of financing, and the level of debt should therefore fall. For all companies except large Slovenian companies, the impact of profitability is also supported by the negative impact of GDP on debt. This impact is linked to the claim that, during a boom, companies usually grow profits, which are a suitable source of financing. As for the positive impact of profitability on the level of debt, here too most of the results are supported by the same effects in terms of the impact of GDP. These effects mean that, for example, in the case of economic growth, companies usually grow profits and thrive overall, which reduces the risk of bankruptcy and therefore lenders are willing to lend them additional funds. The positive impact of profitability can be found, for example, in the studies of Klapper *et al.* (2002), Pinková (2012), Aulová, Hlavsa (2013), and Růčková (2015a, 2015b, 2017) and the GDP growth rates in the studies of Salehi and Manesh (2012), Mursalim, Kusuma (2017), and Yinusa *et al.* (2017).

All economies for which statistically significant coefficients were found performed well for at least half of the period under review. Economies such as Hungary, Romania and Slovenia were hit hard by the global financial crisis, which was still lingering at the beginning of the period under review, and the Hungarian and Romanian governments even had to seek financial assistance, but economic problems were overcome and Romania and Hungary grew during the period, on average over 2.5% per year. In some years, the rate was even over 5% and more. The Slovenian economy grew by an average of 1.7% per year, as in addition to the initial real property and mortgage crisis, the economy also went through a banking crisis. The remaining economies did not suffer the significant effects of the global financial crisis – *e.g.* the Polish economy, as one of the few economies in the world, did not experience an economic downturn during the whole period and showed a good growth rate throughout the year, averaging 3.6% per year. The Bulgarian and Slovak economies grew on average 2.5% per year, and there were also no significant economic problems in these countries during the period under review. The Czech economy recorded a decline in 2012/2013, when household consumption and investment fell in particular. However, apart from these years, year-on-year growth averaged around 3 %. In Austria, the development of basic economic indicators (debt,

unemployment) was not favourable, but apart from the introduction of a deposit guarantee, the economy was no longer constrained. Due to the favourable economic development, companies were able to choose whether to use their own sources of financing or debt financing. Economic conditions gave them the opportunity to do so.

In terms of liquidity, it depends on the size of the companies, as for medium-sized companies the coefficients are very low, which is not uncommon for this determinant and is only an indication of the effect on the level of indebtedness. The negative impact clearly prevails here, which we can see in all cases in large companies, with the difference that in large companies the coefficients reach much higher values. The negative impact means 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 the assets. There may also be conflicts between owners and managers and expropriation of owners, but this is unlikely to occur in all cases. The first explanation is far more likely. Unfortunately, the detailed structure of the assets was not analysed in this research. A negative result is followed by results such as Myers, Rajan (1998), Mateev *et al.* (2013), Aulová, Hlavsa (2013), and Růčková (2015b).

The relationship between asset structure and debt levels should be positive for

*Table 7. GMM results for medium-sized companies.*

| Medium-sized companies | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **DER(–1)** | **ROE** | **L2** | **SA** | **NDTS** | **GDP** | **IR** | **INF** | **J-stat.** |
| **Total debt** | | | | | | | | | |
| CZ | 0.0527[a] | | –0.0030[a] | 5.1516[a] | | 32.9204[a] | | 173.0985[a] | 0.4371 |
| SK | | –4.9185[a] | 0.0030[a] | | –8.1956[a] | | 551.9702[b] | | 0.2038 |
| PL | –0.0079[b] | 3.2266[a] | | 8.5093[c] | | 52.1978[a] | | 112.1304[a] | 0.3027 |
| HU | –0.0030[a] | | 0.0214[b] | | 2.2913[b] | 35.8212[a] | | –68.5682[b] | 0.0734 |
| SI | | –2.2163[a] | | 6.0380[c] | | | 111.9825[a] | | 0.2981 |
| BG | 0.0068[b] | | –0.0084[a] | | –6.7458[a] | | –1,306.0020[b] | | 0.5717 |
| RO | 0.0200[a] | –1.9330[a] | | 5.9717[a] | | –108.3550[a] | | 102.2906[a] | 0.4834 |
| **Short-term debt** | | | | | | | | | |
| CZ | 0.0686[a] | | | 1.4336[a] | | 22.5941[a] | | 90.7396[a] | 0.4663 |
| SK | | –4.5274[a] | –0.0049[b] | | | –107.6472[a] | 1,167.4910[a] | | 0.1400 |
| PL | –0.0431[a] | | | 5.4147[b] | –6.9645[a] | | –86.8116[a] | 62.2194[a] | 0.1955 |
| HU | 0.0047[a] | 2.6482[a] | –0.0067[a] | 2.1044[b] | | 7.2949[a] | –38.0782[b] | | 0.2650 |
| AT | –0.0203[a] | | | | –15.4493[a] | –7.3107[c] | | 129.9113[a] | 0.2059 |
| BG | 0.0664[a] | | –0.0012[a] | | | 12.6994[a] | | | 0.5643 |
| RO | 0.0039[b] | –1.5120[a] | | 3.0467[b] | –2.3016[a] | | –173.4417[a] | | 0.5044 |
| **Long-term debt** | | | | | | | | | |
| CZ | –0.0300[a] | | –0.0042[b] | 4.6038[b] | | 20.7818[b] | | 40.7564[c] | 0.5169 |
| PL | 0.0385[a] | 1.6955[a] | | | –3.5844[a] | | 44.4212[a] | 32.0995[b] | 0.1955 |
| SI | –0.0021[a] | –0.1677[c] | | 2.7280[a] | –1.5276[a] | –4.9497[c] | | | 0.1036 |
| BG | | | –0.0371[b] | | | 21.7240[a] | 849.1702[a] | 27.0029[b] | 0.5071 |
| RO | 0.0614[a] | –0.4084[b] | | 3.3892[c] | –4.7931[a] | | –6.0896[a] | | 0.1811 |

*Source: authors' calculations.*

*Symbols [a], [b] and [c] indicate significance at 1%, 5% and 10%.*

long-term debt and negative for short-term debt, as reported by Klapper *et al.* (2002), Nivorozhkin (2002), Song (2005), Cheng, Shiu (2007), Mateev *et al.* (2013), and Vo (2017). The positive effect means that the higher the share of tangible fixed and total assets, the higher the value of debt. This relationship is based on the assumption that tangible fixed assets can be used as collateral, usually for long-term debt, but not for short-term debt. However, corporate reality is different from theory and collateral can often be used for short-term liabilities. Our results show that the level of corporate debt, regardless of the size and form of debt, is clearly positively affected by the structure of assets. If we look at the ratio of tangible fixed to total assets, the result is not surprising. This ratio is on average 71% for medium-sized companies and 68% for large companies. These are high values, from which it is clear that companies have a large amount of assets that they can use to secure when obtaining debt financing.

The non-debt tax shield should have a negative effect on the amount of debt. We confirmed this result in all cases except medium-sized and large Hungarian companies. A negative result follows the results of studies such as Wald (1999), Klapper *et al.* (2002), or Hernádi, Ormos (2012). Companies with negative coefficients benefit from depreciation, which serves as their own source of financing, and should therefore acquire more assets that can be depreciated and, if possible, assets that have higher depreciation rates. These are mostly fixed assets, of which companies have a large number, as mentioned in the influence of the asset structure. On the other hand, positive impacts have been found, for example, by Delcoure (2007), Hernádi, Ormos (2010), and Mokhova, 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 companies to use collateral than a non-debt tax shield. However, after an additional analysis, it was found that the value of tangible fixed assets and depreciation did not equal or approach them. For medium-sized companies, the value of tangible fixed assets is about 4 times higher than the value of depreciation, for large companies this value is about 2 times higher. Therefore, the differences in tax regulations may explain this, as we do not have detailed internal accounting of all Hungarian companies in which the answer could probably be traced.

