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# Meta-study on relationship between macroeconomic and institutional environment and internal determinants of enterprises' capital structure

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## ABSTRACT

The enterprise capital structure is influenced by internal factors, i.e., the share of fixed assets in total assets, the size and growth of the enterprise, its liquidity and profitability, and the non-debt tax shield. The literature shows that external factors – macroeconomic and institutional specifics of enterprises' environment – may shape the strength and direction of these dependencies. The main aim of this article is to identify the relationship between external factors and the impact of internal determinants on the capital structure. The study includes the meta-analysis of papers which provide information on the relationship between internal factors and the capital structure for 35 countries. The study includes the papers published after 2000 whose research covered the period 1993–2017. A statistically significant relationship between four external factors (inflation, G.D.P. growth rate, G.D.P., index of protection of the creditors and debtors rights) and the strength and direction of the impact of internal factors on the capital structure has been found. In addition, the unambiguously negative impact of two internal factors (liquidity and profitability of the enterprise) on indebtedness was diagnosed. It also reveals that the pecking order theory constitutes a strong theoretical basis for research into the capital structure of enterprises.

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## 1. Introduction

The selection of sources of finance for the company is one of the most important financial decisions taken by managers of contemporary enterprises. The capital structure shaped in this way significantly affects the level of financial risk and the cost of capital which are direct determinants of the results achieved. In this regard previous studies indicate two groups of factors influencing the decisions of enterprises. The first group consists of internal factors related to the characteristics and organisation of the enterprise; its functioning and the effects of its business operations: broadly

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understood relations between assets, sources of financing, revenues and costs, and the results achieved. The second group of factors includes external factors resulting from the macroeconomic and institutional conditions of the environment in which enterprises operate.

The literature indicates that external factors may affect the capital structure directly, but also indirectly – by shaping the strength and direction of the influence of internal determinants. The main aim of this article is to identify the relationship between external factors and the impact of internal factors on the capital structure. At the same time, an attempt to determine internal factors whose impact is common and independent of the place of operation of enterprises is made. Taking into account the literature review we have formulated two hypotheses. The first hypothesis claims that there are external factors exerting influence on the capital structure of enterprises indirectly – by moderating internal factors. The second hypothesis states that the above mentioned external factors include: G.D.P., G.D.P. per capita, G.D.P. growth, inflation, unemployment, taxation, availability of credit, degree of capital markets development, level of research and development expenditures or level of protection of creditors and debtors.

The study uses a meta-analysis of previous empirical studies on the relationship between internal factors and the capital structure of enterprise in the conditions specific to the economies of different countries. It encompasses results of 38 research papers based on data of the enterprises listed on capital markets in 35 countries in the years 1993–2017. The purpose of the meta-analysis conducted is to determine common effects, and at the same time, differences between the results obtained by other authors. An attempt to explain the differences identified is based on meta-regression and logit analysis. The external factors of the capital structure are used as explanatory variables. The macroeconomic and institutional data of the economies of the countries taking part in the analysis was taken from the World Bank databases.

Theories concerning cause-and-effect relationships between external factors and the capital structure of the enterprise have not yet been developed in the literature. It means that from the point of view of the contemporary knowledge, any attempt to aggregate the current empirical research may contribute to the inclusion of these relationships in the theoretical model. This particular paper is placed in this research area. The summary of many empirical studies based on large number of enterprises is its contribution to the development of the existing knowledge. These studies cover the economies of 35 countries from every region of the world. The obtained results provide a strong ground for indicating the capital structure theory which best explains the financial decisions of enterprises. They also create a premise for the development of a theoretical model explaining the relationship between external and internal determinants of the capital structure.

## **2. Contemporary theories and internal factors of capital structure**

The discussion on the capital structure and factors influencing its formation was initiated by the capital structure model developed by Modigliani and Miller (1958). The authors proved that the cost of capital on the perfect market without tax burden does

**Table 1.** Internal determinants of the enterprises' capital structure.

Determinant/Debt	Abbreviation	Agency theory	Signalling theory	Pecking order theory	Static trade-off theory
Tangibility (share of fixed assets in total assets)	TANG	+		–	+
Size of enterprise	SIZE	+		–/+	+
Growth of enterprise	GROW	–	+	+	–
Profitability	PROF	+	+	–	+
Liquidity	LIQ			–	+
Non-debt tax shield	NDTS	+		–	–

Notes: + Positive dependence; – Negative dependence; –/+ Unspecified dependence.

Source: Authors' elaboration based on Harris and Raviv (1991), Frank and Goyal (2007) and Czerwonka and Jaworski (2019).

not depend on capital structure. The introduction of income tax payable by enterprises to the first M.M. model changed this conclusion: the optimal capital structure is made when the enterprise is financed entirely with debt (Modigliani & Miller, 1963). During the scientific discussion on the Modigliani and Miller models, subsequent theories were developed. In 1976, M.C. Jensen and W.H. Meckling presented the concept of financial decisions based on the agency theory. It took into account conflicts of interest between shareholders and creditors and the management of the company. It was assumed that debt is one of the ways to reduce this conflict (Jensen & Meckling, 1976). The next theory (the signalling theory) is based on the thesis that through the selection of the capital structure, the management board signals the knowledge about the condition and development opportunities of the enterprise to the business environment. A larger share of debt in the capital structure provides signal of high future cash flows enabling repayment of liabilities (Ross, 1977). In view of another theory (the pecking order theory), internal financing is the first financing source of investments. Indebtedness comes next, while the issue of equity is the last one in the sequence (Myers & Majluf, 1984). The static trade-off theory assumes that the optimal capital structure results from the calculation of benefits derived from the tax shield with the costs of financial difficulties resulting from the indebtedness of the enterprise (Myers, 1984).

A thorough analysis of the capital structure theories was carried out by Harris and Raviv (1991) and Frank and Goyal (2007). Within this analysis, the authors paid attention to internal factors that could affect decisions related to sources of finance. Table 1 presents the most important of these factors with the determination of the direction of impact.

The explanations of the impact of particular internal factors on the capital structure based on the aforementioned theories were made by: Nejad and Wasiuzzaman (2013), Islam (2016), Czerwonka and Jaworski (2018), among others.

Fixed assets are good collateral for liabilities. They are less exposed to a loss of value than current assets. It means that their high share in total assets may increase the share of debt in the capital structure. In addition, better hedging for debt reduces the cost of its issuance. Therefore, from the point of view of the static trade-off and agency theories the relationship between the share of fixed assets in total assets and debt is positive. The opposite dependence arises from the pecking order theory. A higher level of fixed assets determines the less pronounced asymmetry of information. This process leads to a decreasing equity cost.

Another internal factor can be identified from the static trade-off and agency theories. It is a size of the enterprise. Large enterprises conduct more diversified business activities and the risk of their bankruptcy is lower. They also usually function longer than smaller enterprises; they are better known and because of their reputation the cost of debt issuance is lower for them. It means that the larger the enterprise, the higher the share of debt in its capital structure.

The size of the enterprise also helps reduce the cost of equity. On the other hand, large enterprises have more assets what means that the phenomenon of negative selection of shares buyers is more important for them than for smaller entities. It means that from the point of view of the pecking order theory; the relationship between the size of the enterprise and the degree of its indebtedness is unspecified.

The growth of an enterprise requires an adequate increase in the sources of finance. In a view of the pecking order theory, debt is preferable to the issue of equity. Similarly, in the light of the signalling theory, a faster growth of the company is a positive signal for investors and raises share prices. Higher valuation of shares provides an opportunity to incur a debt at a lower price, with a relatively low risk of bankruptcy. The static trade-off theory and the agency theory point to the opposite relationship. The cost of bankruptcy is higher in the case of companies with a fast growth – such companies lose relatively more in value. At the same time fast growing companies usually tend to finance more risky projects. It means that the cost of debt is higher for them.

