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Firm specific determinants of capital structure in European advanced developing countries

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Abstract

The problem of the determinants of the firm financing structure has been researched in literature for years. Still, there is a lot of ambiguity and difference of opinion in that area. Consequently, in this study the authors have decided to analyse firm specific determinants of capital structure in selected advanced developing economies. The research was conducted on companies from four European markets: Polish, Czech, Greek, and Hungarian. The analysed data covered the period 2009–2017. The applied research method was panel data regression with fixed effects. The outcome shows that company decisions concerning the source of financing from the Greek and Hungarian markets are better explained by the pecking order theory, while in the case of the Czech market the trade-off theory works better. For the Polish market neither the pecking order theory nor the trade-off theory has been proved convincingly.

Keywords: financing structure, indebtedness, pecking order theory, trade-off theory

JEL: G32, O57

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1 Introduction

Any firm willing to conduct business must have capital resources required for that purpose (Ostrowska 2014), which will allow it to achieve its planned objectives. Presently it is assumed that the overriding objective of the activities of any economic entity (with the exception of non-profit organisations) is to maximise the market value of the enterprise, leading to maximised benefits for its owners. Therefore, what is required from this point of view is a detailed analysis of the entity's resources, perceived specifically from the perspective of sources of financing (Błach 2009). Finding answers to such questions as how do economic entities raise capital and what determines the level of companies' indebtedness seems to be the primary research area, the exploration of which could lead to many interesting conclusions. It is worth noting that years of research on the structure of financing did not give clear answers, and the results obtained changed the way in which the analysed issues were perceived over the years.

Therefore, the aim of this paper was to analyse firm specific determinants of capital structure in selected, advanced developing economies.

The research was conducted on four European markets: Polish, Czech, Greek, and Hungarian. The analysis covered all companies which met specific constraints. Due to the availability of data, the study spanned 9 years, from 2009 to 2017, and used a fixed effects regression model.

The paper's main added value is the comprehensive treatment of the issue of specific determinants influencing companies' financing structure. This comprehensive approach stems from:

– large research samples covering small, medium and large entities, both listed and unlisted on the stock exchange,

– a large number of explanatory variables (as many as seven different independent variables),

– five indicators characterising the financing structure,

– a nine-year research period.

The relevant literature, meanwhile, is dominated by research based on data obtained from listed companies (Łukasik, Naczyński 2016; Kaźmierska-Jóźwiak, Marszałek, Sekuła 2015; Fan, Titman, Twite 2012; Noulas, Genimakis 2011; Sheikh, Wang 2011; Eriotis, Vasiliou, Ventoure-Neokosmidi 2007; Mazur 2007; Bauer 2004a, 2004b; Chen 2004; Colombo 2001) and for shorter time periods, usually from 2 to 7 years (Łukasik, Naczyński 2016; Sheikh, Wang 2011; Eriotis, Vasiliou, Ventoure-Neokosmidi 2007; Mazur 2007; Delcoure 2007 Bauer 2004a, 2004b; Chen 2004; Colombo 2001).

The present paper is divided into four sections. The first section provides a detailed literature review that takes into account general theories on the financing structure of entities, as well as researchers' insights regarding individual markets. The second section discusses how the research sample was chosen, and discusses the methodology applied. Panel data regression results and inference are presented in section three. The last section presents conclusions and the summary of the study.

2 Literature overview

The structure of firm financing has been the object of research for years. It is, however, assumed that contemporary studies were started by Modigliani, and Miller (1958, 1963), who with their then controversial models stirred up a discussion in the world of economy and finance that continues to this

day. The effects of many years of analysis of the issue of the financing structure have led to the formation of two principal theories[1] trying to explain economic entities' decisions taken during the selection of the sources of financing for their business: the pecking order theory and the trade-off theory.

The pecking order theory was proposed by Myers and Majluf (1984) as a follow-up to the research carried out by Donaldson (1961). The original source for the pecking order theory was asymmetry of information and its influence on investment decisions and the financing of companies (Shyam--Sunder, Myers 1994). This theory departs from the classic understanding of the structure of capital (Kubiak 2012), placing emphasis on such selection of the sources of financing that will enable the "curbing of costs of asymmetry of information, ensure financial independence, and will limit the influence of financial markets on the operations of an enterprise, while maintaining a policy of profit distributions acceptable by owners" (Łukasik, Naczyński 2016, p. 82). According to this theory, a company looking for sources of financing, operates according to a certain pattern, choosing to finance new investments from retained earnings first, then debt, and as a last resort from equity (Frank, Goyal 2009).

The trade-off policy, in turn, mentions the concept of optimal financing structure. In accordance with the presented theory, an optimal financing structure is when "the marginal benefit of debt finance is equal to its marginal cost" (Abeywardhana 2017, p. 134). Thus, a fundamental role here is played by the advantages of the tax shield, as well as managers' disciplining function assigned to interest-bearing liabilities (Fama, French 2002). Borrowed capital is characterised by deficiencies, such as bankruptcy costs resulting from the need to service debts, and agency costs resulting from conflicts of interest between owners and lenders (Acedo-Ramirezy, Ruiz-Cabestre 2014). The achievement of an optimal financing structure requires the owners to compare the benefits against the marginal cost of borrowed capital.

Despite the differences in viewing the mechanisms according to which economic entities make decisions regarding the choice of financing sources, over the years scientists have identified internal company-specific factors that have a significant impact on the structure of capital in many economies. The most frequently mentioned ones include: company age, size, tangibility, rate of return, liquidity, non-debt tax shield, effective tax rate, growth, business risk and uniqueness (Kaźmierska-Jóźwiak, Marszałek, Sekuła 2015, Akhatar, Oliver 2009, Mazur 2007, Delcoure 2006, Chen 2004, Titman, Wessels 1988). The explanatory variables used in the research method are discussed in detail below.

2.1 Age

One of the analysed determinants of the capital structure is the age of the company. The age of the company is closely tied to the company's lifecycle and the type of capital demand. In accordance with the pecking order theory, the age of a company should have negative influence on its debt, since the longer a company operates on the market, the more capital it had managed to generate, and can finance its business from retained earnings (Pfaffermayr, Stöckl, Winner 2013; Petersen, Rajan 1994). On the other hand, according to the trade-off theory, due to its stable position on the market, "older

[1] The authors decided to present the two principal theories but it should be emphasized that there are others such as the market timing theory (Abeywardhana 2017) or the signalling theory (Duliniec 2015). However, it is these two chosen theories that are relevant to listed companies and capital markets.

firms are expected to face lower debt-related agency cost" (Akhtar, Oliver 2009, p. 6, after: Frank, Goyal 2009). Consequently, it is assumed that there is a positive relation between the age and debt of a company (Akhtar, Oliver 2009; de Haas, Peeters 2006).

Out of the works analysed by the authors (Łukasik, Naczyński 2016; Kaźmierska-Jóźwiak, Marszałek, Sekuła 2015; Jõeveer 2013; Kubiak 2012; de Jong, Kabir, Nguyen 2008; Mazur 2007; Delcoure 2006; de Haas, Peeters 2006; Frąckowiak et al. 2005; Bauer 2004a) which discussed the determinants of the structure of financing for Polish companies, only one (de Haas, Peters 2006) considered age as an explanatory variable in a model. The same conclusions were drawn from relevant literature studies of Czech firms (Jõeveer 2013; Pinkova 2012; Delcoure 2006; de Haas; Peeters 2006; Bauer 2004a, 2004b) and Hungarian firms (Jõeveer 2013; de Jong, Kabir, Nguyen 2008; de Haas, Peeters 2006; Bauer 2004a; Nivorozhkin 2002, Colombo 2001). The research in question (de Haas, Peeters 2006) proved that both on the Polish and Czech markets, as well as on the Hungarian market, there is a positive correlation between the age of companies and their financing structure.

In the case of Greece, among the analysed works (Noulas, Genimakis 2011; Psillaki, Daskalakis 2009; Daskalakis, Psillaki 2008; de Jong, Kabir, Nguyen 2008; Eriotis, Vasiliou, Ventoura-Neokosmidi 2007; Voulgaris, Asteriou, Agiomirgianakis 2004) also only a single study (Noulas, Genimakis 2011) took into account age as an independent variable. Analysis results show that this variable is statistically significantly negatively correlated with three measures of debt structure used in the study, which would confirm that pecking-order theory is at play here.

2.2 Size

There is no clear-cut correlation between the size of a firm and its capital structure either. The pecking order theory proves that there is a negative correlation between a company's size and its debt (Kaźmierska-Jóźwiak, Marszałek, Sekuła 2015) due to the fact that large entities prefer equity rather than debt so as not to introduce more third parties into the company (Rajan, Zingales 1995). On the other hand, Rajan and Zingales (1995) noticed that this correlation can also be positive if we take into account the trade-off theory. Tackling the problem from this point of view one should note that "size may be an inverse proxy for probability of bankruptcy, since larger firms are more likely to be more diversified and fail less often" (Song 2005, p. 14). Additionally, large companies deliver to the market more information than small ones, and in doing so limit the asymmetry of information (Pinková 2012).