Another determinant is the reference interest rate, which was expected to have a negative impact on the level of debt. We see that the resulting impacts are diverse, but in terms of company size they agree. We see a negative impact on Polish, Romanian and Hungarian companies, regardless of size, and on medium-sized Bulgarian companies. The result for Bulgarian companies is surprising and difficult to explain, as the average interest rate was very low – 0.05%. However, in the remaining economies, interest rates were high, leading to higher debt financing costs, which meant lower debt. The Romanian reference interest rate averaged 3.6% with a maximum of 6.3% (2010). The Polish interest rate averaged 2.5% with a maximum of 4.5% (2011). The Hungarian interest rate averaged around 3.1% with a maximum of 7% (2011). It is clear that the values are really high compared to the rest of the economies, but it must be added that they have been gradually declining since their peaks in 2010/2011 and the Hungarian interest rate reached 0.9% at the end of the period analysed, which already has the advantage of lower debt financing costs. Unfortunately, interest rates were higher for most of the period under review, and their resulting development outweighed the resulting coefficient. The remaining economies have a positive impact on debt levels. The result is that interest rates were low in the economies. Slovakia and Slovenia are members

*Table 8. GMM results for large companies.*

| Large companies | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Total debt** | | | | | | | | | |
| | **DER(–1)** | **ROE** | **L2** | **SA** | **NDTS** | **GDP** | **IR** | **INF** | **J-stat.** |
| **Total debt** | | | | | | | | | |
| CZ | | –28.7690[a] | | | –205.3771[a] | –22.5093[b] | 597.6002[a] | | 0.4391 |
| SK | –0.0466[a] | 11.0080[a] | –10.2300[a] | | | 333 5051[a] | | –32.1580[a] | 0.3821 |
| SI | 0.1642[a] | | –1.8513[a] | 7.5260[b] | | | 279.2540[a] | 43.0938[a] | 0.6131 |
| RO | 0.3749[a] | 2.1641[a] | | | –1.7661[b] | 24,6207[b] | | | 0.7172 |
| **Short-term debt** | | | | | | | | | |
| SK | | | –6.8453[a] | 35.7621[a] | | 186.1524[a] | | –316.3017[a] | 0.4773 |
| PL | –0.0789[c] | 15.1581[c] | | | | | –291.4571[b] | 147.7846[a] | 0.9739 |
| HU | | | –44.8175[a] | | 82.4348[a] | 36.9101[a] | | | 0.6449 |
| AT | 0.9670[a] | 3.9827[a] | | 177.7547[a] | | 1,520.1060[a] | | 118.9317[b] | 0.0921 |
| SI | –0.0490[a] | | –2.0277[a] | 7.5292[a] | | | 175.9515[a] | | 0.2687 |
| BG | –0.0340[a] | –2.1036[a] | | | | –25.2762[c] | | 18.9791[b] | 0.1139 |
| **Long-term debt** | | | | | | | | | |
| CZ | | –23.8832[a] | | 9.4005[c] | –174.6068[a] | | 317.0186[a] | 63,2566[c] | 0.1185 |
| SK | 0.0576[a] | | | 57.7827[a] | | 144.8003[a] | 72.1349[a] | | 0.2418 |
| SI | 0.6306[a] | –1.9076[a] | –3.5470[a] | | –23.7863[a] | | | 10,6419[a] | 0.3426 |
| RO | | 0.8458[a] | | | | 9.6773[c] | –21.0019[a] | | 0.4298 |

*Source: authors' calculations.*

*Symbols [a], [b] and [c] indicate significance at 1%, 5% and 10%.*

of the euro area and are therefore subject to the monetary policy of the European Central Bank, which sought to help economies as much as possible during the period under review in the face of crises and economic problems, with an average reference interest rate of 0.3%. The Czech central bank also tried to help the economy and set interest rates very low, averaging 0.4%. Such low interest rates bring very low costs of debt financing, which thus becomes very attractive, and therefore the level of debt to companies has risen.

The inflation rate was expected to have a negative impact on long-term debt and a positive impact on short-term debt, as we saw in the studies of Gajurel (2006), Cheng, Shiu (2007), Hanousek, Shamshur (2014), Mokhova, Zinecker (2014), Öztekin (2015), and Yinusa *et al.* (2017). The resulting coefficients for the impact of the inflation rate on the debt ratio for short-term debt meet our assumptions; however, for long-term debt, the results differ significantly from expectations. In almost all cases, we can observe a positive effect of the inflation rate on the level of debt. The positive impact is strange, as it tells us that debt levels rise as inflation rises. For short-term debt, the positive effect is justified, as short-term inflation can be linked to the interest rate (debt financing costs). However, this cannot be practised in the long run. In the previous paragraph, we discussed the level of reference interest rates in individual economies, which were very low, especially in some economies. The average inflation rate in selected countries ranged from 1.2 to 2. %. These are not high values, but even this inflation rate could reduce interest rates to values where it was advantageous to buy more and more, and therefore there is a positive impact.

A brief summary is appropriate at the end of the subchapter. Regardless of the size of

the company, the main finding is that the level of indebtedness of companies in the Accommodation and food service activities sector is most influenced by the determinants of the external environment of companies. From the point of view of the level of coefficients, the influence of the reference interest rate clearly dominates, which has a negative effect on the indebtedness of Polish, Romanian, Bulgarian and Hungarian companies and a positive impact on the indebtedness of the remaining companies. However, the impact of economic development or inflation is not negligible. Compared to the least squares method, we obtained far more results from the original data, which at least partially showed us how the level of debt in selected companies could be affected. If we used only the least squares method, we would not come to any conclusions regarding the failure to meet a number of tests and assumptions.

## 5. Conclusion

This research dealt with the financial structure of companies from the industry Accommodation and Food Service activities. The analysed companies are located in eight selected European economies. Specifically, these were the Czech Republic, Slovakia, Poland, Hungary, Austria, Bulgaria, Romania, and Slovenia. The aim of this research was to determine whether profitability, liquidity, asset structure, non-debt tax shield, the GDP growth rate, inflation rate, and reference interest rate affect the level of total, long-term and short-term debt. Within this goal, two research questions were formulated:

- Are there differences in impacts in terms of the different maturities of the used funding sources?
- What impact does the price of financial external sources have on the used sources of financing?

A total of 23,991 companies were analysed, of which 22,973 are medium-sized and 1,018 are large and very large companies. The companies were analysed for the period 2010–2018. The least squares method and Generalized Method of Moments were used to determine the impacts of selected factors. It was a comparison of two regression analyses. The research attempted to compare these two methods with regard to the difficulty of verifying their results from the point of view of plausibility. The resulting least squares models must meet several basic assumptions and tests, while the GMM method only needs to perform a single test after analysis.

Regarding the results of the comparison of the two selected methods, the modified regression analysis in the form of the Generalized Method of Moments is a far more suitable method than the least squares method. As stated in the theory, the GMM method has found its application mainly in the field of finance, which is clearly confirmed by this research. Compared to the least squares method, we obtained far more results from the original data, which at least partially showed us how the level of debt in selected companies could be affected. If we used only the least squares method, we would not come to any conclusions regarding the failure to meet a number of tests and assumptions. However, this is also a good finding, as it is so clear that this method is very unsuitable for corporate panel data analysis.

The results of the GMM method showed a number of relationships and the effects of individual determinants on the level of debt of selected companies. Given the number of determinants, economies and endogenous variables, it is clear that the results are plentiful and cannot be summarised in a few sentences. However, the main finding of the research is that the level of indebtedness of selected companies is very significantly influenced by the determinants of the external environment of companies. From the point of view of the value of coefficients, the influence of the reference interest rate clearly dominates, while from the point of view of

the frequency of coefficients, the impact of the GDP growth rate is significant. However, the impact of the inflation rate is not negligible either.

With regard to the mentioned results, only the effects of economic development and reference interest rates are summarised here. The effects of the interest rate vary from one economy to another, but it can be stated that the direction of the impact more or less follows the basic assumption – the higher the cost of acquiring debt financing, the less we will acquire it. Therefore, the reference interest rate has a positive impact on the level of indebtedness in economies that have been supported by central banks by keeping interest rates zero or very low for most of the period under review. These are the Czech Republic (average rate during the observed period 0.4%), Slovakia, Slovenia, and Austria (0.3%). On the other hand, in higher rate economies, the impact of the interest rate on the debt level was negative. These are Romania (3.6%), Hungary (3.1%), and Poland (2.5%). One exception is Bulgarian companies, which were found to have a negative impact, with an average reference interest rate of almost – 0.05%. This may be due to the fact that the Bulgarian economy was doing relatively well and at such low rates, companies did not want to go into debt and preferred to use their own resources to finance investment activities. This is a wise decision, because in the event of a crisis, companies will not be over-indebted and will not have to run into existential problems.