In a view of the pecking order theory, the increase in the profitability of an enterprise favours its self-financing, and thus limits the share of debt in the capital structure. In the case of other theories discussed, the relationship between profitability and debt is opposite. From the standpoint of the static trade-off theory, profitable enterprises have lower costs related to the risk of bankruptcy and more benefits associated with the tax shield. In the light of the signalling theory, the profitable company sends positive signals to the creditors, which enables further debt growth. The agency theory also recognises a higher level of debt as more profitable for enterprises because it could alleviate the problem of excessive free cash.

The pecking order theory shows that enterprises able to generate a significant amount of cash (with high financial liquidity) use internal sources of finance and avoid the resorting to debt. In turn, in a view of the static trade-off theory, a higher share of liquid assets in total assets means a lower risk of bankruptcy. It allows for increasing the debt and using the tax shield.

The next capital structure determinant results from the static trade-off theory: the non-debt tax shield. As the relation between depreciation and total assets, it is a substitute for the debt tax shield and reduces the inclination of indebtedness. A similar relationship can be formulated with regard to the pecking order theory. The higher depreciation, the greater is the financial surplus. It is the reason for an increase in self-financing opportunities. A positive relationship between a non-debt tax shield and debt can be derived from the agency theory. An increase in depreciation means a large level of free cash flow at managers' disposal. In this situation, the natural way to limit irrational use of this cash flow by managers is to increase debt.

The impact of internal factors on the enterprises' capital structure underwent extensive empirical studies. Appendix 1 contains a list of 49 studies in which their

impact on the capital structure in the conditions of the economies from different countries was tested.

### 3. External factors of capital structure: Literature review

The studies on the impact of conditions related to the economies of different countries on the capital structure of enterprises were begun by Rajan and Zingales (1995). The authors attempted to determine whether the factors identified as determinants of the capital structure of US enterprises affected the financing of enterprises from other G-7 countries. They analysed, among other things, institutional differentiation between particular countries (including in terms of the tax regime, bankruptcy law or the role historically played by banks and securities markets) and their possible impact on the capital structure of enterprises. The results of these studies confirmed the fact that external factors specific to a country's economy determine to a certain, but limited degree, the capital structure of enterprises.

Similar research was carried out by Delcours (2007) for economies undergoing the transformation. The author examined the strength and direction of the influence of internal factors on the capital structure in four countries of Central and Eastern Europe. Characterising the researched economies, she concluded that the analysed relations were indirectly affected by differences in the regulations regarding corporate governance, the degree of protection of creditors and the organisation of the financial market.

Gungoraydinoglu and Öztekin (2011), on the grounds of their studies of enterprises from 37 countries, stated that internal factors account for two-thirds of the variability of the capital structure, while external determinants are responsible for the remaining one-third of the variation. Similar conclusions can be drawn from Joeveer's (2006) research which proved that external factors are significant determinants of corporate debt. About half of the debt variability can be explained by measurable macroeconomic factors (G.D.P., capital market rates of return, etc.), while the remaining part results from non-measurable institutional differences (e.g., legal standards and the level of law enforcement). The last problem has been investigated by Cho et al. (2014). The research sample covered 17,452 enterprises from 48 countries in the years 1991–2010. It turned out that strong creditor protection had a negative impact on the use of long-term debt in the capital structure of companies.

Research on the relationship between the capital structure and the risk concerning various macroeconomic and environmental aspects was carried out by Baum, Chakraborty, and Liu (2010) and Chen and Wang (2012). In the first case, the authors proved, on the basis of an analysis nearly 800,000 reports of the companies from the S&P Index, that the level of leverage differs significantly among companies with different levels of corporate governance. The second survey indicated that the decisions related to the selection of sources of finance play a crucial role in the risk related to environmental protection regulations ratified by particular countries.

Measurable external factors were studied, among others, by Booth, Aivazian, Demirguc-Kunt, and Maksimovic (2001) and De Jong, Kabir, and Nguyen (2008). The first study concerned the verification of the influence of internal factors on the

capital structure of enterprises identified in the developed countries under the conditions of the developing economies. In addition to confirmation of this hypothesis, the authors discovered the dependence of the strength and direction of the impact of selected internal factors on such features of economy as G.D.P. growth, the inflation rate and the level of development of financial markets. Similar research was conducted for the economies of countries aspiring to join the E.U. It was carried out by Nivorozhkin (2005). Having analysed the financial statements of enterprises from Bulgaria, the Czech Republic, Estonia, Poland and Romania, the author confirmed that the following external factors have a significant influence on the capital structure: G.D.P. per capita, size of the banking sector, inflation, investment level and capitalisation of capital markets.

De Jong et al. (2008) examined the capital structure of enterprises from 42 countries and confirmed that the level of economic development (G.D.P., cost of loans, tax rates) had a considerable impact on corporate indebtedness. The authors investigated this impact by verifying how the above features affect the internal factors of the capital structure in each respective economy. As a consequence, they formulated the thesis that measurable factors at the level of the economy affect the indebtedness of enterprises indirectly. Similar conclusions concerned the examined institutional factors. Efficiency of the judiciary, degree of corruption, number and quality of financial institutions were listed as crucial institutional capital structure determinants. When the legal system is more institutionalised and developed, the economy tends to be developing more dynamically and intensively then internal factors exert stronger influence on corporate indebtedness. The authors considered the tax rates, G.D.P. and capitalisation of local capital markets as significant external capital structure determinants.

The impact of taxes on corporate debt policy was examined also by Feld, Heckemeyer, and Overesch (2013). They found using meta-analysis based on 48 papers that this impact is substantial, but strongly varied. The authors pointed out that relationship between taxes and debt of enterprises is positive. The firm growth (negative relationship) and inflation (positive relationship) were mentioned as the moderators of the tax impact on the capital structure.

The aim of the Kayo and Kimura (2011) study was to present external capital structure determinants in a hierarchical perspective. They conducted their research on the basis of financial statements of companies from 40 countries. The authors found the strongest dependence for factors at the lowest level of the hierarchy (internal factors). The external factors at the level of economy sector exerted lesser influence on the capital structure. For the macroeconomic and institutional factors at the country level, the weakest dependence was diagnosed. From these observations, the authors drew the conclusion that further investigations should be concentrated on relations between these three levels of factors. This conclusion was confirmed by extensive research based on financial statements of ca. 38,000 enterprises from 39 developed countries conducted by Fan, Titman, and Twite (2012) in the years 1991–2006. The authors came to the opposite conclusions than Kayo and Kimura (2011). They proved that factors at the level of economy sector influence on the capital structure of enterprises much less than macroeconomic and institutional factors.



#### 4. Data source and research method

In order to establish the relationship between external factors and the strength and direction of internal factors' impact on the capital structure, meta-analysis was applied. Meta-analysis is a method of statistical synthesis that shows the full picture of the studied phenomenon by combining and analysing the quantitative results obtained in empirical studies (Glass, 1976).

The research papers included in the study were obtained through a search process used in a systematic review of the literature (more: Petticrew & Roberts, 2008). The following electronic databases containing the entire texts have been explored: Scencedirect (S.C.O.P.U.S.), E.B.S.C.O., Proquest, Repec, Research Gate and Google Scholar. Initial search of the papers was carried out using such keywords as: determinants, capital structure. Research papers that appeared after year 2000 were selected for further analysis. Subsequently, the content of articles was analysed. The fundamental criterion for further selection was minimising the impact on the papers' outcomes of factors beyond the scope of our study. Taking this into account, the following specific criteria were used to select the test sample:

1. The temporal scope of the study is between 1993 and 2017 (the last year under examination had to be 2000 or later),
2. Subject of the study: companies listed on the stock exchange, without any division into sectors and industries,
3. Number of surveyed entities: min. 30,
4. Research method: panel models of linear regression,
5. Number of internal factors included in the model: minimum three of the six discussed in [section 1](#).