Market studies restricted to Polish listed companies (Łukasik, Naczyński 2016; Kaźmierska-Jóźwiak, Marszałek, Sekuła 2015; Mazur 2007) showed that there is a significant negative correlation between the size of a company and its level of debt. Interestingly, collective studies conducted by de Jong, Kabir and Nguyen (2008) covering 42 economies, including Poland, did not confirm this correlation, displaying a positive relation between capital structure and company size.

An analysis covering listed companies (Bauer 2004b) and companies from the automotive industry (Pinková 2012) from the Czech market did not give a clear indication of the direction of this correlation either. In the first instance it was determined that there is a positive correlation between companies' debt, and their size. The second study, in turn, proved that there is a negative correlation between the size of a company and its total and short-term debt, but a positive one with long-term debt.

The Hungarian market research so far also seems to contribute to the ambiguity trend. In two cases (de Jong, Kabir, Nguyen 2008; Colombo 2001) the correlation between a company's size and its debt is positive. However, analysing the dependent variable in more detail, Nivorozhkin (2002) noticed that the relationship between the size of the company and its debt largely depends on the debt maturity structure and the types of liabilities taken into account. In the case of short-term liabilities and general liabilities this correlation was positive, while for interest-bearing debt it was negative. However, only short-term liabilities reported a statistical significance.

The Greek market showed a different characteristic. All researchers surveyed by the authors (Noulas, Genimakis 2011; de Jong, Kabir, Nguyen 2008; Psillaki, Daskalakis 2008; Daskalakis, Psillaki 2007; Eriotis, Vasiliou, Ventoura-Neoksomidi 2007; Voulgaris, Asteriou, Agiomirgianakis 2004) concluded that the financing structure is positively correlated with the size of a company, which means that Greek companies make decisions on the sources of financing in accordance with the trade-off theory.

2.3 Tangibility

Tangibility is a factor which undoubtedly should show significance when selecting the sources of financing, since fixed assets usually constitute collateral when a firm takes up interest-bearing debt. The function of tangible assets is to minimize costs of agency related to the debt (lower risk to lender), due to which, in accordance with the trade-off theory, there is a positive dependency between debt and tangibility (Sheikh, Wang 2011; Rajan, Zingales 1995). On the other hand, "the costs associated with this agency relations may be higher for firms with assets that are less collateralizable since monitoring the capital outlays of such firms is probably more difficult. For this reason, firms with less collateralizable assets may choose higher debt levels to limit their managers' consumption of perquisites" (Titam, Wessels 1988, p. 3), which will result in a negative relation between the structure of financing and tangibility in the pecking order theory.

When studying the Polish market, all the analysed authors (Łukasik, Naczyński 2016; Kaźmierska-Jóźwiak, Marszałek, Sekuła 2015; de Jong, Kabir, Nguyen 2008; Mazur 2007) showed a negative correlation between the structure of assets and the debt of the company, which confirms the application of the pecking order theory.

In the case of the Czech market the results of studies conducted so far were inconsistent. On the basis of the results obtained, Pinková (2012) concluded that there is a positive correlation between tangibility and the applied capital structure measures, while Bauer (2004b) showed that the correlation is negative.

Studies of the Hungarian market conducted by Nivorozhkin (2002) offered the conclusion that the correlation between tangibility and debt depends on the structure of long-term debt. Analyses of total debt and short-term debt showed a negative dependence, and for long-term debt this dependence turned out to be positive. Positive dependence was also showed by de Jong, Kabir, Nguyen (2008) and by Colombo (2001). Interestingly, in the case of the studies by Colombo (2001) the response variable was the share of short-term debt in total debt.

De Jong, Kabir, Nguyen (2008), Daskalakis, Psillaki (2007) and Voulgaris, Asteriou, Agiomirgianakis (2004) concluded that there is a positive correlation between the structure of assets and debt of Greek firms. On the other hand Noulas and Genimakis (2011) in their studies showed that there is a negative correlation between the variables.

2.4 Profitability

Profitable firms "face lower expected costs of financial distress and find interest tax shields more valuable" (Frank, Goyal 2009, p. 7). Thus, from the perspective of the trade-off theory, which takes into account tax shield benefits and bankruptcy costs (which are lower for profit bearing entities), profitable competitors should use borrowed capital. The described causal relationship is also confirmed by agency cost theory forming part of the trade-off theory, which says that debt will discipline managers leading to less frequent problems with cash flow (Jensen 1986). However, in accordance with the pecking order theory, firms prefer internal financing in the first place, thus generated profits will be accumulated for future investments, due to which the dependency between the profitability of a company and its financing structure will be negative (Kaźmierska-Jóźwiak, Marszałek, Sekuła 2015).

When correlations between the rate of return and the financing structure of Polish companies were analysed, it was noticed (Łukasik, Naczyński 2016, Kaźmierska-Jóźwiak, Marszałek, Sekuła 2015; Mazur 2007) that this correlation is negative, which might mean that profitable companies holding own funds use borrowed capital less often. These conclusions are in contradiction with the study by de Jong, Kabir, Nguyen (2008), whose results showed positive correlation.

There is also a negative correlation on the Czech market (Pinková 2012; Bauer 2004b), however, not in all cases. Pinková (2012) proves that profitability is negatively correlated with long-term debt, but positively with the short-term debt ratio and total debt.

By studying Hungarian firms de Jong, Kabir and Nguyen (2008), and Nivorozhkin (2002) proved that profitable companies prefer to depend on in-house funds, consequently the relationship between profitability and debt is negative.

The analysis of literature about the Greek market (Noulas, Genimakis 2011; Psillaki, Daskalakis 2008; Daskalakis, Psillaki 2007; Voulgaris, Asteriou, Agiomirgianakis 2004) showed that more profitable companies have a lower level of debt, thus the correlation between the variables being discussed can be explained using the pecking order theory.

2.5 Liquidity

The influence of a company's liquidity on decisions related to the choice of financing sources is similar to the influence of profitability. Liquid companies have more cash, and as a consequence they are perceived by credit institutions as safer entities whose risk of insolvency is much lower, which in turn allows the company to obtain debt financing at a lower cost. Therefore, the trade-off theory suggests that with the increase of a company's liquidity its liabilities increase too (Sheihk, Wang 2011). The pecking order theory points out, however, that companies will continue to prefer internal financing over external financing in order to minimize agency costs and information asymmetry, and will therefore use the funds generated to finance investments or current operations. This means that in the pecking order theory, the relationship between liquidity and the financing structure will be negative (Singh 2016; Mazur 2007).

The results of literature studies show that the relation between liquidity and the structure of financing for firms on the Polish market is ambiguous. Mazur (2007), Łukasik, Naczyński (2016), and de Jong, Kabir, Nguyen (2008) showed a negative correlation between the indicated variables, while

Frąckowiak et al. (2005) proved a positive correlation. It should be noted that the positive dependence was verified for long-term debt.

In a Czech market study, Pinková (2012) showed a negative correlation between a company's liquidity and its debt, indicating unambiguously that Czech firms with higher liquidity prefer equity financing.

De Jong, Kabir and Nguyen (2008) proved that the debt of Hungarian companies goes down with the increase of the liquidity ratio. Other authors (Nivorozhkin 2002; Colombo 2001) did not include liquidity in their models.

Research in Greek companies (de Jong, Kabir, Nguyen 2008, Eriotis, Vasiliou, Ventoura-Neokosmidi 2007) showed a negative correlation between liquidity and the financing structure of economic entities, which is consistent with the pecking order theory.

2.6 Non-debt tax shield

Due to the taxation of corporate profits, companies willingly increase their tax-deductible expenses in order to reduce the tax base on which public levies must be paid. The standard instrument used to minimize the tax burden is the debt tax shield. Thanks to the debt tax shield the financial costs of servicing debt reduce the firm's tax base. Consequently, this shows a positive correlation between the effective tax shield and borrowed capital (Chakraborty 2011). On the other hand, a non-debt tax shield results from the depreciation of tangible assets and it also forms a cost that reduces the tax base. DeAngelo and Masulis (1980) argued that the non-debt tax shield is in fact a substitute for the debt tax shield and that the correlation between the financing structure of companies and the non-debt tax shield should therefore be negative. This statement was questioned by Mackie-Mason (1990), claiming that the non--debt tax shield will not always supplant the shield on interest. The researcher admitted that a negative correlation will occur in companies that face financial difficulties (firms close to tax exhaustion), but a positive one in companies that are large and profitable.