The results for economic development were mixed, but at the same time the results for profitability were supported. For medium-sized Slovak, Slovenian, Austrian and Romanian companies and for large Czech and Bulgarian companies, a negative impact of GDP growth on the level of debt was found. The negative impact means that if these companies grow in profits (which is usually in times of economic prosperity), companies should prioritize rising profits as a source of funding, and debt levels should therefore decline. A positive impact has been found in the remaining economies, which means that, for example, in the case of economic growth, where companies tend to grow profits and thrive overall, the risk of bankruptcy is reduced and lenders are willing to provide additional funding. Both of these impacts are expected, as the selected economies performed well during the analysed period and there were no major economic problems that would hit the country hard.

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## References

Acedo-Ramírez, M. A., Ruiz-Cabestre, F. J. (2014). Determinants of capital structure: United Kingdom versus continental European countries. *Journal of International Financial Management & Accounting*, 25(3), pp. 237–270. DOI:10.1111/jifm.12020.

Antoniou, A., Guney, Y., Paudyal, K. (2008). *The Determinants of Capital Structure: Capital Market-Oriented versus Bank-Oriented Institutions*. Journal of Financial and Quantitative Analysis, 43(1), pp. 59–92. DOI:10.1017/S0022109000002751.

Arellano, M., Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The Review of Economic Studies*, 58(2), pp. 277–297.

DOI:10.2307/2297968.

Arellano, M., Bover, O. (1995). Another look at the instrumental variable estimation of error-components models. *Journal of Econometrics*, 68, pp. 29–51. DOI:10.1016/0304-4076(94)01642-D.

Asteriou, D., Hall, S. G. (2021). *Applied econometrics*. 4th Ed. London: Red Globe Press. 568 pp.

Aulová, R., Hlavsa, T. (2013). Capital structure of agricultural businesses and its determinants. *Agris on-line Papers in Economics and Informatics*, 5(2), pp. 23–36.

Bastos, D. D., Nakamura, W. T., Basso, L. F. C. (2009). Determinants of capital structure of publicly-traded companies in Latin America: The role of institutional and macroeconomic factors. *Journal of International Finance and Economics*, 9(3), pp. 24–39. DOI:10.2139/ssrn.1365987.

Bauer, P. (2004). Determinants of capital structure: Empirical evidence from the Czech Republic. *Czech Journal of Economics and Finance*, 54(1–2), pp. 2–21.

Bhaird, C., Lucey, B. M. (2010). Determinants of Capital Structure in Irish SMEs. *Small Business Economics*, 35(3), pp. 357–375. DOI:10.1007/s11187-008-9162-6.

Blundell, R., Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics*, 87(1), pp. 115–143. DOI:10.1016/S0304-4076(98)00009-8.

Bokpin, G. A. (2009). Macroeconomic development and capital structure decisions of firms: Evidence from emerging market economies. *Studies in Economics and Finance*, 26(2), pp. 129–142. DOI:10.1108/10867370910963055.

Brealey, R. A., Myers, S. C., Allen, F. (2020). *Principles of corporate Finance*. 13th Ed.: McGraw-Hill, New York. 918 pp.

Çekrezi, A. (2013). The determinants of capital structure: Evidence from Albania. *Academic Journal of Interdisciplinary Studies*, 2(9), pp. 370–376. DOI:10.5901/mjss.2014.v5n13p482.

Cheng, S. R., Shiu, C. Y. (2007). Investor protection and capital structure: International evidence. *Journal of Multinational Financial Management*, 17(1), pp. 30–44. DOI:10.1016/j.mulfin.2006.03.002.

Črnigoj, M., Mramor, D. (2009). Determinants of capital structure in emerging European economies: Evidence from Slovenian firms. *Emerging Markets Finance & Trade*, 45(1), pp. 72–89. DOI:10.2753/REE1540-496X450105.

De Jong, A., Kabir, R., Nguyen, T. T. (2008). Capital structure around the world: The roles of firm- and country-specific determinants. *Journal of Banking & Finance*, 32(9), pp. 1954–1969. DOI:10.1016/j.jbankfin.2007.12.034.

Delcoure, N. (2007). The determinants of capital structure in transitional economies. *International Review of Economics & Finance*, 16(3), pp. 400–415. DOI:10.1016/j.iref.2005.03.005.

Enders, W., Lee, J. (2012). The flexible Fourier form and Dickey–Fuller type unit root tests. *Economic Letters*, 117(1), pp. 196–199. DOI:10.1016/j.econlet.2012.04.081.

Frieder, L., Martell, R. (2006). *Oncapital structure and the liquidity of a firm's stock*. Purdue University, Krannert School of Management. DOI:10.2139/ssrn.880421.

Gajurel, D. P. (2006). *Macroeconomic influences on corporate capital structure*. DOI:10.2139/ssrn.899049.

Greene, W. H. (2020). *Econometric Analysis*, 8th Ed. Harlow: Pearson. 1166 pp.

Hanousek, J., Shamshur, A. (2011). A stubborn persistence: Is the stability of leverage ratios determined by the stability of the economy? *Journal of corporate Finance*, 17(5), pp. 1360–1376. DOI:10.1016/j.jcorpfin.2011.07.004.

Hernádi, P., Ormos, M. (2010). Capital structure and its choice in Central and Eastern Europe. *Acta Oeconomica*, 62(2), pp. 229–263. DOI:10.1556/AOecon.62.2012.2.5.

Hernádi, P., Ormos, M. (2012). What Managers Think of capital Structure and How They Act: Evidence from Central and Eastern Europe. *Baltic Journal of Economics*, 12(2), pp. 47–71. DOI:10.1080/1406099X.2012.10840517.

Jagannathan, R., Skoulakis, G., Wang, Z. (2002). Generalized Method of Moments: Applications in Finance. *Journal of Business and Economic Statistics*, 20(4), pp. 470–481. DOI:10.1198/073500102288618612.

Jamshidian, M., Jennrich, R. I., Liu, W. (2007). A study of partial F tests for multiple linear

regression models. *Computational Statistics & Data Analysis*, 51(12), pp. 6269–6284. DOI:10.1016/j.csda.2007.01.015.

Jõeveer, K. (2013). Firm, country and macroeconomic determinants of capital structure: Evidence from transition economies. *Journal of comparative Economics*, 41(1), pp. 294–308. DOI:10.1016/j.jce.2012.05.001.

Kayo, E. K., Kimura, H. (2011). Hierarchical determinants of capital structure. *Journal of Banking & Finance*, 35(2), pp. 358–371. DOI:10.1016/j.jbankfin.2010.08.015.

Klapper, L. F., Sarria-Allende, V., Sulla, V. (2002). *Small- and Medium-Size Enterprise Financing in Eastern Europe*. World Bank Policy Research Working Paper No. 2933.

Kurz-Kim, J.-R., Loretan, M. (2014). On the properties of the coefficient of determination in regression models with infinite variance variables. *Journal of Econometrics*, 181(1), pp. 15–24. DOI:10.1016/j.jeconom.2014.02.004.

Li, Y., Singal, M. (2019). Capital structure in the hospitality industry: The role of the asset-light and fee-oriented strategy. *Tourism Management*, 70, pp. 124–133. DOI:10.1016/j.tourman.2018.08.004.

Lipson, M. L., Mortal, S. (2009). Liquidity and capital structure. *Journal of Financial Markets*, 12(4), pp. 611–644. DOI:10.1016/j.finmar.2009.04.002.

Lourenço, A. M., Oliveira, E. C. (2017). Determinants of debt: Empirical evidence on firms in the district of Santarém in Portugal. C*ontaduría y Administración*, 62(2), pp. 625–643. DOI:10.1016/j.cya.2016.06.010.

Mangafić, J., Martinović, D. (2015). The Firm-Specific Determinants of the Target Capital Structure: Evidence from Bosnia and Herzegovina Panel Data. *Mediterranean Journal of Social Sciences*, 6(2), pp. 188–198. DOI:10.5901/mjss.2015.v6n2s5p188.

