

# The impact of macroeconomic variables on capital structure: A comparison between companies in E7 and G7 countries

Damian Tomschik  
University of Twente  
P.O. Box 217, 7500AE Enschede  
The Netherlands

## ABSTRACT

Although capital structure determinants have been the main focus of many research papers, it would appear that the ‘capital structure puzzle’ has yet to be solved. Hence, this study would like to contribute to this subject by conducting a longitudinal study of companies in E7 and G7 countries over the period 2005-2014. Especially, multivariate regression models are used to examine the direct impact of macroeconomic variables on the capital structure choice of publicly traded non-financial companies. Evidence has been found that there are similarities and differences across E7 and G7 countries with respect to the impact of macroeconomic variables on capital structure. In particular when comparing the E7 with the G7 countries, macroeconomic variables such as the real GDP growth rate, corporate tax rate, bond market development, financial freedom and law enforcement show similar relationships to leverage – characterised as long-term book and market debt – while the inflation rate, stock market development, bank concentration, creditor protection and perceived level of corruption state divergent relationships across the countries. Overall, these findings partly support earlier research outcomes but also indicate new types of relationships within emerging and developed countries.

## Supervisors

Dr. Samy A.G. Essa, Prof. Dr. Rezaul Kabir, Dr. Xiaohong Huang, Henry van Beusichem MSc., Dr. Peter-Jan Engelen, Dr. George Iatridis

## Keywords

E7 countries, G7 countries, Macroeconomic variables, Capital structure, Multivariate regression analysis, Long-term book debt, Long-term market debt

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## 1. INTRODUCTION

Globalisation is a process that has transformed supply and demand conditions across the global. Karadagli (2012) claimed that, in particular, political and social globalisation offer options for emerging countries to catch up with developed countries. Consequently, it is argued that globalisation is likely to affect a number of macroeconomic variables. Thus, the question arises as to what impact do those changing variables, such as GDP or inflation, have on companies and their capital structures?

The determinants of a company's capital structure have been the focus of much research since the 20<sup>th</sup> century. Particular attention has been paid to non-financial companies, operating in sectors such as, e.g. agriculture, construction, IT, manufacturing, mining, real estate, wholesale and retail as well as transport and warehousing, as these sectors, are effectively less regulated with respect to their capital structure (Chipeta & Mbululu, 2013; Cho et al., 2014).

Modigliani and Miller's theorem, from 1958, arguably forms the basis of modern thinking on capital structure. In their so-called capital structure irrelevance proposition, they claimed that the choice of capital structure is irrelevant under the assumption of perfect markets where for example taxes and transaction costs do not exist. Hence the value of a company would be independent of the capital structure. Nevertheless, subsequent studies have examined the determinants of capital structure and provided new theories. The main ones that have been used by other academics as background for hypotheses testing include: the pecking order theory, the trade-off theory, the agency and market timing theories (Frank & Goyal, 2009). These theories offer different views on the determinants of capital structure but there is still no clear consensus as to exactly how capital structure is determined. Myers & Majluf (1984) described this phenomenon as the capital structure puzzle – apparently one that has yet to be solved.

The aim of recent empirical research has been to verify significant findings in this subject area. According to, Gungoraydinoglu & Öztekin (2011) the capital structure of company is not only determined by firm's intrinsic characteristics but is also a result of its external environment in which it operates. In this respect, De Jong et al. (2008) and Kayo & Kimura (2011) claimed that there are internal and external determinants that influence the capital structure of companies. While internal determinants, which are called firm-specific factors, have been analysed to a large extent, the external determinants have been relatively underrepresented in the literature (Booth et al., 2001; De Jong et al., 2008; Muthama et al. 2013). However, companies operate in particular industries and countries and, thus, understanding the external determinants is important (Jõeveer, 2013). It is these factors that will be change in the long term but cannot be influenced by the companies themselves (Kayo & Kimura, 2011). It is only governments and central banks that are able to use monetary and fiscal policies to influence macroeconomic conditions with the ultimate long-term goal of financial and economic stability, or even an increase in economic wealth (Karadagli, 2012).

The goal of this paper is to contribute to the subject of macroeconomic variables and capital structure by providing up-to-date empirical findings and an answer to the research question:

*'What is the relationship between macroeconomic variables and the capital structure choice of publicly traded non-financial companies in E7 and G7 countries?'*

In order to answer this question, this study examines different countries (14 in total) over the period 2005-2014. More specifically, the sample size is 3.426 companies, which are incorporated into a database for the bivariate and multivariate analyses. Moreover, the 10 examined macroeconomic variables are represented by the real GDP growth rate, the inflation rate, the corporate tax rate, stock market development, bond market development, bank concentration, financial freedom, creditor protection, law enforcement and perceived level of corruption. These macroeconomic variables show significant coefficient in the conducted bivariate and multivariate regression analysis except the inflation rate, bank concentration and financial freedom in the E7 countries and the real GDP growth rate and stock market development in the G7 countries. However, the findings do not indicate a considerable difference in the coefficient signs by using long-term book and market debt ratios. Concerning the model fits, the long-term debt ratio is similar in the E7 as well as G7 countries, which is in contrast to the long-term market debt ratio. Overall, the findings indicate that the relationships of macroeconomic variables and capital structure are in accordance with prior research, especially, for the G7 countries. Nevertheless, the stock market development and law enforcement show results which are not expected in the hypotheses. By contrast, considering E7 countries most of the found relationships are not in line with the literature, except the real GDP growth rate, corporate tax rate and financial freedom.

The remainder of this paper is organised as follows: *Section 2* summarises the past research on capital structure. *Section 3* discusses relevant theories. *Section 4* explains how the variables as well as the hypotheses were determined. *Sections 5* and *6* describe the methodology and the data collection. *Section 7* consists of a discussion of descriptive statistics, bivariate and multivariate analysis. *Section 8* sums up the main findings of this research and, finally, *Section 9* discusses the limitations.

## 2. LITERATURE REVIEW

Much research has been published on the determinants of capital structure (De Jong et al., 2008; Jõeveer, 2013; Kayo & Kimura, 2011). As depicted in *Table 1*, the research differs in terms of emerging and developed countries, the size of samples and the study periods that were reviewed.

**Table 1. Prior literature**

Overview					
Authors	Year	Countries	Number of countries	Sample	Study period
Rajan, R. G., & Zingales, L.	1995	Developed	7	4557	1987-1991
Giannetti, M.	2003	Developed	8	1151	1993-1997
Jõeveer, K.	2013	Emerging	9	2909	1995-2002
Schmukler, S., & Vesperoni, E.	2001	Emerging	7	800	1980-1999
Booth, L.	2001	Emerging & Developed	10	1000	1980-1991
Cho, S. S., et al.	2014	Emerging & Developed	48	7593	1991-2010
De Jong, A., et al.	2008	Emerging & Developed	42	11849	1997-2001
Gungoraydinoglu & Öztekin	2011	Emerging & Developed	37	15177	1991-2006
Kayo, E.L., & Kimura, H.	2011	Emerging & Developed	40	12734	1997-2007

*This table presents published papers which examined the relationship of firm specific and macroeconomic variables in regard to capital structure. The depicted literature is sorted by the examined country classifications.*

Up to now, the main focus of most papers has been the internal determinants of capital structure, namely firm-specific variables (Deesomsak et al., 2004). Thus, this aspect has been thoroughly researched and includes: tangibility, business risk, size, tax, growth opportunities, profitability and liquidity. For example, the Rajan & Zingales study (1995) had the primary objective of determining whether or not the observed relationships between firm-specific determinants and capital structure in the USA could also be seen in other G7 countries. Indeed, the academics found that the effect of internal factors on a firm's leverage is quite similar across the G7 countries. De Jong et al. (2008) extended this study by examining a total of 42 countries split evenly between emerging and developed economies. This study did not find that the relationship of firm-specific determinants and capital structure was the same across all the countries in the sample. Besides firm-specific variables, macroeconomic variables and their impact on capital structure have also been the focus of numerous research papers. Furthermore, Daskalakis & Psillaki (2008) and Kayo & Kimura (2011) argued that firm-specific variables were relatively better explanatory determinants of the variance in capital structure because they are more dynamic and volatile. In addition, they are more likely to change in the short-term whereas macroeconomic factors tend to change in the long run. Therefore, Gungoraydinoglu & Öztekin (2011) claimed that managers focus more on firm-specific characteristics when making financing decisions.

With regard to differences between emerging and developed economies, the Booth et al. study (2001) is deemed to be important since the purpose of this research was to compare 10 emerging countries with developed countries (represented by the G7). The academics found that, despite institutional and cultural differences among countries, the relationship between external determinants and capital structure seen in developed countries could also be observed in emerging, too. There were robust and significant findings showing that macroeconomic factors, such as the economic growth rate, the inflation rate, financial market development and government policies, did indeed influence the capital structure in developed as well as emerging countries (Booth et al., 2001).

