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## **CAPITAL STRUCTURE IN EU SELECTED COUNTRIES – MICRO AND MACRO DETERMINANTS**

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The paper presents own research on the determinants which have an impact on the capital structure of 1063 companies from selected EU member states. The detailed analysis of empirical data refers to the following countries: Finland, France, Greece, Spain, the Netherlands, Germany, the UK, Romania, Italy, Lithuania, Latvia, Poland and Slovakia. The objective of the paper is to compare capital structure and its determinants in new and old EU member states. The author proves that capital structure is affected not only by the traditional determinants related to a business entity (such as industry, profitability, size and growth potential) but also macroeconomic/institutional factors including economic growth, inflation rates, corporate income taxes, the development of the banking sector and capital markets and national legal frameworks. It is the first time literature has recorded different corporate capital structures in new and old EU member states as well as different capital structure determinants. The empirical material is consistent in terms of the accounting valuation – for the first time recorded in literature – which is proved by the statistical analysis. This paper provides an analysis of the impact of International Accounting Standards on companies' capital structure. The paper presents the hierarchy of capital structure determinants in terms of their statistical significance.

**Keywords:** capital structure, microeconomic, macroeconomic, institutional determinants

### **INTRODUCTION**

The theoretical issues related to capital structure have aroused the interest of a number of scientists and business practitioners. The first significant studies in this field were conducted as early as at the beginning of the 1950s. Research on capital structure is one of the major issues discussed in prestigious financial journals. Apart from a large number of studies and extensive theoretical research, no clear-cut explanations have been offered as to the specific factors which determine corporate capital structure.

The verification of capital structure determinants seems necessary in a large number of countries. The larger the number of countries, companies and observations, the greater is the likelihood of formulating some general statements with regard to the entire block of countries – the European Union.

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However, an analysis of capital structure in a large number of countries involves a number of problems. One of them, recognized in the literature in this area, is the so called country factor. Every EU member state is characterized by specific factors with a different impact; they make comparisons of capital structure more difficult, exerting an influence on capital structure in different ways. Every member state applies different corporate tax rates. The process is made even more complicated by the continuous changes to these rates. The economies, for example, have different characteristics when measured by growth rates. The particular countries have different legal systems, and, consequently, apply different systems for protecting stock exchange investors or banks – the suppliers of capital. Capital markets and the banking industry represent different levels of advancement which affects the capital structure of business entities.

Special attention, however, should be given to differences in local accounting standards. Generally, every country applies different methods for the valuation and presentation of financial statements, which leads to the potential risk of the inconsistency of empirical data. A number of international research studies seem to disregard this factor. The currently provided empirical data, if properly selected, mitigate the risk of inconsistency. The unified system is based on the EU directives which require that consolidated financial statements prepared by public companies be based on the International Accounting Standards (IAS).

In the light of different conditions and factors in the particular countries, it is advisable to distinguish two types of capital structure determinants. The first type includes microeconomic determinants which are dependent on company operations. They are described in detail in international literature, and they include such factors as risk, the share of tangible fixed assets in the balance sheet total, the business entity's size, profitability, etc. The other type includes macroeconomic/institutional factors: legal systems, macroeconomic indicators, corporate taxation as well as the development of capital and bank markets.

A few research studies on capital structure refer to the CEE countries, e.g. the Visegrad Group (Nivorozhkin, 2003; Bauer, 2004; Joeveer, 2006). P. Bauer draws a comparison between the capital structures of public companies in Poland, the Czech Republic, Slovakia and Hungary, while K. Joeveer focuses on public and non-public companies in Poland, the Czech Republic, Slovakia, Hungary, Bulgaria, Lithuania, Latvia, Estonia and Romania. E. Nivorozhkin examines Czech and Bulgarian companies. This paper investigates capital structure determinants in companies operating in

Western European and CEE countries. Specialist literature does not offer many works relating to capital structure focusing on a large number of entities originating from many European states; an exception may be seen in B. Steil (Steil et. al., 1996), W. Frąckowiak (Frąckowiak et al., 2006). Public companies which represent 20 countries are discussed. A number of macroeconomic/institutional determinants are introduced whose impact may be compared with microeconomic factors. Most international literature, as mentioned before, disregards macroeconomic factors; they are discussed only by a few authors (Booth et al., 2001; Bancel and Mittoo, 2004; Joeveer, 2006). The collection of data poses a number of problems, especially if information concerns longer periods of time and is collected from such countries as Lithuania, Latvia, Romania, or even Poland. This may be the reason for which the impact of such factors has not been examined on a larger scale.

## 1. LITERATURE OVERVIEW, DERIVED HYPOTHESES

Most authors often analyse capital structure at a country level. Many researchers adopt such an approach (e.g. Aggarwal, 1994) arguing that differences between companies from the different countries result from such national specific factors as the economic environment, corporate tax rates as well as bankruptcy costs. Therefore, it seems advisable to refer capital structure analyses to the particular countries, their specific factors and measurement values. Consequently, international research should differentiate between different groups of business entities depending on the country of their origin.

**Hypothesis 1:** The structure of corporate financing is different in particular EU member states.

Research studies give more and more attention to capital structure determinants in large groups of countries. One of the first research analyses was undertaken by Rajan and Zingales (1995). However, most researchers focus on the basic determinants of capital structure which are dependent on the financial data of business entities. Very few research studies stress the significance of international factors or the characteristics of a given economy (country). In most cases the authors mention the country factor without showing its impact on capital structure (e.g. Krishnan and Moyer, 1996). Only in very rare cases do the authors classify the determinants as those characteristic of a given country or company and present their significance (both micro- and macroeconomic factors) in the particular countries of the world.

Some of the authors (McClure et. al., 1999) divide capital structure determinants into the following groups: international environment factors, local factors and the environment factors characteristic of a given country or company. Other authors refer to the factors at a country level or a company level (Bancel and Mittoo, 2004).

For the purposes of this paper, I refer to the following classification of capital structure determinants:

1. factors at a company level,
2. factors at a country level (institutional and macroeconomic).

### **1.1. Microeconomic determinants**

The major capital structure theories described in literatures merely present an outline of the decision-making process related to the company's capital structure. However, they are significant both in their theoretical and practical dimensions. In practice, company managers who select financing methods for their operations are driven by much more quantitative factors. Literature refers to such factors as the capital structure determinants of business entities – the determinants at a company level which should be analysed in an individual manner.

Harris and Raviv (1991) define the following capital structure determinants, recognized in literature to be the dominant factors: the share of fixed assets in the total assets, the company's size and growth opportunities, the non-debt tax shield, the risk of failure, the volatility of earnings, R&D and advertising expenditures, and the unique character of products.

Lowe, Naughton and Taylor (1994) define the following capital structure determinants: profitability, the company's size and growth opportunities, taxation and cash flows.

Other capital structure determinants are proposed by Balakrishnan and Fox (1993): the volatility of earnings, depreciation as an alternative to the interest tax shield (depreciation write-offs), R&D and advertising expenditures and the company's growth opportunities.

For the purposes of this paper, reference is made to the following capital structure determinants at a company level: profitability, the volatility of earnings, industry, growth opportunities, the company's size and asset structure.

The company's profitability determines different aspects of financial management. The business theory and practice prove a negative correlation between profitability and the share of debt in capital structure. This is confirmed by the Pecking Order Theory (the theory of the order of sources

of financing). It assumes that businesses, in the first place, rely on their retained earnings with debt being a secondary source of financing (Myers, 2001). It should also be stressed that profitable companies which possess their own financial resources do not need to borrow larger amounts of money. Literature expresses different views as to the correlation between profitability and indebtedness; however, the opinion prevails that this correlation is negative (Friend and Lang, 1988). The positive correlation is also claimed by some authors (Frank and Goyal, 2003).

Most literature defines risk as the volatility of earnings. Greater risk may reduce the company's debt. This variable usually controls risk in a business entity (Burgman, 1996). Surprisingly, literature refers both to the positive and negative correlations between the volatility of earnings and the level of debt. The negative correlation is referred to by Bradley et al. (1984), while the positive one by Kim and Soerensen (1986). It should be stressed, however, that most authors refer to the negative correlation.

The company's core business has an impact on many aspects of its functioning. Empirical data indicate that there is a correlation between a given industry, profitability, the values of other financial indicators, etc. There is also a correlation between the industry and the company's capital structure. Because of the similar internal and external conditions of carrying out business activities, companies operating within the same industry should have similar capital structures. A number of research studies confirm that the industry factor is one of the capital structure determinants (Hovakimian et al., 2001; Cai and Ghosh, 2003). It is the average industry debt ratio that is considered by some authors and business practitioners to be a target level of capital structure in a given industry. International research studies make use of different typologies to divide the investigated sample into industries. The United States and the EU member states apply two major divisions of companies into industries: SIC Code (*Standard Industrial Classification – USA*) and NACE (*Statistical Classification of Economic Activities* in the European Union). It should be noted, however, that literature expresses different views on the significance of the industry factor.

The company's ability to expand also affects its financing methods. Generally, according to the financial theory, there is a negative correlation between growth opportunities and the level of debt. High growth companies, for example, biotechnological or internet ones, usually rely on equity financing. This factor is recognised as one of the company's major capital structure determinants (Myers, 1977). Companies with greater growth opportunities are more vulnerable to value losses as a result of financial

difficulties, and because of that they rely on indebtedness on a limited scale. Apart from the proven negative correlation between the level of debt and growth opportunities (Rajan and Zingales, 1996; Qiu and Bo, 2010), some authors stress the positive aspects of this correlation (e.g. Kester, 1986; Smith, 2010).

The company's size is one of the major capital structure determinants. Most authors believe that larger companies have a greater ability to service debt than smaller entities. Large companies are usually mature entities operating in the market for a number of years, they are well known and their financial stability results from many years of business operations (Bhaduri, 2002). Simultaneously, large companies possess more assets, which makes them vulnerable to so called negative selection, especially if they are not well known companies (Frank and Goyal, 2007). Empirical research, however, does not lead to clear-cut explanations. The authors point to both positive and negative correlations between the company's size and the level of debt. In most cases the correlation is positive. Many authors stress the significance of size as a capital structure determinant (e.g. Marsh, 1982; Nunkooa and Boateng, 2010).

Asset structure is another factor which has an impact on capital structure. In traditional production companies with a greater share of fixed assets, it may be expected that the share of long-term capital in the financial structure (equity and external sources) will be considerable. According to the agency theory (Jensen and Meckling, 1976), some investors are inclined to accept high risk projects. This is beneficial for shareholders because they may share risk with the lenders and generate higher profits, which does not apply to the lenders. Therefore, in order to protect their own interests, the lenders try to avoid such activities. The company which is characterized by greater collateral value has easier access to loans. This function is most effectively performed by tangible fixed assets. The above facts confirm a positive relation between the share of tangible fixed assets and the company's level of debt. Many authors confirm this correlation (e.g. Marsh, 1982; Gonedes et al., 1998; Awan et. al., 2011), while some of them claim the opposite (Harris and Raviv, 1991).

Furthermore, the IAS variable is also introduced. It provides information on whether the company's financial statements are based on the International Accounting Standards or local accounting systems. The variable may have a two-direction impact. International Accounting Standards are high quality standards and as such may contribute to reduced information asymmetry, greater transparency of financial data, lowering the cost of equity and external financing. Some banks offer more favourable lending terms to

companies which apply the IAS. This is also true of stock exchange investors. The application of the IAS may either raise or lower the level of debt. On the other hand, the IAS variable examines the impact of accounting differences on the results of analyses and the level of corporate capital structure. In the past, it was not recognized in literature as a capital structure determinant.