Studies of Polish companies (Mazur 2007) showed that the non-debt tax shield is not a significant variable for explaining the structure of corporate financing. In their study, Łukasik and Naczyński (2016) verified only the debt tax shield, showing its positive impact on the structure of corporate financing.

In his Czech market analysis, Bauer (2004b) concluded that the non-debt tax shield has a negative impact on the structure of corporate financing, although not in all models this variable was statistically significant.

Out of the analysed literature devoted to the determinants of the financing structure of companies on the Hungarian and Greek markets, authors of only one study (Noulas, Genimakis 2011) included a non--debt tax shield in their model, showing that it does not affect the financing structure of Greek companies in general, but has a positive impact on the financing structure of companies from the trade sector.

The conducted analysis of the existing literature makes it clear that further research into the financing structure of enterprises is necessary. The authors suspect that the ambiguity of results may be caused, among others, by the fact that researchers applied different research methods and studied different samples in different periods of time. Thus, despite the passage of time, the title of the famous work by Myers (1984) *The capital structure puzzle* remains true and pertinent.

3 Data and methodology

The study uses data based on information from the Amadeus database published by Moody's Analytics, and from Bureau van Dijk. This database includes both financial and business data on public and private companies of European origin. The analysis covered economic entities from four European economies classified by FTSE Russell (2018) as advanced emerging countries: Poland, the Czech Republic, Greek, and Hungary. While Poland, the Czech Republic, and Hungary might seem to be comparable markets, the choice of the Greek economy warrants some comments. In our opinion, after the Greek government-debt crisis, the Greek economy has gone backwards and therefore from the perspective of investors (capital providers) it has become similar to the other chosen markets (comparable level of risk) and might be included in this research. Due to the availability of financial data, the analysis was based on a 9-year time series from 2009 to 2017 inclusive.

As in the research of other authors (Avarmaa, Hazak, Männasoo 2011; Huizinga, Laeven, Nicodame 2008), the study was based on unconsolidated financial data for 2009–2017. All entities whose business status was marked as active were qualified for the study, and their legal form ranged from private limited company through public limited company to a branch of a foreign company.

The sample did not include entities operating in the "Financial and insurance activities" and "Public administration and defence; compulsory social security" sectors, as specified in accordance with NACE Rev. 2 main section classification. The removal of such entities is common practice in research and analysis (Kaźmierska-Jóźwiak, Marszałek, Sekuła 2015; Avarmaa, Hazak, Männasoo 2011; Frank, Goyal 2009; Wald 1999; Rajan, Zingales 1995) due to a completely different structure of financial data of the excluded entities and the specific nature of their operations. The sample did not exclude entities that presented extreme values (highly overstated or significantly understated), which may have influenced the occurrence of differences between the results of particular measures when analysing descriptive statistics.

Due to the form of the data received, it was decided that panel data regression would be the most suitable tool for such a goal. Panel models are used when the dataset contains $N > 1$ units and when these individual entities are observed over time. "Choice of panel data analysis is always preferable as it is better than cross section and time series analysis" (Singh 2016, p. 1653). It is worth noting, however, that the panel models used in the study do not allow direct tracking of the rate of change of individual parameters. The authors verified the short, fixed, and balanced panel.

The study started with a classic pooled OLS, whose form is:

$$y_{it} = X_{it}\beta + u_{it} \qquad i = 1,\ldots,N \qquad t = 1,\ldots,T \tag{1}$$

where:

y_{it} – the observation on the dependent variable for cross-sectional unit i in period t,
X_{it} – a $1 \times k$ vector of independent variables observed for unit i in period t,
t, β – a $k \times 1$ vector of parameters,
u_{it} – an error or disturbance term specific to unit i in period t (Cottrell, Lucchetti 2019).

In each of the analysed cases, test statistics F showed, however, that the classic pooled OLS model should be rejected in favour of the fixed effects model. On the other hand, Breusch-Pagan test statistics

showed that the classic pooled OLS model should be rejected in favour of the random effects model. In order to choose one model from those two options, the Hausman test was used, the results of which clearly showed that the zero hypothesis must be rejected in favour of the alternative hypothesis, which says that the fixed effects model is more appropriate. Test results are in line with the idea of the study, since the fixed effects model "helps to control for unobserved heterogeneity between firms that is constant over time and correlated with independent variables" (Avarmaa, Hazak, Männasoo 2011, p. 129).

Finally, the model adopted the following general form:

$$y_{it} = X_{it}\beta + \alpha_i + \varepsilon_{it} \qquad i = 1,\ldots,N \qquad t = 1,\ldots,T \tag{2}$$

where α_i is a unit-specific and time-invariant component and ε_{it} is an observation-specific error.

Following literature studies, the decision was made to select a number of response and explanatory variables to the model, as presented in the Table 1. The authors decided to choose the most common variables, however, it should be emphasized that there are many others determinants of capital structure, such as growth, business risk and uniqueness.

Consequently, an example of the model formula for the response variable LEV_A will look as follows:

$$LEV_A = \beta_0 + \beta_1 AGE_{it} + \beta_2 SIZE_{it} + \beta_3 TANG_{it} + \beta_4 PROF_{Ait} + \beta_5 PROF_{B_{it}} + \beta_6 LIQ_{it} + \beta_7 NDTS_{it} + \alpha_i + \varepsilon_{it} \tag{3}$$

The final effect of modelling is five panel regression equations in which the differentiating feature is the response variable. The authors run the regression for every single country separately.

4 Results

We begin the presentation of the results by showing descriptive statistics for individual response and explanatory variables for selected economies. When the standard deviation from the average is high, it is the median of the indicator that is interpreted (as the high standard deviation indicates that the results of a given measurement are highly dispersed within the sample).

The average total debt of enterprises in Poland measured with variable LEV_A is 0.59 over the years, which means that on average what predominates in the capital structure of analysed entities is borrowed capital, and companies are more willing to use short-term debt (average for LEV_C was close to 0.40) than long-term debt (average for LEV_B was nearly 0.20). Such a structure of capital, where short-term debt predominates, for which no collateral is required, is characteristic for the developing economies (de Haas, Peeters 2006; after: Booth et al. 2001; Demigrüç-Kunt, Maksimovic 1999), which may be caused by poorer stability of the economic environment, as well as by the low level of development of the capital market (including the debt securities market). The median debt-to-equity ratio is above 0.51, which means that for half of the companies in the sample, interest-bearing liabilities accounted for no more than 51% of equity, and for the other half no less than 51%. On average, companies operate on the market for 20 years and are characterised by the median return on sales (ROS) of about 4%, and a return on assets (ROA) of about 5%. There are entities with a negative rate of return in the sample,

but they account for a small percentage of cases. The average size of analysed entities is about 15.6 and was consistent with the median. The ratio of the share of tangible assets in total assets is 0.45 and in this case it is also close to the median, which amounts to 0.44. Analysing liquidity we notice that for 50% of the companies in the sample this ratio is not lower than 1.22, and for 50% not higher than 1.22. The ratio showing a non-debt tax shield is on average just over 0.04, while 95% of entities reported its value at under 0.12.

Analysing individual ratios for the Czech Republic we notice that the average value of the LEV_A variable is similar to the values calculated for Polish firms, as it hovers just over 0.57. What should be noted, however, is the value of the 95th percentile, which is over 1.12, while for Poland it stands below 1. The ratio between the variables LEV_B and LEV_C remains the same, which means that in the Czech corporate financing structure short-term liabilities predominate on average. The median of interest-bearing liabilities in the studied period is close to 0.07, which shows a low-level utilization of interest-bearing liabilities by Czech firms. In the case of some of them this ratio is negative, which shows negative equity. On average, Czech firms are about 16 years old, while their size is similar to Polish companies. On average Czech firms have a lower level of tangible assets than Polish companies, while the ROS (comparing medians) is similar. However, one should note that in the Czech Republic companies enjoy a slightly higher ROA (the median was 5.4%), and higher liquidity (the median was over 1.79). The average value of the ratio characterising the non-debt tax shield is nearly 0.058 and is higher than in Poland, however, the values of the medians are nearly identical.

The next analysed economy was Greece. In the case of Greek enterprises the average value of LEV_A is 0.59, right in the middle between the average values for Polish and Czech firms. What is interesting, however, is the fact that Greek companies on average use short-term liabilities to the largest extent, since the variable LEV_C is nearly 0.48, while the variable LEV_B just ca. 0.12, which may be the result of the Greek financial crisis raising the cost of borrowed capital, reducing confidence in credit institutions, and imposing stricter requirements on debt financing. The presented dependency may also result from the low level of the variable TANG, which on average stands at 0.29 and is lower than the value of this variable for Polish and Czech companies. The lack of a sufficient amount of tangible fixed assets, which usually serve as collateral, might escalate the problems with raising long-term debt. In the case of most, i.e. 95% of firms in the sample, the debt-to-equity ratio value does not exceed 4.97, with the median value of ca. 0.32. Out of all studied firms Greek companies are the oldest, with a median age of 21 years. Greek enterprises are characterised by a comparable ROS (median at ca. 4.4%) and lowest ROA (at ca. 3.7%). Greek companies should be considered as showing good liquidity, since for 95% of them the liquidity ratio does not exceed 7.53. On average the non-debt tax shield in Greek firms stands at 0.03 and is lower than that in Polish and Czech companies.