Research carried out by De Jong et al. (2008) found additionally that macroeconomic variables have a direct and indirect impact. The indirect impact is characterised by the changed effect of firm-specific variables on capital structure due to macroeconomic variables. Hence the influence of firm-specific factors tends to change when companies are operating within a particular country. In particular, countries might also be allocated into bank or market-based financial systems (De Jong et al., 2008). According to Sett & Sarkhel (2010), financially constrained companies operating in a bank-based systems are more likely to rely on funds provided by banks than companies operating in market-based systems. But Schumkler & Vesperoni (2001) asserted, that the difference between developed and emerging countries is more important than the distinction between bank-based and market-based countries.

Furthermore, (Kayo & Kimura, 2011; Talberg et al., 2008) claimed that most papers have only focused on firms and countries rather than sectors or industries. Talberg et al. (2008) found significant differences in the capital structure of companies which were dependent on the type of industry. For example, the authors found that the independent variables tend to have the same impact across the examined industries. In addition, Kayo & Kimura (2011) argued that there are direct and indirect impacts on firm-specific variables not only from macroeconomic variables but also from industry variables, such

as industry dynamism, industry concentration and industry munificence. According to them, the latter was deemed to be a significant direct driver of growth opportunities in emerging countries and not significant in developed ones while the effect of industry munificence on a firm's profitability is indirect and also classified as a significant determinant of capital structure.

Besides industry-specific variables, Akhtar (2012) and Hackbarth et al. (2006) noted that the four different stages of the business cycle, namely peak, contraction, trough and expansion had a significant role in explaining the error terms of capital structure studies. In this regard, Cook & Tang (2010) claimed that the impact of macroeconomic variables on the adjustment speed of capital structure was largely ignored. They asserted, that when macroeconomic conditions are favourable companies tend to adjust their capital structure more quickly, with a view to achieving their target leverage ratios, than under adverse conditions. For example, companies operating in France, adjusted their capital structure relatively more quickly than companies in Japan (Antoniou et al., 2008). Moreover, in terms of adjustment speed a distinction is made between companies that are 'financially constrained' and companies that are 'unconstrained' (Cook & Tang, 2010). According to Levy & Hennessey (2007), financially unconstrained companies have a free cash flow to total debt ratio of more than 1. Hanousek & Shamshur (2011) found that the capital structure of companies which are financially constrained, due to credits, is not affected by economic transformations and macroeconomic shocks. Therefore, supporting Levy & Hennessey (2007), they concluded that financially constrained companies are more focused on firm-specific variables, while financial unconstrained companies are more responsive to macroeconomic variables.

However, a common feature of most of the research is the restricted database. Small companies tend to provide less financial information than larger ones (Beck et al., 2008). Consequently, very often it is only large companies that are included – for example, the constituents of major indices. Jõeveer (2013) examined the impact of including either small or large companies in the sample. In a study of 9 Eastern European countries he argued, that macroeconomic variables were the main determinants of capital structure for small unlisted companies while firm-specific variables mostly explain the variation in the leverage of large unlisted and listed companies. These findings thus explain the relatively weak model fits of macroeconomic variables compared with firm-specific variables. (Kayo & Kimura, 2011). In addition, Daskalakis & Psillaki (2008) and Katagiri (2014) argued that larger firms tend to rely more on debt compared to smaller companies. In this respect, Kayo & Kimura (2011) found evidence that larger companies are more transparent and are able to spread the cost of debt by taking higher volumes. Finally, Camara (2012) stressed, that there are significant differences between multinational and domestic companies in regard to the impact of macroeconomic variables on capital structure.

All in all, latest research findings appear to confirm that macroeconomic variables do influence capital structure. However, there are that still not enough studies that solely focus on the direct impact of macroeconomic variables. In addition, the literature, as summarised in *Table 1*, has mostly focused on study periods of 1980-2010, which means that there is lack of up-to-date findings. Furthermore, although there are already many comparisons between emerging and developed countries, it is assumed that there is still a research gap as regards comparisons of the E7 with the G7 countries (Karadagli, 2012).

### 3. RELEVANT THEORIES

This section discusses the main theories in the subject of capital structure. In particular, the trade-off theory, the pecking-order theory, the agency theory and the market timing theory are introduced and explained.

#### 3.1 Trade-Off Theory

The Kraus & Litzenberger (1973) theory resulted from the debate about the Modigliani and Miller propositions. It is called the trade-off theory and can be divided into static and dynamic. The static trade-off theory is one of the most used theories in explaining the determinants of capital structure (Kraus & Litzenberger, 1973). It argues that a company will use debt instead of equity to a certain extent to maximise its enterprise value. Particular consideration is given to, the tax-shield which can be used to reduce taxable income for a given year, or delay income taxes into subsequent years. In this respect, the static trade-off theory stresses a target leverage ratio. Antoniou et al. (2008) claimed that the impact of a one-period lagged leverage ratio on the current leverage ratio is supposed to show whether or not a company has a target capital structure.

However the tax shield has a drawback since too much leverage would give rise to a proportional increase in the financial distress costs (Antoniou et al., 2008; Frank & Goyal, 2009). Thus, the static trade-off theory assumes that companies always have to make a trade-off between financial distress costs and the benefits of a tax shield. Moreover, the financial distress costs can be divided into direct and indirect ones. Direct costs are, for example, legal fees connected with bankruptcy, while indirect costs could include a potential decrease in the number of customers, employees and business opportunities.

Besides the static trade-off theory, there is also the dynamic trade-off theory that is concerned with the adjustment speed of the capital structure. Camara (2012) claimed that, in particular, for equity investors the adjustment speed to a target leverage ratio denotes lower recapitalisation costs, financial flexibility and stable cost of capital. It is assumed that companies that deviate to a far extent from the target leverage ratio, or ones that are overleveraged, will adjust at a faster speed in order to achieve their target leverage ratio when compared with companies that are closer to their target, are deemed to be underleveraged (Camara, 2012; Chipeta & Mbululu, 2013). In addition, Hackbarth et al. (2006) and Cook & Tang (2010) stated that the size and speed of the adjustment depends on the economic conditions, where more often but smaller adjustments were observed in booms compared to recessions. In this respect, Camara (2012) found evidence that multinational corporations adjust faster to their target leverage ratio in good macroeconomic conditions compared to domestic companies.

#### 3.2 Pecking-Order Theory

The pecking-order theory was expounded by Myers & Majluf (1984) and differs from the 'trade-off theory' that it does not imply that there is a target capital structure that has to be attained and maintained. According to the theory, companies are supposed to follow a predefined financial hierarchy to finance investments, starting off with the use of internal resources thereafter debt and subsequently convertible bonds then finally equity. This order was selected on account of asymmetric information, which is the main reason for conflicts between agents and principals (Jensen & Meckling, 1976). Moreover, issuing more debt or equity signifies a willingness to share information with the outside world, although this could lead to a loss of competitive advantage (Myers & Majluf, 1984).

Furthermore, the pecking order theory states certain relationships between firm-specific variables with respect to capital structure. According to the pecking-order theory, larger companies have more opportunities to use internal funds to finance themselves since their revenues are relatively higher than those of small firms. Nevertheless, Beck et al. (2008) claimed that the 'traditional pecking order theory' did not consider that investors would like to acquire additional 'proprietary' information. Thus, the 'reverse pecking order' coexisted where companies tend to issue equity before debt to increase the incentives for investors to acquire information.

#### 3.3 Agency Cost Theory

Jensen & Meckling (1976) claimed that the agency cost deals with the problems that can emerge because of a separation of control and ownership. There are several types of agency problems that can result in agency costs. Firstly, there is the 'type one' agency problem which mainly consists of conflicts between executives and shareholders. It is assumed that, in reality agents and principals have varying amounts of information and different targets with respect to the assets and the company's on-going day-to-day operations. This can potentially result in costs when the agents are not acting in the interest of shareholders. Jensen & Meckling (1976) stated that additional leverage can be an effective method against abusive behaviour of managers. Shareholders may grant the use of additional debt since this would limit the funds available to executives that allow them to pursue personal agendas and, moreover, ties them to a repayment obligation. (Kayo & Kimura, 2011). In this way, it is possible to stop the empire building ambitions of managers since their investment decisions are limited. Secondly, the 'type two' agency problem concerns tensions between majority and minority shareholders that can lead to abuses of power and free riding problems which lead an increase in agency costs. Finally, the 'type three' agency problem is characterised as the conflict between bondholders and shareholders and specifically situations where creditors and owners pursue different goals in order to maximise their own value. In contrast to shareholders, bondholders do not wish to invest in risky investments since this would imply a value transfer to shareholders as they benefit from capital gains and dividends whereas bondholders only receive the interests.