Many authors refer to a large number of different microeconomic capital structure determinants. It is hardly possible to estimate the number of such determinants. The determinants discussed above are recognized worldwide. Some other determinants include the payment of dividends and the company's uniqueness.

**Hypothesis 2:** Capital structure is determined by microeconomic factors which are dependent on company activities<sup>1</sup>.

Based on the above presented theoretical presentations the following support hypotheses have been introduced; these concern the microeconomic determinants of capital structure.

The support hypotheses are as follows:

- the capital structure of the enterprise is negatively dependent on its profitability,
- the capital structure of the enterprise is negatively correlated with risk,
- the capital structure of the enterprise is impacted by the line of business to which it belongs,
- the capital structure of the enterprise is negatively linked with its capacity to develop,
- the capital structure of the enterprise is positively linked with its size,
- the capital structure of the enterprise is positively correlated with the share of tangible fixed assets in total assets,
- the capital structure of the enterprise is dependent on the standards of accounting operating in it.

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<sup>1</sup> The second hypothesis does not assume similarity of microeconomic determinants for entities stemming from given EU States. The purpose of its verification is solely to confirm the potential impact of microeconomic factors on the capital structure of enterprises. The similarity of capital structure determinants for the old and new EU States will be verified as part of the fourth hypothesis.

## 1.2. Macroeconomic/institutional determinants

One of the major institutional capital structure determinants is the country's legal system. Research studies conducted by LaPorta et al. (1997) have had a major impact on many results of research in the field of finance. They classify countries from the point of view of their legal systems: English Common Law, French Civil Law, German Civil Law, Scandinavian Civil Law.

English Common Law puts an emphasis on the protection of minority interests. It has led to an increased confidence in stock exchanges and, consequently, to their development. Other legal systems, dominated by civil law, emphasize the protection of lenders (Germany's legal system). It has greatly contributed to the development of the banking industry in such countries. Therefore, countries with well developed stock exchange systems provide easier access to external financing in the form of the issue of shares. Obviously, countries with well developed banking systems offer more favourable lending opportunities. The cost of money is lower, and banks are more inclined to engage in lending activities. The English system provides the best protection for stock exchange investors, the French system – the worst, while the German systems ranks second and the Scandinavian system third in terms of the protection of investor interests. The greatest differences occur between the English and French systems. The German and English systems provide the best protection for lenders, the Scandinavian system provides less protection, and the French system – the least.

Capital structure is also affected by the development of capital markets and the banking industry. The more advanced the stock market, the lower the cost of capital at the stock exchange and the lower the share of debt. The more advanced the banking industry, the higher the number of entities in the sector and the lower is the cost of borrowing. Bank loans constitute a more favourable source of financing, and their share in capital structure rises. Some of the above hypotheses are confirmed by researchers in the field (Demirgüç-Kunt and Maksimovic, 1995). The authors analysed 30 countries. The sample was divided into developing and developed countries. A negative correlation between the development of the stock market and the share of debt in financing was recorded for the entire sample. The size of the banking sector was positively correlated with the level of debt in companies.

In the above considerations a presentation is offered of the institutional factors characteristic of the particular countries. A given country is also characterised by the factors which literature refers to as macroeconomic ones. Inflation rates, economic growth and the country's tax rates are included.



Economic growth reflects the company's growth opportunities in a given economy. According to the Pecking Order Theory (the theory of the order of financing sources) and the above statements related to capital structure determinants at company level, the correlation between economic growth and the level of debt is likely to be negative. However, not all business entities possess sufficient financial resources which ensure expansion on a larger scale. Therefore, it may be assumed that higher economic growth rates lead to higher levels of debt, making the above relation positive (see: Joeveer, 2006). Economic growth enhances the above discussed company's growth opportunities. It is possible to find out whether the company's growth is not below the country's economic growth rate – the country in which the company carries out most of its business activities (the home country).

Inflation and its impact on the structure of financing should be considered from two points of view. Indirectly, from the point of view of the development of financial markets – high inflation rates hinder the expansion of the banking and stock markets in less stable countries in terms of their macroeconomic environment (Demirgüç-Kunt and Levine, 1999). At the same time, inflation rates have an impact on the decisions related to the company's sources of financing. Expected high inflation rates may encourage the company to borrow on more favourable terms. Therefore, expected high inflation rates should be positively correlated with debt (Joeveer, 2005). Also, inflation rates provide information on the economy's condition. Inflation increases business risk (Demirgüç-Kunt and Maksimovic, 1995) and may reduce high risk debt financing. It may be assumed that higher inflation rates are negatively correlated with an increase in the company's indebtedness. Apart from the fact that inflation increases the monetary value of assets, higher interest rates and monetary risk result in the lower level of debt financing (Booth et al., 2001).

Capital structure is also affected by corporate tax rates. Most authors agree as to the following: the higher the corporate tax rates, the greater the company's inclination to reduce its tax burden. Therefore, we may expect a positive correlation between country tax rates and the level of debt. At the same time, there are more effective methods for reducing the tax burden including accounting policies and investment tax concessions (DeAngelo and Masulis, 1980). It should be noted that such methods do not involve additional risk such as debt. This method for reducing the tax burden (non-debt tax shield) is a better alternative than the interest tax shield (debt). The non-debt tax shield is a substitute for the interest tax shield. Heavier reliance on the non-debt tax shield reduces the use of the interest tax shield. The

interest tax shield, unlike the non-debt tax shield, is positively correlated with debt. Empirical research leads to different results. Some authors observe a positive relation between the non-debt tax shield and debt (Chaplinsky and Niehaus, 1993), and also a negative correlation (Kim and Sorensen, 1986). Corporate tax rates are treated as capital structure determinants in a number of empirical studies (e.g. Bancel and Mittoo, 2004).

In closing, one should stress that macroeconomic/institutional determinants have a significant impact on the company's capital structure. They create specific conditions with regard to the accessibility of different sources of financing, affecting the basic capital structure determinant – the cost of capital. The company's (country's) environment is an equally significant determinant of financing compared with the factors dependent on the company. According to the analysis conducted by Booth et al. (2001), institutional/macro-economic country factors account for 42% of the examined determinants, while 40%–43% are financial variables characteristic of a given company.

**Hypothesis 3:** capital structure is dependent on institutional/macro-economic factors which are characteristic of a given country.

An additional research hypothesis is formulated for the purposes of this paper:

**Hypothesis 4:** corporate capital structures in new and old EU member states are characterised by similar determinants.

Based on the above presented theoretical presentations, the following support hypotheses concerning the microeconomic/institutional determinants of capital structure have been introduced:

- the capital structure of enterprises in a given country is dependent on the binding legal system,
- the capital structure of enterprises in a given country is negatively correlated with the development of the capital markets,
- the capital structure of enterprises in a given country is positively connected with the development of the banking sector,
- the capital structure of enterprises in a given country is negatively dependent on the level of inflation,
- the capital structure of enterprises in a given country is positively correlated with the level of economic growth,
- the capital structure of enterprises in a given country is positively connected with the level of taxation.

## 2. METHODS

### 2.1. Sample

The empirical material is based on the financial data of public production companies from selected EU member states, especially their balance sheets and profit and loss accounts. The main advantage of such empirical material is its general availability and the time framework of disclosing information. At the same time, all European public companies prepare relatively uniform balance sheets and profit and loss accounts, which eliminates time-consuming procedures of adjusting data to one format for the purpose of setting up regression equations. Adjustments are necessary, but there is no need for developing one format for all the companies from scratch.

Another characteristic of the empirical material presented in the paper is the high degree of its comparability. Many international research studies on capital structure either disregard accounting differences or just refer to them as a possibly significant factor which hinders the comparability of results in their international dimension (Giannetti, 2003). The comparability of financial statements in this paper results from the fact that as of 1 January 2005, all European listed companies have been obligated to prepare their consolidated financial statements in compliance with the International Accounting Standards. This paper is one of the first attempts to do an analysis of capital structure determinants, where most of the empirical material – balance sheets and P&L Accounts – are based on International Accounting Standards. Most of the empirical material is based on similar methods for valuation and presenting balance sheet and result items. It should be noted that some EU member states introduced the adjustment processes prior to the introduction of IAS. Apart from that, IAS obligates companies to present comparable data one year prior to their actual implementation. Unfortunately, the data base (Amadeus Database) applied in generating the financial data of companies which meet specific requirements presents some of the data based on local accounting standards. This paper distinguishes two types of accounting standards because the data base relies on different country accounting standards. Companies present their financial statements based on local standards or IAS. For the purposes of this paper, the IAS variable was introduced to investigate the impact of the adopted accounting standards on capital structure and the results of the analysis. It may be expected that future data bases will rely on the same standards, making empirical material more uniform.

In the absence of financial data for some of independent variables, and considering the period of time required to carry out research studies (5 years), the number of the investigated companies has been reduced. The final number of companies from the particular countries amounts to 1,063. The total number of companies comes from the following countries: Belgium, Bulgaria, the Czech Republic, Ireland, Portugal, Spain, Sweden, Estonia, Romania, Finland, France, Greece, the Netherlands, Germany, the UK, Italy, Lithuania, Latvia, Poland and Slovakia. The companies analysed in great detail come from the following countries: Finland, France, Greece, Spain, the Netherlands, Germany, the UK, Romania, Italy, Lithuania, Latvia, Poland and Slovakia. Concerning the old EU States the following are distinguished: Finland, France, Germany, Greece, Italy, the Netherlands, Spain, Great Britain, whilst among the new EU States are distinguished: Latvia, Lithuania, Poland, Romania, Slovakia.

## **2.2. Definitions of dependent variables**

Dependent variables are treated as the capital structure indicators of the specific listed companies. International literature does not accept one common indicator of the company's capital structure. In most cases, the indicators have the following general form:

capital structure = level of debt/value of sources of financing.

The authors agree as to the presentation of debt in accounting or market values. Most researchers claim that the amount of debt should be recorded in accounting values. Accounting values do not considerably differ from market values, but it is very difficult to obtain the market values of debt. This results from the fact that active markets for specific types of debt do not exist, and the market-based valuation would be time-consuming and not free from errors.

The basic discrepancy refers to the presentation of equity in market or accounting values. In this paper, equity valuation based on accounting values is applied. This is motivated by the fact that accounting values are less dependent on the current fluctuations of share values, and their changeability as a statistical variable is lower. Many authors refer to equity accounting values (e.g., Firth, 1995; Bhaduri 2002; Jun and Jen, 2003). A significant advantage of accounting values is their availability in specialised data bases, especially in the case of longer periods of time under examination (more than 6 years). For example, the Amadeus database does not provide any information on equity market values.

Literature does not agree as to the definition of the value of debt. Some of the authors claim that long-term capital structure decisions are based on the level of long-term debt, while the level of short-term debt is not subject to long-term planning and is not included in capital structure considerations. According to this view, the capital structure indicator should be calculated only on the basis of long-term liabilities (Jensen et al., 1992; Jahera and Lloyd, 1996; Moh'd et al., 1998; Panno, 2003; Akhtar, 2005).