The sample excluded all those studies in which the mathematical description of the research outcomes made it impossible to determine the data necessary to carry out relevant calculations through the application of meta-analysis. As a result of the selection carried out in this way, the research sample covered 38 academic papers concerning internal determinants of the capital structure of enterprises in 35 countries. In these papers, 49 relationships were identified for the internal capital structure factors described in [Section 1](#). These dependencies are summarised in Appendix 1.

The analytical procedure under the meta-analysis applied covers the following stages (Shelby & Vaske, 2008, p. 102):

1. Calculation of the effect size for each study,
2. Calculation of the weighted average of the size of effects,
3. Determining whether the calculated averages significantly differ from zero,
4. Homogeneity/heterogeneity analysis.

To determine the size and direction of the effect (effect size) for each internal factor included in the papers making up the study sample, we used the measures of 'r-family' (Suurmond, van Rhee, & Hak, 2017, p. 538; Hanji, 2017, p. 53):



$$r = \sqrt{\frac{t^2}{t^2 + df}}, \quad (1)$$

where  $t$  is the value of  $t$ -statistics.

Depending on the data provided by authors of particular academic studies, we used:

- Directly the values of  $t$ -statistics,
- Having the value of the coefficient for variable ( $b$ ) and standard error (SE) the following transformation was made:  $t_i = \frac{b_i}{SE_i}$ ,
- Having  $p$ -value - the  $t$ -value from the  $t$ -Distribution was obtained.

The presentation of effect size calculations is included in Appendix 1.

The random-effect model was used to calculate the weighted average of the effect size for individual variables. It is based on the assumption that the actual effect may vary depending on the study (Hanji, 2017, pp. 102–103). The verification process checking whether the calculated averages were significantly different from zero was conducted by estimating the 95% confidence interval. The interval with the beginning and the end on the same side of zero means that the average effect size is significantly different from zero. If the confidence interval includes zero, it is assumed that the average insignificantly differs from zero. The obtained outcomes were verified with the  $Z$ -test: lower  $p$ -value than the assumed level of significance allows us to assume that the average effect size differs in a statistically significant way from zero (Littell, Corcoran, & Pillai, 2008, pp. 81–82).

The heterogeneity analysis was based on two statistical tests:  $Q$  and  $I^2$ . The small  $p$ -value for the  $Q$  statistic indicates the presence of significant heterogeneity.  $I^2$  is a measure of inconsistency that can be obtained from the  $Q$  statistics.  $I^2$  represents the percentage of variation in effect estimates, resulting from heterogeneity. A value greater than 50% can be considered substantial (Littell et al., 2008, p. 104–108).

Meta-regression was used to explain the heterogeneity of the meta-analysis results at the initial stage of the research. Meta-regression is based on multiple linear regression. After including moderators in the random-effect model, a mixed effect model has been obtained (Viechtbauer, 2010, p. 16).

Meta-regression enables the identification of moderators, or variables that cause changes in the correlation between the other two variables (Ahmed & Courtis, 1999, p. 42). In the present study, the estimation of parameters of meta-regression models allows for a multidimensional diagnosis of the relationship between the strength and direction of the influence of internal factors on the structure of capital and external factors. The average effect sizes were taken as response variables for each analysed internal determinant, and the institutional and macroeconomic indicators characterising the economies of the studied countries were adopted as potential moderators (explanatory variables in the meta-regression models). They came from the World Bank databases ([www.worldbank.org](http://www.worldbank.org)). Table 2 contains a list of external factors most frequently mentioned in the literature on the subject-matter together with their measures applied in the study.

**Table 2.** External factors influencing the capital structure of enterprises.

Factor	Symbol	Measure/proxy
GDP	GDP	Natural logarithm of GDP (constant 2010 US\$)
GDP per capita	GDP_CAP	Natural logarithm of GDP per capita (constant 2010 US\$)
GDP growth	GDP_GROW	Annual % of GDP
Inflation	INFLAT	Annual % of consumer prices
Unemployment	UNEMPLOY	% of total labour force (modelled ILO estimate)
Taxation	TAX_REV	Tax revenue (% of GDP)
Availability of credit	CREDIT	Domestic credit to private sector by banks (% of GDP)
Degree of capital markets development	CAPITAL	Market capitalisation of listed domestic companies (% of GDP)
Level of research and development expenditures	RD	Research and development expenditure (% of GDP)
Level of protection of creditors and debtors	LEGAL	Strength of legal rights index (0 = weak to 12 = strong)

Source: Authors' elaboration.

The value of a given indicator was calculated as the arithmetic average from the period covered by a particular empirical study (taking into account the availability of data). These indicators for individual countries are listed in Appendix 2.

The use of these moderators to assess the causes of the heterogeneity of each of the internal determinants of the capital structure was associated with the estimation of many models. The choice of the final model was made on the basis of the QM test based on  $\chi^2$  (allowing us to determine whether the equation is significant) (Viechtbauer, 2010, p. 16) and the validity of selection was assessed using the  $R^2$  coefficient. The best-estimated model was the one in which the statistical significance of the model was determined (the lowest p-value of the QM test) and at the same time with the highest value of the  $R^2$  coefficient. The calculations of model parameters and tests were made using the metafor package in the statistical software environment R (more: Viechtbauer, 2010).

At the second stage of the analysis, ordered multinomial logit models were used to analyse the relationship between the influence of internal determinants on the structure of enterprise capital and external factors. These models assume that the exact but unobserved dependent variable exists. The representation of the unobservable variable  $y^*$  is the ordinal variable  $y$ , which takes 3 values in accordance with the scale used in the study. Number 1 was assigned to the situation when, in the model of another author, the increase in the internal factor significantly affected a decrease in the enterprise's indebtedness (negative dependence). Number 2 was assigned to the situation when in the model of another author, no statistically significant relationship was detected between a given internal factor and the capital structure. Number 3 was assigned to the situation when, in the model of the next author the given internal factor influenced the increase of the enterprise's debt in a statistically significant way (positive dependence). The variables being moderators in meta-regression (selected external factors) were used as explanatory variables. This method allows us to identify external factors that moderate the statistical significance of the influence of internal factors on the structure of enterprises' capital in various conditions of the economies of the countries studied.

The choice of the model was made on the basis of the L.R. test using  $\chi^2$  statistics (allowing us to determine whether the model is significant). The appropriateness of

**Table 3.** Structure of the research results used in meta-analysis.

Factor/Relationship	Positive		Neutral		Negative		Not tested	
	Num	%	Num	%	Num	%	Num	%
TANG	14	28.6	13	32.5	15	30.61	7	14.3
SIZE	22	44.9	10	25	16	32.65	1	2.0
GROW	12	24.5	11	27.5	10	20.41	16	32.7
PROF.	4	8.2	4	10	40	81.63	1	2.0
LIQ	7	14.3	2	5	24	48.98	16	32.7
NDTS	5	10.2	12	30	9	18.37	23	46.9

Source: Authors' elaboration.

selection was determined using the Count  $R^2$  coefficient and Akaike information criterion (A.I.C.) and the Schwartz or Bayesian information criterion (B.I.C.) (allowing for comparison of two models related to the same dependent variable with different numbers of independent variables). The lower the A.I.C. and B.I.C. values, the better the model (Greene, 2003, p. 160, 678, 685). The models that ensured the statistical significance of the entire estimation were selected as the best estimates, on condition that at the same time they guaranteed improvement of at least two criteria from the above-mentioned list of criteria  $R^2$ , A.I.C. and B.I.C. G.R.E.T.L. software (2016b) was used for calculations.