#### 3.4 Market Timing Theory

Baker & Wurgler (2002) expounded the market timing theory. It states that companies decide to change or adjust their capital structure according to market timing and market valuations. Therefore, the market timing theory explains changes to capital structure during market fluctuations more appropriately than the trade-off, pecking-order and agency-theory. In this case, Baker & Wurgler (2002) and explained that for companies it is not important whether they issue more debt or equity but only which one is more highly valued on the market at a particular point in time. For example when companies go public, generally, they issue more equity compared with the phase afterwards, as IPOs are usually carried out when markets are buoyant and the intention is to benefit from the high valuation and favourable forecast for the company's performance. Additionally, in their market timing theory Baker & Wurgler (2002) maintain that, similar to the pecking order theory, there is no target capital structure and that capital structure can be seen as a cumulative result of past attempts to time the equity. They concluded, that companies with low levels of leverage tend to raise equity when their market valuations are high, while highly leveraged companies seem to do the opposite and issue equity when their market valuations are relatively low.

## 4. VARIABLES & HYPOTHESES

After all relevant theories were explained, this section provide information about the variable and hypotheses determination.

### 4.1 Dependent Variables

Rajan & Zingales (1995) asserted that the total debt ratio is deemed as the broadest definition of leverage. According to them, this ratio is inappropriate for measuring leverage as there is a lack of indication of future financial distress. Moreover, they claimed that total liabilities include other means such as account payables and/or pension liabilities, which are not interest-bearing. Furthermore Cho et al. (2014) and De Jong et al. (2008) argued that the total debt ratio is not appropriate to measure leverage due to trade credits and short-term debt. In this respect, short-term debt is mainly used to finance current assets and working capital management and trade credits are deemed to have other determinants leading to a bias interpretation at the end of the analysis. Consequently, total debt is not taken as a financial ratio to measure leverage.

In the literature, academics used either the book value or market value of equity as a denominator in their calculations (Booth et al., 2001; Kayo & Kimura, 2011). Frank & Goyal (2009) claimed that book based leverage ratios are backward looking, whereas market based ratios are forward looking. Indeed, Chipeta & Mbululu (2013) stated that, instead of the book value, the market value should be used as it considers the market valuation of a company. The importance of considering market value was stated by Giannetti (2003), who claimed, that a major limitation of his study was the database, as few companies were able to provide data on market capitalisation and thus the explanatory power of the results was restricted. Moreover, Kayo & Kimura (2011) and Antoniou et al. (2008) stated that book values reflect distortions of accounting rules while the market value provides a more realistic view since it is closer to a firm's intrinsic value.

Nevertheless, there have been studies that have used book based ratios. It has been argued that the market value of the debt ratio can be determined by other factors that are not controlled by a company (Booth et al., 2001). In this regard, Booth et al. (2001) claimed that the market value should not be used on its own since it implies actions that are not fully related to managers' actions and could be the result of market fluctuations. Moreover, book leverage captures the value of assets in place and not growth options reflected in the current market values (Kayo & Kimura, 2011). Thus it does not distort future investment decisions as market value does.

This paper uses the long-term book debt ratio and the long-term market debt ratio as proxies for leverage, following Akhtar (2012), Booth et al. (2001), Cho et al. (2014) and Frank & Goyal, (2009). The leverage ratios are calculated as follows:

$$\text{Long term book debt ratio: } \frac{\text{Total liabilities} - \text{current liabilities}}{\text{Total liabilities} + \text{Book equity value}}$$

$$\text{Long term market debt ratio: } \frac{\text{Total liabilities} - \text{current liabilities}}{\text{Total liabilities} + \text{Market equity value}}$$

### 4.2 Independent variables

#### 4.2.1 Real Gross Domestic Product Growth Rate

Beck et al. (2008), De Jong et al. (2008), Chipeta & Mbululu (2013) and Muthama et al. (2013) found that companies operating in a country with increased real GDP, have a higher level of economic wealth and thus tend to issue more debt than

equity. However, Kayo & Kimura (2011) verified a negative relationship and argued, that companies tend to generate greater revenues and higher net incomes during periods of peak economic activity. This provides the opportunity to finance further investments internally and not by issuing debt or equity.

*Hypothesis 1: Real GDP growth rate is negatively related to leverage*

#### 4.2.2 Inflation Rate

Frank & Goyal (2009) and Jöeveer (2013) argued that the inflation rate is positively related to leverage since, during periods of inflation, companies can repay debt more easily because of their greater pricing power and higher revenues. However, Beck et al. (2008) and Muthama et al. (2013) stated that inflation is negatively related to leverage as it harms companies' profitability through the influence on consumer demand. While pricing power increases during periods of inflation, the earnings can become very volatile and this can entail greater business risk and financial distress (Chipeta & Mbululu, 2013). Inspired by Beck et al. (2008), Camara (2012), Muthama et al. (2013) and Chipeta & Mbululu (2013) this paper uses the annual percentage change of the consumer price

*Hypothesis 2: Inflation is negatively related to leverage*

#### 4.2.3 Tax Rate

De Jong et al. (2008) classified the tax rate as being a firm-specific determinant of capital structure calculated as total income taxes divided by pre-tax income. However Gungoraydinoglu & Öztekin (2011) asserted that, in particular, institutional factors influence taxes and therefore drive most of the country heterogeneity in capital structure. In this concern, Fan & Twite (2012) found that taxes are significant determinants of capital structure in developed countries. Furthermore according to the trade-off theory, large companies are more able to use the tax-shield as their costs of financial distress and bankruptcy are lower and thus have more incentives to issue debt. Given that the sample in this study comprises mostly large companies, including this variable is reasonable. This study uses the corporate tax rates, following Fan & Twite (2012), Jöeveer (2013) and Sett & Sarkhel (2010).

*Hypothesis 3: The corporate tax rate is positively related to leverage*

#### 4.2.4 Stock Market Development

De Jong et al. (2008), Kayo & Kimura (2011) and Sett & Sarkhel (2010) found that stock market development is an important variable for the evaluation of the impact of macroeconomic variables on capital structure, as it influences the tendency to issue equity rather than debt. This influence is justified by the market timing theory but is not in accordance with the pecking-order theory and trade-off theory. As mentioned earlier, the market timing theory states that the decision to issue either debt or equity is related to the question of whether the stock market is undervalued or overvalued. It is assumed that if the stock market is undervalued a company would be more willing to issue equity rather than debt, as the cost of equity would be relatively low. According to Antoniou et al. (2008), De Jong et al. (2008), Delcours (2007) and Kayo & Kimura (2011) stock market development can be gauged by looking at the ratio of stock market capitalisation to GDP.

*Hypothesis 4: Stock market development is negatively related to leverage*

#### 4.2.5 Bond Market Development

Schmukler & Vesperoni (2001) examined whether or not the sources of financing are related to internal determinants and how those change when companies operate in world markets. In this respect, there were no significant results that an evolving banking sector does guarantee more external financing opportunities in emerging countries. However, De Jong et al. (2008) and Sett & Sarkhel (2010) asserted that a more developed bond market, also known as debt or credit markets, in a country facilitates access to debt. This is justified by the argument that developed bond markets lead to robust legal systems that protect debt holders and mitigate agency problems. In this concern, Beck et al. (2008) found evidence that bond market development is positively related to 'bank and development finance', in particular, for large companies. Furthermore, Giannetti (2003) stated that some countries provide better surveillance opportunities for debt holders by adjusting the law appropriately. For example, in Germany if banks wish to represent their interest there is the possibility to have seats on corporate boards. Therefore, it has been assumed that this increased level of security for the banks has tended to decrease their costs of debt, which ultimately makes it more attractive for companies. Following Beck et al. (2008), bond market development is represented as the amount of domestic credit provided by the financial sector in regard to GDP.

*Hypothesis 5: Bond market development is positively related to leverage*

#### 4.2.6 Bank Concentration

Jõeveer (2013) claimed that the higher the degree of bank concentration within a country the lower the level of competition. This leads to an increase in the cost of debt as the competitive pressure in the market is lower. However, Jõeveer (2013) was not able to verify the established expectations and found a positive correlation to leverage. Hence, this study uses this variable to examine whether different countries and sample sizes lead to the same outcomes. Jõeveer (2013) defined bank concentration as a percentage of the 'three biggest banks assets in relation to the total banking sector assets'. In other words, an evaluation of the level of bank sector competition in a country.

*Hypothesis 6: Bank concentration is negatively related to leverage*

#### 4.2.7 Financial Freedom

Delcours (2007) claimed, that the financial constraints of banking systems in a country represent a crucial factor that influence the capital structure choice. In this respect, it is assumed that without additional control and limitations, banks, are more able to decrease their cost of debt. Consequently, companies should have greater incentives to borrow more. The 'Financial Freedom Index' is used to measure efficiency as well as independence of the financial sector from the government control and inferences. The scale is 0 to 100 - the higher the score the more independent the financial system.

*Hypothesis 7: Financial Freedom is positively related to leverage*

#### 4.2.8 Creditor Protection

Creditor protection describes the degree to which tangible collateral and bankruptcy laws protect the rights of debt holders. De Jong et al. (2008) claimed, that heightened creditor protection in a country increases the propensity to issue more debt than equity. It has been argued better creditor protection

decreases the 'type two' agency cost problem where bondholders defend their own intention and goals vis-à-vis managers and shareholders by means such as higher interest rates or additional debt covenants. The intention is to reduce the likelihood of a value shift from bondholders to shareholders. The assumption is that if the debt holders' interests are protected and misconduct is punished then there will be more incentives to lower the cost of debt or make debt covenants less strict. In order to measure the level of creditor protection in a country, the 'Depth of Credit Information Index' is used. It has a scale of 0-8 where 0 indicates low scope, accessibility and quality of credit information, while 10 states high scope, accessibility and quality of credit information.