According to another approach favoured by many authors, short- and long-term liabilities should be treated as a whole. The authors argue that short-term debt has an obvious impact on the company's financial flexibility and its sources of equity or external financing. It is short-term debt that is considered by many authors to be more risky. Therefore, an analysis of the company's capital structure should be based on the company's total indebtedness (Omer and Terando, 1992; Balakrishnan and Fox, 1993; Pittman, 2002; Jun and Jen, 2003).

Because many authors support the idea of examining capital structure on the basis of the long-term debt ratio (Y2) and the total debt ratio (Y1), two capital structure formula as explanatory variables are applied:

$$Y1 = (\text{total short- + long-term liabilities in accounting values}) / (\text{equity in accounting values + total liabilities in accounting values})$$

$$Y2 = (\text{total long-term liabilities in accounting values}) / (\text{total long-term liabilities in accounting values + equity in accounting values})$$

### **2.3. Definitions of microeconomic independent variables**

Most authors define risk (operational risk) as the volatility of earnings. The higher the volatility, the higher the risk and the lower the level of debt financing. The volatility of earnings should be understood as profit fluctuations in absolute values. This variable is defined as operational risk variant (Nivorozhkin, 2003), variation of earnings before interest and taxes (Jahera and Lloyd, 1996). Some authors define it as quick ratio (Low and Chen, 2004). For the purposes of this paper, application is made of the following formula in absolute values for the past 5 years:

$$\text{risk} = \text{standard deviation (EBIT)}$$

The explanatory variable concerning the company's size is defined by some authors as the natural logarithm of the volume of assets (Al-Sakran, 2001). The natural logarithm makes differences between the volumes of assets in the particular companies insignificant. Otherwise, the largest companies could dominate the statistical sample. Another possibility

specified in research papers is the description of a business entity based on its revenues (Majumdar and Chhibber, 1999, similar variable: Colombo, 2001), or a natural logarithm of market capitalization (Bancel and Mittoo, 2004). For the purposes of this paper, application is made of the following definition of the variable:

$$\text{size} = \ln(\text{revenues from operating activities})$$

Research papers offer different definitions of the company's growth opportunities in the context of investigating capital structure determinants. Some of the authors define it as a quotient of the company's market value and its book value (Low and Chen, 2004). Other authors apply market to book ratio, defined as the sum of market value of common equity, liquidation value of preferred stock, and book value of total debt divided by book value of total assets (e.g., Johnson, 1997). The impact of stock exchange fluctuations resulting from external factors on the value of this indicator should be stressed. Other authors define growth opportunities as the annual increase in total revenues, or a forecast of five-year sales growth (Moh'd et al., 1998). I define this variable in the following way:

$$\text{growth opportunities} = \frac{\text{annual increase in revenues from operating activities}}{\text{activities}} (\%)$$

It is more difficult to define the industry factor. As already mentioned, an analysis of public companies from the production sector is performed. According to US SIC (Standard Industrial Classification), all the companies are divided into groups on the basis of the above standard (see: Balakrishnan and Fox, 1993). Production companies belong to the following codes: US SIC 1000 – US SIC 3999. Further division of the group of the investigated companies into industries is based on the first two digits of the SIC code (variable = IND1 – IND27, Table 1). Other authors divide business entities on the basis of the first digit of US SIC; however, such a division is too simplified in the case of a large number of entities (e.g. Omer and Terando, 1992). As the next step, calculation is made of the average capital structures for the particular industries.

Table 1  
Number of companies in given lines of business

Industry variable	Number of companies	Branch of industry (US SIC 1000 - US SIC 3999)
IND1	7	Gold and silver ores; Miscellaneous metal ores
IND2	3	Bituminous coal and lignite mining
IND3	17	Oil and gas extraction; Crude petroleum and natural gas; Oil and gas fields services
IND4	11	Dimension stone; Chemical and fertilizer mineral mining; Miscellaneous non-metallic minerals, except fuels
IND5	76	Building construction general contractors and operative builders; General building contractors residential buildings
IND6	19	Highway and street construction, except elevated highways; Heavy construction, except highway and street construction
IND7	12	Plumbing, heating and air-conditioning; Painting and paper hanging; Electrical work; Masonry, stonework, tile setting and plastering; Carpentry and floor work; Miscellaneous special trade contractors
IND8	107	Food and kindred products; Meat products; Dairy products; Canned, frozen and preserved fruits, vegetables and food specialties manufacturing; Grain mill products; Bakery products manufacturing; Sugar and confectionery products manufacturing; Fats and oil
IND9	4	Cigarettes manufacturing
IND10	44	Textile mill products manufacturing; Broad woven fabric mills, cotton manufacturing; Broad woven fabric mills, manmade fiber and silk manufacturing; Broad woven fabric mills, wool (including dyeing and finishing) manufacturing; Narrow fabric and other
IND11	25	Men's and boys' furnishings, work clothing and allied garments manufacturing; Miscellaneous apparel and accessories manufacturing; Miscellaneous fabricated textile products manufacturing
IND12	10	Sawmills and planing mills; Millwork, veneer, plywood and structural wood members; Wood containers; Wood buildings and mobile homes
IND13	21	Furniture and fixtures manufacturing; Household furniture manufacturing; Office furniture manufacturing
IND14	33	Paper and allied products manufacturing; Pulp mills manufacturing; Paper mills manufacturing; Paperboard containers and boxes manufacturing; Converted paper and paperboard products, except containers and boxes manufacturing
IND15	62	Printing, publishing and allied industries; Newspapers publishing or publishing and printing; Periodicals: publishing or publishing and printing; Books; Miscellaneous publishing; Commercial printing; Service industries for the printing trade
IND16	103	Chemicals and allied products manufacturing; Industrial inorganic chemicals manufacturing; Plastics materials and synthetic resins, synthetic rubber, cellulosic and other manmade fibers, except glass manufacturing; Drugs; Soap, detergents and cleaning prep
IND17	10	Miscellaneous products of petroleum and coal manufacturing

<b>IND18</b>	32	Rubber and miscellaneous plastics products manufacturing; Tires and inner tubes manufacturing; Fabricated rubber products, not elsewhere specified manufacturing; Miscellaneous plastics products manufacturing
<b>IND19</b>	4	Leather tanning and finishing manufacturing; Footwear, except rubber manufacturing; Luggage manufacturing
<b>IND20</b>	56	Stone, clay, glass and concrete products manufacturing; Glass and glassware, pressed or blown manufacturing; Glass products, made of purchased glass manufacturing; Cement, hydraulic manufacturing; Structural clay products manufacturing; Pottery and relate
<b>IND21</b>	38	Primary metal industries manufacturing; Steel works, blast furnaces and rolling and finishing manufacturing; Iron and steel foundries; Primary smelting and refining of nonferrous metals; Nonferrous foundries (castings); Miscellaneous primary metal product
<b>IND22</b>	60	Fabricated metal products, except machinery and transportation equipment; Metal cans and shipping containers; Cutlery, hand tools and general hardware; Heating equipment, except electric and warm air, and plumbing fixtures; Fabricated structural metal prod
<b>IND23</b>	104	Industrial and commercial machinery and computer equipment; Engines and turbines; Farm and garden machinery and equipment; Construction, mining and materials handling machinery and equipment; Metalworking machinery and equipment; Special industry machinery
<b>IND24</b>	89	Electrical industrial apparatus; Household appliances; Electric lighting and wiring equipment; Household audio and video equipment, and audio recordings; Communications equipment; Electronic components and accessories; Miscellaneous electrical machinery
<b>IND25</b>	36	Transportation equipment manufacturing; Motor vehicles and motor vehicle equipment manufacturing; Aircraft and parts manufacturing; Ship and boat building and repairing; Railroad equipment manufacturing; Motorcycles, bicycles and parts manufacturing
<b>IND26</b>	62	Measuring, analyzing and controlling instruments; photographic, medical and optical goods; watches and clocks manufacturing; Laboratory apparatus and analytical, optical, measuring, and controlling instruments manufacturing; Surgical, medical and dental
<b>IND27</b>	18	Jewellery, silverware, and plated ware; Musical instruments; Dolls, toys, games and sporting and athletic goods; Miscellaneous manufacturing industries
<b>Σ</b>	1063	

Source: author's own research

Notes: **IND1–IND27** – branch of industry based on US SIC 1000 - US SIC 3999.

Profitability as a variable is also defined in different ways in research papers. In most cases it is understood as the financial result of a given period divided by total assets (Moh'd et al., 1998), understood as a ratio of net income to total assets (Nivorozhkin, 2003), or as the relation between total cash flow and sales ratio (Low and Chen, 1994). For the purposes of this paper, application of ROA is made in the following way:

$$\text{ROA (profitability)} = \text{profit(loss) before tax} / \text{total assets}$$

Research papers express similar views on the share of tangible fixed assets (fixed assets) in the balance sheet total. Some of the authors define



this variable as the share of property, plant and equipment in the balance sheet total (Firth, 1995; Pittman, 2002), others represent a broader view and define it as the share of tangible fixed assets in the balance sheet total (Colombo, 2001), while some other authors calculate this indicator as the share of fixed assets in total assets (Akhtar, 2005).

For the purposes of this paper, the following definition is applied:

$$\text{tangible fixed assets} = \text{tangible fixed assets} / \text{total assets}$$

The last variable which investigates the impact of accounting differences in the particular countries is the IAS (International Accounting Standards) variable. This variable explains the impact of accounting differences within the investigated sample on capital structure. Reports based on IAS assume that IAS variable = 1, while in the case of financial statements based on local accounting standards the respective values equals 0. It should be noted that some of the companies prepared their financial statements on the basis of local accounting standards, while in later years they applied IAS.

#### **2.4. The definitions of macroeconomic independent variables**

Research in the field of finance and international accounting refers to the legal system as a variable. Such variables assume values (0, 1). The classification of legal systems has its source in research papers (LaPorta et al., 1998). The remaining information on legal systems has been collected from Globallex Database and "The World Factbook 2007". The following division of explanatory variables for the particular legal systems is applied: English Common Law (0, 1); French Civil Law (0, 1); German Civil Law (0, 1); Scandinavian Civil Law (0, 1).

The development of capital markets is most frequently defined as a quotient of stock exchange market capitalization in a given country and GDP (Rajan and Zingales, 1995; Giannetti, 2003; Joeveer, 2006). Another common variable of capital market development is expressed as a quotient of the total value of sold shares and GDP (Demirgüç-Kunt and Maksimovic, 1995; Bance and, Mittoo, 2004). For the purposes of this paper, I apply the following definition of capital market development:

$$\text{development of capital market} = \frac{\text{stock exchange market capitalization}}{\text{GDP}}$$

The level of advancement of the banking sector in a given country is defined as the value of loans extended by banks to the private sector divided by GDP (Levine and Zervos, 1996; similar variable: Bancel and Mittoo, 2004; similar variable: Joeveer, 2006). According to another definition, this

variable represents the share of liquid liabilities (M3) in GDP (Demirgüç-Kunt and Maksimovic, 1994). For the purposes of this paper, application is made of the following definition:

development of the banking sector = value of loans extended by banks to  
the private sector/GDP

To eliminate exchange rate fluctuations which may considerably distort the value of GDP for the particular countries, this value is expressed in euros on the basis of the fixed rate of 2000 for the purpose of the analysis covering the period 2001–2007.

Inflation rates, corporate income taxes and economic growth constitute the remaining macroeconomic variables. The majority of macroeconomic data has been collected from Euromonitor International, IMF, International Financial Statistics and World Economic Outlook/UN/National Statistics.