## 5. Research results

The structure of the studies included in the meta-analysis is presented in Table 3.

In the case of the share of fixed assets in total assets (TANG), a similar number of studies indicated a positive, negative as well as no impact of this factor on the capital structure. The size of the enterprise (SIZE) in a larger number of studies positively affected corporate indebtedness. In the case of enterprise growth (GROW), none of the directions of impact on the capital structure was distinctive. In turn, for profitability (PROF) and liquidity (LIQ), as factors that may have an impact on the capital structure, the prevalence of the negative dependence of enterprises' indebtedness is clearly visible. Non-debt tax shield (N.D.T.S.) affects the capital structure of enterprises in a statistically insignificant way most often.

Table 4 presents meta-analysis results for the parameters of 49 models included in the research sample. They indicate that for PROF and LIQ (profitability and liquidity) the average size of the effect is significantly different from zero ( $p$ -value for the Z test  $< 0.01$ , the limits of confidence intervals are negative). It means that in the vast majority of enterprises included in the meta-analysis studies, these factors affect the structure of capital. In both cases the direction of this dependence is negative. The higher the profitability and/or liquidity, the lower the enterprise's indebtedness.

The low  $p$ -values of the Z test for SIZE and GROW (to a small extent going over the values of one of the traditionally accepted significance levels) mean that these factors are also determinants of the capital structure of enterprises in a large part of the analyzed enterprises. However, in this case the impact is not as unambiguous as for PROF and LIQ. In most studies, it had a positive direction. The larger the enterprise, the greater its indebtedness. And analogically – the more dynamic the company's growth, the higher the share of debt in the capital structure. However, the negative

**Table 4.** Meta-analysis internal factors influencing capital structure (random-effect model).

Explanatory variable	Study	Mean effect	CI Lower limit	CI Upper Limit	Test Z		Q-statistic		I <sup>2</sup> (%)
					Stat.	p-value	Stat.	p-value	
TANG	42	0.0023	-0.0479	0.0525	0.0902	0.9281	1451.19	<0.0001	97.16
SIZE	48	0.0499	-0.0099	0.1096	1.6364	0.1018	2915.27	<0.0001	98.35
GROW	33	0.0373	-0.0090	0.0836	1.5800	0.1141	516.41	<0.0001	95.77
PROF	48	-0.1702 ***	-0.2055	-0.1349	-9.4572	<0.0001	1203.22	<0.0001	95.11
LIQ	33	-0.0983 ***	-0.1659	-0.0306	-2.8472	0.0044	1399.00	<0.0001	98.08
NDS	26	-0.0113	-0.0714	0.0487	-0.3697	0.7116	373.34	<0.0001	95.71

Notes: \* - statistical significance at the level of 0.1.

\*\* - statistical significance at the level of 0.05.

\*\*\* - statistical significance at the level of 0.01.

Source: Authors' elaboration.

lower limits of confidence intervals mean that in the analyzed studies the opposite direction of the SIZE and GROW dependences on the capital structure have been discovered as well.

For TANG and N.D.T.S. variables (share of fixed assets in total assets and non-debt tax shield), the Z test and confidence intervals show that it is impossible to indicate the common direction and strength with which these determinants affect the structure of capital in the enterprises included in the study.

The negative impact of PROF and LIQ and, at the same time, positive influence of SIZE and GROW on corporate indebtedness is a characteristic feature of the pecking order theory. It means that in the majority of enterprises included in the research sample, this theory explains the shaping of the capital structure in the most effective manner.

A meta-analysis based on a similar set of internal determinants of the capital structure was conducted by Hang, Geyer-Klingeborg, Rathgeber, and Stockl, (2017). Their study also proved that profitability exerts a statistically significant and unambiguously negative impact on corporate indebtedness. A negative relationship was discovered for GROW. In addition, it was diagnosed that the TANG variable affects the indebtedness of most enterprises positively. In the case of GROW and TANG, the current study did not confirm the dependencies identified by Hang et al. (2017). However, these differences may result from a different composition of the research sample. In the previous study, the sample covered 50 scientific papers for the most part based on enterprises operating in the U.S. In addition to the listed companies, the research also concerned small and medium-sized enterprises, often broken down into industries and sectors. Therefore, a simple comparison of results seems to be impossible to conduct.

The low p-value for Q-statistic presented in Table 4 and the high I<sup>2</sup> values for all tested variables indicate significant heterogeneity of the sample. Thus, in the adopted research sample there are statistically significant moderators for all internal factors. For TANG, SIZE, GROW and N.D.T.S., they cause differences in the value and direction of effects. For PROF and LIQ they only moderate their value.

The selection of the research sample was carried out in such a way that the main difference between the studies included was a country where enterprises operate. Therefore, there is a premise to accept that moderators of the heterogeneity of research results are moderated at the country level. Table 5 presents the outcomes of the meta-regression analysis carried out between external factors and the direction and value of the effects calculated for internal factors. For each response variable

**Table 5.** Results of meta-regression.

Model	TANG 1	TANG 2	SIZE 3	SIZE 4	GROW 5	GROW 6	PROF 7	PROF 8	LIQ 9	NDTS 10	NDTS 11
Const	-0.9343 (0.7475)	-1.2741*** (0.4310)	1.1333 (0.8110)	0.4913 (0.5307)	2.1451** (0.8549)	1.4334*** (0.4856)	-0.3874 (0.5492)	-0.4551*** (0.1264)	0.8951 (0.7703)	0.7193 (1.0826)	-0.1986 (0.0949)
GDP	0.0462* (0.0252)	0.0514*** (0.0156)	-0.0601** (0.0284)	-0.0514** (0.0235)	-0.0573* (0.0297)	-0.0421** (0.0181)	-0.0027 (0.0197)		-0.0103 (0.0267)	-0.0186 (0.0300)	
GDP_CAP	-0.0115 (0.0390)		0.0567 (0.0480)	0.1045*** (0.0405)	-0.0623 (0.0401)	-0.0330* (0.0175)	0.0336 (0.0323)	0.0316** (0.0139)	0.0087 (0.0360)	-0.0719 (0.0811)	
GDP_GROW	-0.0976 (0.6096)		0.9918 (0.7263)	1.2911* (0.7516)	-0.2842 (0.6194)		-0.2968 (0.5137)		-2.2262* (1.3371)	-0.8655 (0.6580)	-0.8007* (0.4344)
INFLAT	-0.4536 (0.4026)		0.0766 (0.4650)		-0.0756 (0.3911)		0.4298 (0.3254)		-0.5587 (0.4958)	2.0582 (1.9179)	2.2313** (0.9569)
UNEMPLOY	-1.6224** (0.7992)	-1.3213** (0.5815)	-1.1683 (1.0374)	-1.3637 (0.9719)	-0.2716 (0.9808)		0.0687 (0.6528)		-3.5936*** (0.7860)	2.4608 (1.5183)	1.0735* (0.6178)
TAX_REV	0.8577 (0.6425)	0.7999 (0.5079)	-0.0835 (0.6249)		0.2088 (0.5942)		-0.5398 (0.4402)		-0.5378 (0.6021)	0.3362 (0.7808)	
CREDIT	-0.1360 (0.1007)	-0.0888 (0.0799)	0.1608 (0.1014)	0.1550* (0.0868)	-0.0562 (0.1042)		0.0283 (0.0739)		-0.3913*** (0.1000)	0.0617 (0.1027)	
CAPITAL	0.1150 (0.0791)	0.1355** (0.0539)	-0.1200 (0.0860)	-0.1256 (0.0805)	-0.0776 (0.0819)		0.0262 (0.0615)		0.0742 (0.0864)	0.0617 (0.1027)	
RD	2.6373 (7.5148)		6.1078 (8.1446)		13.0744 (8.7213)		0.7035 (5.5943)		2.3005 (7.1082)	10.2704 (8.4049)	3.2377 (3.9562)
LEGAL	-0.0287*** (0.0106)	-0.0244*** (0.0086)	-0.0049 (0.0113)		-0.0126 (0.0118)		0.0024 (0.0080)		-0.0242** (0.0103)	-0.0140 (0.0151)	
R <sup>2</sup> (%)	27.50	36.79	11.46	18.23	7.56	22.20	0.00	8.46	54.51	0.00	23.84
I <sup>2</sup> (%)	95.29	94.99	97.13	97.63	94.41	94.13	94.14	94.47	93.07	91.26	90.73
Test of Moderators	QM(df = 10) = 22.5425**	QM(df = 6) = 26.2200***	QM(df = 10) = 15.6721**	QM(df = 6) = 15.6721**	QM(df = 10) = 9.4733	QM(df = 2) = 9.9374***	QM(df = 10) = 9.4733	QM(df = 1) = 5.1767**	QM(df = 10) = 41.3754***	QM(df = 10) = 10.7074	QM(df = 4) = 9.9490***
(p-value)	(0.0126)	(0.0002)	(0.01248)	(0.0156)	11.7640 (0.3012)	(0.0070)	(0.4878)	(0.0229)	(< 0.0001)	(0.3808)	(0.0413)
Number of observations	38	40	44	47	29	33	44	48	30	24	24