Mateev, M., Poutziouris, P., Ivanov, K. (2013). On the determinants of SME capital structure in Central and Eastern Europe: A dynamic panel analysis. *Research in International Business and Finance*, 27(1), pp. 28–51. DOI:10.1016/j.ribaf.2012.05.002.

Matemilola, B. T., Bany-Ariffin, A. N., Azman-Saini, W. N. W., Nassir, A. M. (2018). Does top managers' experience affect firms' capital structure? *Research in International Business and Finance*, 45, pp. 488–498. DOI:10.1016/j.ribaf.2017.07.184.

Matemilola, B. T., Bany-Ariffin, A. N., Azman-Saini, W. N. W., Nassir, A. M. (2019). Impact of institutional quality on the capital structure of firms in developing countries. *Emerging Markets Review*, 39, pp. 175–209. DOI:10.1016/j.ememar.2019.04.003.

Michaelas, N., Chittenden, F., Poutziouris, P. (1999). Financial policy and capital structure choice in U.K. SMEs: Empirical evidence from company panel data. *Small Business Economics*, 12(2), pp. 113–130. DOI:10.1023/A:1008010724051.

Modigliani, F., Miller, M. H. (1958). The cost of capital, corporation Finance and the Theory of Investment. *American Economic Association*, 48(3), pp. 261–297.

Mokhova, N., Zinecker, M. (2013). The determinants of capital structure: The evidence from the European Union. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, 61(7), pp. 2533–2546. DOI:10.11118/actaun201361072533.

Mokhova, N., Zinecker, M. (2014). Macroeconomic factors and corporate capital structure. *Procedia – Social and Behavioral Sciences*, 110, pp. 530–540. DOI:10.1016/j.sbspro.2013.12.897.

Moradi, A., Paulet, E. (2019). The firm-specific determinants of capital structure – An empirical analysis of firms before and during the Euro Crisis. *Research in International Business and Finance*, 47, pp. 150–161. DOI:10.1016/j.ribaf.2018.07.007.

Morellec, E. (2001). Asset liquidity, capital structure, and secured debt. *Journal of Financial Economics*, 61(2), pp. 173–206. DOI:10.1016/S0304-405X(01)00059-9.

Mursalim, M. M., Kusuma, H. (2017). Capital structure determinants and firms' performance: Empirical evidence from Thailand, Indonesia and Malaysia. *Polish Journal of Management Studies*, 16(1), pp. 154–164. DOI:10.17512/pjms.2017.16.1.13.

Myers, S. C. (1984). The capital structure puzzle. *Journal of Finance*, 39, pp. 575–592. DOI:10.2307/2327916.

Myers, S. C., Rajan, R. G. (1998). The Paradox of liquidity. *The Quarterly Journal of Economics*, 113(3), pp. 733–771. DOI:10.1162/003355398555739.

Myers, S. C. (2001). Capital structure. *The Journal*

*of Economic Perspectives*, 15(2), pp. 81–102. DOI:10.1257/jep.15.2.81.

Nivorozhkin, E. (2002). Capital structures in emerging stock markets: The case of Hungary. *The Developing Economies*, 40(2), pp. 166–187. DOI:10.1111/j.1746-1049.2002.tb01006.x.

Nivorozhkin, E. (2005). Financing choices of firms in EU accession countries. *Emerging Markets Review*, 6(2), pp. 138–169. DOI:10.1016/j.ememar.2004.10.002.

Onofrei, M., Tudose, M. B., Durdureanu, C., Anton, S. G. (2015). Determinant Factors of Firm Leverage: An Empirical Analysis at Iasi country Level. *Procedia Economics and Finance*, 20, pp. 460–466. DOI:10.1016/S2212-5671(15)00097-0.

Öztekin, Ö. (2015). Capital Structure Decisions around the World: Which Factors Are Reliably Important? *The Journal of Financial and Quantitative Analysis*, 50(3), pp. 301–323. DOI:10.1017/S0022109014000660.

Pinková, P. (2012). Determinants of capital structure: Evidence from the Czech automotive industry. Acta Universitatis *Agriculturae et Silviculturae Mendelianae Brunensis*, 60(7), pp. 217–224. DOI:10.11118/actaun201260070217.

Prędkiewicz, K., Prędkiewicz, P. (2015). Chosen determinants of capital structure in small and medium-sized enterprises – Evidence from Poland. *Finanse, Rynki Finansowe, Ubezpieczenia*, 74(2), pp. 331–340.

Průcha, I. R. (2014). *Instrumental Variables/Method of Moments Estimation*. In: Fisher, M. M. and Nijkamp, P. (ed.) Handbook of Regional Science. Heidelberg: Springer.

Roodman, D. (2009). How to do xtabond2: An introduction to difference and system GMM in Stata. *The Stata* Journal, 9(1), pp. 86–136. DOI:10.1177/1536867X0900900106.

Růčková, P. (2015a). Impact of fixed assets share and profitability on use of debt sources of companies in the building industry in V4countries. *Acta academica karviniensia*, 15(2), pp. 122–135.

Růčková, P. (2015b). Impact of liquidity and profitability on use of debt finance sources of companies in manufacturing industry in V4countries. *Acta academica karviniensia*, 15(3), pp. 69–79. DOI:10.25142/aak.2015.032.

Růčková, P. (2017). Evaluation of profitability impact on selection of financing sources under conditions in Visegrád Group countries in the field of power engineering. *Scientific Papers of the University of Pardubice*, D(39), pp. 140–150.

Salehi, M., Manesh, N. B. (2012). A study of the roles of firm and country on specific determinates in capital structure: Iranian evidence. *International Management Review*, 8(2), pp. 51–62.

Shleifer, A., Vishny, R. W. (1992). Liquidation values and debt capacity: A market equilibrium approach. *The Journal of Finance*, 47(4), pp. 1343–1366. DOI:10.1111/j.1540-6261.1992.tb04661.x.

Sikveland, M., Xie, J., Zhang, D. (2022). Determinants of capital structure in the hospitality industry: Impact of clustering and seasonality on debt and liquidity. *International Journal of Hospitality Management*, 102. DOI:10.1016/j.ijhm.2022.103172.

Song, H. S. (2005). C*apital structure determinants – An empirical study of Swedish companies*. Working paper No. 25, The Royal Institute of Technology, Centre of Excellence for Science and Innovation Studies.

Strýčková, L. (2015). Factors determining the corporate capital structure in the Czech Republic from the perspective of business entities. *E&M Economics and Management*, 18(2), pp. 40–56. DOI:10.15240/tul/001/2015-2-004.

Šarlija, N., Harc, M. (2012). The impact of liquidity on the capital structure: A case study of Croatian firms. Business Systems Research, 3(1), pp. 30–36. DOI:10.2478/v10305-012-0005-1.

Titman, S., Wessels, R. (1988). The determinants of capital structure choice. *The Journal of Finance*, 43, pp. 1–19. DOI:10.1111/j.1540-6261.1988.tb02585.x.

Ullah, S., Akhtar, P., Zaefarian, G. (2018). Dealing with Endogeneity Bias: The Generalized Methods of Moments (GMM) for panel data. *Industrial Marketing Management*, 71, pp. 69–78. DOI:10.1016/j.indmarman.2017.11.010.

Vo, X. V. (2017). Determinants of capital structure in emerging markets: Evidence from Vietnam. *Research in International Business and Finance*, 40, pp. 105–113. DOI:10.1016/j.ribaf.2016.12.001.

Wald, J. K. (1999). How firm characteristics affect

capital structure: An international comparison. The Journal of Financial Research, 22(2), pp. 161–187. DOI:10.1111/j.1475-6803.1999.tb00721.x.

Weill, L. (2004). What determinants leverage in transition countries? C*zech Journal of Economics and Finance*, 54(5–6), pp. 234–242.

Williamson, O. E. (1988). Corporate finance and corporate governance. *The Journal of Finance*, 43(3), pp. 567–591. DOI:10.1111/j.1540-6261.1988.tb04592.x.

Yildirim, R., Masih, M., Bacha, O. I. (2018). Determinants of capital structure: evidence from Shari'ah compliant and non-compliant firms. *Pacific-Basin Financial Journal*, 51, pp. 198–219. DOI:10.1016/j.pacfin.2018.06.008.