Analysing variable LEV_A in the case of the Hungarian economy we clearly notice the highest average value out of all the economies under scrutiny so far. On average, Hungarian companies have over 70% of borrowed capital in their financing structure. Interesting and slightly different conclusions than those reached so far can be drawn when analysing the average of variables LEV_B and LEV_C. On average, Hungarian companies have a higher level of long-term than short-term liabilities, however, this difference is small. Variable TANG is characterised by the highest value, while the average value of this variable is close to its median, which might play a role in the higher level of long-term liabilities. The debt-to-equity ratio median does not exceed the value calculated for Polish firms, and stands at ca. 0.42. From the point of view of age, the age of Hungarian firms is similar to that of Czech companies, since on average they operate on the market for over 15 years, while their size is not much

different from firms from other economies. The ROS median and the ROA median both stand at ca. 4.50%. The median of the liquidity ratio for this sample is slightly over 1.4. The non-debt tax shield resembles the most the one calculated for Czech firms and amounts to slightly over 0.05.

The next step in the study was a panel regression analysis for each of the economies. Correlation matrices were moved to the Appendix. Tables 6 through 9 present the results of fixed effects regression for selected countries.

The first analysed economy is Poland. In the case of the model for the response variable LEV_A only one explanatory variable, namely the ROS, out of all the studied ones turns out to be statistically insignificant. Other variables are significant statistically for $p < 0.01$ or $p < 0.05$. At the same time it should be noted that the model for LEV_A is characterised by the highest rate of match, as the R^2 ratio is over 80%. In the case of the share of long-term debt in total liabilities, which is the second response variable, as many as three variables, i.e. AGE, LIQ and NDTS, turn out to be statistically insignificant, however, the model's rate of match still remains high. Interestingly, in the case of short-term debt all variables entered in the model are statistically significant. In the case of ratios based on interest-bearing debt, the model's rate of match is very low, ca. 11–12%, with statistical significance shown by variables AGE, SIZE and $PROF_B$ in the case of the debt-to-equity ratio, and only variable AGE in the case of the D_D+E.

In accordance with regression results, for most response variables (apart from variable D_D+E) there is a negative correlation between the age of the firm and its general financing structure. In the case of LEV_A an increase in the firm's age by one year would result in a reduction of the firm's total debt by 0.45%. The influence of the size of the company varies. In the case of total debt (LEV_A), short-term debt (LEV_C) and debt-to-equity ratio (D_E) there is a significant positive correlation, while in the case of long-term debt (LEV_B) this correlation is negative. The sign inconsistency appears also in the case of the variable TANG. In the case of all response variables, except for variable LEV_C, this correlation is positive, which means that, for example, if the share of tangible assets in total assets increases by 10%, long-term debt will go up by nearly 2.4% against total liabilities (LEV_B). The return on sales has a minor influence on the structure of firm financing in the case of two dependent variables: long- and short-term debt. More specifically, in the case of long-term debt this influence is positive, while in the case of short-term debt it is negative. The liquidity of companies alters the structure of financing of Polish companies with varying strength and in various directions, but in two cases for which it is statistically significant the sign is negative, which means that with an increase in liquidity the debt of companies goes down. The variable NDTS, just like liquidity, is significant only in two cases, and it has small influence on the structure of debt.

The next country to be analysed is the Czech Republic. In this case too, the best rate of match applies to the first model with a dependent variable LEV_A, although its match is just over 63%. Models based on a dependent variable taking into account interest-bearing liabilities show a similar rate of match as in the case of Poland, i.e. ca. 11–13%. In the case of the debt-to-equity ratio none of the variables had any significant influence. It should be noted, however, that when the ratio is modified by adding debt to equity in the denominator, the variables AGE, TANG and PROFB appear statistically significant at the level of $p < 0.01$, while the variable NDTS is significant at $p < 0.05$.

The variable AGE in four out of five analysed cases is significant. However, it does not always affect the dependent variable in the same way. In the case of variables LEV_A, LEV_C and D_D+E, a firm's age has negative influence on the firm's structure of financing, which means that the older

the company, the lower its total, short-term, and interest-bearing debt. In the case of LEV_B age has positive influence, which means that debt goes up with the age of the company. The variable TANG was definitely significant in the case of LEV_A, as an increase in the share of tangible assets in total assets of 10% translated into a massive 39% increase in total debt. However, it should be noted that this factor in reality influences short-term debt, as in the case of long-term debt this correlation is negative. Only in two cases the ROS is statistically significant (LEV_A and LEV_C), while ROA is very significant statistically in as many as four response variables (LEV_A, LEV_B, LEV_C and D_D+E), the correlation being negative for three of them (LEV_A, LEV_B and LEV_C). For example, an increase in the rate of return of 10% results in a decrease in total debt of ca. 7.4%. For none of the generated models the variable LIQ is statistically significant. The independent variable NDTS has a significant positive influence on the financing structure in the case of variable LEV_A, LEV_B and LEV_C, where for instance an increase in non--debt tax shield of 10% results in an increase in total debt of ca. 1.3%. This correlation does not apply in the case of interest-bearing liability (variable D_D+E), where an increase in non-debt tax shield results in a decrease in interest-bearing debt.

The next analysed economy out of the advanced developing markets' basket is Greece. In the case of Greece the model's best match also takes place for the first model with the response variable LEV_A slightly over 78%, and with a slightly worse match, at the level of 77%, achieved by the third model with the dependent variable LEV_C. In the first and third models only one variable ($PROF_A$) turns out to be statistically insignificant. In other models the number of statistically insignificant variables is higher. In the case of the model based on LEV_B there are three such variables, namely two rate of return ratios, and one liquidity ratio. In models in which the dependent variable is defined by interest-bearing liabilities, statistically significant are two variables (the model with D_E), or no variable (the model with D_D+E). As in the case of other economies, in Greece too the rate of match for these models is poor (ca. 12–18%).

The variable AGE is statistically significant in three out of five models, however, the correlation between the financing structure and the company age is not always the same. As in the Czech Republic, in Greece too there is a negative correlation between the total debt and short-term debt ratios on the one hand, and the age of a company on the other, but there is a positive one between long-term debt and AGE. The variable SIZE has significant influence on four out of five models, and again the direction of influence is inconsistent. In the case of LEV_A and LEV_B we are dealing with negative correlation, while for LEV_C and D_E this correlation is positive. The independent variable TANG has no significant influence on the level of interest-bearing debt in Greece, however, there is a clearly significant correlation ($p < 0.01$) between that variable and the first three models. Tangibility has the highest impact for LEV_C. For example, if the share of tangible assets in total assets goes up by 10%, the ratio of the share of short-term liabilities in total assets will go down by over 1.5%. ROS is statistically insignificant in all of the analysed models. ROA is significant in two cases: for variables LEV_A and LEV_C. The influence of the rate of return on the aforementioned variables is negative, while the volume of response in the change of the financing structure of Greek companies in both cases is similar (an increase of 10% in the ROA translates into an over 4% decrease in total debt). The liquidity of Greek firms influences the same dependent variables (in terms of significance) in the same direction as the variable $PROF_B$. The independent variable NDTS is significant in the case of the first three models, while the identified correlation among the variables is positive. An increase in the depreciation of total assets of 10% translates into a nearly 3.50% increase in total debt of the studied economic entities.

The last analysed economy is Hungary. In the case of the Hungarian market, completely differently than in the case of other studied countries, the best match rate is found in the model whose response variable is LEV_B, i.e. the variable based on long-term debt. The R^2 coefficient for this model is above 64%. A surprisingly low match rate is shown by the first and third models, which looked much better for the three other economies discussed above. However, it should be noted that the highest level of significance for most of the variables identified as statistically significant is $p < 0.01$. In the first model (LEV_A) only one variable is statistically non-significant, while in the second (LEV_B) and third (LEV_C) models there are two such variables. Few statistically significant variables are identified in models based on interest-bearing debt, as demonstrated by the analyses of the other economies in question.