Note: (SE in parenthesis).

\* - statistical significance at the level of 0.1.

\*\* - statistical significance at the level of 0.05.

\*\*\* - statistical significance at the level of 0.01.

Source: Authors' elaboration.

**Table 6.** Direction of relationship between external factors of the capital structure and strength of impact of internal factors (meta-regression).

	TANG	SIZE	GROW	PROF	LIQ	NDTS
GDP	+	–	–			
GDP_CAP		+	–	+		
GDP_GROW		+			–	–
INFLAT						+
UNEMPLOY	–				–	+
CREDIT		+			–	
CAPITAL	+					
LEGAL	–				–	

Source: Authors' elaboration.

(TANG, SIZE, GROW, PROF, LIQ, N.D.T.S.) two models were presented: one containing all intended explanatory variables and the second, being the best estimate, by omitting some explanatory variables.

Models 2, 4, 6, 8, 9 and 11 are the best estimations of the relationships between the adopted response and explanatory variables. They indicate statistically significant relationships between the value of external factors and the strength and direction of the internal determinants of the capital structure. They were collected in Table 6 in order to analyse these results more easily.

No statistically significant relationship was discovered for two explanatory variables, TAX\_REV and RD. In the case of other external factors, one to three significant dependencies between their values and the effect size value for a given internal factor were detected. A plus sign between variables means that the higher the external factor, the greater the impact of the internal factor on the capital structure of enterprises. A minus sign means the opposite relationship.

The results obtained are much richer than the meta-regression outcomes carried out by Hang et al. (2017). They are also different from them. Hang et al. (2017) only detected a weak negative relationship between GDP\_GROW and TANG and SIZE.

The meta-regression analysis is based on the effect sizes calculated for each model included in the research sample. These values are calculated irrespective of whether in the original model the beta coefficient for internal factor was statistically significant or not. In order to determine whether there is a relationship between external factors and the significance of the impact of a specific internal factor, we conducted an additional analysis using logit models. Variables that were moderators in meta-regression - macroeconomic and institutional factors were adopted as explanatory variables. However, in the case of a full set of variables, the estimation of the model was impossible. It was impossible to achieve a criterion for convergence of the model. Therefore, the estimations were made excluding the variables TAX\_REV and RD, which were of no significance in the meta-regression estimations. The results of estimating parameters of the eight models are presented in Table 7.

For five response variables (TANG, SIZE, GROW, PROF, N.D.T.S.) the parameters of two models were estimated: one containing all the intended explanatory variables and the second, being the most precise estimation, by omitting some explanatory variables. It was impossible to estimate the base model for the LIQ variable.

The parameters of models 2, 4, 6, 8 and 10 are the most precise estimates of the relationships between the adopted response variables and explanatory variables. The

Table 7. Results of logit analysis.

Model	TANG 1	TANG 2	SIZE 3	SIZE 4	GROW 5	GROW 6	PROF 7	PROF 8	NDTS 9	NDTS 10
GDP	0.8586*** (0.3219)	0.8720*** (0.3228)	-0.5366* (0.2929)	-0.4692* (0.2712)	-0.1035 (0.3921)		-0.0738 (0.3539)		0.1266 (0.5779)	
GDP_CAP	0.0654 (0.4890)		1.2849** (0.5413)	0.8551** (0.4349)	-0.3906 (0.5129)	-0.4788 (0.4220)	0.1477 (0.6349)		-2.8339* (1.4675)	-1.9104** (0.9736)
GDP_GROW	-9.0427 (7.2837)	-8.4569 (6.4545)	28.7839 (21.7312)	26.8169 (20.7127)	-11.1833 (10.1611)	-12.5030 (8.8787)	-1.8704 (12.0289)		-299.431** (12.0504)	-215.8270** (91.9754)
INFLAT	3.1198 (5.0226)		1.7824 (4.4797)		0.0409 (4.7841)		10.1490* (5.9806)	8.3741 (5.3296)	145.117** (65.9827)	103.5330** (49.9754)
UNEMPLOY	-27.1588* (15.6103)	-20.3537** (10.2102)	-17.8710 (12.5594)		9.5531 (13.2409)	11.4505 (11.1912)	-3.5313 (15.4894)		72.0233* (37.052)	45.5421* (25.4055)
CREDIT	-0.3728 (1.0994)		2.6494** (1.1008)	3.0104*** (1.0266)	1.6215 (1.3606)	1.6930 (1.2605)	0.6964 (1.3940)		-5.1325* (2.6843)	-4.3263* (2.4707)
CAPITAL	1.0898 (0.9295)	0.6981 (0.6215)	-1.9786* (1.0118)	-1.5915* (0.8764)	-1.1086 (1.0260)	-1.0409 (0.9782)	-0.0880 (1.1915)		7.0886** (3.4487)	5.1034* (2.7139)
LEGAL	-0.1577 (0.1463)		-0.1222 (0.1280)		-0.0256 (0.1416)		0.1635 (0.1671)	0.1778 (0.1475)	0.3868 (0.3305)	
Cut1	20.0443*** (7.7641)	20.9441** (8.1497)	-3.6325 (6.9798)	-3.5175 (6.6765)	-6.7187 (8.9783)	-4.4832 (3.3306)	2.6767 (7.9859)	3.2015 (1.1884)	-22.2717 (14.7734)	-20.1435** (9.7569)
Cut2	22.0217*** (7.9075)	22.8309*** (8.2806)	-2.3230 (6.9540)	-2.2795 (6.6529)	-4.9821 (8.9385)	-2.7526 (3.2629)	3.5280 (7.9995)	4.0418 (1.2681)	-17.8321 (14.2100)	-15.9396* (9.1678)
Likelihood ratio test (p-value)	Chi-sq(8) = 24.0948*** (0.0022)	Chi-sq(4) = 21.9698*** (0.0002)	Chi-sq(8) = 22.9939*** (0.0034)	Chi-sq(5) = 20.1202*** (0.0012)	Chi-sq(8) = 10.2885 (0.2454)	Chi-sq(5) = 10.1925 (0.0700)	Chi-sq(8) = 8.2876 (0.4059)	Chi-sq(2) = 7.9048 (0.0192)	Chi-sq(8) = 28.1200*** (0.0005)	Chi-sq(6) = 26.4726*** (0.0002)
Count R <sup>2</sup> (%)	58.5	63.4	70.2	68.1	59.4	56.2	85.1	83.3	61.5	65.4
AIC	88.8489	82.9739	98.5358	95.4095	82.5760	76.6720	70.5567	59.4562	49.1765	46.8239
BIC	105.9846	93.2554	117.0373	108.3605	97.2333	86.9322	89.0582	66.9411	61.7575	56.8887
Numbers of observation	41	41	47	47	32	32	47	48	26	26

Notes: (SE in parenthesis).