Yin, Y. (2020). Model-free tests for series correlation in multivariate linear regression. *Journal of Statistical Planning and Inference*, 206, pp. 179–195. DOI:10.1016/j.jspi.2019.09.011.

Yinusa, O. G., Alimi, O. Y., Ilo, B. M. (2017). Macroeconomic determinants of capital structure of firms: Evidence from Nigeria. *Journal of Knowledge Globalization*, 9(2), pp. 1–21.

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## Annex

**Czech medium-sized companies**

| | ROE | L2 | SA | NDTS | GDP | IR | INF | DER | DER_L | DER_S |
|---|---|---|---|---|---|---|---|---|---|---|
| ROE | 1 | 0.0023 | –0.0287 | **–1.0000** | –0.0123 | –0.0118 | –0.0054 | 0.0007 | 0.0003 | 0.0006 |
| L2 | 0.0023 | 1 | –0.0382 | –0.0006 | –0.0137 | 0.0141 | 0.0146 | 0.0001 | –0.0001 | 0.0003 |
| SA | –0.0287 | –0.0382 | 1 | 0.0154 | –0.0273 | –0.0118 | –0.0173 | –0.0021 | –0.0083 | 0.0103 |
| NDTS | **–1.0000** | –0.0006 | 0.0154 | 1 | 0.0124 | 0.0115 | 0.0054 | 0.0001 | 0.0001 | 0.0001 |
| GDP | –0.0123 | –0.0137 | –0.0273 | 0.0124 | 1 | –0.4625 | 0.1869 | 0.0016 | 0.0009 | 0.0018 |
| IR | –0.0118 | 0.0141 | –0.0118 | 0.0115 | –0.4625 | 1 | 0.3414 | 0.0076 | 0.0036 | 0.0100 |
| INF | –0.0054 | 0.0146 | –0.0173 | 0.0054 | 0.1869 | 0.3414 | 1 | 0.0027 | –0.0033 | 0.0117 |
| DER | 0.0007 | 0.0001 | –0.0021 | 0.0001 | 0.0016 | 0.0076 | 0.0027 | 1 | **0.8901** | 0.5770 |
| DER_L | 0.0003 | –0.0001 | –0.0083 | 0.0001 | 0.0009 | 0.0036 | –0.0033 | **0.8901** | 1 | 0.1414 |
| DER_S | 0.0006 | 0.0003 | 0.0103 | 0.0001 | 0.0018 | 0.0100 | 0.0117 | 0.5770 | 0.1414 | 1 |

**Czech large companies**

| | ROE | L2 | SA | NDTS | GDP | IR | INF | DER | DER_L | DER_S |
|---|---|---|---|---|---|---|---|---|---|---|
| ROE | 1 | –0.0431 | 0.0310 | 0.0487 | –0.0582 | –0.0119 | 0.0866 | 0.7538 | 0.7166 | 0.5267 |
| L2 | –0.0431 | 1 | –0.0806 | –0.1347 | 0.0219 | 0.0272 | –0.0038 | –0.0246 | –0.0221 | –0.0230 |
| SA | 0.0310 | –0.0806 | 1 | 0.1169 | 0.0132 | 0.0296 | 0.0041 | 0.0640 | 0.0612 | 0.0432 |
| NDTS | 0.0487 | –0.1347 | 0.1169 | 1 | 0.0283 | 0.0376 | 0.0146 | –0.0217 | –0.0160 | –0.0351 |
| GDP | –0.0582 | 0.0219 | 0.0132 | 0.0283 | 1 | 0.1871 | –0.4625 | –0.0640 | –0.0606 | –0.0457 |
| IR | –0.0119 | 0.0272 | 0.0296 | 0.0376 | 0.1871 | 1 | 0.3383 | –0.0308 | –0.0290 | –0.0227 |
| INF | 0.0866 | –0.0038 | 0.0041 | 0.0146 | –0.4625 | 0.3383 | 1 | 0.0789 | 0.0765 | 0.0486 |
| DER | 0.7538 | –0.0246 | 0.0640 | –0.0217 | –0.0640 | –0.0308 | 0.0789 | 1 | **0.9817** | 0.5645 |
| DER_L | 0.7166 | –0.0221 | 0.0612 | –0.0160 | –0.0606 | –0.0290 | 0.0765 | **0.9817** | 1 | 0.3967 |
| DER_S | 0.5267 | –0.0230 | 0.0432 | –0.0351 | –0.0457 | –0.0227 | 0.0486 | 0.5645 | 0.3967 | 1 |

**Slovak medium-sized companies**

| | ROE | L2 | SA | NDTS | GDP | IR | INF | DER | DER_L | DER_S |
|---|---|---|---|---|---|---|---|---|---|---|
| ROE | 1 | 0.0005 | 0.0148 | 0.0086 | –0.0157 | 0.0047 | 0.0112 | –0.5516 | 0.0537 | –0.5641 |
| L2 | 0.0005 | 1 | –0.0418 | –0.0288 | –0.0123 | –0.0046 | –0.0027 | –0.0013 | –0.0016 | –0.0011 |
| SA | 0.0148 | –0.0418 | 1 | 0.1998 | –0.0038 | 0.0303 | 0.0246 | –0.0003 | 0.0059 | –0.0009 |
| NDTS | 0.0086 | –0.0288 | 0.1998 | 1 | 0.0108 | 0.0271 | 0.0218 | –0.0036 | 0.0038 | –0.0040 |
| GDP | –0.0157 | –0.0123 | –0.0038 | 0.0108 | 1 | 0.1708 | –0.1945 | 0.0017 | –0.0363 | 0.0051 |
| IR | 0.0047 | –0.0046 | 0.0303 | 0.0271 | 0.1708 | 1 | 0.6051 | –0.0082 | 0.0023 | –0.0085 |
| INF | 0.0112 | –0.0027 | 0.0246 | 0.0218 | –0.1945 | 0.6051 | 1 | –0.0059 | 0.0043 | –0.0064 |
| DER | –0.5516 | –0.0013 | –0.0003 | –0.0036 | 0.0017 | –0.0082 | –0.0059 | 1 | 0.1911 | **0.9959** |
| DER_L | 0.0537 | –0.0016 | 0.0059 | 0.0038 | –0.0363 | 0.0023 | 0.0043 | 0.1911 | 1 | 0.1012 |
| DER_S | –0.5641 | –0.0011 | –0.0009 | –0.0040 | 0.0051 | –0.0085 | –0.0064 | **0.9959** | 0.1012 | 1 |

**Slovak large companies**

| | ROE | L2 | SA | NDTS | GDP | IR | INF | DER | DER_L | DER_S |
|---|---|---|---|---|---|---|---|---|---|---|
| ROE | 1 | –0.0565 | –0.0568 | 0.0819 | –0.0385 | 0.1249 | 0.0194 | –0.0445 | 0.0605 | –0.0452 |
| L2 | –0.0565 | 1 | –0.1727 | –0.1558 | 0.0316 | 0.0223 | –0.0005 | –0.0158 | –0.0427 | –0.0153 |
| SA | –0.0568 | –0.1727 | 1 | 0.1144 | –0.0437 | 0.0219 | 0.0559 | 0.0001 | –0.0793 | 0.0009 |
| NDTS | 0.0819 | –0.1558 | 0.1144 | 1 | 0.0212 | 0.0684 | 0.0484 | –0.0163 | –0.0311 | –0.0160 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| GDP | –0.0385 | 0.0316 | –0.0437 | 0.0212 | 1 | 0.1708 | –0.1945 | 0.0333 | 0.0597 | 0.0326 |
| IR | 0.1249 | 0.0223 | 0.0219 | 0.0684 | 0.1708 | 1 | 0.6051 | 0.0030 | –0.1044 | 0.0042 |
| INF | 0.0194 | –0.0005 | 0.0559 | 0.0484 | –0.1945 | 0.6051 | 1 | –0.0488 | –0.0704 | –0.0481 |
| DER | –0.0445 | –0.0158 | 0.0001 | –0.0163 | 0.0333 | 0.0030 | –0.0488 | 1 | 0.0277 | **0.9999** |
| DER_L | 0.0605 | –0.0427 | –0.0793 | –0.0311 | 0.0597 | –0.1044 | –0.0704 | 0.0277 | 1 | 0.0168 |
| DER_S | –0.0452 | –0.0153 | 0.0009 | –0.0160 | 0.0326 | 0.0042 | –0.0481 | **0.9999** | 0.0168 | 1 |