*Hypothesis 8: Creditor protection is positively related to leverage*

#### 4.2.9 Law Enforcement

On the one hand, Beck et al. (2008) claimed that better protection of property rights is correlated with higher use of external funding, especially for small companies. However, they claimed that this positive correlation decreases proportionally with size. On the other hand, Gungoraydinoglu & Öztekin (2011) and Antoniou et al. (2008) argued that a higher level of enforcement of both the law generally and contracts specifically leads to a greater risk of bankruptcy and thus to lower agency costs of equity and less debt. It has therefore been assumed that higher levels of enforcement are associated with lower leverage ratios. In addition, De Jong et al. (2008) observed that better law enforcement in a country facilitated the health of the economy and thus reduced the borrowing of companies. Still, they stressed the importance of this variable as a mean for measuring the indirect impact of macroeconomic variables. In this respect, it is assumed that higher law enforcement further increases the influence of the firm-specific variable namely profitability on capital structure. This study uses the 'Strength of Legal Rights Index', which measures the degree to which collateral and bankruptcy law protect the rights of creditors. A scale of 0 to 12 is used and 0 represents non-enforcement law protection by the government while higher scores imply greater levels of enforcement.

*Hypothesis 9: Law enforcement is negatively related to leverage*

#### 4.2.10 Perceived Level of Corruption

Hanousek & Shamshur (2011) argued that lower corruption is correlated to higher debt levels. Still, their findings classified corruption as an insignificant determinants of capital structure for listed companies. However, Jõeveer (2013) found significant evidence that corruption is negatively related to leverage. In this concern, it was expected that less corruption within a country lead to a lower level of asymmetric information. This is supported by the pecking-order theory and the agency theory, which state that greater levels of asymmetric information lead to increased use of internal funds instead of external financing. In addition, Fan & Twite (2012) argued that in more corrupt countries total debt increase while long-term debt is negatively correlated and decrease. Following Jõeveer (2013), Fan & Twite (2012) and Hanousek & Shamshur (2011) the 'Corruption Perceptions Index' is used in order to identify to what extent corruption is present in a country. A score of 0 is correlated with a highly corrupt environment in a country while a higher score indicates lower levels of corruption.

*Hypothesis 10: The perceived level of corruption is negatively related to leverage*

## 5. METHODOLOGY

This paper describes a longitudinal study, where panel data was examined over a period of 10 years, namely 2005-2014. This duration is justified since other academics, such as Booth et al. (2001), Frank & Goyal (2009), Gungoraydinoglu & Öztekin (2011), Kayo & Kimura (2011) and Schmukler & Vesperoni (2001) took similar periods for their studies and stated significant and robust findings. The units of analysis are the E7 and G7 countries and the units of observation are non-financial publicly listed companies operating within these countries. Long-term book and market ratios are regressed against 10 macroeconomic variables (See Table 2) using the ‘Ordinary Least Squares’ (OLS) method. Furthermore, ‘z-scores’ are used to standardise the independent variables since different measurement scales are applied (De Jong et al., 2008).

**Table 2. Dependent and Independent Variables**

Variable	Abbreviation	Source
Long-term book debt ratio	LTB	ORBIS
Long-term market debt ratio	LTM	ORBIS
Real Gross Domestic Product Growth Rate	GDP	World Bank, IMF
Inflation rate	INF	World Bank
Corporate Tax Rate	T	World Bank
Stock market Development	SM	World Bank
Bond market Development	BM	World Bank
Bank Concentration	B	World Bank
Financial Freedom	FF	Heritage Foundation, IMF
Creditor protection	CP	World Bank
Law enforcement	L	World Bank
Perceived level of corruption	C	Transparency International

This table shows the abbreviations and the sources of the dependent as well as independent variables.

Inspired by Daskalakis & Psillaki (2008), Cho et al. (2014), Giannetti (2003), Karadagli (2012), Rajan & Zingales (1995), Sett & Sarkhel (2010) and Talberg et al. (2009) the multivariate regression equation is stated as follows:

$$LTB_{ict} = \beta_0 + \beta_1 zGDP_{ct} + \beta_2 zINF_{ct} + \beta_3 zT_{ct} + \beta_4 zSM_{ct} + \beta_5 zBM_{ct} + \beta_6 zB_{ct} + \beta_7 zFF_{ct} + \beta_8 zCP_{ct} + \beta_9 zL_{ct} + \beta_{10} zC_{ct} + \varepsilon_{ct} \quad [1]$$

$$LTM_{ict} = \beta_0 + \beta_1 zGDP_{ct} + \beta_2 zINF_{ct} + \beta_3 zT_{ct} + \beta_4 zSM_{ct} + \beta_5 zBM_{ct} + \beta_6 zB_{ct} + \beta_7 zFF_{ct} + \beta_8 zCP_{ct} + \beta_9 zL_{ct} + \beta_{10} zC_{ct} + \varepsilon_{ct} \quad [2]$$

Where

- $\beta_0$  = intercept of the econometric model
- $\beta_{1-10}$  = regression coefficients of the econometric model
- $\varepsilon$  = error term (also known as disturbance term)
- $i$  = company (1, ..., 3426)
- $c$  = country (1, ..., 14)
- $t$  = year (2005, ..., 2014)
- $z$  = standardisation by using z-scores
- $LTB_{ict}$  = long-term book debt ratio of company  $i$  in country  $c$  at time  $t$
- $LTM_{ict}$  = long-term market debt ratio of company  $i$  in country  $c$  at time  $t$
- $\beta_1 zGDP_{ct}$  = standardised real GDP growth rate of country  $c$  at time  $t$
- $\beta_2 zINF_{ct}$  = standardised inflation rate of country  $c$  at time  $t$

Nevertheless, Verbeek (2012) and Wooldridge (2014) explained that in order to use the OLS method several requirements have to be fulfilled.

Firstly, it was presumed that heteroscedasticity could occur when examining macroeconomic variables and capital structure (Hanousek & Shamshur, 2011). This is when the standard deviations of a variable are non-constant and results in biased F-statistics, standard errors and coefficients (Hayes & Cai, 2010; Wooldridge, 2014). Therefore, in order to find this out, unstandardised predicted values and unstandardised residuals were depicted on a scatterplot. This provided a small indication of heteroscedasticity. Therefore subsequently, further statistical tests called ‘Breusch-Pagan test’ and ‘White test’ were performed (Verbeek, 2012). The hypotheses were tested with the assumption that  $H_0$  equals homoscedasticity and  $H_1$  equals heteroscedasticity. Unfortunately, the  $H_0$  was rejected meaning that heteroscedasticity was present. For this reason the ‘General Linear Model’ (GLM) was applied, to verify the extent to which heteroscedasticity influenced the F-statistics, parameters and standard errors in the OLS method. Wooldridge (2014) claimed that GLM is not susceptible to heteroscedasticity and is thus suitable for a multivariate analysis if considerable heteroscedasticity is present in the data. Fortunately, the GLM analysis produced the same findings as the OLS model leading to the assumption that only a small degree of heteroscedasticity existed. Nevertheless, in order to exclude heteroscedasticity, the syntax provided by Hayes & Cai (2010) was used to establish heteroscedasticity-consistent standard errors in the OLS model.

Secondly, *autocorrelation* or *lagged correlation* has been considered and tested. This is used, in particular, when examining historical time series data implies residuals which can be segregated by a time lag (Verbeek, 2012). Kayo & Kimura (2011) encountered this type of problem and argued that it occurs when data is extracted from companies nested in the same kind of industry or country. In this study the ‘Durbin-Watson Statistic’ was used to detect autocorrelation where the outcome of this statistic varies between 0 and 4. Verbeek (2012) stated that a value that is near to 0 implies a positive autocorrelation and means that the hypothesis  $H_0$ , with no autocorrelation, is rejected. Furthermore, a value approaching 4 indicates that a negative autocorrelation prevails. Consequently, a Durbin-Watson value of 2 would indicate no autocorrelation. In this regard, the OLS outcomes have shown a value of 1.7-1.9, hence the requirement is fulfilled and the outcomes of this study are deemed to be unbiased.

Thirdly, there is the requirement that there should be a normal distribution of the residuals. Long-term book and market debt ratios that are regressed against ten macroeconomic variables in G7 countries stated a normal distribution. However, in E7 countries slightly positively skewed data have been observed. Nevertheless, Wooldridge (2014) argued that although skewed data is present a large sample size provides unbiased results.

Fourthly, multicollinearity has been analysed. It pertains the concern of linear correlations between independent variables, which could lead to biased regression estimates (Verbeek, 2004). Prior studies encountered multicollinearity issues while using similar macroeconomic variables (De Jong et al., 2008). Thus, the multicollinearity diagnostic test was performed and consisted of a tolerance value as well as the variation inflation factor (Verbeek, 2012). In this regard, the assumption of multicollinearity was rejected since the examined independent variables in the E7 and G7 exceeded neither the tolerance margin of 1 nor the variation inflation factor margin of 10.