Company age has a significant positive impact on the financing structure of firms in the first three models, however, this impact is relatively low. It should be noted that in the case of variable D_E this influence is negative. What is found in the analysis of variable SIZE is a negative influence on the structure of debt in all models in which this variable proved to be statistically significant (i.e. LEV_A, LEV_B, and LEV_C). Interestingly, Hungary is the only country in which variable TANG has no impact on LEV_B. The variable TANG is significant for two models with LEV_A and LEV_C and the proved dependency is negative. For instance, the growth of the share of tangible assets in total assets of 10% results in a decrease in total debt of around 0.4%. Independent variables based on rate of return ratios prove statistically significant in many models. ROS is significant in three out of five models, including model five, which takes into account interest-bearing liabilities (D_D+E). ROA is very significant statistically in the first four models, and it has the biggest impact on the debt-to-equity ratio, where an increase in ROA by 10% results in an increase in interest-bearing liabilities by a massive 68%. Variable LIQ is statistically insignificant in all five models, as in the case of the Czech Republic. The non-debt tax shield has a positive, significant impact on the financing structure of Hungarian companies in the first three models.

Since the selected economies come from a basket of countries at the same level of development, at the end of the study we decided to compare the obtained results in order to answer the following questions: firstly, what connects the analysed markets with each other, and secondly, what determinants constitute variables differentiating the countries under analysis. In addition, the authors decided to initiate a discussion on the causes of possible differences, which may be continued in future studies. Table 10 shows a summary of panel regression analyses.

Due to the lack of clarity as far as the sign of the non-debt tax shield is concerned in the pecking order theory, this variable was excluded from the analysis of matching the theory to individual economies. Theories were assigned on the basis of the domination of positive or negative direction of the influence of explanatory variables on the response variable in particular models (both significant and not statistically significant variables were taken into account). Following are the final findings:

– in the case of the Greek and Hungarian markets the theory best explaining company behaviour with regard to its financing structure is the pecking order theory (as demonstrated in the studies for Greece – Eriotis, Vasiliou, Ventoura-Neokosmidi 2007, and for Hungary – Colombo 2001);

– in the case of the Czech market the theory best explaining company behaviour with regard to its financing structure is the trade-off theory (in the literature analysed by the authors researchers did not decide to clearly select any matching theory[2]);

– in the case of the Polish market neither the pecking order theory nor the trade-off theory has been proved convincingly.

[2] "Neither *the pecking order theory nor the trade-off theory* has been convincingly proved" (Pinková 2012, p. 222).

At the same time, attention should be drawn to several interesting observations resulting from the conducted research:

– on average, the highest debt (LEV_A) was shown by Hungarian companies,

– only in Hungary is the average long-term corporate debt higher than the short-term debt, and the company total debt rises with age,

– in Hungary, the best match was showed by the model in which the response variable was based on long-term liabilities, while in other countries it was the model with the variable describing total debt,

– in all economies the size of the company had a statistically significant and negative influence on long-term debt,

– only in the case of the Hungarian market the structure of assets had an insignificant influence on companies' long-term debt,

– in all economies total return on assets had a statistically significant, negative influence on companies' total debt,

– in the case of most models, for all economies the variable NDTS had a positive impact on the financing structure (only in the case of Poland in one model and the Czech Republic in two models this influence was negative).

As evident from the above, the Hungarian market shows the highest number of anomalies. This fact is all the more surprising that Poland, the Czech Republic, and Hungary are all in the group of transition economies (Jõeveer 2013; de Haas, Peeter 2006), thus in the group of economies with shared historical and cultural conditions. It seems that only further research on the structure of financing of companies from advanced developing countries, including the inclusion of exogenous variables in the model, will make it possible to provide answers to the questions raised by researchers concerning the reasons for the existence of the identified differences.

5 Conclusions

The main purpose of this paper was to analyse firm specific determinants of capital structure in selected, advanced developing economies, i.e. Poland, the Czech Republic, Greece, and Hungary. On the basis of the relevant literature seven explanatory variables were selected and introduced in the model, as potential determinants of the structure of company financing. The following independent variables were selected: age, size, tangibility, return on sales, return on assets, liquidity, and non-debt tax shield. The explanatory variable was companies' financing structure, proxied by five different ratios. Ultimately, using a fixed effects regression model the research reviewed 20 models, i.e. 5 for each of the economies.

Research results demonstrate that selected endogenous factors influence the financing structure of companies in advanced developing economies, and the variables' highest statistical significance appeared in the model with response variable LEV_A. The direction of influence of individual variables differed, while the variability of influence was apparent not only between economies, but also between models analysed within one market.

Finally, it was determined that in the case of the Greek and Hungarian markets the theory best explaining company behaviour with regard to the financing structure is the pecking order theory,

while in the case of the Czech market it is the trade-off theory. In the case of the Polish market neither the pecking order theory nor the trade-off theory has been proved convincingly. The presented results should not be treated in a binary way, since in some cases differences related to the inclusion of a given model in a specific theoretical approach were very small. On more than one occasion analyses have shown that decisions taken by economic entities are a combination of both theories.

The analysis pays particular attention to the Hungarian market, which seems to differ from the other analysed economies. However, the exclusion of macroeconomic factors from the study does not allow us to establish what the cause of possible differences may be and how country-specific variables directly and indirectly affect the structure of company financing. The presented paper constitutes therefore a starting point for further in-depth research and discussion on the issues of the structure of company financing.

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Appendix

Table 1
Description of selected variables

Variable	Abbreviation	Measurement	Literature	Expected sign pecking order theory	Expected sign trade--off theory
Total leverage	LEV_A	total liabilities / total assets	Delcoure (2006); Song (2005); Bauer (2004a); Rajan, Zingales (1995)		
Long-term leverage	LEV_B	non-current liabilities / total assets	Delcoure (2006); Frąckowiak et al. (2005); Song (2005); Wald (1999)		
Short-term leverage	LEV_C	current-liabilities / total assets	Delcoure (2006); Song (2005); Titman, Wessels (1988)		
Debt-to-equity ratio	D_E	(interest-bearing liabilities*) / shareholder funds	Wędzki (2019); Herawati, Fauzia (2018); Sugiarto (2015); Noulas, Genimakis (2011); Van Horne, Wachowicz (2009)**		
Debt-to-debt--and-equity ratio	D_D+E	(interest-bearing liabilities) / (shareholder funds + interest--bearing liabilities)	Bauer (2004b); Bevan, Danbolt (2002); Rajan, Zingales (1995)		
Age	AGE	number of years from incorporation	Pfaffermayr, Stöckl, Winner (2013); Akhtar, Oliver (2009); de Haas, Peters (2006); Petersen, Rajan (1994)	–	+
Size	SIZE	natural logarithm of sales***	Kaźmierska--Jóźwiak, Marszałek, Sekuła (2015); Avarmaa, Hazak, Männasoo (2011); Psillaki, Daskalakis (2008); Chen (2004)	–	+

Table 1, cont'd

Variable	Abbreviation	Measurement	Literature	Expected sign pecking order theory	Expected sign trade--off theory
Tangibility	TANG	tangible fixed assets / total assets	Pinková (2012); Jong, Verbeek, Verwijmeren (2010); Hovakimian, Opler, Titman (2001); Rajan, Zingales (1995)	–	+
Return on sales	$PROF_A$	EBIT/sales	Kaźmierska--Jóźwiak, Marszałek, Sekuła (2015); Pinková (2012); Frank, Goyal (2009) Psillaki, Daskalakis (2008)	–	+
Return on total assets	$PROF_B$	EBIT / total assets	Kaźmierska--Jóźwiak, Marszałek, Sekuła (2015); Pinková (2012); Frank, Goyal (2009) Psillaki, Daskalakis (2008)	–	+
Liquidity	LIQ	current assets / current liabilities	Singh (2016), Pinková (2012); Sheikh, Wang (2011); Mazur (2007)	–	+
Non-debt tax shield	NDTS	depreciation and amortization / total assets	Chakraborty (2011); Cotei, Farhat (2009); Mazur (2007); Bauer (2004a); DeAneglo, Masulis (1980)	+/–	–

* Data presented in the Amadeus database are standardised, therefore we subjectively count long-term debt + other non--current liabilities + loans among interest-bearing liabilities.

** Since the authors did not find any literature (apart from Noulas, Genimakis 2011), in which researchers would use the D/E ratio as a response variable when verifying internal determinants of the capital structure of companies, the presented literature applies to the general use of the D/E ratio and ways of its calculation.

*** Sales in thousand EUR.

Source: own compilation based on literature review.

Table 2
Descriptive statistics: Poland (PL)

Variable	Mean	SD	Median	5th percentile	95th percentile
LEV_A	0.59112	0.57734	0.57467	0.16775	0.94920
LEV_B	0.19727	0.48501	0.11925	0.0057432	0.58540
LEV_C	0.39385	0.28941	0.36720	0.060251	0.78868
D_E	1.3905	34.045	0.51522	0.0082944	3.7935
D_D+E	0.37450	5.6873	0.35995	0.024141	0.87465
AGE	19.998	16.958	17.000	7.0000	51.000
SIZE	15.554	1.5543	15.533	13.105	18.152
TANG	0.44540	0.27817	0.43520	0.021080	0.91849
$PROF_A$	0.054145	1.5199	0.040839	-0.060821	0.27057
$PROF_B$	0.061264	0.14127	0.051343	-0.057311	0.22095
LIQ	2.0040	7.6925	1.2275	0.28194	4.8196
NDTS	0.047983	0.11698	0.037290	0.0059357	0.11620

Source: own compilation based on data from the Amadeus database.