**Polish medium-sized companies**

| | **ROE** | **L2** | **SA** | **NDTS** | **GDP** | **IR** | **INF** | **DER** | **DER_L** | **DER_S** |
|---|---|---|---|---|---|---|---|---|---|---|
| ROE | 1 | –0.0013 | –0.0232 | 0.0082 | 0.0160 | –0.0194 | –0.0047 | 0.0959 | 0.1151 | 0.0601 |
| L2 | –0.0013 | 1 | –0.0369 | –0.0191 | 0.0163 | –0.0139 | –0.0008 | 0.0055 | 0.0114 | 0.0000 |
| SA | –0.0232 | –0.0369 | 1 | 0.0095 | –0.0642 | 0.0908 | 0.0295 | 0.0240 | 0.0206 | 0.0212 |
| NDTS | 0.0082 | –0.0191 | 0.0095 | 1 | –0.0143 | 0.0177 | –0.0030 | 0.0076 | –0.0007 | 0.0121 |
| GDP | 0.0160 | 0.0163 | –0.0642 | –0.0143 | 1 | –0.2234 | 0.1585 | –0.0045 | 0.0036 | –0.0095 |
| IR | –0.0194 | –0.0139 | 0.0908 | 0.0177 | –0.2234 | 1 | 0.8122 | 0.0057 | –0.0038 | 0.0114 |
| INF | –0.0047 | –0.0008 | 0.0295 | –0.0030 | 0.1585 | 0.8122 | 1 | 0.0022 | 0.0002 | 0.0032 |
| DER | 0.0959 | 0.0055 | 0.0240 | 0.0076 | –0.0045 | 0.0057 | 0.0022 | 1 | 0.8248 | **0.9067** |
| DER_L | 0.1151 | 0.0114 | 0.0206 | –0.0007 | 0.0036 | –0.0038 | 0.0002 | 0.8248 | 1 | 0.5093 |
| DER_S | 0.0601 | 0.0000 | 0.0212 | 0.0121 | –0.0095 | 0.0114 | 0.0032 | **0.9067** | 0.5093 | 1 |

**Polish large companies**

| | **ROE** | **L2** | **SA** | **NDTS** | **GDP** | **IR** | **INF** | **DER** | **DER_L** | **DER_S** |
|---|---|---|---|---|---|---|---|---|---|---|
| ROE | 1 | –0.0034 | –0.0534 | 0.0790 | 0.0152 | –0.0746 | –0.0752 | 0.5654 | 0.0426 | 0.5771 |
| L2 | –0.0034 | 1 | 0.0309 | –0.0328 | 0.0157 | –0.0284 | –0.0380 | 0.0657 | 0.4169 | –0.0015 |
| SA | –0.0534 | 0.0309 | 1 | 0.1552 | –0.0337 | 0.0760 | 0.0435 | –0.0616 | 0.0031 | –0.0642 |
| NDTS | 0.0790 | –0.0328 | 0.1552 | 1 | 0.0162 | –0.0944 | –0.0883 | –0.0273 | –0.0185 | –0.0251 |
| GDP | 0.0152 | 0.0157 | –0.0337 | 0.0162 | 1 | –0.2234 | 0.1585 | –0.0118 | 0.0530 | –0.0210 |
| IR | –0.0746 | –0.0284 | 0.0760 | –0.0944 | –0.2234 | 1 | 0.8122 | –0.0314 | –0.0764 | –0.0197 |
| INF | –0.0752 | –0.0380 | 0.0435 | –0.0883 | 0.1585 | 0.8122 | 1 | –0.0427 | –0.0446 | –0.0367 |
| DER | 0.5654 | 0.0657 | –0.0616 | –0.0273 | –0.0118 | –0.0314 | –0.0427 | 1 | 0.2768 | **0.9871** |
| DER_L | 0.0426 | 0.4169 | 0.0031 | –0.0185 | 0.0530 | –0.0764 | –0.0446 | 0.2768 | 1 | 0.1196 |
| DER_S | 0.5771 | –0.0015 | –0.0642 | –0.0251 | –0.0210 | –0.0197 | –0.0367 | **0.9871** | 0.1196 | 1 |

**Hungarian medium-sized companies**

| | **ROE** | **L2** | **SA** | **NDTS** | **GDP** | **IR** | **INF** | **DER** | **DER_L** | **DER_S** |
|---|---|---|---|---|---|---|---|---|---|---|
| ROE | 1 | –0.0005 | –0.0084 | –0.0114 | 0.0008 | –0.0018 | –0.0108 | 0.3399 | 0.2381 | 0.3591 |
| L2 | –0.0005 | 1 | –0.0649 | –0.0254 | –0.0075 | 0.0143 | –0.0027 | 0.0009 | 0.0024 | –0.0026 |
| SA | –0.0084 | –0.0649 | 1 | 0.0247 | –0.0294 | 0.0378 | 0.0158 | 0.0004 | –0.0030 | 0.0074 |
| NDTS | –0.0114 | –0.0254 | 0.0247 | 1 | –0.0181 | 0.0228 | 0.0077 | –0.0020 | 0.0004 | –0.0059 |
| GDP | 0.0008 | –0.0075 | –0.0294 | –0.0181 | 1 | –0.7630 | –0.6790 | 0.0135 | 0.0186 | –0.0055 |
| IR | –0.0018 | 0.0143 | 0.0378 | 0.0228 | –0.7630 | 1 | 0.7560 | –0.0100 | –0.0128 | 0.0019 |
| INF | –0.0108 | –0.0027 | 0.0158 | 0.0077 | –0.6790 | 0.7560 | 1 | –0.0133 | –0.0127 | –0.0067 |
| DER | 0.3399 | 0.0009 | 0.0004 | –0.0020 | 0.0135 | –0.0100 | –0.0133 | 1 | **0.9246** | 0.5753 |
| DER_L | 0.2381 | 0.0024 | –0.0030 | 0.0004 | 0.0186 | –0.0128 | –0.0127 | **0.9246** | 1 | 0.2203 |
| DER_S | 0.3591 | –0.0026 | 0.0074 | –0.0059 | –0.0055 | 0.0019 | –0.0067 | 0.5753 | 0.2203 | 1 |

**Hungarian large companies**

| | ROE | L2 | SA | NDTS | GDP | IR | INF | DER | DER_L | DER_S |
|---|---|---|---|---|---|---|---|---|---|---|
| ROE | 1 | –0.0243 | –0.1275 | 0.0674 | 0.1012 | –0.0794 | –0.1180 | –0.3604 | –0.3905 | 0.3257 |
| L2 | –0.0243 | 1 | –0.1082 | –0.1808 | –0.0108 | 0.0345 | 0.0058 | 0.0190 | 0.0199 | –0.0069 |
| SA | –0.1275 | –0.1082 | 1 | –0.0004 | –0.0417 | 0.0516 | 0.0179 | 0.0846 | 0.0960 | –0.1385 |
| NDTS | 0.0674 | –0.1808 | –0.0004 | 1 | –0.0434 | 0.0317 | 0.0228 | –0.0775 | –0.0737 | –0.0735 |
| GDP | 0.1012 | –0.0108 | –0.0417 | –0.0434 | 1 | –0.7630 | –0.6790 | –0.0342 | –0.0348 | –0.0010 |
| IR | –0.0794 | 0.0345 | 0.0516 | 0.0317 | –0.7630 | 1 | 0.7560 | 0.0406 | 0.0429 | –0.0221 |
| INF | –0.1180 | 0.0058 | 0.0179 | 0.0228 | –0.6790 | 0.7560 | 1 | 0.0340 | 0.0379 | –0.0463 |
| DER | –0.3604 | 0.0190 | 0.0846 | –0.0775 | –0.0342 | 0.0406 | 0.0340 | 1 | **0.9977** | 0.2960 |
| DER_L | –0.3905 | 0.0199 | 0.0960 | –0.0737 | –0.0348 | 0.0429 | 0.0379 | **0.9977** | 1 | 0.2301 |
| DER_S | 0.3257 | –0.0069 | –0.1385 | –0.0735 | –0.0010 | –0.0221 | –0.0463 | 0.2960 | 0.2301 | 1 |