## 6. DATA

This section is divided into two sub-sections covering countries as well as companies, in order to show how the data collection was done in this study. In the first sub-section, the choice of the appropriate countries is explained. Subsequently, in the second sub-section, there is a brief elaboration with respect to the two selection criteria that were applied to gather the sample.

### 6.1 Countries

In keeping with Rajan & Zingales (1995), this study takes the IMF's G7 classification as a representative group for the seven wealthiest developed economies (Canada, France, Germany, Italy, Japan, United Kingdom and the USA). The E7 includes Brazil, China, India, Indonesia, Mexico, Russia and Turkey and represents the wealthiest emerging economies. The E7 acronym is relatively unknown and was first coined in the PricewaterhouseCoopers' report 'The World in 2050'. Hawksworth & Chan (2015) classified seven emerging economies whose collective size is still below that of the well-known G7 countries but will overtake them by approximately 2050, leading to a shift in global economic power. The main sources for the macroeconomic data, for the period 2005-2014, are: the World Bank<sup>1</sup>, Eurostat<sup>2</sup> and the International Monetary Fund<sup>3</sup>. It should be noted that data for the real GDP growth rate is only published at regular intervals of two years, which means that it is only available up to 2013. Thus, in this study estimates for 2014 are provided by the International Monetary Fund. These are considered to be accurate and reliable for 2014. While this approach implies a limitation, it has been assumed that reducing the period for the study by one year would change the explanatory power of the other macroeconomic factor significantly, as this study is not able to increase the sample size due to a lack of availability in the ORBIS database<sup>4</sup>.

### 6.2 Companies

As previously stated, this study focuses on publicly listed companies from major stock exchanges. These have been classified by the 'World Federation of Exchanges'. The data for the major stock exchanges in each country was retrieved on the 31st January 2015 and is therefore deemed to be appropriate for the research. Antoniou et al. (2008) and Rajan & Zingales (1995) also took the major stock exchanges as a benchmark to compare several countries and produced reliable findings for the predetermined groups. The choice to take publicly traded companies is justified by the fact that those companies are obliged to publish additional information, such as annual reports, at regular intervals (Schmukler & Vesperoni, 2001). Moreover, it is assumed that the financial statements have been checked by independent auditors and that the figures are therefore veridical. In addition, publicly listed companies also imply that there are sufficient information about the market capitalisation. In order to obtain the necessary data for the two leverage ratios, the ORBIS database<sup>4</sup> (Bureau van Dijk) is used where access was granted by the University of Twente.

This paper focuses on non-financial companies (based on Standard Industrial Classification (SIC) industry codes) operating in the agriculture, construction, IT, manufacturing, mining, real estate, wholesale and retail as well as transport and warehousing industries. Financial institutions as well as utilities are deliberately excluded from this study as it is assumed that

these companies have specific regulations as regards their capital structure (Chipeta & Mbululu, 2013; Cho et al., 2014). Finally, the suitable determination of the sample is important. Booth et al. (2001) stated that there were some insignificant results in their study since the sample size was relatively small, leading to excessively high standard errors. Therefore based on the requirements described earlier in this sub-section, two selection criteria are used (See Table 3) to select suitable companies. Overall, there is a sample size of 1482 in the E7 and 1944 in the G7 countries. However, considering how many non-financial companies operate in each country acronym, these numbers represented 25.01% of the population. In this study the sample size is seen as reasonable, as it is in line with other researchers, such as, Booth et al. (2001), Jõeveer (2013), Rajan & Zingales (1995) and Schmukler & Vesperoni (2001). Nevertheless, the studies conducted by De Jong et al. (2008), Cho et al. (2014) and Kayo & Kimura (2011) covered more countries and hence exhibited considerably more companies.

**Table 3. Sample**

E7 Countries				
Country	Major Stock Exchange	Total	Available	Selected
Brazil	BM&F Bovespa	416	276 (66.35%)	40 (14.49%)
China	Shanghai Stock Exchange	979	854 (87.23%)	425 (49.77%)
India	Bombay Stock Exchange	4921	3837 (77.97%)	768 (20.02%)
Indonesia	Indonesia Stock Exchange	509	371 (72.89%)	122 (32.88%)
Mexico	Bolsa Mexicana de Valores	136	113 (83.09%)	41 (36.28%)
Russia	Moscow Exchange	271	168 (62.00%)	51 (30.36%)
Turkey	Istanbul Stock Exchange	429	307 (71.56%)	35 (11.40%)
	<b>Overall</b>	<b>7661</b>	<b>5926</b> <b>(77.35%)</b>	<b>1482</b> <b>(25.01%)</b>
G7 Countries				
Country	Major Stock Exchange	Total	Available	Selected
Canada	Toronto Stock Exchange	1165	678 (58.20%)	153 (22.57%)
France	Euronext Paris	887	707 (79.71%)	143 (20.23%)
Germany	Boerse Frankfurt	764	580 (75.92%)	130 (22.41%)
Italy	Borsa Italiana	296	212 (71.62%)	102 (48.11%)
Japan	Toyko Stock Exchange	3493	3086 (88.35%)	618 (20.03%)
United Kingdom	London Stock Exchange	2033	1242 (61.09%)	249 (20.05%)
United States	New York Stock Exchange	2354	1268 (53.87%)	549 (43.30%)
	<b>Overall</b>	<b>10992</b>	<b>7773</b> <b>(70.72%)</b>	<b>1944</b> <b>(25.01%)</b>

*This table presents the chosen sample for the E7 and G7 countries. The first selection criterion ('available') was that the companies within each major stock exchange had to operate in one of the following sectors: agriculture, construction, IT, manufacturing, mining, retail trade, wholesale trade, transport or warehousing. Companies in the financial or utilities industries were excluded. The second criterion ('selected') was that companies had to provide full financial data for the required period 2005-2014.*

<sup>1</sup> World Bank - <http://www.worldbank.org/>

<sup>2</sup> Eurostat - <http://ec.europa.eu/eurostat>

<sup>3</sup> IMF - <http://www.imf.org/external/data.htm>

<sup>4</sup> ORBIS - <http://www.bvdinfo.com>



## 7. RESULTS

This section includes the discussion of the descriptive, bivariate and multivariate analysis. In this respect, a sub-section begins with an evaluation of the E7 countries followed by G7.

### 7.1 Descriptive Analysis

All the information for the descriptive statistics are extracted from Table 6, which can be found in the appendix. According to the findings of this study, companies operating in the G7 countries have relatively more long-term debt in terms of book (0.291) and market value (0.247) than E7 countries do (0.241 as well as 0.218). Brazil and India have the largest long-term debt mean in the E7 while companies operating in China, surprisingly, have the lowest mean during the period 2005-2014. The United States has the highest percent of long-term debt in G7 countries although being a market-based economy. Nevertheless, Italy, Germany and France are characterised as bank based economies and indeed provide indications that these have especially more long-term debt in terms of book and market value compared to Canada. These findings are in line with those of Kayo & Kimura (2011). However, De Jong et al. (2008) found considerably lower means in terms of long-term market debt ratio. This might be explained by the fact that the number of countries and the sample size is higher in their study, which was conducted for the period 1997-2001 and, therefore, did not cover the periods of the most recent financial crises.

As regards the real GDP growth rate, the E7 countries exhibit a higher rate (0.079) than the G7 countries (0.010). As claimed by Hawsworth & Chan (2015), among the E7 countries China possesses the highest real GDP growth rate (0.102). By contrast, in the G7 the development in Italy is even slightly negative (-0.004). Another expected result is that companies in the G7 countries (0.36) have higher corporate tax rates compared with the E7 countries (0.31). Moreover, the stock and bond markets are significantly more developed in the G7 countries. It is notable that the United States of America has a more highly developed bond market (2.282) than stock market (1.153). Furthermore, Japan has an even more developed bond market than the USA (3.267) which is coherent with the classification of Japan to be a bank based economy.

On the subject of financial systems, the degree of bank concentration is slightly higher in the G7 than in the E7 countries, which is in accordance with Jõeveer (2013). As regards financial freedom, the findings show that financial institutions in the G7 countries (68.80) are more independent from government control compared with the E7 countries (36.11). This can be explained by the assumption that, for example, the Chinese government wants to keep control of the markets as much as possible. In this respect, the fiscal and monetary policies of a country are deemed to be the primary means for regulating the market. In addition, there still exist other limitations on banks, such as the minimum amount of reserves, which can be set by the government, as well.

Finally, the descriptive statistics show that, the G7 countries provide higher levels of creditor protection through the obligation to publish additional credit and financial information in accordance with generally accepted international accounting standards, such as, IFRS and GAAP. Moreover, in the G7 countries, creditors have greater protection in situations of financial distress and bankruptcy than in the E7 countries. Finally, the 'Corruption Perceptions Index' results state that in the G7 countries (73.34) the perceived level of corruption are higher than in the E7 countries (33.76), which implies that there is less corruption in the G7 compared with the E7 countries.