Table 3
Descriptive statistics: Czech Republic (CZ)

Variable	Mean	SD	Median	5th percentile	95th percentile
LEV_A	0.57102	2.0986	0.48058	0.062567	1.1209
LEV_B	0.14988	0.70432	0.015488	0.00000	0.66298
LEV_C	0.42114	1.9588	0.31883	0.029002	0.96620
D_E	1.1449	180.94	0.067400	-0.070433	3.4892
D_D+E	0.24224	12.347	0.094768	0.00000	0.93538
AGE	15.793	6.0473	16.000	5.0000	25.000
SIZE	14.179	1.9995	14.250	10.0771	17.388
TANG	0.35303	0.38470	0.29871	0.010724	0.90119
$PROF_A$	-0.16623	60.867	0.041901	-0.18400	0.36128
$PROF_B$	0.071524	0.83430	0.054285	-0.11567	0.31920
LIQ	5.0716	106.44	1.7933	0.31222	13.026
NDTS	0.057962	2.5194	0.037414	0.0042955	0.14126

Source: own compilation based on data from the Amadeus database.

Table 4
Descriptive statistics: Greece (GR)

Variable	Mean	SD	Median	5th percentile	95th percentile
LEV_A	0.58659	0.40288	0.57627	0.10194	1.0020
LEV_B	0.11765	0.18688	0.038811	0.00000	0.48114
LEV_C	0.46894	0.38890	0.42363	0.057742	0.94191
D_E	1.1861	32.354	0.31829	0.00000	4.9738
D_D+E	0.37448	3.7309	0.27754	0.00000	0.92526
AGE	58.755	260.51	21.000	6.0000	58.000
SIZE	15.043	1.7249	15.008	12.466	17.959
TANG	0.28635	0.26213	0.21302	0.0041685	0.82576
$PROF_A$	0.12123	24.112	0.043987	-0.27745	0.30064
$PROF_B$	0.045026	0.13953	0.036859	-0.10588	0.23463
LIQ	3.1868	52.137	1.4544	0.44010	7.5360
NDTS	0.034075	0.043922	0.023132	0.0021939	0.097725

Source: own compilation based on data from the Amadeus database.

Table 5
Descriptive statistics: Hungary (HU)

Variable	Mean	SD	Median	5th percentile	95th percentile
LEV_A	0.70806	1.5002	0.62136	0.18573	1.1591
LEV_B	0.36104	0.99430	0.20525	0.0089014	0.94277
LEV_C	0.34702	0.94863	0.29231	0.023018	0.77825
D_E	2.5023	173.33	0.42291	-2.1298	8.4996
D_D+E	0.41251	29.550	0.36479	0.014623	1.1237
AGE	15.362	7.7706	15.000	5.0000	26.000
SIZE	13.031	2.1333	12.937	9.7091	16.704
TANG	0.51422	2.1574	0.51588	0.039931	0.96016
$PROF_A$	-0.084822	7.9251	0.045047	-0.36253	0.43354
$PROF_B$	0.044941	0.33664	0.044333	-0.13562	0.24951
LIQ	5.6314	127.73	1.4006	0.20062	11.711
NDTS	0.053578	0.064619	0.037844	0.0054705	0.15021

Source: own compilation based on data from the Amadeus database.

Table 6
Regression results – Poland

Variable	**LEV_A**	**LEV_B**	**LEV_C**	**D_E**	**D_D+E**
AGE	-0.00452961*** (0.000564072)	-0.000311686 (0.000487591)	-0.00421793*** (0.000297734)	-0.177503** (0.0707496)	0.0202079* (0.0117561)
SIZE	0.00855457** (0.00419330)	-0.0191707*** (0.00362474)	0.0277253*** (0.00221335)	1.08054** (0.525951)	-0.113625 (0.0873944)
TANG	0.0852862*** (0.0163316)	0.238829*** (0.0141172)	-0.153543*** (0.00862029)	2.09749 (2.04841)	0.0586633 (0.340373)
$PROF_A$	0.000105636 (0.000992083)	0.00165387* (0.000857569)	-0.00154823*** (0.000523651)	0.0202843 (0.124433)	0.0109396 (0.0206764)
$PROF_B$	-0.323173*** (0.0125431)	-0.0299146*** (0.0108424)	-0.293259*** (0.00662063)	-3.75652** (1.57324)	-0.0220297 (0.261416)
LIQ	-0.00171484*** (0.000225386)	1.35453e-05 0.000194826	-0.00172839*** (0.000118965)	0.00462521 (0.0282694)	-0.00210678 (0.00469736)
NDTS	0.0318782** (0.0146747)	0.00785668 (0.0126850)	0.0240216*** (0.00774576)	-0.172706 (1.84060)	0.0677132 (0.305842)
Const	0.532358*** (0.0640981)	0.396642*** (0.0554072)	0.135716*** (0.0338329)	-12.5723 (8.03960)	1.71328 (1.33590)
No. of observations	37,836	37,836	37,836	37,836	37,836
No. of companies	4,204	4,204	4,204	4,204	4,204
LSDV R^2	0.804284	0.792774	0.783008	0.114555	0.123941
Fixed effects	yes	yes	yes	yes	yes
Random effects	no	no	no	no	no

Note: *, ** and *** indicate significance at the 10%, 5% and 1% level respectively.

Source: own compilation based on data from the Amadeus database.

Table 7
Regression results – Czech Republic

Variable	LEV_A	LEV_B	LEV_C	D_E	D_D+E
AGE	-0.00304423** (0.00127017)	0.00443979 *** (0.000494941)	-0.00748402*** (0.00121661)	0.254782 (0.169193)	-0.0305905*** (0.0114656)
SIZE	0.0262938*** (0.00743858)	-0.0459167*** (0.00289855)	0.0722105*** (0.00712490)	-0.53407 (0.990857)	0.0398892 (0.0671469)
TANG	3.97341*** (0.0135935)	-0.0203177*** (0.00529691)	3.99373*** (0.0130203)	0.643678 (1.81072)	0.425006*** (0.122706)
$PROF_A$	0.000111719** (5.67083e-05)	6.30371e-06 (2.20972e-05)	0.000105415* (5.43169e-05)	-3.76948e-05 (0.00755384)	0.000141871 (0.000511897)
$PROF_B$	-0.741060*** (0.00520899)	-0.0101313*** (0.00202976)	-0.730928*** (0.00498932)	-0.0189748 (0.693864)	0.177044*** (0.0470207)
LIQ	8.24895e-06 (3.28537e-05)	6.22506e-07 (1.28019e-05)	7.62645e-06 (3.14683e-05)	0.000633490 (0.00437628)	7.14662e-06 (0.000296565)
NDTS	0.133312*** (0.00164139)	0.00175432*** (0.000639592)	0.131558*** (0.00157217)	-0.00202280 (0.218642)	-0.0292679** (0.0148166)
Const	-1.11120*** (0.105232)	0.738595*** (0.0410054)	-1.84979 (0.100795)	4.46923 (14.0175)	-0.00123094 (0.949917)
No. of observations	173,448	173,448	173,448	173,448	173,448
No. of companies	19,272	19,272	19,272	19,272	19,272
LSDV R^2	0.628581	0.499322	0.608892	0.113432	0.125651
Fixed effects	yes	yes	yes	yes	yes
Random effects	no	no	no	no	no

Note: *, ** and *** indicate significance at the 10%, 5% and 1% level respectively.

Source: own compilation based on data from the Amadeus database.

Table 8
Regression results – Greece

Variable	LEV_A	LEV_B	LEV_C	D_E	D_D+E
AGE	-0.00315808*** (0.000384914)	0.00174861*** (0.000198560)	-0.00490668*** (0.000379047)	-0.0678715 (0.0619665)	-0.00789554 (0.00687508)
SIZE	-0.00375278* (0.00226734)	-0.0109632*** (0.00116962)	0.00721042*** (0.00223278)	1.21825*** (0.365014)	0.0552145 (0.0404977)
TANG	-0.0906353*** (0.0119785)	0.0602944*** (0.00617917)	-0.150930*** (0.0117959)	-0.902867 (1.92839)	-0.00576871 (0.213951)
$PROF_A$	2.68389e-05 (4.29343e-05)	-1.09838e-05 (2.21479e-05)	3.78228e-05 (4.22799e-05)	0.00199644 (0.00691190)	0.000119158 (0.000766864)
$PROF_B$	-0.411298*** (0.00976843)	8.16151e-05 (0.00503911)	-0.411380*** (0.00961956)	-1.79726 (1.57260)	-0.0283084 (0.174477)
LIQ	-4.37887e-05** (2.01824e-05)	5.13694e-06 (1.04112e-05)	-4.89257e-05** (1.98748e-05)	8.76975e-05 (0.00324913)	-7.79672e-06 (0.000360486)
NDTS	0.344667*** (0.0379573)	0.0398566** (0.0195805)	0.304810*** (0.0373788)	1.09364 (6.11067)	0.0526877 (0.677969)
Const	0.861460*** (0.0428608)	0.161187*** (0.0221100)	0.700273*** (0.0422076)	-12.8505* (6.90008)	0.00893272 (0.765553)
No. of observations	43,497	43,497	43,497	43,497	43,497
No. of companies	4,833	4,833	4,833	4,833	4,833
LSDV R^2	0.780267	0.728238	0.771325	0.116975	0.182582
Fixed effects	yes	yes	yes	yes	yes
Random effects	no	no	no	no	no

Note: *, ** and *** indicate significance at the 10%, 5% and 1% level respectively.