\* - statistical significance at the level of 0.1.

\*\* - statistical significance at the level of 0.05.

\*\*\* - statistical significance at the level of 0.01.

Source: Authors' elaboration.



**Table 8.** Direction of relationship between external factors of the capital structure and statistical significance of impact of internal factors (logit analysis).

	TANG	SIZE	GROW	PROF	LIQ	NDTS
GDP	+	–				
GDP_CAP		+				–
GDP_GROW						–
INFLAT						+
UNEMPLOY	–					+
CREDIT		+				–
CAPITAL		–				+
LEGAL						+

Source: Authors' elaboration.

relationships between the value of external factors and the significance of the influence of internal determinants on the capital structure are presented in Table 8.

A plus sign between variables means that the higher the value of the external factor, the greater the probability that the internal factor will affect the corporate indebtedness in positive statistically significant way. A minus sign indicates that the higher the value of the external factor, the more likely it is that the internal factor will affect the enterprise's indebtedness in negative statistically significant way.

Meta-regression showed the existence of dependence between the external factors studied and the strength and direction of the influence of internal factors on the structure of capital. By using logit analysis, we identified external factors that affect its statistical significance. Thus, the common part of both diagnoses allows us to identify those external factors for which all three characteristics of internal factors and corporate indebtedness simultaneously change (strength, direction and statistical significance). These factors are summarized in Table 9.

The final results of the study allow us to identify eight indirect relationships between external factors and the structure of capital:

1. The higher the G.D.P. value, the more likely it is that there is a strong, statistically significant, positive relationship between TANG and the enterprise's indebtedness;
2. The higher the G.D.P. value, the more likely it is that there is a strong, statistically significant, negative relationship between SIZE and the enterprise's indebtedness;
3. The higher the GDP\_CAP value, the more likely it is that there is a strong, statistically significant, positive relationship between SIZE and the enterprise's indebtedness;
4. The higher the GDP\_GROW value, the more likely it is that there is a strong, statistically significant, negative relationship between N.D.T.S. and the enterprise's indebtedness;
5. The higher the INFLAT value, the more likely it is that there is a strong, statistically significant, positive relationship between N.D.T.S. and the enterprise's indebtedness;
6. The higher the UNEMPLOY value, the more likely it is that there is a strong, statistically significant, negative relationship between TANG and the enterprise's indebtedness;

**Table 9.** Joint results for both studies – meta-regression and logit.

	TANG	SIZE	GROW	PROF	LIQ	NDTS
GDP	+	–				
GDP_CAP		+				
GDP_GROW						–
INFLAT						+
UNEMPLOY	–					+
CREDIT		+				
CAPITAL						
LEGAL						

Source: Authors' elaboration.

7. The higher the UNEMPLOY value, the more likely it is that there is a strong, statistically significant, positive relationship between N.D.T.S. and the enterprise's indebtedness;
8. The higher the CREDIT value, the more likely it is that there is a strong, statistically significant, positive relationship between SIZE and the enterprise's indebtedness.

## 6. Conclusion

The results of the meta-analysis conducted show that two out of six internal determinants of the capital structure have a negative impact on corporate indebtedness, regardless specifics of the economy in which they operate. The more profitable enterprises are, the smaller the share of debt in their financing. The same direction of dependence applies to financial liquidity.

Two other factors, namely the size of the enterprise and its growth, also exert an impact on indebtedness in the majority of enterprises. Its direction is positive. The larger the company and/or faster the company grows, the higher the share of debt in the capital structure. However, these relationships have not been fully supported by statistical tests. It means that some features of the economy can have a certain impact on strength and direction of these dependencies.

The negative impact of profitability and financial liquidity on corporate indebtedness with the simultaneous positive influence of the size and growth of the enterprise is characteristic of the pecking order theory. It means that for the economies of 35 countries, the pecking order theory best explains the shaping of the enterprises' capital structure.

The results of the meta-analysis conducted indicate a significant differentiation of the strength and direction of the impact of internal factors on the enterprises' capital structure depending on the studied economy. We have identified eight important relationships between the characteristics of the economy (external factors) and indebtedness of the enterprise. Our observation is based on the triangulation of two methods: meta-regression and logit analysis. External factors affect the indebtedness of enterprises indirectly - moderating the strength, direction and statistical significance of the influence of internal capital structure determinants. It confirms the first hypothesis of the research. Second hypothesis is confirmed partially (six of 10 components). Identified external determinants of the capital structure include:

1. G.D.P. – the larger the economy then the share of fixed assets in total assets exerts a stronger positive impact on corporate indebtedness; as regards for the

- enterprises' size, the relationship is opposite: in economies with a higher G.D.P. larger enterprises are less indebted,
2. G.D.P. per capita – the richer the citizens, the stronger positive impact of the enterprise's size on corporate indebtedness,
  3. G.D.P. growth – the faster the economy grows, the stronger the negative relationship between the non-debt tax shield and the share of debt in the enterprises' capital structure,
  4. Inflation – in economies with high inflation, the growth of the non-debt tax shield causes a stronger increase in corporate indebtedness than in economies with low inflation,
  5. Unemployment – in countries with higher unemployment, the share of fixed assets in total assets exerts a stronger negative impact on the share of debt in the enterprises' capital structure. The increase in non-debt tax shield causes an increase in indebtedness,
  6. Credit access – in economies with easier access to credit, the increase in the size of the enterprise causes a dynamic increase in its debt.

The observation for G.D.P. per capita coincides with the results of Nivorozhkin's (2005) research. Economic growth was diagnosed as a determinant of the capital structure by De Jong et al. (2008), Kayo and Kimura (2011), and Gungoraydinoglu and Öztekin (2011). However, all these authors identified the opposite direction of this dependence than in our study. The first two studies focused on direct dependence (without the involvement of internal factors). In the third study, the share of fixed assets in total assets was the internal factor whose strength and direction of impact on the capital structure was shaped by G.D.P. per capita.

Fan et al. (2012) and Feld et al. (2013) pointed out the direction of the relationship between inflation and debt compliant with the diagnoses presented in our research. Nivorozhkin (2005) showed an opposite (negative) relationship. Negative direction of this dependence was also pointed out by Gungoraydinoglu and Öztekin (2011). Furthermore, these authors indicated that the impact of inflation on the capital structure is indirect – through the profitability of enterprises.

The Nivorozhkin (2005), De Jong et al. (2008) and Gungoraydinoglu and Öztekin (2011) indicated the same directions of dependencies between the availability and cost of credit and the corporate capital structure as has been described in our study. The opposite direction of this dependence was discovered by Kayo and Kimura (2011). None of the mentioned studies has indicated that this factor may affect the indebtedness of enterprises indirectly.

The size of G.D.P. as an external determinant of enterprises' capital structure has not been diagnosed so far. It is interesting that its impact on indebtedness is marked as positive or negative depending on the intermediary internal factor.

The influence of creditors' protection and capital market development were often identified as the external factor of corporate debt by other authors (Nivorozhkin, 2005, Delcours, 2007, De Jong et al., 2008, Gungoraydinoglu & Öztekin, 2011, Cho, El Ghouli, Guedhami, & Suh, 2014, Kayo & Kimura, 2011). These dependences have been not confirmed in our study. It means that these external factors can only affect

the capital structure directly. Any significant impact of taxation and the research and development expenditures on the capital structure of enterprises was also not diagnosed. Above outcomes of the study do not confirm four components of our second hypothesis.