### 3. RESULTS

In the first phase of the analysis basic capital structure measurements Y1, Y2 are subjected to further statistical analysis. One-factor variance analysis is applied to Y1, Y2 by old and new member states and Poland. The results of research for Y1 and Y2 are presented in Tables 2, 3 and 4. The values of F test statistic suggest that the null hypothesis should be rejected for Y1 and Y2, so both ratios have different statistical levels in the particular groups of countries (Table 2). NIR analysis indicates that the values of Y1 and Y2 are statistically lower in new member states (including Poland) than the values of Y1 and Y2 in old member states. Y1 is significantly higher for Poland than the remaining new member states, and Y2 is at the same level in Poland and the other new member states.

Table 2

The levels of total debt and long-term debt in old and new member states and in Poland

Countries	Y1		Y2	
	Mean	Stand. Dev.	Mean	Stand. Dev.
Old EU member states	53,90 <sup>c</sup>	18,640	31,18 <sup>b</sup>	21,151
New EU member	40,67 <sup>a</sup>	19,506	16,34 <sup>a</sup>	17,707
Poland	49,16 <sup>b</sup>	18,360	14,02 <sup>a</sup>	17,126
	F			
	67,45*		152,67*	

Source: author's own research

Notes: **Y1** = (total short- + long-term liabilities in accounting values)/(equity in accounting values + total liabilities in accounting values), **Y2** = (total long-term liabilities in accounting values)/(total long-term liabilities in accounting values + equity in accounting values).

Symbol \* indicates the statistically significant values of test  $F$  ( $\alpha = 0.05$ )

*a, b, c* – various letter indicate statistically significant differences in average values in the post-hoc analysis.

The values of  $F$  statistic suggest that the null hypothesis for variables **Y1** and **Y2** should be rejected, so both ratios have statistically significant values in different countries (Table 3). Statistically, **Y1** records the lowest levels in the following countries (based on NIR): Greece, Spain, and the UK, followed by Germany and the Netherlands, while the highest values are recorded in Italy. The lowest value of **Y2** is recorded in Greece, followed by Finnish, French, Spanish and British companies, while the highest values are recorded in Italian and German companies.

Table 3

The levels of total debt and long-term debt in old member states

Countries	Y1		Y2	
	Mean	Stand. dev.	Mean	Stand. dev.
Finland	54,74 <sup>bc</sup>	15,221	31,11 <sup>b</sup>	17,173
France	58,26 <sup>cd</sup>	16,855	28,83 <sup>b</sup>	19,063
Germany	57,36 <sup>c</sup>	18,184	43,69 <sup>c</sup>	19,445
Greece	47,56 <sup>a</sup>	17,904	24,98 <sup>a</sup>	19,592
Italy	63,34 <sup>d</sup>	17,006	39,56 <sup>c</sup>	18,660
The Netherlands	56,66 <sup>c</sup>	17,991	34,36 <sup>bc</sup>	21,074
Spain	52,17 <sup>b</sup>	19,171	27,86 <sup>b</sup>	19,437
The UK	51,66 <sup>b</sup>	19,112	27,53 <sup>b</sup>	21,372
	F			
	10,445*		24,507*	

Source: author's own research

Notes: **Y1** = (total short- + long-term liabilities in accounting values)/(equity in accounting values + total liabilities in accounting values), **Y2** = (total long-term liabilities in accounting values)/(total long-term liabilities in accounting values + equity in accounting values).

Symbol \* indicates the statistically significant values of test  $F$  ( $\alpha = 0.05$ )

*a, b, c* – various letter indicate statistically significant differences in average values in the post-hoc analysis.

The values of  $F$  statistic suggest that the null hypothesis for dependent variables (**Y1** and **Y2**) should be rejected, which implies that both ratios have different (statistically significant) levels in new member states (Table 4). NIR analysis indicates that **Y1** is significantly lower in Latvian and Romanian companies, and significantly higher in Lithuanian, Polish and

Slovak companies. Y2 is significantly lowest in Slovak and Romanian companies, followed by Latvian and Polish companies. Y2 records the highest significant values in Lithuanian companies.

Table 4

The level of total debt and long-term debt in new member states

Countries	Y1		Y2	
	Mean	Stand. dev.	Mean	Stand. dev.
Latvia	32,05 <sup>a</sup>	20,184	12,94 <sup>ab</sup>	14,427
Lithuania	46,87 <sup>b</sup>	17,665	24,58 <sup>c</sup>	19,103
Poland	49,16 <sup>b</sup>	18,360	14,02 <sup>b</sup>	17,126
Romania	31,96 <sup>a</sup>	15,503	10,27 <sup>a</sup>	16,123
Slovakia	46,58 <sup>a</sup>	20,636	7,86 <sup>a</sup>	10,710
	F			
	8,514*		4,669*	

Source: author's own research

*Notes:* **Y1** = (total short- + long-term liabilities in accounting values)/(equity in accounting values + total liabilities in accounting values), **Y2** = (total long-term liabilities in accounting values)/(total long-term liabilities in accounting values + equity in accounting values).

*Symbol \* indicates the statistically significant values of test F ( $\alpha = 0.05$ )*

*a,b,c – various letter indicate statistically significant differences in average values in the post-hoc analysis.*

The statistical analysis starts with an analysis of correlations. Correlation matrices are based on the following dimensions: old member states, new member states, Poland (Tables 5, 6 and 7). The analysis of variable Y1 for old countries records the following statistically significant capital structure determinants (Table 5): inflation rates, taxation, economic growth, profitability and the share of tangible fixed assets. The impact of the remaining determinants is statistically insignificant. The analysis of the direction of correlations between determinants and capital structure positively verifies the hypothesis on the negative impact of inflation on the level of debt; the same is true of the positive impact of taxation (classical tax shield). The positive verification also concerns the negative impact of the company's profitability on the level of debt. The negative verification, on the other hand, relates to the negative impact of tangible fixed assets on the level of debt financing and the negative impact of economic growth on variable Y1.

In terms of significance, the impact of the particular determinants on variable Y2 is identical: inflation rates, taxation, economic growth,

profitability and the share of tangible fixed assets. Also, the type of the particular correlations has identical signs which supports the results obtained for Y2. The only difference occurs in the correlation between tangible fixed assets and Y2 – it is positive, which is also suggested by literature. The reason is that tangible fixed assets are most commonly used as collateral for long-term loans. Attention should be given to a stronger correlation between Y2 and tax rates, which may imply that business entities are more inclined to resort to deducting interest on long-term debt to reduce their tax burden. Another interesting correlation is that of the impact of taxation on economic growth at the level of 0.516. The detailed results are presented below:

- **negative impact of inflation, hypothesis positively verified (Y1, Y2),**
- **positive impact of taxation, hypothesis positively verified (Y1, Y2),** similar results for this group of countries: Krishnan and Moyer (1996),
- **negative impact of economic growth, hypothesis negatively verified (Y1, Y2),**
- no statistically significant impact of risk (Y1, Y2), negative impact of risk recorded by Krishnan and Moyer (1996). The research studies, however, related to earlier periods than the ones analysed in this paper,
- no statistical significance of company size (Y1, Y2), positive impact of company size recorded by Wald (1999), Rajan and Zingales (1995),
- no statistically significant impact of the company's expansion potential (Y1, Y2), negative impact of expansion potential recorded by Wald (1999),
- **negative impact of profitability, hypothesis positively verified (Y1, Y2),** similar results for this group of countries recorded by Rajan and Zingales (1995),
- **negative (Y1)/positive impact of the share of tangible fixed assets (Y2), hypothesis negatively verified (Y1)/positively (Y2),** positive impact for this group of countries recorded by Rajan and Zingales (1995).

Table 5  
Correlation matrix – old EU member states

	Y1	Y2	Inflation rate	Taxation	Economic growth	Risk	Size	Growth opportunities	ROA	Tangible fixed assets
Y1	1.000	<b>0.796*</b>	<b>-0.087*</b>	<b>0.093*</b>	<b>-0.187*</b>	0.015	0.030	-0.048	<b>-0.173*</b>	<b>-0.071*</b>
Y2		1.000	<b>-0.103*</b>	<b>0.159*</b>	<b>-0.206*</b>	0.010	-0.006	-0.025	<b>-0.134*</b>	<b>0.108*</b>
Inflation rate			1.000	-0.028	<b>0.353*</b>	-0.004	<b>0.402*</b>	0.016	-0.061	0.066
Taxation				1.000	<b>-0.516*</b>	0.008	<b>-0.196*</b>	-0.020	0.004	-0.053
Economic growth					1.000	-0.000	<b>0.440*</b>	0.039	0.022	<b>0.079*</b>
Risk						1.000	0.031	0.005	-0.000	-0.002
Size							1.000	-0.027	0.057	<b>0.130*</b>
Growth opportunities								1.000	-0.019	-0.033
ROA									1.000	-0.001
Tangible fixed assets										1.000

Source: author's own research

Notes: **Y1** = (total short- + long-term liabilities in accounting values)/(equity in accounting values + total liabilities in accounting values), **Y2** = (total long-term liabilities in accounting values)/(total long-term liabilities in accounting values + equity in accounting values), **risk** = standard deviation (EBIT), **size** = ln (revenues from operating activities), **growth opportunities** = annual increase in revenues from operating activities (%), **ROA (profitability)** = profit/loss before tax/total assets, **tangible fixed assets** = tangible fixed assets/total assets.

\* if  $p < 0.05$

In new EU member states (excluding Poland) the following significant correlations are recorded for variable Y1: inflation rates and ROA (Table 6). Unfortunately, it is not a desirable phenomenon that not all the theories commonly accepted in countries with well-established market economies are applicable to less advanced countries. The following determinants may be

positively verified: the negative impact of inflation and profitability. The levels of inflation are more significant than in old countries. This may result from higher inflation rates in new member states. Taxes are verified as statistically insignificant in this group of countries, which may result from different methods for reducing tax burdens (non-interest tax shield) as well as from the considerably lower tax rates in new member states. With regard to Y2, the following determinants turn out to be statistically significant: inflation, taxes, company size, ROA and tangible fixed assets. Therefore, variable Y2 is a more effective measure of capital structure based on the applied determinants. Positive verification with regard to Y2 direction changes is recorded for the negative impact of inflation rates, the positive impact of company size, the negative impact of profitability and the positive impact of the share of tangible fixed assets. The negative impact of taxes on Y2 is negatively verified. The share of tangible fixed assets is significant and positively correlated. Company size is also statistically significant and positively correlated, which may imply greater reliability and borrowing opportunity for larger companies in CEE countries.

The general results for new member states with regard to variable Y1/Y2 are as follows:

- **negative impact of inflation, hypothesis positively verified (Y1, Y2)**, negative impact of inflation also confirmed for developing countries by Booth et al. (2001),
  - no statistically significant impact of taxes (Y1)/**negative impact of taxes, hypothesis negatively verified (Y2)**, positive impact of taxes in developing countries recorded by Booth et al. (2001),
  - no statistically significant impact of economic growth (Y1, Y2), negative correlation recorded by Joeveer (2006),
  - no statistically significant impact of risk (Y1, Y2), similarly, Bauer (2004),
  - no statistically significant impact of company size (Y1)/**positive impact of company size, hypothesis positively verified (Y2)**, positive impact of company size for Bulgaria and the Czech Republic confirmed by Nivorozhkin (2004). Similar results for developing countries recorded by Demirgüç-Kunt (1992),
  - no statistically significant impact of company's development potential (Y1, Y2). Ambiguous results for developing countries recorded by Demirgüç-Kunt (1992),
  - **negative impact of profitability, hypothesis positively verified (Y1, Y2)**, similar results for Bulgaria and the Czech Republic: Nivorozhkin,

(2004). Negative impact for developing countries recorded by Demirgüç-Kunt and Maksimovic (1994),

- no statistically significant impact of the share of tangible fixed assets (Y1)/**positive impact of the share of tangible fixed assets, hypothesis positively verified (Y2)**, negative impact for Bulgaria and the Czech Republic recorded by Nivorozhkin, (2004).