**Austrian medium-sized companies**

| | ROE | L2 | SA | NDTS | GDP | IR | INF | DER | DER_L | DER_S |
|---|---|---|---|---|---|---|---|---|---|---|
| ROE | 1 | –0.0007 | –0.0029 | 0.0332 | –0.0036 | –0.0097 | –0.0108 | 0.0009 | –0.0001 | 0.0269 |
| L2 | –0.0007 | 1 | 0.0211 | –0.0053 | –0.0192 | 0.0041 | 0.0091 | –0.0007 | –0.0007 | –0.0007 |
| SA | –0.0029 | 0.0211 | 1 | –0.0113 | 0.0143 | –0.0242 | –0.0020 | 0.0055 | 0.0054 | 0.0042 |
| NDTS | 0.0332 | –0.0053 | –0.0113 | 1 | 0.0032 | –0.0034 | 0.0012 | –0.0023 | –0.0025 | 0.0034 |
| GDP | –0.0036 | –0.0192 | 0.0143 | 0.0032 | 1 | 0.1403 | 0.2905 | 0.0019 | 0.0015 | 0.0108 |
| IR | –0.0097 | 0.0041 | –0.0242 | –0.0034 | 0.1403 | 1 | 0.6509 | 0.0111 | 0.0116 | –0.0096 |
| INF | –0.0108 | 0.0091 | –0.0020 | 0.0012 | 0.2905 | 0.6509 | 1 | 0.0134 | 0.0135 | 0.0034 |
| DER | 0.0009 | –0.0007 | 0.0055 | –0.0023 | 0.0019 | 0.0111 | 0.0134 | 1 | **0.9994** | 0.3982 |
| DER_L | –0.0001 | –0.0007 | 0.0054 | –0.0025 | 0.0015 | 0.0116 | 0.0135 | **0.9994** | 1 | 0.3659 |
| DER_S | 0.0269 | –0.0007 | 0.0042 | 0.0034 | 0.0108 | –0.0096 | 0.0034 | 0.3982 | 0.3659 | 1 |

Austrian large companies

| | ROE | L2 | SA | NDTS | GDP | IR | INF | DER | DER_L | DER_S |
|---|---|---|---|---|---|---|---|---|---|---|
| ROE | 1 | 0.0115 | –0.1165 | 0.0112 | 0.0384 | 0.0469 | 0.0144 | 0.0731 | 0.3061 | 0.0165 |
| L2 | 0.0115 | 1 | –0.0767 | 0.0167 | –0.0021 | 0.1143 | 0.0456 | 0.0036 | –0.0056 | 0.0047 |
| SA | –0.1165 | –0.0767 | 1 | –0.0263 | 0.0016 | –0.0374 | –0.0191 | 0.0110 | –0.0373 | 0.0203 |
| NDTS | 0.0112 | 0.0167 | –0.0263 | 1 | 0.0403 | –0.0284 | –0.0042 | 0.0075 | –0.0098 | 0.0104 |
| GDP | 0.0384 | –0.0021 | 0.0016 | 0.0403 | 1 | 0.1403 | 0.2905 | –0.0372 | –0.0277 | –0.0357 |
| IR | 0.0469 | 0.1143 | –0.0374 | –0.0284 | 0.1403 | 1 | 0.6509 | –0.0394 | –0.0153 | –0.0408 |
| INF | 0.0144 | 0.0456 | –0.0191 | –0.0042 | 0.2905 | 0.6509 | 1 | –0.0421 | 0.0098 | –0.0492 |
| DER | 0.0731 | 0.0036 | 0.0110 | 0.0075 | –0.0372 | –0.0394 | –0.0421 | 1 | 0.6230 | **0.9860** |
| DER_L | 0.3061 | –0.0056 | –0.0373 | –0.0098 | –0.0277 | –0.0153 | 0.0098 | 0.6230 | 1 | 0.4838 |
| DER_S | 0.0165 | 0.0047 | 0.0203 | 0.0104 | –0.0357 | –0.0408 | –0.0492 | **0.9860** | 0.4838 | 1 |

**Slovenian medium-sized companies**

| | ROE | L2 | SA | NDTS | GDP | IR | INF | DER | DER_L | DER_S |
|---|---|---|---|---|---|---|---|---|---|---|
| ROE | 1 | –0.0009 | –0.0451 | –0.0099 | –0.0004 | 0.0259 | 0.0046 | **–0.9501** | **–0.9582** | –0.1174 |
| L2 | –0.0009 | 1 | 0.0188 | –0.0046 | 0.0247 | –0.0123 | 0.0054 | 0.0002 | 0.0003 | –0.0017 |
| SA | –0.0451 | 0.0188 | 1 | 0.0151 | 0.0016 | 0.0101 | 0.0220 | 0.0313 | 0.0322 | –0.0064 |
| NDTS | –0.0099 | –0.0046 | 0.0151 | 1 | 0.0112 | –0.0136 | 0.0019 | 0.0066 | 0.0067 | 0.0009 |
| GDP | –0.0004 | 0.0247 | 0.0016 | 0.0112 | 1 | –0.6065 | –0.4957 | 0.0046 | 0.0037 | 0.0161 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| IR | 0.0259 | –0.0123 | 0.0101 | –0.0136 | –0.6065 | 1 | 0.6096 | –0.0331 | –0.0323 | –0.0218 |
| INF | 0.0046 | 0.0054 | 0.0220 | 0.0019 | –0.4957 | 0.6096 | 1 | –0.0138 | –0.0121 | –0.0317 |
| DER | **–0.9501** | 0.0002 | 0.0313 | 0.0066 | 0.0046 | –0.0331 | –0.0138 | 1 | **0.9982** | 0.2884 |
| DER_L | **–0.9582** | 0.0003 | 0.0322 | 0.0067 | 0.0037 | –0.0323 | –0.0121 | **0.9982** | 1 | 0.2303 |
| DER_S | –0.1174 | –0.0017 | –0.0064 | 0.0009 | 0.0161 | –0.0218 | –0.0317 | 0.2884 | 0.2303 | 1 |

**Slovenian large companies**

| | **ROE** | **L2** | **SA** | **NDTS** | **GDP** | **IR** | **INF** | **DER** | **DER_L** | **DER_S** |
|---|---|---|---|---|---|---|---|---|---|---|
| ROE | 1 | 0.1178 | –0.1819 | –0.6938 | 0.1063 | 0.0028 | –0.0469 | –0.2792 | –0.3889 | –0.0972 |
| L2 | 0.1178 | 1 | –0.4641 | 0.1823 | 0.0561 | –0.1570 | –0.0981 | –0.0883 | –0.0806 | –0.0655 |
| SA | –0.1819 | –0.4641 | 1 | –0.0673 | 0.0157 | –0.0410 | –0.0338 | –0.0810 | 0.1160 | –0.2156 |
| NDTS | –0.6938 | 0.1823 | –0.0673 | 1 | –0.0769 | –0.0387 | –0.0481 | 0.1506 | 0.2001 | 0.0602 |
| GDP | 0.1063 | 0.0561 | 0.0157 | –0.0769 | 1 | –0.6065 | –0.4957 | –0.0085 | –0.0337 | 0.0150 |
| IR | 0.0028 | –0.1570 | –0.0410 | –0.0387 | –0.6065 | 1 | 0.6096 | 0.0354 | 0.0996 | –0.0288 |
| INF | –0.0469 | –0.0981 | –0.0338 | –0.0481 | –0.4957 | 0.6096 | 1 | –0.0370 | 0.0260 | –0.0763 |
| DER | –0.2792 | –0.0883 | –0.0810 | 0.1506 | –0.0085 | 0.0354 | –0.0370 | 1 | 0.7740 | 0.8549 |
| DER_L | –0.3889 | –0.0806 | 0.1160 | 0.2001 | –0.0337 | 0.0996 | 0.0260 | 0.7740 | 1 | 0.3332 |
| DER_S | –0.0972 | –0.0655 | –0.2156 | 0.0602 | 0.0150 | –0.0288 | –0.0763 | 0.8549 | 0.3332 | 1 |