The main limitations that may affect the interpretation of the research outcomes are: the inclusion of research papers' sample relating only to the listed companies in the study, wide time range of empirical research adopted for meta-analysis and numerical differentiation of research samples of these studies as well a small number of observations for statistical meta-regression and logit analysis.

Despite the indicated limitations of this study, its outcomes and their comparison with the research of other scholars create perspectives for outlining a framework of the theoretical model concerning the external determinants of the capital structure. The results of our research also enable to take into account contemporary theories of the capital structure in the proposed model. It will be the subject of the authors' further research.

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## Appendices

Appendix 1. Description of capital structure studies included in the meta-analysis.

On.	Authors	Country	Period from	Period to	No of companies	Source	Effect size TANG	Effect size SIZE	Effect size GROW	Effect size PROF	Effect size LIQ	Effect size NDTs
1	Drobetz and Fix (2003)	Swiss	1997	2001	124	Table 5. p. 22	-0.071	0.109	-0.109**	-0.047**		0.033
2	Bauer (2004)	Czech Rep.	2001	2001	74	Table 9. p. 15	-0.270**	0.607***		-0.066		-0.123
3	Huang and Song (2006)	China	1994	2003	1200	Table 5. p. 28	0.006	0.162***	-0.128***	-0.269***		-0.079***
4	Mazur (2007)	Poland	2000	2004	238	Table 6. p. 506	-0.110***	-0.078***		-0.325***		-0.558***
5	Eriotis, Vasilidou, and Ventoura-Neokosmidi (2007)	Greece	1996	2001	129	Table III. p. 328	0.151***	0.151***	-0.090**			-0.167***
6	Hossain and Ali (2012)	Bangladesh	2003	2007	39	Table 4. p. 174	-0.185**	0.036	0.091	-0.394***		0.494***
7	Nejad and Wasizuzaman (2013)	Malaysia	2005	2010	177	Table 2. p. 471	0.008	0.185***	-0.111***	-0.239***		-0.063**
8	Oliveira, Tabak, de Lara Resende, and Cajueiro (2013)	Brasil	2000	2009	394	Table 6. p. 133	0.204	-0.282*	0.045***	-0.139***		-0.042
9	Malinić, Dentić-Mihajlov, and Ljubenović (2013)	Serbia	2008	2011	108	Table 4. p. 107	-0.260***	0.170**	0.170**	-0.119**		-0.341***
10	Acedo-Ramirez and Ruiz-Cabestre (2014)	France	1998	2008	242	Table 5. p. 258-259		0.044*		-0.104***		-0.104***
11	Acedo-Ramirez and Ruiz-Cabestre (2014)	Germany	1998	2008	164	Table 5. p. 258-259		0.052*		-0.077***		0.034
12	Acedo-Ramirez and Ruiz-Cabestre (2014)	Italy	1998	2008	85	Table 5. p. 258-259		-0.001		-0.174***		-0.009
13	Acedo-Ramirez and Ruiz-Cabestre (2014)	Spain	1998	2008	60	Table 5. p. 258-259		0.032		0.102**		-0.204***
14	Acedo-Ramirez and Ruiz-Cabestre (2014)	UK	1998	2008	337	Table 5. p. 258-259		0.090***		-0.054***		0.013
15	Awan and Amin (2014)	Pakistan	2006	2012	68	Table 7. p. 34	0.105**	-0.177***		-0.334***		0.238***
16	Harrison and Widjaja (2014)	USA	2004	2011	331	Table 5.1. p. 68	0.106***	0.008		-0.122***		-0.032*
17	Brendea (2014)	Romania	2004	2011	77	Table 3. p. 320	-0.083*	0.131***	-0.001	-0.257***		
18	Handoo and Sharma (2014)	India	2001	2010	870	Table 7. p. 180	0.136***	-0.072***	0.038***	-0.118***		0.021*
19	Thippayana (2014)	Thailand	2000	2011	144	Table 2. p. 1076	0.108***	0.494***	0.018	-0.439***		
20	Deesomsak, Paudyal, and Pescetto, (2004)	Thailand	1993	2001	294	Table 4. p. 399	0.088	0.158***	-0.128**	-0.056		-0.140**
21	Deesomsak et al. (2004)	Malaysia	1993	2001	669	Table 4. p. 399	0.025	0.146***	-0.011	-0.198***		-0.105**
22	Deesomsak et al. (2004)	Singapore	1993	2001	345	Table 4. p. 399	0.061	0.113	-0.187***	-0.042		-0.224***
23	Deesomsak et al. (2004)	Australia	1993	2001	219	Table 4. p. 399	0.174**	0.274***	0.011	-0.059		-0.169**

(continued)

## Appendix 1. Continued.

On.	Authors	Country	Period from	Period to	No of companies	Source	Effect size TANG	Effect size SIZE	Effect size GROW	Effect size PROF	Effect size LIQ	Effect size NDTs
24	Nguyen, Diaz-Rainey, and Gregoriou (2014)	Vietnam	2007	2011	116	Table 5, p. 425	-0.041	0.018	0.102**	-0.253**	-0.289**	
25	Alzomaia (2014)	Saudi Arabia	2000	2010	93	Table 5, p. 63	-0.133***	0.331***	0.085***	-0.262		
26	Alipour, Mohammadi, and Derakhshan (2015)	Iran	2003	2007	327	Table 6, p. 72	-0.112***	-0.112***	-0.112***	-0.112***	-0.047*	
27	Adiputro (2015)	Indonesia	2010	2013	231	Table 6, p. 7	-0.084**	-0.184***		-0.093**	-0.127***	-0.024
28	Milos (2015)	Romania	2003	2014	50	Table 2, p. 132	-0.555***	-0.081*	-0.033***	-0.165***	-0.073***	
29	Vergas, Cerqueira, and Brandao (2015)	Portugal	2005	2012	45	Table 6, p. 21	0.088	-0.035	0.133**	-0.204***		0.278***
30	Koksal and Orman (2015)	Turkey	1996	2009	206	Table 8, p. 276	-0.018	0.072***	0.031	-0.189***		
31	Gharaibeh (2015)	Kuwait	2008	2013	49	Table 3, p. 10	0.221***	0.407***	0.172	-0.363***	0.420***	
32	Vortelinos, Lakshmi, and Ya (2015)	China	2007	2012	558	Table 7, p. 80	0.258***	0.388***	0.073***	-0.359***	-0.213***	-0.186***
33	Islam (2016)	Bangladesh	2008	2012	63	Table 3, p. 5	-0.152***	-0.587***	0.271***	-0.121**	-0.320***	0.012
34	Guner (2016)	Turkey	2008	2014	131	Table 2, p. 86		-0.119**	-0.097**	-0.145**	-0.128**	-0.010
35	Aroa, Bagucandani, and Liu (2016)	Singapore	2002	2011	137	Table 2, p. 21	0.301***	0.020	-0.008	-0.040*	-0.004	-0.086***
36	Pratheepan and Banda (2016)	Sri Lanka	2003	2012	287	Table 5, p. 101	0.006	0.224***	0.493***	-0.133***		-0.038
37	Yinusa, Somoye, Alimi, and Ilo (2016)	Nigeria	1998	2012	115	Table 3, p. 11	-0.110*	-0.110*	0.020	0.110***		
38	Rodrigues, de Moura, Santos, and Sobreiro (2017)	Argentina	2009	2013	44	Table 9, p. 65	0.224***	-0.224***		-0.224***	0.224***	
39	Rodrigues et al. (2017)	Brasil	2009	2013	196	Table 9, p. 65	0.105***	-0.105***		-0.105***	0.105***	
40	Rodrigues et al. (2017)	Mexico	2009	2013	56	Table 9, p. 65	0.198***	-0.198***		-0.198***	0.198***	
41	Rodrigues et al. (2017)	Peru	2009	2013	43	Table 9, p. 65	0.227***	-0.227***		-0.227***	0.227***	
42	Rodrigues et al. (2017)	USA	2009	2013	666	Table 10, p. 66	0.057***	-0.057***		-0.057***	0.057***	
43	Karacaer, Temiz, and Gulec (2016)	Turkey	2005	2014	131	Table 6, p. 55	-0.083***	0.123		-0.123***	-0.123***	0.070**
44	Karահahin and Kúcksaraç (2016)	Turkey	1994	2014	224	Table 5, p. 27	0.043**	0.113***	0.011	-0.055***	-0.177***	
45	Nguyen and Hung (2016)	Vietnam	2010	2014	420	Table 6, p. 34	-0.076**	0.175***	0.231***	-0.347***	-0.401***	-0.010
46	Singh (2016)	Oman	2011	2015	61	Table 2, p. 1654	-0.138**	0.223***	0.164***	-0.167***	-0.252***	0.075
47	Thanh and Huong (2017)	Vietnam	2010	2014	228	Table 8, p. 87	-0.010	0.131**	0.085*	-0.131**	-0.100**	
48	Alkhatib, Al-Sraheen, and Marji (2017)	Jordan	2011	2014	127	Table 1, p. 20	-0.062	0.219***	0.045	-0.198***	-0.038	
49	Czerwonka and Jaworski (2019)	Poland	1998	2012	335	Table 5, p. 259	-0.131***	-0.156***	-0.029	-0.410***	-0.054***	0.069***