Table 6  
Correlation matrix – new EU member states

	Y1	Y2	Inflation rate	Taxation	Economic growth	Risk	Size	Growth opportunities	ROA	Tangible fixed assets
Y1	1.000	<b>0.647*</b>	<b>-0.203*</b>	0.028	0.023	0.029	-0.048	0.085	<b>-0.289*</b>	0.052
Y2		1.000	<b>-0.245*</b>	<b>-0.129*</b>	0.109	0.045	<b>0.173*</b>	0.010	<b>-0.139*</b>	<b>0.238*</b>
Inflation rate			1.000	<b>0.354*</b>	<b>-0.151*</b>	0.032	-0.050	-0.009	<b>0.185*</b>	<b>-0.201*</b>
Taxation				1.000	<b>-0.544*</b>	0.025	<b>-0.485*</b>	<b>0.175</b>	-0.050	0.020
Economic growth					1.000	0.026	<b>0.343*</b>	-0.034	0.027	<b>-0.138*</b>
Risk						1.000	-0.037	0.041	-0.004	-0.010
Size							1.000	0.003	<b>0.377*</b>	-0.052
Growth opportunities								1.000	<b>0.112*</b>	0.006
ROA									1.000	<b>-0.272*</b>
Tangible fixed assets										1.000

Source: author's own research

Notes: **Y1** = (total short- + long-term liabilities in accounting values)/(equity in accounting values + total liabilities in accounting values), **Y2** = (total long-term liabilities in accounting values)/(total long-term liabilities in accounting values + equity in accounting values), **risk** = standard deviation (EBIT), **size** = ln (revenues from operating activities), **growth opportunities** = annual increase in revenues from operating activities (%), **ROA (profitability)** = profit/loss before tax/total assets, **tangible fixed assets** = tangible fixed assets/total assets.

\* if  $p < 0.05$



In the case of Poland, statistically significant Y1 determinants include risk, company development potential and profitability (Table 7). Positive verification of the hypotheses is recorded for the negative impact of operational risk and the negative impact of ROA, while the positive impact of company development potential is negatively verified. Attention should be given to the properly verified correlation with risk not recorded in the previous measurements. The impact of inflation on capital structure is not recorded, which may be partially attributed to low inflation rates in Poland, excluding the year 2000. Also, taxes turn out to have no impact whatsoever on capital structure. Similarly, economic growth is not statistically significant for the remaining countries of the region. For variable Y2, statistically significant determinants include taxes, company size and the share of tangible fixed assets. Positive verification – the positive impact of company size and tangible fixed assets; negative verification – the impact of taxes. Similarly to the previous matrixes, taxes are significant only for Y2. Inflation rates are not significant only for Poland (similarly to the previous cases).

The general results for Poland with regard to variable Y1/Y2 are as follows:

- no statistically significant impact of inflation (Y1, Y2), negative impact of inflation in the entire CEE region (including Poland) recorded by Joeveer (2006),
  - no statistically significant impact of taxes (Y1)/**negative impact of taxes, hypothesis negatively verified (Y2)**,
  - no statistically significant impact of economic growth (Y1, Y2), negative impact of economic growth in the entire CEE region (including Poland) recorded by Joeveer (2006),
    - **negative impact of risk (Y1)**/ no statistically significant impact of risk (Y2), **hypothesis positively verified (Y1)**, slightly negative impact of operational risk for Poland confirmed by Bauer (2004),
    - no statistically significant impact of company size (Y1)/**positive impact of company size (Y2), hypothesis positively verified (Y2)**. Positive impact of company size for Poland recorded by Bauer (2004),
      - **positive impact of company's development potential (Y1)**/ no statistically significant impact of development potential (Y2), **hypothesis positively verified (Y1)**,
      - **negative impact of profitability (Y1)**/ no statistically significant impact of profitability (Y2), **hypothesis positively verified (Y1)**, negative impact of profitability for Poland confirmed by Bauer (2004),

- no statistically significant impact of tangible fixed assets (Y1)/**positive impact of the share of tangible fixed assets (Y2), hypothesis positively verified (Y2).**

Concluding, it should be stated that there are differences in the significance of determinants and types of correlations between new and old member states. The only common characteristic is statistical significance and correlation for inflation and ROA. The greater predictability of correlations – as confirmed by literature – is recorded for old member states. Poland shares more characteristics with its region, which also demonstrates differences from country to country.

Table 7

Correlation matrix for Poland

	Y1	Y2	Inflation rate	Taxation	Economic growth	Risk	Size	Growth opportunities	ROA	Tangible fixed assets
Y1	1.000	<b>0.629*</b>	0.038	0.000	-0.030	<b>-0.127*</b>	-0.018	<b>0.155*</b>	<b>-0.240*</b>	0.003
Y2		1.000	-0.002	<b>-0.128*</b>	0.079	-0.043	<b>0.164*</b>	0.053	-0.024	<b>0.206*</b>
Inflation rate			1.000	<b>-0.340*</b>	-0.034	-0.031	-0.025	0.066	0.030	0.022
Taxation				1.000	<b>-0.693*</b>	-0.005	<b>-0.251*</b>	<b>-0.114*</b>	<b>-0.185*</b>	0.079
Economic growth					1.000	0.045	<b>0.218*</b>	<b>0.134*</b>	<b>0.185*</b>	-0.096
Risk						1.000	-0.086	-0.043	-0.035	-0.078
Size							1.000	0.043	<b>0.288*</b>	<b>0.127*</b>
Growth opportunities								1.000	<b>0.140*</b>	-0.048
ROA									1.000	<b>-0.134*</b>
Tangible fixed assets										1.000

Source: author's own research

*Notes:* **Y1** = (total short- + long-term liabilities in accounting values)/(equity in accounting values + total liabilities in accounting values), **Y2** = (total long-term liabilities in accounting values)/(total long-term liabilities in accounting values + equity in accounting values), **risk** = standard deviation (EBIT), **size** = ln (revenues from operating activities), **growth opportunities** = annual increase in revenues from operating activities (%), **ROA (profitability)** = profit/loss before tax/total assets, **tangible fixed assets** = tangible fixed assets/total assets.

\* if  $p < 0.05$

In the next phase of the analysis capital structure qualitative determinants are subjected to further statistical analysis. The analysis focuses on variables which are not recognized enough by literature, or constitute new groups of variables not applied in earlier research studies on capital structure, or qualitative variables which may not be explicitly verified in a linear correlation analysis:

- legal system,
- capital market development,
- banking sector development,
- IAS as a variable.

The first part of the analysis focuses on the legal system as a capital structure determinant. The analysis of legal systems is carried out for old and new EU member states. The results of research are presented in Tables 8 and 9. The values of F statistic suggest that the null hypothesis for both dependent variables (Y1 i Y2) may be rejected, which implies that both ratios have different (statistically significant) values in countries with different legal systems (old member states, Table 8). NIR analysis indicates that Y1 and Y2 are significantly the lowest in countries based on the UK system and significantly the highest in countries which have the German system. A more detailed analysis of the group of countries shows almost ideal distributions of debt in particular legal systems: the UK system is followed by the French, Scandinavian and German systems both for Y1 and Y2 variables. This confirms the hypothesis concerning the impact of legal systems on corporate capital structure. An analysis, as already stressed, should be carried out for countries at comparable levels of economic advancement. Similar results for this group of countries are recorded by LaPorta et al. (1997), and also LaPorta et al. (1998).

Table 8  
Impact of legal systems on capital structure in old member states

Legal system	Y1		Y2	
	Mean	Stand. dev.	Mean	Stand. dev.
English Common Law	51,73 <sup>a</sup>	19,187	27,77 <sup>a</sup>	21,592
French Civil Law	54,33 <sup>b</sup>	18,525	29,42 <sup>b</sup>	20,388
German Civil Law	57,36 <sup>c</sup>	18,184	43,69 <sup>c</sup>	19,445
Scandinavian Civil Law	54,24 <sup>b</sup>	16,620	31,25 <sup>b</sup>	17,717
F				
	13,471*		91,444*	

Source: author's own research

Notes: **Y1** = (total short- + long-term liabilities in accounting values)/(equity in accounting values + total liabilities in accounting values), **Y2** = (total long-term liabilities in accounting values)/(total long-term liabilities in accounting values + equity in accounting values), **legal system** based on R. LaPorta, F. Lopez-de-Silances, F. Shleifer, R. Vishny (1998).

Symbol \* indicates the statistically significant values of test F ( $\alpha = 0.05$ ); a,b,c – various letter indicate statistically significant differences in average values in the post-hoc analysis.

The values of variable F lead to the rejection of the null hypothesis concerning the insignificance of variables Y1 and Y2 – they are statistically significant from the point of view of the division into the French and German systems for new member states (Table 9). The level of debt in countries with systems which are consistent with the German system is statistically significant and higher than in countries in which the legal system is consistent with the French system. The results for this group of countries empirically confirm the expected results based on literature. In conclusion, the hypothesis concerning the impact of legal systems on the level of debt financing in selected countries worldwide is empirically proven and positively verified.

Table 9  
Impact of legal systems on capital structure in new member states

Legal system	Y1		Y2	
	Mean	Stand. dev.	Mean	Stand. dev.
French Civil Law	31,66	14,161	10,65	14,867
German Civil Law	42,93	20,032	17,77	18,102
F				
	14,601*		6,871*	

Source: author's own research

Notes: **Y1** = (total short- + long-term liabilities in accounting values)/(equity in accounting values + total liabilities in accounting values), **Y2** = (total long-term liabilities in accounting values)/(total long-term liabilities in accounting values + equity in accounting values), **legal system** based on R. LaPorta, F. Lopez-de-Silances, F. Shleifer, R. Vishny (1998).

Symbol \* indicates the statistically significant values of test F ( $\alpha = 0.05$ ); a,b,c – various letter indicate statistically significant differences in average values in the post-hoc analysis.

The further part of verification analyses the impact of variable IAS on capital structure. The variable is a basis for dividing companies into two groups: those which apply the International Accounting Standards and the companies which apply local accounting standards. The analysis is carried out for new and old member states. The results are presented in Table 9. Analysis of old member states indicates that the impact of accounting standards is statistically significant.

The value of variable F leads to the rejection of the null hypothesis for Y1 and Y2, so the differences between dependent variables for companies from old member states applying IAS and local standards are statistically significant (Table 10), while no statistical significance is recorded for new member states. For old member states Y1 is statistically lower in IAS companies, which is also true of Y2. The statistical significance of the impact of IAS in old member states may result from the fact that free market traditions of developing accounting standards and free market business processes in these countries are much longer. This may be the reason why these countries relied on their own accounting standards, which differed, in many respects, from IAS. On the other hand, many new member states, prior to accession to the EU, developed their accounting standards based on IAS. The two Polish Acts on accounting were based on IAS. All matters which are not regulated by Polish legislation should be resolved on the basis of IAS regulations. There is an impact, however, recorded in old member states, while variable IAS is not statistically significant for new member states.