### 7.2 Bivariate analysis

In E7 countries, law enforcement (0.38) and corporate tax rates (0.31) have the highest positive correlation to the long-term book debt ratio (LTB). In the G7 countries, credit protection (0.37) and law enforcement (0.35) imply the highest positive impact on the LTB. Furthermore, in the E7 countries the real GDP growth rate (-0.71) and bond market concentration (-0.41) are mostly negative related to the LTB, while in the G7 countries the financial freedom (-0.24) and the bond market developments (-0.19) are mostly negative related to the LTB. Moreover, regarding the long-term market debt ratio (LTM) in the E7 countries, the highest positive impacts come from law enforcement (0.40) and the inflation rate (0.37). Similar to these findings, there are observations that in the G7 countries, law enforcement (0.23) and creditor protection (0.23) also have the highest positive correlation to LTM. Finally, in the E7 countries bank concentration (-0.44) and bond market development (-0.33) are mostly negative related to LTM, while in G7 countries financial freedom (-0.18) and bond market development state the highest negative impact.

Nevertheless, the correlation among independent variables is tested, too. In the E7 countries most notably, there is a very positive correlation between stock market development and GDP (0.56), law enforcement and inflation rate (0.64) as well as bank concentration and bond market development (0.73). While in the G7 countries bond market development and corporate taxes (0.59), creditor protection and stock market development (0.64) as well as law enforcement and creditor protection (0.65) are deemed to be significantly positively related to each other. Finally, in E7 countries, bank concentration and inflation (-0.71) have the highest negative relationship with each other. Hence there is the conclusion that independent variables show initial indications to be correlated to each other. Last but not least, all bivariate correlations are significant - at the level of 1% - except for the relationship between creditor protection and corporate taxes in the E7 countries as well as financial freedom and the real GDP growth rate in the G7 countries.

**Table 4. Bivariate correlation analysis results**

E7 Countries												
	LTB	LTM	GDP	INF	T	SM	BM	B	FF	CP	L	C
LTB	1											
LTM	0.89*	1										
GDP	-0.71*	-0.11*	1									
INF	0.26*	0.37*	-0.31*	1								
T	0.31*	0.32*	0.13*	0.42*	1							
SM	0.12*	0.10*	0.56*	-0.03*	0.29*	1						
BM	-0.34*	-0.33*	0.45*	-0.59*	-0.43*	0.09*	1					
B	-0.41*	-0.44*	0.18*	-0.71*	-0.56*	-0.13*	0.73*	1				
FF	0.05*	0.14*	-0.53*	0.31*	0.13*	-0.28*	-0.42*	-0.62*	1			
CP	-0.02*	0.12*	-0.35*	0.25*	0.00	0.15*	-0.04*	-0.08*	0.46*	1		
L	0.38*	0.40*	-0.17*	0.64*	0.46*	0.17*	-0.49*	-0.76*	0.05*	0.19*	1	
C	-0.09*	-0.05*	0.12*	-0.23*	-0.07*	0.25*	0.61*	0.34*	0.05*	0.51*	-0.04*	1
G7 Countries												
	LTB	LTM	GDP	INF	T	SM	BM	B	FF	CP	L	C
LTB	1											
LTM	0.87*	1										
GDP	0.05*	-0.04*	1									
INF	0.27*	0.18*	0.29*	1								
T	0.16*	0.13*	0.02*	-0.32*	1							
SM	0.21*	0.06*	0.33*	0.28*	0.06*	1						
BM	-0.19*	-0.13*	-0.07*	-0.59*	0.59*	0.04*	1					
B	0.15*	0.14*	-0.11*	-0.08*	0.25*	-0.09*	0.23*	1				
FF	-0.24*	-0.18*	0.00	0.06*	-0.65*	-0.28*	-0.54*	-0.24*	1			
CP	0.37*	0.23*	0.16*	0.39*	0.06*	0.64*	-0.11*	0.04*	-0.22*	1		
L	0.35*	0.23*	0.08*	0.64*	-0.26*	0.52*	-0.51*	-0.15*	-0.03*	0.65*	1	
C	-0.10*	-0.12*	0.18*	-0.06*	-0.04*	0.43*	0.14*	-0.14*	0.28*	0.41*	0.16*	1

This table presents the bivariate results of the E7 and G7 countries with respect to the dependent and independent variables. \*, \*\*, \*\*\* denote statistical significance at the 1%, 5% and 10% levels, respectively.

### 7.3 Multivariate analysis

In this sub-section there is a discussion of the multivariate regression results in regard to the E7 and G7 countries.

**Table 5. Multivariate regression results of OLS and GLM**

E7 Countries			
Independent variables	Expected relationship	Long term book debt	Long term market debt
Intercept	/	<b>0.256*</b> (0.002)	<b>0.231*</b> (0.003)
Real GDP	negative	<b>-0.014*</b> (0.003)	<b>-0.013*</b> (0.003)
Growth rate			
Inflation	negative	0.002 (0.003)	<b>0.031*</b> (0.003)
Rate			
Corporate Tax Rate	positive	<b>0.028*</b> (0.003)	<b>0.027*</b> (0.003)
Stock market Development	negative	<b>0.011*</b> (0.002)	<b>0.009*</b> (0.003)
Bond market Development	positive	<b>-0.060*</b> (0.004)	<b>-0.036*</b> (0.005)
Bank Concentration	negative	0.004 (0.005)	0.003 (0.005)
Financial Freedom	positive	0.001 (0.003)	<b>0.012*</b> (0.003)
Creditor protection	positive	<b>-0.036*</b> (0.003)	<b>-0.024*</b> (0.004)
Law enforcement	negative	<b>0.049*</b> (0.003)	<b>0.042*</b> (0.004)
Perceived level of corruption	negative	<b>0.048*</b> (0.004)	<b>0.042*</b> (0.004)
Observations		14820	14820
R <sup>2</sup>		0.269	0.277
Adjusted R <sup>2</sup>		0.268	0.276
G7 Countries			
Independent variables	Expected relationship	Long term book debt	Long term market debt
Intercept	/	<b>0.287*</b> (0.002)	<b>0.246*</b> (0.001)
Real GDP	negative	-0.001 (0.001)	<b>-0.006*</b> (0.001)
Growth rate			
Inflation	negative	<b>-0.009*</b> (0.002)	<b>-0.007*</b> (0.002)
Rate			
Corporate Tax Rate	positive	<b>0.036*</b> (0.002)	<b>0.024*</b> (0.002)
Stock market Development	negative	0.002 (0.002)	<b>-0.020*</b> (0.002)
Bond market Development	positive	<b>-0.075*</b> (0.003)	<b>-0.050*</b> (0.003)
Bank Concentration	negative	<b>-0.036*</b> (0.003)	<b>-0.027*</b> (0.003)
Financial Freedom	positive	<b>0.017*</b> (0.003)	<b>0.021*</b> (0.003)
Creditor protection	positive	<b>0.027*</b> (0.002)	<b>0.026*</b> (0.002)
Law enforcement	negative	<b>0.056*</b> (0.003)	<b>0.040*</b> (0.003)
Perceived level of corruption	negative	<b>-0.020*</b> (0.003)	<b>-0.011*</b> (0.003)
Observations		19440	19440
R <sup>2</sup>		0.275	0.177
Adjusted R <sup>2</sup>		0.274	0.177

*This table presents the regression results of the E7 and G7 countries. Bold highlighting and the superscripts \*, \*\*, \*\*\* indicate statistical significance of the unstandardised coefficients at the 1%, 5% and 10% levels, respectively. Inspired by Hanousek & Shamshur (2011), Hayes & Cai (2010) and Wooldridge (2014) heteroscedasticity-consistent standard errors are reported in parentheses. With respect to multicollinearity, VIF is under 10.*

First of all, the results of the E7 countries are evaluated. As shown in *Table 5*, the so-called model fits, expressed as the adjusted-R<sup>2</sup> show a relatively moderate degree of explanatory power for the E7 countries. In more detail, the regression of the LTB (0.268) has a slightly lower explanatory value compared to the LTM (0.276). Nevertheless, these figures are in accordance with Gungoraydinoglu & Öztekin (2011) who claimed that macroeconomic variables only explain about 1/3 of the variance within leverage ratios. Thus, the remaining 2/3 is represented by unobserved variables that are firm and industry-specific. In addition the ‘model significance’, also known as F-test, is (453.72) for the long-term book debt and (385.48) for the long-term market debt ratio, respectively with 1% ANOVA significance that thus satisfies the statistical ‘goodness of fit’ requirement stated by Verbeek (2012) and Wooldridge (2014).

Turning now to the ‘economic significance’, the real GDP growth rate shows significantly negative coefficients for both ratios (-0.014; -0.013) which is in accordance with Hypothesis 1 and the pecking-order theory. Furthermore, the inflation rate shows an insignificant positive relationship with the LTB (0.002) but a significant one with LTM (0.031) which makes it hard to verify whether the Hypothesis 2 should be rejected or not. The corporate tax rate shows the strongest positive relationship in both leverage ratios and thus confirms Hypothesis 3, leading to the assumption that the trade-off theory holds in E7 countries.