Note: Statistical significance of variables in primary research was marked by asterisks at the level of: \* -0.1, \*\* -0.05, \*\*\* -0.01.

Source: Authors' compilation.

**Appendix 2.** Average macroeconomic and institutional indicators for selected countries.

No of Study	Country	GDP	GDP_CAP	GDP_GRO	INFLAT	UNEMPLOY	CREDIT	CAPITAL	LEGAL	RD	TAX_REV
1	Swiss	26.872	11.089	0.025	0.008	0.032	1.482	2.299	6	0.023	0.093
2	Czech Rep.	25.773	9.634	0.031	0.047	0.080	0.358	0.121	6.5	0.011	0.146
3	China	28.490	7.529	0.308	0.100	0.045	1.064	0.419	4	0.008	0.086
4	Poland	26.558	9.099	0.033	0.043	0.186	0.205	0.182	7	0.006	0.165
5	Greece	26.199	10.009	0.037	0.046	0.106	0.377	0.622	3	0.005	0.206
6	Bangladesh	25.184	6.402	0.060	0.072	0.043	0.290	0.070	5		0.070
7	Malaysia	26.173	9.065	0.046	0.027	0.034	1.044	1.373	7	0.009	0.144
8	Brasil	28.204	9.163	0.033	0.068	0.119	0.348	0.515	2	0.010	0.153
9	Serbia	24.407	8.604	0.010	0.094	0.180	0.447	0.210	6	0.008	0.213
10	France	28.531	10.583	0.022	0.017	0.096	0.811	0.772	4	0.021	0.226
11	Germany	28.797	10.571	0.016	0.016	0.092	1.057	0.491	6	0.024	0.110
12	Italy	28.379	10.511	0.013	0.023	0.089	0.692	0.458	2	0.011	0.221
13	Spain	27.873	10.305	0.036	0.031	0.117	1.254	0.812	5	0.010	0.155
14	UK	28.441	10.533	0.026	0.017	0.053	1.372	1.280	7	0.016	0.255
15	Pakistan	25.883	6.948	0.033	0.121	0.056	0.231	0.246	3	0.005	0.095
16	USA	30.322	10.795	0.016	0.025	0.067	0.549	1.177	11	0.027	0.099
17	Romania	25.814	8.967	0.035	0.072	0.069	0.311	0.125	10	0.005	0.172
18	India	27.803	6.930	0.075	0.063	0.040	0.412	0.828	6	0.008	0.101
19	Thailand	26.378	8.378	0.043	0.026	0.015	0.936	0.573	3	0.002	0.147
20	Thailand	26.089	8.154	0.021	0.041	0.021	1.330	0.399	3	0.002	0.146
21	Malaysia	25.722	8.810	0.049	0.029	0.030	1.380	1.708	7	0.004	0.169
22	Singapour	25.509	10.341	0.049	0.010	0.036	1.001	1.503	8	0.017	0.150
23	Australia	27.381	10.634	0.039	0.027	0.076	0.794	0.847	11	0.016	0.226
24	Vietnam	25.422	7.151	0.062	0.130	0.024	0.977	0.191	7	0.002	0.218
25	Saudi Arabia	26.827	9.832	0.036	0.023	0.054	0.336	0.706	2	0.002	
26	Iran	26.651	8.580	0.064	0.147	0.113	0.406	0.169	2	0.006	0.058
27	Indonesia	27.440	8.113	0.060	0.053	0.067	0.284	0.440	4.75	0.001	0.111
28	Romania	25.818	8.979	0.034	0.067	0.069	0.304	0.117	10	0.004	0.174
29	Portugal	26.182	10.011	-0.003	0.022	0.099	1.470	0.369	2	0.013	0.206
30	Turkey	27.096	9.092	0.037	0.362	0.089	0.214	0.265	3	0.006	0.170
31	Kuwait	25.563	10.620	0.016	0.051	0.026	0.646		2	0.001	0.009
32	China	29.399	8.386	0.102	0.035	0.042	1.182	0.648	4	0.016	0.101
33	Bangladesh	25.480	6.638	0.059	0.079	0.043	0.391	0.266	5		0.081
34	Turkey	27.475	9.358	0.048	0.081	0.098	0.458	0.278	3	0.009	0.184
35	Singapore	25.971	10.626	0.065	0.020	0.046	0.963	2.094	8	0.022	0.127
36	Sri Lanka	24.634	7.832	0.067	0.097	0.061	0.315	0.229	2	0.002	0.128
37	Nigeria	26.283	7.500	0.071	0.116	0.069	0.172	0.194	6.25	0.002	0.028
38	Argentina	26.790	9.245	0.022	0.094	0.076	0.135	0.106	2	0.006	0.127
39	Brasil	28.447	9.340	0.032	0.056	0.081	0.570	0.576	2	0.011	0.139
40	Mexico	27.715	9.119	0.019	0.042	0.052	0.197	0.407	8.75	0.005	0.101
41	Peru	25.777	8.567	0.055	0.029	0.040	0.274	0.541	8	0.001	0.158
42	USA	30.354	10.796	0.010	0.016	0.087	0.507	1.161	11	0.028	0.093
43	Turkey	27.419	9.321	0.054	0.085	0.097	0.395	0.297	3	0.008	0.184
44	Turkey	27.212	9.171	0.049	0.306	0.090	0.287	0.263	3	0.007	0.175
45	Vietnam	25.591	7.288	0.059	0.094	0.021	1.017	0.222	7	0.003	0.206
46	Oman	24.904	9.778	0.041	0.019	0.175	0.477	0.462	1	0.002	0.025
47	Vietnam	25.591	7.288	0.059	0.094	0.021	1.017	0.222	7	0.003	0.206
48	Jordan	24.065	8.147	0.028	0.041	0.124	0.722	0.824	0	0.004	0.152
49	Poland	26.705	9.247	0.040	0.043	0.134	0.327	0.264	7	0.006	0.171

Source: Authors' compilation based on worldbank.org.