Table 10

Impact of different accounting standards on capital structure in old member states

International Accounting Standards (IAS)	Y1		Y2	
	Mean	Stand. dev.	Mean	Stand. dDev.
Yes	52,83 <sup>a</sup>	18,626	30,15 <sup>a</sup>	20,707
No	54,55 <sup>b</sup>	18,551	31,84 <sup>b</sup>	21,298
	F			
	7,573*		5,681*	

Source: author's own research

Notes: **Y1** = (total short- + long-term liabilities in accounting values)/(equity in accounting values + total liabilities in accounting values), **Y2** = (total long-term liabilities in accounting values)/(total long-term liabilities in accounting values + equity in accounting values), **IAS** – International Accounting Standards.

Symbol \* indicates the statistically significant values of test F ( $\alpha = 0.05$ )

a,b,c – various letter indicate statistically significant differences in average values in the post-hoc analysis.

The next phase of verification focuses on the impact of capital market development on capital structure. Capital market development is divided into three groups: weak, average and strong. The impact of capital markets is analysed for old and new member states. The results are presented in Tables 11 and 12.

The analysis of variable F confirms that Y1 and Y2 have statistically different values in different capital markets (in terms of market development) in old member states (Table 11). Indeed, Y1 is significantly lower for countries with strong markets, and Y2 is significantly lower for countries with strong markets. The analysis refers only to average and strong capital markets because old member states do not have weak markets. A decreased share of debt in countries with strong capital markets results from easier access to external stock capital on well developed stock exchanges. The obtained results imply positive verification of the negative impact of capital market development on corporate financing in old member states. Similar results for Western Europe are recorded by Booth et al. (2001).

Table 11

Impact of capital market development on capital structure in old member states

The development of capital markets	Y1		Y2	
	Mean	Stand. dev.	Mean	Stand. dev.
Medium	55,03 <sup>b</sup>	18,646	33,69 <sup>b</sup>	21,279
Strong	52,72 <sup>a</sup>	18,565	28,57 <sup>a</sup>	20,703
	F			
	15,233*		58,782*	

Source: author's own research

Notes: **Y1** = (total short- + long-term liabilities in accounting values)/(equity in accounting values + total liabilities in accounting values), **Y2** = (total long-term liabilities in accounting values)/(total long-term liabilities in accounting values + equity in accounting values), **development of capital market** = stock exchange market capitalization/GDP.

Symbol \* indicates the statistically significant values of test F ( $\alpha = 0.05$ )

a,b,c – various letter indicate statistically significant differences in average values in the post-hoc analysis.

Differences in Y1 and Y2 in new member states depending on weak and average capital markets turn out to be statistically significant (Table 12). Nevertheless, they do not reflect the expected results. It might be advisable for these countries to wait to "qualify" to the group of nations with strong markets and carry out research studies in the future. Low levels of debt in weak capital markets result from weak banking systems as well as low debt

base levels. It should be noted that an overwhelming majority of the analysed countries lack strongly developed stock exchanges. Poland is an exception to the rule. In new member states the hypothesis on the negative impact of capital market development should be negatively verified; however, the results are not unambiguous. In this group of countries a minimum positive correlation is recorded by Joeveer (2006).

Table 12

Impact of capital market development on capital structure in new member states

The development of capital markets	Y1		Y2	
	Mean	Stand. dev.	Mean	Stand. dev.
Weak	38,36 <sup>a</sup>	19,495	14,28 <sup>a</sup>	16,097
Medium	49,87 <sup>b</sup>	16,786	24,40 <sup>b</sup>	21,262
	F			
	15,274*		14,499*	

Source: author's own research

Notes: **Y1** = (total short- + long-term liabilities in accounting values)/(equity in accounting values + total liabilities in accounting values), **Y2** = (total long-term liabilities in accounting values)/(total long-term liabilities in accounting values + equity in accounting values), **development of capital market** = stock exchange market capitalization/GDP.

Symbol \* indicates the statistically significant values of test  $F$  ( $\alpha = 0.05$ )

*a, b, c* – various letter indicate statistically significant differences in average values in the post-hoc analysis.

The further part of the analysis verifies the expected positive impact of the banking sector on the level of debt. The development of the banking sector, similarly to capital markets, is divided into weak, average and strong. Again, the analysis is carried out for new and old member states. The results are presented in Tables 13 and 14. The results for old member states indicate a positive correlation between the development of the banking sector and the rising levels of debt (Table 13). Despite the absence of the statistical differences for Y1, the impact of the banking sector on the level of debt, especially long-term debt, should be positively verified. Short-term debt seems to be less dependent on the banking sector; it should rely more heavily on industry-related factors. Similar results are recorded for new member states (Table 14), with differences in Y2 being statistically insignificant. For this group of countries a minimum positive correlation is recorded by Joeveer (2006). It is still true, however, that the development of the banking sector has a positive impact on both Y1 and Y2. Also, it should be noted that capital structure is more affected by the banking sector than capital market development.

Table 13

Impact of the banking sector on capital structure in old member states

The development of the banking sector	Y1		Y2	
	Mean	Stand. dev.	Mean	Stand. dev.
Medium	53,59	17,876	28,72 <sup>a</sup>	19,435
Strong	54,06	19,027	32,46 <sup>b</sup>	21,887
	F			
	0,560		28,089*	

Source: author's own research

Notes: **Y1** = (total short- + long-term liabilities in accounting values)/(equity in accounting values + total liabilities in accounting values), **Y2** = (total long-term liabilities in accounting values)/(total long-term liabilities in accounting values + equity in accounting values), **development of the banking sector** = value of loans extended by banks to private sector/GDP.

Symbol \* indicates the statistically significant values of test  $F$  ( $\alpha = 0.05$ )

a,b,c – various letter indicate statistically significant differences in average values in the post-hoc analysis.

Table 14

Impact of the banking sector on capital structure in new member states

The development of the banking sector	Y1		Y2	
	Mean	Stand. dev.	Mean	Stand. dev.
Weak	37,76 <sup>a</sup>	17,434	16,06	17,486
Medium	42,47 <sup>b</sup>	20,531	16,52	17,894
	F			
	3,598*		0,041	

Source: author's own research

Notes: **Y1** = (total short- + long-term liabilities in accounting values)/(equity in accounting values + total liabilities in accounting values), **Y2** = (total long-term liabilities in accounting values)/(total long-term liabilities in accounting values + equity in accounting values), **development of the banking sector** = value of loans extended by banks to private sector/GDP.

Symbol \* indicates the statistically significant values of test  $F$  ( $\alpha = 0.05$ )

a,b,c – various letter indicate statistically significant differences in average values in the post-hoc analysis.



Further analysis verifies basic capital structure determinants at the micro and macroeconomic level on the basis of Newey-West regression, which is of key significance in the case of a strong correlation between the particular explanatory variables. Regression is a basis for determining statistically significant micro- and macroeconomic factors and the types of correlation (positive and negative, level of significance – 0.05). Again, the analysis is carried out for old and new member states and for Poland. Regressions are separately calculated for variables Y1 and Y2. The results of regressions for Y1 and Y2 for new member states are presented in Tables 15 and 16. Statistically significant and positively verified microeconomic determinants for Y1 in new member states are as follows (Table 15): ROA and industries, and negatively verified – growth potential. Among microeconomic determinants, no impact is recorded for company size which may result from the less versatile structure of such determinants in new member states. As regards statistically significant macroeconomic factors, attention should be given to the positive verification of the impact of taxation and the positive, negatively verified impact of capital markets; this may result from the correlation between the development of capital markets and the banking sector (referred to in the earlier analyses), or from their slight significance, especially in less advanced countries. Inflation, on the other hand, is close to statistical significance. Attention should be given to the lack of the statistical significance of inflation and economic growth as compared with the entire group of countries. The following microeconomic factors have a greater impact on Y2 (Table 16): tangible fixed assets, company size (both of them positively verified), growth potential (positive correlation negatively verified). Increased debt for expanding companies in new member states may result from the lack of other sources of financing (lack of equity financing), coupled with underdeveloped capital markets and the inability to issue large packages of shares. Similarly to variable Y1, the positive impact of capital markets on the level of debt is recorded for Y2.

Table 15

Newey-West regression for Y1 in new member states

Variable	Coefficient	t-Statistics	Level of significance
constant	-0,9110647	-2,7346303	6,48E-03
IND2	-2,3029964	-15,904997	5,24E-46
IND3	-0,8775325	-4,3993054	1,34E-05
IND6	0,94448746	4,04385083	6,13E-05
IND7	0,44066408	2,20423042	2,80E-02
IND9	-0,6468347	-6,997134	8,89E-12
IND15	-1,1716671	-16,881964	1,80E-50
IND16	-0,5608211	-4,4961619	8,70E-06
ROA	-2,16048	-5,5508613	4,72E-08
Growth opportunities	0,12003312	3,13444557	0,00182793
Inflation rate	-2,2298666	-1,7687055	0,07758208
Taxation	3,67025095	2,74346367	0,00630845
Development of capital markets	1,17023996	2,48699884	1,32E-02
R <sup>2</sup>	0,31303269		
Adjusted R <sup>2</sup>	0,2957505		

Source: author's own research

Notes: **Y1** = (total short- + long-term liabilities in accounting values)/(equity in accounting values + total liabilities in accounting values), **IND2–IND16** – branch of industry based on US SIC 1000 - US SIC 3999, **ROA (profitability)** = profit/loss before tax/total assets, **growth opportunities** = annual increase in revenues from operating activities (%), **development of capital market** = stock exchange market capitalization/GDP.

Table 16

Newey-West regression for variable Y2 in new member states

Variable	Coefficient	t-Statistics	Level of significance
IND1	-6,2621161	-8,3993615	5,59E-16
IND2	-6,0926293	-11,104069	1,51E-25
IND3	-5,8997154	-8,4309195	4,43E-16
IND5	-4,7684114	-7,9703861	1,25E-14
IND6	-3,9029152	-4,8546931	1,65E-06
IND7	-5,4826672	-8,1097523	4,62E-15
IND8	-5,131064	-7,6693992	1,04E-13
IND9	-6,5711216	-8,7685999	3,51E-17
IND10	-5,3888529	-8,4887469	2,88E-16
IND11	-5,3941818	-4,3806134	1,47E-05
IND13	-4,6982734	-6,7880212	3,51E-11
IND14	-5,7868897	-7,6772046	9,81E-14

IND15	-5,4529776	-9,1887764	1,36E-18
IND16	-6,0836382	-8,6262703	1,03E-16
IND17	-5,5520849	-5,251821	2,30E-07
IND18	-6,7413637	-5,7493543	1,63E-08
IND19	-3,5942805	-6,7792874	3,71E-11
IND20	-4,8720311	-6,6097055	1,07E-10
IND21	-5,6097897	-8,4914663	2,83E-16
IND22	-5,3944887	-9,013006	5,37E-18
IND23	-4,8395321	-8,7159277	5,24E-17
IND24	-5,3652394	-8,9666881	7,68E-18
IND25	-5,8392013	-6,9868879	9,88E-12
IND26	-5,6379952	-8,4351732	4,29E-16
IND27	-6,6114822	-6,5341785	1,70E-10
Tangible fixed assets	2,39267142	3,23519712	0,00130301
Size	0,09518761	2,95620022	0,0032743
Growth opportunities	0,17286499	2,19262013	0,02883382
Development of capital markets	3,34583599	4,05747023	5,83E-05
R <sup>2</sup>	0,19909554		
Adjusted R <sup>2</sup>	0,15045058		

Source: author's own research

*Notes:* **Y2** = (total long-term liabilities in accounting values)/(total long-term liabilities in accounting values + equity in accounting values), **IND1–IND27** – branch of industry based on US SIC 1000 - US SIC 3999, **tangible fixed assets** = tangible fixed assets/total assets, **size** = ln (revenues from operating activities), **growth opportunities** = annual increase in revenues from operating activities (%), **development of capital market** = stock exchange market capitalization/GDP.