Moreover, stock market development show a significant positive relationship with LTB and LTM where bond market development show a significant negative relationship implying the strongest negative beta coefficient. Accordingly, these findings lead to a rejection of Hypotheses 4 and 5 for the E7 countries and are not in accordance with De Jong et al. (2008). However, Kayo & Kimura (2011) also expected a positive relationship to bond market development and verified afterwards a negative one. As regards bank concentration, in the E7 countries there is a insignificant negative impact on both leverage ratios, thus Hypothesis 6 is rejected which is not in line with Jõeveer (2013). Notwithstanding, Hypothesis 7 is confirmed for E7 countries which implies that, if the financial sector operates without additional interventions this leads to more leverage. However, in this case the result for the LTB is insignificant (0.001). Furthermore most surprisingly, creditor protection shows a significantly negative influence on the LTB as well as LTM which implies to reject Hypothesis 8 in E7 countries. In addition, these findings are not in accordance with Cho et al. (2014). Furthermore, law enforcement states a significant positive relationship to the LTB as well as the LTM, which is in contrast to the Hypothesis 9 and the findings of Antoniou et al. (2008). Last but not least, there is the perceived level of corruption, which shows significant positive relationships to leverage and leads to a reject the Hypothesis 10.

Turning now to the evaluation of the multivariate results for the G7 countries, which are also depicted in *Table 5*. In this regard, the adjusted-R<sup>2</sup> represents (0.274) for the LTB and (0.177) for the LTM, respectively. The ANOVA analysis shows again 1% significance which implies that the independent variables do not explain the dependent variables randomly but there is a model significance prevailing for both leverage ratios. This assumption is supported by the F-statistic for the LTB (503.77) and for the LTM (273.02). With respect to the economic significance of the unstandardised coefficients and their correlated signs, first of all, the real GDP growth rate is insignificantly negatively related to the LTB and significantly negatively related to the LTM. In this case the coefficient signs are in line with

Hypothesis 1 except LTB which is insignificant. Furthermore, in contrast to E7 countries, the inflation rate shows significant negative findings, which are in accordance with Hypothesis 2. Nevertheless, similar to the situation in E7 countries, in G7 countries the corporate tax rate is significantly positively related to the LTB (0.676) and the LTM (0.622), which therefore also confirm Hypothesis 3 that companies are abusing the tax-shield.

As regards, the stock market development, the findings are inconsistent, that is, there is an insignificant positive relationship for the LTB (0.002), while for the LTM ratio this relationship is significantly negative (-0.020). Hence, the results for the LTM are consistent with the findings of De Jong et al. (2008) and the established Hypothesis 4. Moreover, in terms of bond market development, similarly to the E7 countries, there is a significantly negative relationship with the LTB (-0.075) and the LTM (-0.050). Therefore, Hypothesis 5 is rejected and the unexpected findings of Kayo & Kimura (2011) are confirmed. Furthermore, in contrast to the situation in the E7 countries and in accordance with Hypothesis 6, increased bank concentration within a country does have a significant negative relationship with the LTB (-0.036) and the LTM (-0.027). Jøveer (2013) observed the same results and argued that less competition in the financial sectors puts more pressure on debtors since the market leaders control the market. That is, a monopolistic banking sector is deemed to imply increased cost of debt since there is no competition which keeps the costs low. Moving along, the significant positive relationship between financial freedom and the LTB (0.017) as well as the LTM (0.021) is similar to the situation in the E7 countries and confirms the Hypothesis 7 that less control by government promotes debt issue instead of equity. As concerns, corporate governance mechanisms, increased creditor protection has significant positive correlations to the LTB (0.027) and the LTM (0.026). Therefore, in G7 countries the Hypothesis 8 is confirmed which is also in line with De Jong et al. (2008) and Cho et al. (2014).

Furthermore concerning law enforcement in G7 countries, there is a positive relationship to the LTB (0.056) as well as the LTM (0.040). Unfortunately, similar to E7 countries this does not support Hypothesis 9, which anticipates a negative relationship. The assumption is that debtors might be afraid of stricter bankruptcy laws in the case of financial distress and would thus borrow less. Finally, the perceived level of corruption indicates a negatively correlation to the LTB (-0.020) and the LTM (-0.010) and thus confirms Hypothesis 10 and the findings of Fan & Twite (2012) as well as Jøveer (2013).

## 8. CONCLUSION

The multivariate regression models, performed as part of this study, show that there are significant relationships between macroeconomic variables and capital structure. However, the inflation rate, bank concentration, financial freedom in the E7 as well as the real GDP growth rate and stock market development in the G7 countries claim insignificant relationships with long-term book debt ratio, which is in line with Beck et al. (2008). Overall, this study states that the results verified in the literature could be mostly observed in G7 countries while in E7 countries new types of relationships are determined. In more detail, the results of this study as regards the E7 countries support earlier research outcomes in terms of real GDP growth rate, the inflation rate and the corporate tax rate but also indicate unexpected relationships concerning financial system development and corporate governance. In general, law enforcement has the largest positive impact in the E7 and G7 countries, while bond market development surprisingly, reports the largest negative impact related to long-

term book and market debt. Nevertheless as already claimed by Jøveer (2013) and Kayo & Kimura (2011), this study also provides empirical evidence that macroeconomic variables can be seen as determinants of capital structure where the impact varies depending on the country of origin. Concerning the model fits, the E7 countries show similar adjusted-R<sup>2</sup> in contrast to the G7 countries. In this case, the long-term market debt ratio only showed an adjusted-R<sup>2</sup> of (0.177) in the G7 countries which is assumed to be justified by the bigger sample size. Notwithstanding, the relatively low model fits in the E7 and G7 are in accordance with the findings of Kayo & Kimura (2011). Besides, Wooldridge (2014) stated that low model fits occur if a large sample size is taken. In addition, the differences in the model fits assert, that the debate in the literature about whether market or book value should be used for leverage still is reasonable, although the coefficients signs do not vary.

Ultimately, the question arises, for whom will the findings of this study prove to be particularly useful? First of all, they could be of interest to other researchers. For example, there might be other similar studies on macroeconomic variables and capital structure where the focus is on a comparison between emerging and developed countries. The outcomes of this study could be used as a starting point or as a comparison. Moreover, it would be interesting to compare other acronyms, such as, 'ASEAN' or 'Next-11'. In addition, further papers such as 'The World in 2050' (Hawksworth & Chan, 2015) could be published where, especially, the descriptive statistics of this study could be of particular interest, as there are observations that the E7 countries already lead in terms of real GDP growth rates. Moreover, the results of this study could be of interest to large and small companies operating in the non-financial industries as they would be able to compare their own behaviour with the findings of this study. On the one hand, Kayo & Kimura (2011) stated that large companies appear to ignore macroeconomic variables as they tend to determine their capital structures on the basis of firm-specific variables. However this study also includes large companies and verifies that macroeconomic variables have an impact on the capital structure choice. On the other hand, as Jøveer (2013) argued that macroeconomic variables are important for small unlisted companies since they are not able to make such use of tax shields or other firm-specific means in comparison to large companies. Thus, initially they are more focused on external variables when determining their capital structure. Therefore, the results of this study could also be useful for companies that are uncertain as to how they are supposed to cope with sudden macroeconomic changes.

## 9. LIMITATIONS

As indicated earlier in this paper, the number of companies operating in the E7 is a major limitation of this study. The ORBIS database did not provide sufficient accounting data for the period 2005-2014 in terms of market capitalization for countries such as Brazil, Mexico, Russia or Turkey. Thus, further research should be done, in particular, for the E7 countries with a bigger sample size and an increased number of small companies. In addition, the focus of further studies should be put on emerging countries as this study verifies new relationships for E7 countries which are not in line with prior findings. Finally, another limitation of this study is that the indirect impact of macroeconomic variables is not considered. In this respect, Cho et al. (2014), De Jong et al. (2008) and Kayo & Kimura (2011) claimed that the consideration of this indirect impact is important and would entail the inclusion of additional industry and firm-specific variables. Therefore, a study of G7 and E7 countries should be done in terms of the indirect impact of macroeconomic variables on capital structure.