Source: own compilation based on data from the Amadeus database.

Table 9
Regression results – Hungary

Variable	LEV_A	LEV_B	LEV_C	D_E	D_D+E
AGE	0.0129588*** (0.00130381)	0.00484578*** (0.000705292)	0.00811302*** (0.000945435)	-0.320197* (0.193304)	0.0362469 (0.0330554)
SIZE	-0.107670*** (0.00686399)	-0.0798264*** (0.00371306)	-0.0278438*** (0.00497731)	0.563057 (1.01766)	-0.102448 (0.174022)
TANG	-0.0430308*** (0.00178925)	-0.000317012 (0.000967889)	-0.0427138*** (0.00129744)	-0.353508 (0.265276)	-0.0108931 (0.0453628)
$PROF_A$	-0.00567928*** (0.000457181)	-0.00559779*** (0.000247311)	-8.14872e-05 (0.000331517)	0.0148455 (0.0677821)	-0.0228218** (0.0115909)
$PROF_B$	-0.147101*** (0.0118198)	-0.298341*** (0.00639390)	0.151240*** (0.00857095)	6.84402*** (1.75242)	0.00313831 (0.299668)
LIQ	-3.26370e-05 (2.80356e-05)	-3.78186e-06 (1.51658e-05)	-2.88552e-05 (2.03296e-05)	-0.000118051 (0.00415659)	-2.82488e-05 (0.000710787)
NDTS	9.35104*** (0.0776909)	2.29638*** (0.0420267)	7.05466*** (0.0563362)	7.71091 (11.5185)	2.29411 (1.96969)
Const	1.43947*** (0.0893027)	1.21690*** (0.0483081)	0.222575*** (0.0647564)	-0.453186 (13.2401)	1.07147 (2.26409)
No. of observations	121,752	121,752	121,752	121,752	121,752
No. of companies	13,528	13,528	13,528	13,528	13,528
LSDV R^2	0.466575	0.644647	0.298506	0.121646	0.116259
Fixed effects	yes	yes	yes	yes	yes
Random effects	no	no	no	no	no

Note: *, ** and *** indicate significance at the 10%, 5% and 1% level respectively.
Source: own compilation based on data from the Amadeus database.

Table 10
Summary of data panel regression

	PL	CZ	GR	HU	PL	CZ	GR	HU	PL	CZ	GR	HU	PL	CZ	GR	HU	PL	CZ	GR	HU
	LEV_A				LEV_B				LEV_C				D_E				D_D+E			
AGE	−	−	−	+	−	+	+	+	−	−	−	+	−	+	−	−	+	−	−	+
SIZE	+	+	−	−	−	−	−	−	+	+	+	−	+	−	+	+	−	+	+	−
TANG	+	+	−	−	+	−	+	−	−	+	−	−	+	+	−	−	+	+	−	−
$PROF_A$	+	+	+	−	+	+	−	−	−	+	+	−	+	−	+	+	+	+	+	−
$PROF_B$	−	−	−	−	−	−	+	−	−	−	−	+	−	−	−	+	−	+	−	+
LIQ	−	+	−	−	+	+	+	−	−	+	−	−	+	+	+	−	−	+	−	−
NDTS	+	+	+	+	+	+	+	+	+	+	+	+	−	−	+	+	+	−	+	+

Note: fields marked in grey show that the specific variable was statistically significant, while white fields mean that the variable was not statistically significant. The table does not take into account the strength of influence of the variables, focusing on the direction only.

Source: own compilation.

Table 11
Correlation matrix – Poland

	LEV_A	LEV_B	LEV_C	D_E	D_D+E	AGE	SIZE	TANG	$PROF_A$	$PROF_B$	LIQ	NDTS
LEV_A	1.0000	0.8657	0.5442	0.0141	0.0340	-0.0540	-0.0463	-0.0666	-0.0330	-0.1819	-0.0726	0.0472
LEV_B	0.8657	1.0000	0.0511	0.0091	0.0438	-0.0474	-0.1587	0.1196	-0.0165	-0.0851	-0.0046	0.0483
LEV_C	0.5442	0.0511	1.0000	0.0129	-0.0055	-0.0283	0.1737	-0.3333	-0.0383	-0.2202	-0.1371	0.0131
D_E	0.0141	0.0091	0.0129	1.0000	0.0026	-0.0094	-0.0019	0.0025	0.0001	-0.0143	-0.0039	0.0014
D_D+E	0.0340	0.0438	-0.0055	0.0026	1.0000	-0.0042	-0.0046	-0.0044	-0.0043	-0.0108	-0.0031	0.0045
AGE	-0.0540	-0.0474	-0.0283	-0.0094	-0.0042	1.0000	0.1599	0.0255	-0.0041	-0.0484	-0.0086	-0.0001
SIZE	-0.0463	-0.1587	0.1737	-0.0019	-0.0046	0.1599	1.0000	-0.2516	0.0167	0.0991	-0.0774	0.0087
TANG	-0.0666	0.1196	-0.3333	0.0025	-0.0044	0.0255	-0.2516	1.0000	0.0108	-0.0781	-0.0756	0.0801
$PROF_A$	-0.0330	-0.0165	-0.0383	0.0001	-0.0043	-0.0041	0.0167	0.0108	1.0000	0.1018	-0.0063	-0.0055
$PROF_B$	-0.1819	-0.0851	-0.2202	-0.0143	-0.0108	-0.0484	0.0991	-0.0781	0.1018	1.0000	0.0201	0.0163
LIQ	-0.0726	-0.0046	-0.1371	-0.0039	-0.0031	-0.0086	-0.0774	-0.0756	-0.0063	0.0201	1.0000	-0.0162
NDTS	0.0472	0.0483	0.0131	0.0014	0.0045	-0.0001	0.0087	0.0801	-0.0055	0.0163	-0.0162	1.0000

Source: own compilation.

Table 12
Correlation matrix – Czech Republic

	LEV_A	LEV_B	LEV_C	D_E	D_D+E	AGE	SIZE	TANG	$PROF_A$	$PROF_B$	LIQ	NDTS
LEV_A	1.0000	0.3596	0.9420	0.0008	-0.0540	-0.0349	-0.0505	0.4485	-0.0006	-0.3920	-0.0057	0.0068
LEV_B	0.3596	1.0000	0.0257	0.0036	-0.1581	-0.0365	-0.0969	0.1040	-0.0010	-0.0639	0.0033	0.0045
LEV_C	0.9420	0.0257	1.0000	-0.0005	-0.0010	-0.0243	-0.0192	0.4431	-0.0003	-0.3970	-0.0073	0.0056
D_E	0.0008	0.0036	-0.0005	1.0000	0.0003	0.0031	-0.0012	0.0037	0.0000	-0.0004	0.0002	0.0002
D_D+E	-0.0540	-0.1581	-0.0010	0.0003	1.0000	-0.0053	0.0002	0.0072	0.0008	0.0128	-0.0001	0.0002
AGE	-0.0349	-0.0365	-0.0243	0.0031	-0.0053	1.0000	0.1789	-0.0043	0.0041	-0.0045	0.0041	-0.0046
SIZE	-0.0505	-0.0969	-0.0192	-0.0012	0.0002	0.1789	1.0000	-0.1503	0.0153	0.0336	-0.0315	-0.0053
TANG	0.4485	0.1040	0.4431	0.0037	0.0072	-0.0043	-0.1503	1.0000	-0.0056	-0.2231	-0.0056	0.0048
$PROF_A$	-0.0006	-0.0010	-0.0003	0.0000	0.0008	0.0041	0.0153	-0.0056	1.0000	0.0115	-0.0002	0.0000
$PROF_B$	-0.3920	-0.0639	-0.3970	-0.0004	0.0128	-0.0045	0.0336	-0.2231	0.0115	1.0000	-0.0008	0.5227
LIQ	-0.0057	0.0033	-0.0073	0.0002	-0.0001	0.0041	-0.0315	-0.0056	-0.0002	-0.0008	1.0000	-0.0004
NDTS	0.0068	0.0045	0.0056	0.0002	0.0002	-0.0046	-0.0053	0.0048	0.0000	0.5227	-0.0004	1.0000

Source: own compilation.