The following microeconomic determinants have a statistically significant impact on Y1 in old member states (Table 17): ROA, growth potential and industries. Both variables are positively verified, as expected. The share of tangible fixed assets in the balance sheet total is close to statistical significance. With regard to macroeconomic factors, attention should be given to the positively verified impact of inflation and the negatively verified impact of economic growth, while capital market development is close to statistical significance. As compared with new member states, inflation rates and economic growth are more vulnerable and affect the value of Y1. Taxation is of less significance, which may suggest that business entities in old member states do not resort to debt financing as a method for reducing their tax burden as part of their accounting policies. Microeconomic factors are very similar for the two groups of countries. The following microeconomic factors have a statistically significant impact on

Y2 (Table 18): ROA, tangible fixed assets and growth potential. All of them are positively verified. Macroeconomic factors include inflation, the development of capital markets and the banking sector as well as economic growth. This group of factors has a greater impact on Y2 than in new member states. All the above macroeconomic factors are positively verified with the exception of economic growth (negative verification).

Table 17

Newey-West regression for variable Y1 in old member states

Variable	Coefficient	t-Statistics	Level of significance
constant	0,83481963	8,055448842	1,04E-15
IND4	-0,472193028	-1,75822348	0,078786929
IND5	0,625948133	5,515818472	3,69E-08
IND6	0,34145722	2,303808759	0,021285051
IND7	0,748667643	2,542447285	0,011045778
IND8	0,189200079	2,742856598	0,0061182
IND9	1,277711076	1,634175042	0,102301791
IND11	-0,29437654	-2,398889942	0,016490935
IND14	0,207519367	1,778083507	0,075467049
IND17	0,606433732	3,065163411	0,002190208
IND18	0,203466005	1,481612217	0,138523271
IND23	0,145525467	1,726693526	0,084300904
IND25	0,605938637	8,014801857	1,44E-15
IND26	-0,313347284	-2,955618813	0,003138877
ROA	-1,784231873	-6,648520563	3,37E-11
Tangible fixed assets	-0,228608155	-1,597670321	0,110196354
Growth opportunities	-0,000340536	-4,441742848	9,17E-06
Inflation rate	-7,701001052	-2,957813811	0,003116663
Development of capital markets	-0,129412337	-1,937054122	0,052809944
Economic growth	-10,7709307	-6,033237668	1,75E-09
R <sup>2</sup>	0,153678064		
Adjusted R <sup>2</sup>	0,149607149		

Source: author's own research

Notes: **Y1** = (total short- + long-term liabilities in accounting values)/(equity in accounting values + total liabilities in accounting values), **IND4–IND26** – branch of industry based on US SIC 1000 – US SIC 3999, **ROA (profitability)** = profit/loss before tax/total assets, **tangible fixed assets** = tangible fixed assets/total assets, **growth opportunities** = annual increase in revenues from operating activities (%), **development of capital market** = stock exchange market capitalization/GDP.

Table 18  
Newey-West regression for variable Y2 in old member states

Variable	Coefficient	t-Statistics	Level of significance
constant	0,248567	1,482755	0,138219
IND3	-0,29056	-0,96337	0,335421
IND4	-0,66783	-1,78993	0,073541
IND6	-0,52225	-1,68316	0,092422
IND7	-0,83004	-2,10628	0,035243
IND10	-0,36825	-2,03836	0,04158
IND11	-0,91013	-3,5638	0,00037
IND12	-0,23377	-0,95438	0,339948
IND13	-0,72766	-2,72534	0,006452
IND15	-0,46311	-2,78771	0,005334
IND16	-0,32411	-2,45582	0,014099
IND18	-0,32417	-1,52303	0,127831
IND19	-1,21549	-2,36109	0,018269
IND20	-0,37722	-2,32795	0,019965
IND22	-0,52639	-2,94509	0,003248
IND23	-0,29346	-2,27524	0,022945
IND24	-0,61716	-4,68652	2,87E-06
IND26	-0,81975	-4,90602	9,67E-07
IND27	-0,71138	-1,81723	0,069258
ROA	-1,37911	-3,65938	0,000256
Tangible fixed assets	0,813643	3,799086	0,000147
Growth opportunities	-0,00053	-5,10232	3,51E-07
Inflation rate	-26,7961	-6,22382	5,36E-10
Development of banking sector	0,419483	3,220977	0,001288
Development of capital markets	-0,79429	-5,62844	1,94E-08
Economic growth	-13,0042	-4,04051	5,44E-05
R <sup>2</sup>	0,123628		
Adjusted R <sup>2</sup>	0,118073		

Source: author's own research

Notes: **Y2** = (total long-term liabilities in accounting values)/(total long-term liabilities in accounting values + equity in accounting values), **IND3–IND27** – branch of industry based on US SIC 1000 - US SIC 3999, **ROA (profitability)** = profit/loss before tax/total assets, **tangible fixed assets** = tangible fixed assets/total assets, **growth opportunities** = annual increase in revenues from operating activities (%), **development of the banking sector** = value of loans extended by banks to private sector/GDP, **development of capital market** = stock exchange market capitalization/GDP.

As regards Poland, the major (statistically significant) Y1 determinants are ROA, growth potential and industries (Table 19). ROA is positively verified, while growth potential is negatively verified. The share of tangible fixed assets in the balance sheet total is statistically significant for Y2 (positive impact positively verified) as well as industries (Table 20). In less developed economies it is the high share of tangible fixed assets that provides easier access to bank loans thanks to offering property as collateral.

Table 19  
Newey-West regression for Y1 – Poland

Variable	Coefficient	t-Statistics	Level of significance
constant	0,160796726	1,735475347	8,39E-02
IND5	0,422041119	2,062210429	0,040233709
IND6	1,010435033	3,254425939	1,30E-03
IND7	0,449235604	2,03485345	0,042933639
IND13	-0,36447713	-4,506228838	1,02E-05
IND15	-1,197868749	-14,97429969	1,65E-36
IND16	-0,714802032	-3,209315873	0,00150669
ROA	-2,147161616	-4,712928863	4,08E-06
Growth opportunities	0,126544166	6,345440945	1,05E-09
R <sup>2</sup>	0,261500933		
Adjusted R <sup>2</sup>	0,237581935		

Source: author's own research

Notes: **Y1** = (total short- + long-term liabilities in accounting values)/(equity in accounting values + total liabilities in accounting values), **IND5–IND16** – branch of industry based on US SIC 1000 - US SIC 3999, **ROA (profitability)** = profit/loss before tax/total assets, **growth opportunities** = annual increase in revenues from operating activities (%).

Table 20  
Newey-West regression for Y2 – Poland

Variable	Coefficient	t-Statistics	Level of significance
constant	-1,364272099	-3,132535551	0,0019541
IND1	-2,819359257	-4,13305513	4,99E-05
IND5	-0,93584491	-1,555013911	0,121294183
IND7	-2,393182187	-3,59581384	3,94E-04
IND8	-1,97413064	-3,418742918	7,42E-04
IND10	-2,270657324	-4,607749869	6,69E-06
IND11	-2,388866291	-1,713843678	0,087881679
IND13	-1,747090847	-3,783650018	1,96E-04

IND14	-3,153356213	-3,259461999	0,001282267
IND15	-2,197067221	-4,622403576	6,27E-06
IND16	-3,931896997	-3,832869202	1,63E-04
IND17	-1,658075279	-3,278027645	0,001204319
IND18	-3,563498922	-3,306542747	1,09E-03
IND20	-2,119813466	-2,725243871	0,006910975
IND21	-2,361634449	-3,758913116	2,16E-04
IND22	-2,120385038	-4,103046927	5,63E-05
IND23	-1,81910703	-3,014849608	0,002854428
IND24	-2,433373768	-3,784485252	1,96E-04
IND25	-2,635999294	-5,530305199	8,52E-08
IND26	-3,06454706	-4,589693625	7,24E-06
IND27	-3,321388852	-3,439292538	6,90E-04
Tangible fixed assets	3,402251815	4,135534672	4,94E-05
R <sup>2</sup>	0,245730577		
Adjusted R <sup>2</sup>	0,178039732		

Source: author's own research

*Notes:* **Y2** = (total long-term liabilities in accounting values)/(total long-term liabilities in accounting values + equity in accounting values), **IND1–IND27** – branch of industry based on US SIC 1000 - US SIC 3999, **tangible fixed assets** = tangible fixed assets/total assets.

#### 4. CONCLUSION AND DISCUSSION

The results of empirical research verify the basic research hypotheses. Positive verification should be given to hypothesis 1 on different capital structure levels for the analysed countries. The verification of hypothesis 1 is based on one-factor variance analysis. On the basis of empirical data, I positively verify hypothesis 2 concerning the impact of microeconomic factors on capital structure. This hypothesis is verified on the basis of the following statistical methods: the analysis of simple correlation and Newey-West regression. Relatively explicit results are obtained in the verification of hypothesis 3 concerning the impact of institutional/macro-economic factors on capital structure. All the applied statistical methods (the analysis of simple correlation, the variance analysis and Newey-West regression) confirm the projected results. Proof is provided of their statistical significance in developing capital structure, while almost all other authors disregard this issue in their research studies.

Hypothesis 4, concerning the application of similar capital structure determinants by business entities for old and new member states, may not be

explicitly verified. Capital structure microeconomic determinants for these groups of countries are relatively similar. Considerable differences, however, are recorded for macroeconomic determinants. The hypothesis is verified on the basis of simple correlation analysis, one-factor variance analysis and Newey-West regression.

Actual differences in capital structure between examined states depend on the use in active managerial decisions of specific determinants and the level of their intensity. As an example, the old and the new European Union Member States make use of relatively similar determinants concerning decisions on total debt (both micro and macro-economic), whilst in the case of decisions relating to long-term debt the old EU states to a larger degree make use of macro-economic variables. However, there is a difference in the micro and macro-economic situation of these entities. The old EU states should be regarded as more profitable on average (concerning the old and new EU states these values stand at 5% and 3% respectively); they are burdened on average with lower operating risk (0.43; 1.11 respectively), they make use to a far greater degree of the benefits offered by the tax shield (44.28; 20.13 respectively), they have a lower share of tangible fixed assets in total assets (27.36; 39.03 respectively), they develop more slowly than the units belonging to the new EU States (9%; 18% respectively). A similar diverse impact on capital structure is brought about by the macro-economic and institutional environment of firms (macro-economic institutional determinants). The old EU states are characterized by a higher average level of stock exchange development in comparison to the new EU States (85%, 23% respectively), higher level of development of the banking sector (117%; 40.14% respectively), lower level of inflation (2.19; 4.93 respectively), lower average economic growth (2.64; 6.81) and higher average taxation (31%, 20%). Furthermore, taking into account the level of intensity of given variables the higher level of total and long-term debt of the old EU states is brought about both by micro- and macro-economic factors, to the largest degree by lower operating risk, the tax shield, higher development of the banking sector, lower inflation and higher taxation. Varying combinations of the above determinants and the varying level of their intensity means that capital structure varies from country to country, in groups of some states and to a smaller degree between states within a given group (the old or new EU states).