**Bulgarian medium-sized companies**

| | **ROE** | **L2** | **SA** | **NDTS** | **GDP** | **IR** | **INF** | **DER** | **DER_L** | **DER_S** |
|---|---|---|---|---|---|---|---|---|---|---|
| ROE | 1 | –0.0046 | –0.0222 | 0.3368 | 0.0120 | –0.0115 | –0.0041 | 0.0321 | 0.0545 | –0.0124 |
| L2 | –0.0046 | 1 | –0.0247 | –0.0268 | 0.0016 | 0.0027 | –0.0032 | 0.0056 | 0.0100 | –0.0027 |
| SA | –0.0222 | –0.0247 | 1 | 0.0569 | –0.0542 | 0.0898 | 0.0452 | 0.0128 | 0.0157 | 0.0033 |
| NDTS | 0.3368 | –0.0268 | 0.0569 | 1 | 0.0087 | 0.0048 | 0.0193 | –0.0026 | –0.0014 | –0.0031 |
| GDP | 0.0120 | 0.0016 | –0.0542 | 0.0087 | 1 | –0.3285 | –0.3007 | 0.0022 | 0.0020 | 0.0015 |
| IR | –0.0115 | 0.0027 | 0.0898 | 0.0048 | –0.3285 | 1 | 0.5802 | 0.0096 | 0.0022 | 0.0157 |
| INF | –0.0041 | –0.0032 | 0.0452 | 0.0193 | –0.3007 | 0.5802 | 1 | 0.0114 | 0.0082 | 0.0109 |
| DER | 0.0321 | 0.0056 | 0.0128 | –0.0026 | 0.0022 | 0.0096 | 0.0114 | 1 | 0.8770 | 0.7472 |
| DER_L | 0.0545 | 0.0100 | 0.0157 | –0.0014 | 0.0020 | 0.0022 | 0.0082 | 0.8770 | 1 | 0.3360 |
| DER_S | –0.0124 | –0.0027 | 0.0033 | –0.0031 | 0.0015 | 0.0157 | 0.0109 | 0.7472 | 0.3360 | 1 |

**Bulgarian large companies**

| | **ROE** | **L2** | **SA** | **NDTS** | **GDP** | **IR** | **INF** | **DER** | **DER_L** | **DER_S** |
|---|---|---|---|---|---|---|---|---|---|---|
| ROE | 1 | –0.0114 | –0.1491 | –0.0777 | –0.0205 | –0.0053 | 0.0336 | 0.3591 | 0.0599 | 0.7137 |
| L2 | –0.0114 | 1 | 0.0344 | –0.0556 | –0.0689 | 0.0069 | 0.0135 | –0.0165 | –0.0116 | –0.0164 |
| SA | –0.1491 | 0.0344 | 1 | 0.0743 | –0.0304 | 0.0699 | 0.0370 | –0.0176 | 0.0534 | –0.1389 |
| NDTS | –0.0777 | –0.0556 | 0.0743 | 1 | 0.0130 | 0.0572 | 0.0290 | –0.0912 | –0.0686 | –0.0829 |
| GDP | –0.0205 | –0.0689 | –0.0304 | 0.0130 | 1 | –0.3285 | –0.3007 | 0.0024 | 0.0254 | –0.0414 |
| IR | –0.0053 | 0.0069 | 0.0699 | 0.0572 | –0.3285 | 1 | 0.5802 | –0.0568 | –0.0768 | 0.0113 |
| INF | 0.0336 | 0.0135 | 0.0370 | 0.0290 | –0.3007 | 0.5802 | 1 | –0.0180 | –0.0539 | 0.0580 |
| DER | 0.3591 | –0.0165 | –0.0176 | –0.0912 | 0.0024 | –0.0568 | –0.0180 | 1 | **0.9059** | 0.6252 |
| DER_L | 0.0599 | –0.0116 | 0.0534 | –0.0686 | 0.0254 | –0.0768 | –0.0539 | **0.9059** | 1 | 0.2360 |
| DER_S | 0.7137 | –0.0164 | –0.1389 | –0.0829 | –0.0414 | 0.0113 | 0.0580 | 0.6252 | 0.2360 | 1 |

| Romanian medium-sized companies | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **ROE** | **L2** | **SA** | **NDTS** | **GDP** | **IR** | **INF** | **DER** | **DER_L** | **DER_S** |
| ROE | 1 | –0.0003 | –0.0182 | 0.0030 | 0.0163 | –0.0115 | –0.0086 | 0.2248 | 0.1713 | 0.1838 |
| L2 | –0.0003 | 1 | –0.0044 | –0.0048 | 0.0094 | –0.0051 | –0.0002 | 0.0053 | 0.0125 | –0.0001 |
| SA | –0.0182 | –0.0044 | 1 | 0.1383 | –0.0619 | 0.0629 | 0.0560 | –0.0036 | 0.0158 | –0.0126 |
| NDTS | 0.0030 | –0.0048 | 0.1383 | 1 | –0.0137 | 0.0224 | 0.0205 | –0.0003 | –0.0034 | 0.0014 |
| GDP | 0.0163 | 0.0094 | –0.0619 | –0.0137 | 1 | –0.8043 | –0.6293 | 0.0028 | –0.0001 | 0.0035 |
| IR | –0.0115 | –0.0051 | 0.0629 | 0.0224 | –0.8043 | 1 | 0.8229 | 0.0047 | 0.0063 | 0.0025 |
| INF | –0.0086 | –0.0002 | 0.0560 | 0.0205 | –0.6293 | 0.8229 | 1 | 0.0057 | 0.0076 | 0.0029 |
| DER | 0.2248 | 0.0053 | –0.0036 | –0.0003 | 0.0028 | 0.0047 | 0.0057 | 1 | 0.5911 | **0.9071** |
| DER_L | 0.1713 | 0.0125 | 0.0158 | –0.0034 | –0.0001 | 0.0063 | 0.0076 | 0.5911 | 1 | 0.1966 |
| DER_S | 0.1838 | –0.0001 | –0.0126 | 0.0014 | 0.0035 | 0.0025 | 0.0029 | **0.9071** | 0.1966 | 1 |
| **Romanian large companies** | | | | | | | | | | |
| | **ROE** | **L2** | **SA** | **NDTS** | **GDP** | **IR** | **INF** | **DER** | **DER_L** | **DER_S** |
| ROE | 1 | –0.0123 | –0.0926 | 0.0054 | –0.0167 | –0.0137 | –0.0172 | 0.4019 | 0.0361 | 0.3041 |
| L2 | –0.0123 | 1 | –0.1636 | –0.0495 | –0.0078 | –0.0239 | –0.0273 | –0.0084 | –0.0036 | –0.0105 |
| SA | –0.0926 | –0.1636 | 1 | –0.0588 | 0.0006 | –0.0187 | –0.0072 | –0.0331 | –0.0561 | –0.0212 |
| NDTS | 0.0054 | –0.0495 | –0.0588 | 1 | –0.0262 | –0.0001 | –0.0125 | 0.0005 | 0.0132 | 0.0052 |
| GDP | –0.0167 | –0.0078 | 0.0006 | –0.0262 | 1 | –0.8043 | –0.6293 | –0.0487 | –0.0231 | –0.0585 |
| IR | –0.0137 | –0.0239 | –0.0187 | –0.0001 | –0.8043 | 1 | 0.8229 | 0.0720 | 0.0562 | 0.0699 |
| INF | –0.0172 | –0.0273 | –0.0072 | –0.0125 | –0.6293 | 0.8229 | 1 | 0.0777 | 0.0556 | 0.0793 |
| DER | 0.4019 | –0.0084 | –0.0331 | 0.0005 | –0.0487 | 0.0720 | 0.0777 | 1 | 0.3084 | **0.9178** |
| DER_L | 0.0361 | –0.0036 | –0.0561 | 0.0132 | –0.0231 | 0.0562 | 0.0556 | 0.3084 | 1 | 0.2166 |
| DER_S | 0.3041 | –0.0105 | –0.0212 | 0.0052 | –0.0585 | 0.0699 | 0.0793 | **0.9178** | 0.2166 | 1 |