Table 13
Correlation matrix – Greece

	LEV_A	LEV_B	LEV_C	D_E	D_D+E	AGE	SIZE	TANG	$PROF_A$	$PROF_B$	LIQ	NDTS
LEV_A	1.0000	0.3054	0.8892	0.0190	0.1340	-0.0738	0.1297	-0.1553	-0.0048	-0.2249	-0.0441	0.0256
LEV_B	0.3054	1.0000	-0.1641	0.0320	0.0544	-0.0045	0.0882	0.3114	-0.0052	-0.1143	-0.0087	0.0829
LEV_C	0.8892	-0.1641	1.0000	0.0043	0.1127	-0.0743	0.0920	-0.3105	-0.0024	-0.1780	-0.0415	-0.0134
D_E	0.0190	0.0320	0.0043	1.0000	0.0030	-0.0013	0.0143	0.0063	-0.0001	-0.0038	-0.0012	0.0036
D_D+E	0.1340	0.0544	0.1127	0.0030	1.0000	-0.0053	0.0230	0.0093	-0.0003	-0.0125	-0.0032	0.0006
AGE	-0.0738	-0.0045	-0.0743	-0.0013	-0.0053	1.0000	-0.0682	0.1077	0.0001	-0.0006	0.0039	0.0436
SIZE	0.1297	0.0882	0.0920	0.0143	0.0230	-0.0682	1.0000	-0.1230	-0.0321	0.0964	-0.0351	-0.1164
TANG	-0.1553	0.3114	-0.3105	0.0063	0.0093	0.1077	-0.1230	1.0000	-0.0018	-0.1553	0.0080	0.3088
$PROF_A$	-0.0048	-0.0052	-0.0024	-0.0001	-0.0003	0.0001	-0.0321	-0.0018	1.0000	0.0135	-0.0001	-0.0035
$PROF_B$	-0.2249	-0.1143	-0.1780	-0.0038	-0.0125	-0.0006	0.0964	-0.1553	0.0135	1.0000	0.0026	-0.1691
LIQ	-0.0441	-0.0087	-0.0415	-0.0012	-0.0032	0.0039	-0.0351	0.0080	-0.0001	0.0026	1.0000	0.0020
NDTS	0.0256	0.0829	-0.0134	0.0036	0.0006	0.0436	-0.1164	0.3088	-0.0035	-0.1691	0.0020	1.0000

Source: own compilation.

Table 14
Correlation matrix – Hungary

	LEV_A	**LEV_B**	**LEV_C**	**D_E**	**D_D+E**	**AGE**	**SIZE**	**TANG**	**$PROF_A$**	**$PROF_B$**	**LIQ**	**NDTS**
LEV_A	1.0000	0.7842	0.7596	0.0013	-0.0756	-0.0590	-0.1025	-0.0010	-0.0475	-0.1902	-0.0021	0.2720
LEV_B	0.7842	1.0000	0.1920	0.0032	-0.1111	-0.0831	-0.2088	0.0104	-0.0669	-0.2449	0.0086	0.1527
LEV_C	0.7596	0.1920	1.0000	-0.0012	-0.0031	-0.0062	0.0568	-0.0124	-0.0049	-0.0441	-0.0123	0.2700
D_E	0.0013	0.0032	-0.0012	1.0000	0.0002	-0.0054	-0.0018	0.0007	0.0006	-0.0003	0.0002	-0.0021
D_D+E	-0.0756	-0.1111	-0.0031	0.0002	1.0000	-0.0026	-0.0016	0.0006	-0.0023	0.0052	0.0003	0.0052
AGE	-0.0590	-0.0831	-0.0062	-0.0054	-0.0026	1.0000	0.2855	-0.0103	0.0016	0.0051	-0.0042	-0.0984
SIZE	-0.1025	-0.2088	0.0568	-0.0018	-0.0016	0.2855	1.0000	-0.0381	0.0598	0.0977	-0.0345	-0.0213
TANG	-0.0010	0.0104	-0.0124	0.0007	0.0006	-0.0103	-0.0381	1.0000	-0.0002	0.2619	-0.0025	0.1622
$PROF_A$	-0.0475	-0.0669	-0.0049	0.0006	-0.0023	0.0016	0.0598	-0.0002	1.0000	0.0447	-0.0021	0.0004
$PROF_B$	-0.1902	-0.2449	-0.0441	-0.0003	0.0052	0.0051	0.0977	0.2619	0.0447	1.0000	-0.0031	-0.0911
LIQ	-0.0021	0.0086	-0.0123	0.0002	0.0003	-0.0042	-0.0345	-0.0025	-0.0021	-0.0031	1.0000	-0.0130
NDTS	0.2720	0.1527	0.2700	-0.0021	0.0052	-0.0984	-0.0213	0.1622	0.0004	-0.0911	-0.0130	1.0000

Source: own compilation.

Mikrodeterminanty struktury kapitału przedsiębiorstw z europejskich zaawansowanie rozwijających się gospodarek

Problematyka determinant struktury finansowania przedsiębiorstw jest od lat tematem badań w literaturze przedmiotu. Do dwóch najpopularniejszych i najczęściej aplikowanych teorii, które próbują tłumaczyć decyzje podmiotów gospodarczych podejmowanych w zakresie wyboru źródeł finansowania działalności, należą: teoria hierarchii wyboru źródeł finansowania (*pecking order theory*) oraz teoria substytucji (trade-off theory). Każda z tych teorii analizuje szereg czynników i determinant, które wpływają na decyzje przedsiębiorstw w zakresie wyboru źródeł finansowania, uwzględniając działania asymetrii informacji, kosztów agencji czy kosztów bankructwa.

Pomimo to nadal istnieje wiele niejasności i rozbieżności w obszarze wyboru poszczególnych źródeł finansowania przez przedsiębiorstwa. Warto również zwrócić uwagę, iż wiele opracowań dotyczących obszaru struktury finansowania powstało na podstawie badań przeprowadzonych na gospodarkach rozwiniętych, co powoduje, że ich wyniki nie zawsze znajdują odzwierciedlenie w przypadku państw rozwijających się. Wskazane niejasności oraz potrzeba zgłębienia problemu z perspektywy państw o innych uwarunkowaniach strukturalnych skłoniły autorów do podjęcia analizy w obszarze determinant struktury finansowania.

Głównym celem niniejszego artykułu była analiza mikrodeterminant (specyficznych dla danego przedsiębiorstwa) struktury kapitału w wybranych zaawansowanie rozwijających się gospodarkach, tj. w Polsce, Czechach, Grecji i na Węgrzech. Na podstawie literatury przedmiotu wybrano siedem zmiennych objaśniających, które wprowadzono do modelu jako potencjalne determinanty struktury finansowania spółek. Jako zmienne niezależne wybrano: wiek, rozmiar, strukturę aktywów, rentowność sprzedaży, rentowność aktywów ogółem, płynność i nieodsetkową tarczę podatkową. Zmienną objaśniającą była struktura finansowania spółek, weryfikowana za pomocą pięciu różnych wskaźników. Z uwagi na dostępność danych w modelu uwzględniono dziewięć lat, to jest od 2009 do 2017 r. Ostatecznie za pomocą analizy regresji panelowej w badaniu zweryfikowano 20 modeli, po pięć dla każdej gospodarki.

Rezultaty badania wskazują, że wybrane czynniki endogeniczne mają wpływ na strukturę finansowania spółek w gospodarkach zaawansowanie rozwijających się, przy czym największa istotność statystyczna zmiennych była w przypadku modelu zbudowanego dla wskaźnika zadłużenia ogółem. Kierunek oddziaływania poszczególnych zmiennych był różny, a zmienność oddziaływania występowała nie tylko pomiędzy gospodarkami, ale również pomiędzy modelami analizowanymi w ramach jednego rynku.

Ostatecznie stwierdzono, że w przypadku rynku greckiego i węgierskiego teorią najlepiej tłumaczącą zachowania spółek w zakresie struktury finansowania będzie teoria hierarchii wyboru źródeł finansowania, a w przypadku rynku czeskiego teoria substytucji. W przypadku rynku polskiego żadna z dwóch wspomnianych teorii nie została jednoznacznie potwierdzona. Zaprezentowanych wyników nie należy jednak traktować zero-jedynkowo, ponieważ w niektórych przypadkach różnice związane z klasyfikacją modelu do danego ujęcia teoretycznego były bardzo niewielkie. Niejednokrotnie analizy wykazały bowiem, że decyzje podejmowane przez podmioty gospodarcze stanowią połączenie obu teorii.