The capital structure of Polish companies for the Y1 variable is higher than the average for the new EU states and comparable to the less developed states of the old EU – Greece and Spain. On the other hand, the value of the Y2 variable for Poland stands at an average level amongst the new EU states



and low level in comparison to the old states. The values of the Y1 and Y2 indicators (for Poland) stem from the similarity of values for Poland, Greece or Spain in terms of level of profitability, tangible fixed asset share, tax shield, growth capacity (mainly micro-economic factors). The lower level of Y2 value for Poland is caused by the lower level of development of the stock exchange, the banking sector, lower level of taxation, relatively similar inflation and similar economic growth in relation to Greece or Spain.

Similar capital structure determinants are recorded for Polish companies and new member states. For Poland the most important determinants for the Y1 variable are operating risk, ROA, growth capacity and the line of business, whilst for the Y2 variable should distinguish the share of tangible fixed assets, company size, lines of business and taxation.

It seems difficult, or even impossible, to develop a model which would explain capital structure decisions more precisely. It seems advisable, then, to draw up a list of major capital structure determinants on the basis of the applied statistical methods. On the basis of the analysis of simple linear correlation, the variance analysis and Newey-West regression, a final verification of all the determinants of capital structure presented in the paper is conducted; a hierarchy of their significance is proposed. In order to achieve this objective all the determinants are divided – from the point of view of the obtained results and their significance simultaneously for Y1 and Y2 – into four basic groups:

- lack of any statistical significance: lack of any significance in one of the above statistical methods,
- slight statistical significance: significance mainly based on the analysis of simple linear correlation or variance analysis, significance for variable Y1 or Y2,
- average significance: partially confirmed impact on the basis of the analysis of simple linear correlation or variance analysis as well as Newey-West regression; results are not completely consistent for all the statistical methods and for variables Y1 and Y2,
- very high statistical significance: confirmed impact on the basis of one-factor variance analysis, the analysis of simple linear correlation and Newey-West regression; full consistency of results with all (almost all) statistical methods and simultaneously for variables Y1 and Y2.

Tables 21 and 22 present the classification of determinants and their statistical significance. On the basis of empirical data (whole sample) one may positively verify the negative impact of profitability, growth opportunities and inflation rates, and the positive impact of company size, taxation and the development of the banking sector; one may also positively verify the impact of the legal system and industry. The results for the share

of tangible fixed assets, accounting standards and the development of capital markets are not always consistent. The only factors which are verified negatively are the lack of the impact of operational risk on capital structure and the negative impact of economic growth on capital structure. One should stress a positive verification of 8 out of 13 determinants that I and other international authors consider to be significant.

Table 21

Verification of support hypotheses – micro- and macroeconomic capital structure determinants for all the countries on the basis of one-factor variance analysis, the analysis of simple linear correlation and Newey-West regression

Group of determinants	Structure determinants	Projected	Obtained	Verification
Microeconomic determinants	Risk	negative	-	negative
	ROA	negative	negative	<b>positive</b>
	Growth opportunities	negative	negative	<b>positive</b>
	Tangible fixed assets	positive	ambiguous	ambiguous
	Size	positive	positive	<b>positive</b>
	Industry	-	-	<b>positive</b>
	IAS	-	-	ambiguous
Macroeconomic determinants	Inflation rate	negative	negative	<b>positive</b>
	Taxation	positive	positive	<b>positive</b>
	Economic growth	positive	negative	negative
	Legal systems	-	-	<b>positive</b>
	Development of capital markets	negative	ambiguous	ambiguous
	Development of banking sector	positive	positive	<b>positive</b>

Source: author's own research

*Notes:* **risk** = standard deviation (EBIT), **ROA (profitability)** = profit/loss before tax/total assets, **growth opportunities** = annual increase in revenues from operating activities (%), **tangible fixed assets** = tangible fixed assets/total assets, **size** = ln (revenues from operating activities), **industry** – branch of industry based on US SIC 1000 - US SIC 3999, **IAS** – International Accounting Standard, **legal system** based on R. LaPorta, F. Lopez-de-Silanes, F. Shleifer, R. Vishny (1998), **development of capital market** = stock exchange market capitalization/GDP, **development of the banking sector** = value of loans extended by banks to private sector/GDP.

The following factors deserve special attention in the analysis of statistical significance: profitability (ROA), industry, inflation rates and economic growth. They represent the major capital structure determinants. It seems, however, that the industry factor is by far the most significant capital structure determinant. It has a very high statistical significance both for Y1 and Y2. Additionally, its significance is not reduced by macroeconomic/institutional differences. This results from the fact that entities from different countries

represent the same industry. The unique character of an industry implies similar conditions for corporate functioning. At the same time, as research studies suggest, a given industry imposes certain capital structure patterns. Companies try to adjust to industry average debt levels, raising or lowering their own debt levels, respectively. It should be noted that the industry factor (expressed in %) explains more changes of Y1 in relation to Y2. The following factors should be regarded as having average statistical significance: growth opportunities, tangible fixed assets, company size, taxation and the development of the banking sector. The determinants with low statistical significance include legal systems and the development of capital markets. Risk turns out to be statistically insignificant, which is also true of accounting standards (with the exception of EU old member states). Among all the presented capital structure determinants, 11 out of 13 are significant (Table 22).

Table 22

Verification of the statistical significance of micro- and macroeconomic capital structure determinants for all the countries on the basis of one-factor variance analysis, the analysis of simple linear correlation and Newey-West regression

Group of determinants	Capital structure determinants	Statistical significance
Microeconomic determinants	Risk	insignificant
	ROA	<b>very high significance</b>
	Growth opportunities	<b>average significance</b>
	Tangible fixed assets	<b>average significance</b>
	Size	<b>average significance</b>
	Industry	<b>very high significance</b>
	International Accounting Standards	relatively insignificant
Macroeconomic determinants	Inflation rate	<b>very high significance</b>
	Taxation	<b>average significance</b>
	Economic growth	<b>very high significance</b>
	Legal systems	slight significance
	Development of capital markets	slight significance
	Development of banking sector	<b>average significance</b>

Source: author's own research

*Notes:* **risk** = standard deviation (EBIT), **ROA (profitability)** = profit/loss before tax/total assets, **growth opportunities** = annual increase in revenues from operating activities (%), **tangible fixed assets** = tangible fixed assets/total assets, **size** = ln (revenues from operating activities), **industry** – branch of industry based on US SIC 1000 - US SIC 3999, **IAS** – International Accounting Standard, **legal system** based on R. LaPorta, F. Lopez-de-Silanes, F. Shleifer, R. Vishny (1998), **development of capital market** = stock exchange market capitalization/GDP, **development of the banking sector** = value of loans extended by banks to private sector/GDP.

The analysis of the impact of the groups of determinants (micro- and macroeconomic) and the industry factor defined for the entire group of countries lead to the conclusion that every group of determinants explain one third of the changes in the adopted model. Macroeconomic factors have a greater impact on Y2, while the industry factor has a greater impact on Y1. Microeconomic factors explain more changes related to total debt in relation to long-term debt. The impact (percentagewise) of macroeconomic variables in the adopted model is greater for Y2 than for Y1. Short-term debt is more dependent on microeconomic factors, while long-term debt is affected by macroeconomic variables.

This paper avails itself of empirical (accounting) data which are consistent in terms of the applied accounting valuation methods. This results from the fact that most of the investigated companies prepare their financial statements (empirical data) on the basis of IAS. The impact of different accounting standards in the entire population is statistically insignificant, unlike in the case of EU old member states (the difference amounting to merely 2 percentage points). The impact of the application of IAS on the results of the analysis is insignificant. The companies which apply IAS are characterized by a lower level of debt.

Verification is not performed on all the possible determinants which may have an impact on corporate capital structure decisions, focusing on the most significant ones. Further research may include other factors, but it is conditioned by their greater availability. Some other factors include R&D, advertising and marketing expenditures (Harris and Raviv, 1991; Balakrishnan and Fox, 1993). They affect the possible significance of corporate agency costs. Such expenditures are not easily controlled, and it is hardly possible to determine their impact on future revenues. Another significant factor which deserves attention, especially in international research, is the degree of corporate international diversification (Akhtar 2005; Majumdar and Chhibber, 1999). Also, attention may be given to issues related to culture and personal qualities, which have an impact on corporate financial decisions, as well as those related to the sources of financing (Chui et al., 2002; Li et al., 2011). Some research papers (Kędzior, 2005) combine capital structure with such statistically significant factors as "power distance", "individualism", "avoiding uncertainty" or "masculinity" – cultural dimensions identified by G. Hofstede (1985). Another significant factor which is not discussed in this paper and which may have an impact on corporate financing methods is the market-to-book value ratio (Scherr and Hulburt, 2001; Johnson, 1997; Low and Chen, 2004). This ratio shows the business entity's growth opportunities on the stock exchange, and it is an

equivalent of the ratio of the increase in revenues from core operating activities. Assuming the availability of data, it would be worthwhile to examine the impact of the non-debt tax shield on capital structure (Balakrishnan and Fox, 1993). Of the other micro-economic determinants of capital structure detailed by specialist literature one may refer to dividends (Jensen et al., 1992), cash flow (Lowe et al., 1994) and the time that a company has been operating (Majumdar and Chhibber 1999). The impact of the type of investor on capital structure deserves separate consideration (Kędzior, 2005). Banks as shareholders are characteristic primarily of Germany, in Italy it is the family that is the dominating investor, whilst in Japan the dominating factor is seen in groups of companies which jointly control a listed company. Specialist literature has considered, amongst others, the impact of internal ownership (Jensen et al., 1992), State, foreign investors (Colombo, 2001), ownership structure (Moh'd et al., 1998) and the impact of institutional investors (Firth, 1995).

Of the macro-economic and institutional factors which merit further detailed study, one may take into account political risk and government policy as well as the policies of financial institutions (McClure et al., 1999). One should also distinguish the creditor index which gauges creditor rights (CRRIGHTS) and the shareholders index (SHRIGHTS) which gauges the rights of shareholders (Bancel and Mittoo, 2004). The higher the level of the SHRIGHTS indicator the easier it is to issue shares, the higher the level of the CRRIGHTS indicator the greater the accessibility of credit (LaPorta et al., 1997). In analysing the institutional determinants of capital structure it is worth considering the implementation of variables relating to the development of corporate governance practice. This may be characterized, amongst others, by the participation of given types of investors in the shareholder structure of listed companies (Bontempi, 2002). In turn, a badly functioning system of court enforcement leads to a reduction both in financing through debt and share capital (Demirgüç-Kunt and , 1999). For the needs of this type of research a Rules of Law indicator has been set up which checks the above dependencies (Demirgüç-Kunt et al., 2000). Such determinants may contribute to my research and verify new possible correlations between dependent and independent variables.

Also, it would be interesting to develop variables which define more precisely, from the statistical point of view, a given country's corporate governance system, the size of the stock and bond market, the scope of external and equity financing and the size of the banking sector. Such variables could be used in other research studies in the field of finance and accounting.

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