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## 11. APPENDIX

**Table 6. Descriptive Statistics – E7 countries**

Country	Stats	LTB	LTM	GDP	INF	T	SM	BM	B	FF	CP	L	C
Brazil	Mean	0.308	0.270	0.035	0.055	0.330	0.629	0.957	0.555	51.00	5.400	2.800	37.50
	Median	0.306	0.228	0.032	0.055	0.340	0.600	0.963	0.526	50.00	5.000	3.000	37.00
	SD	0.188	0.199	0.023	0.010	0.027	0.182	0.106	0.074	7.009	0.801	0.401	3.806
	Min	0.003	0.002	- 0.003	0.036	0.250	0.356	0.745	0.461	40.00	5.000	2.000	32.00
	Max	0.777	0.776	0.075	0.069	0.340	1.003	1.108	0.663	60.00	7.000	3.000	43.00
China	Mean	0.132	0.103	0.102	0.029	0.274	0.795	1.412	0.564	30.00	4.000	4.300	35.80
	Median	0.099	0.067	0.096	0.026	0.250	0.710	1.451	0.526	30.00	4.000	4.500	36.00
	SD	0.113	0.106	0.021	0.019	0.037	0.432	0.126	0.065	0.000	1.549	0.781	2.272
	Min	0.001	0.001	0.077	- 0.007	0.250	0.346	1.208	0.479	30.00	0.000	3.000	32.00
	Max	0.636	0.637	0.142	0.059	0.330	1.782	1.630	0.663	30.00	6.000	5.000	40.00
India	Mean	0.309	0.294	0.077	0.083	0.335	0.821	0.688	0.315	36.00	4.800	7.300	33.90
	Median	0.296	0.261	0.085	0.086	0.340	0.775	0.701	0.321	40.00	5.000	8.000	34.00
	SD	0.183	0.199	0.021	0.024	0.008	0.283	0.069	0.018	4.899	1.833	0.900	2.468
	Min	0.010	0.011	0.039	0.042	0.320	0.527	0.584	0.289	30.00	0.000	6.000	29.00
	Max	0.899	0.911	0.103	0.120	0.340	1.469	0.772	0.339	40.00	7.000	8.000	38.00
Indonesia	Mean	0.176	0.167	0.059	0.072	0.306	0.388	0.406	0.444	41.00	4.200	4.800	27.90
	Median	0.114	0.099	0.060	0.064	0.313	0.417	0.406	0.443	40.00	5.000	5.000	28.00
	SD	0.165	0.174	0.005	0.028	0.012	0.104	0.035	0.014	8.310	1.834	0.400	3.912
	Min	0.002	0.002	0.046	0.043	0.287	0.194	0.364	0.425	30.00	0.000	4.000	22.00
	Max	0.758	0.800	0.065	0.131	0.318	0.508	0.462	0.473	60.00	6.000	5.000	34.00
Mexico	Mean	0.270	0.232	0.025	0.042	0.296	0.354	0.409	0.560	62.00	6.400	5.700	33.60
	Median	0.243	0.181	0.031	0.040	0.300	0.370	0.431	0.577	60.00	6.000	5.000	34.00
	SD	0.177	0.174	0.029	0.006	0.014	0.072	0.058	0.055	4.005	0.801	1.006	1.802
	Min	0.002	0.004	- 0.047	0.034	0.280	0.212	0.314	0.440	60.00	6.000	5.000	30.00
	Max	0.885	0.858	0.051	0.053	0.330	0.443	0.495	0.604	70.00	8.000	8.000	36.00
Russia	Mean	0.221	0.232	0.038	0.092	0.225	0.675	0.328	0.269	36.00	3.800	4.800	24.30
	Median	0.199	0.201	0.045	0.087	0.200	0.682	0.341	0.276	40.00	5.000	5.000	24.00
	SD	0.158	0.176	0.046	0.027	0.039	0.297	0.094	0.033	4.904	2.641	0.400	2.534
	Min	0.001	0.001	- 0.078	0.051	0.200	0.239	0.208	0.222	30.00	0.000	4.000	21.00
	Max	0.767	0.758	0.085	0.141	0.330	1.156	0.483	0.317	40.00	7.000	5.000	28.00
Turkey	Mean	0.174	0.185	0.044	0.085	0.200	0.335	0.625	0.423	51.00	5.100	4.600	43.40
	Median	0.050	0.089	0.047	0.088	0.200	0.351	0.647	0.462	50.00	5.000	5.000	44.00
	SD	0.199	0.204	0.044	0.014	0.000	0.087	0.134	0.135	8.353	0.542	0.804	4.411
	Min	0.001	0.001	- 0.048	0.063	0.200	0.161	0.456	0.100	30.00	4.000	3.000	35.00
	Max	0.637	0.667	0.092	0.104	0.200	0.443	0.843	0.531	60.00	6.000	5.000	50.00
<b>Total</b>	Mean	0.241	0.218	0.079	0.065	0.309	0.751	0.862	0.411	35.90	4.545	5.942	33.76
	Median	0.202	0.160	0.085	0.064	0.330	0.688	0.719	0.339	30.00	5.000	6.000	34.00
	SD	0.182	0.192	0.030	0.033	0.040	0.349	0.382	0.125	7.792	1.818	1.691	3.877
	Min	0.001	0.001	- 0.078	- 0.007	0.200	0.161	0.208	0.100	30.00	0.000	2.000	21.00
	Max	0.899	0.911	0.142	0.141	0.340	1.782	1.630	0.663	70.00	8.000	8.000	50.00

*This table presents the descriptive statistics for the E7 countries. In this respect the means, medians, standard deviations, minimums and maximums are stated for the dependent as well as independent variables.*

**Table 6. (Continued) Descriptive Statistics – G7 countries**

Country	Stats	LTB	LTM	GDP	INF	T	SM	BM	B	FF	CP	L	C
Canada	Mean	0.257	0.224	0.018	0.018	0.313	1.183	1.775	6.400	0.758	7.400	77.00	85.30
	Median	0.243	0.192	0.020	0.020	0.320	1.249	1.731	6.000	0.812	7.000	80.00	86.50
	SD	0.167	0.163	0.017	0.007	0.040	0.237	0.171	0.800	0.107	0.800	4.584	2.572
	Min	0.006	0.002	-0.027	0.003	0.260	0.650	1.506	6.000	0.594	7.000	70.00	81.00
	Max	0.757	0.775	0.034	0.029	0.360	1.500	2.142	8.000	0.869	9.000	80.00	89.00
France	Mean	0.272	0.240	0.009	0.015	0.330	0.760	1.225	4.400	0.643	4.500	65.00	70.69
	Median	0.251	0.217	0.016	0.016	0.330	0.730	1.252	4.000	0.650	5.000	70.00	70.00
	SD	0.128	0.121	0.016	0.008	0.000	0.186	0.087	0.800	0.018	0.671	8.065	2.383
	Min	0.044	0.025	-0.029	0.001	0.330	0.510	1.057	4.000	0.620	3.000	50.00	67.88
	Max	0.780	0.738	0.024	0.028	0.330	1.045	1.325	6.000	0.666	5.000	70.00	75.00
Germany	Mean	0.267	0.236	0.013	0.016	0.318	0.427	1.235	6.200	0.740	7.100	59.00	79.40
	Median	0.262	0.226	0.011	0.016	0.300	0.420	1.225	6.000	0.722	7.000	60.00	79.00
	SD	0.131	0.135	0.029	0.007	0.034	0.100	0.056	0.980	0.027	0.700	7.003	1.114
	Min	0.016	0.010	-0.056	0.003	0.290	0.296	1.135	5.000	0.712	6.000	50.00	78.00
	Max	0.708	0.699	0.041	0.026	0.380	0.613	1.328	8.000	0.781	8.000	70.00	82.00
Italy	Mean	0.281	0.260	-0.004	0.019	0.326	0.297	1.360	5.500	0.499	2.800	60.00	44.80
	Median	0.248	0.228	0.006	0.019	0.310	0.224	1.367	5.000	0.523	3.000	60.00	43.00
	SD	0.157	0.162	0.023	0.009	0.023	0.148	0.207	0.807	0.103	0.400	4.474	4.379
	Min	0.016	0.007	-0.055	0.002	0.310	0.145	1.035	5.000	0.350	2.000	50.00	39.00
	Max	0.768	0.711	0.020	0.034	0.370	0.528	1.618	7.000	0.631	3.000	70.00	52.00
Japan	Mean	0.188	0.182	0.007	0.002	0.388	0.805	3.267	5.700	0.428	5.600	48.00	75.60
	Median	0.163	0.159	0.016	0.000	0.410	0.708	3.285	6.000	0.439	6.000	50.00	75.50
	SD	0.125	0.121	0.027	0.011	0.031	0.193	0.209	0.458	0.024	0.800	6.000	2.154
	Min	0.011	0.010	-0.055	-0.013	0.330	0.600	2.991	5.000	0.383	4.000	30.00	73.00
	Max	0.720	0.651	0.047	0.027	0.410	1.085	3.665	6.000	0.450	6.000	50.00	80.00
United Kingdom	Mean	0.257	0.199	0.011	0.027	0.285	1.185	1.887	3.800	0.564	9.400	85.00	79.20
	Median	0.235	0.174	0.017	0.024	0.290	1.239	1.956	5.000	0.567	10.00	85.00	77.50
	SD	0.158	0.136	0.022	0.008	0.032	0.221	0.199	2.562	0.041	1.200	5.001	4.191
	Min	0.016	0.004	-0.043	0.015	0.230	0.663	1.530	0.000	0.501	7.000	80.00	74.00
	Max	0.770	0.703	0.030	0.045	0.330	1.469	2.156	7.000	0.632	10.00	90.00	86.00
United States	Mean	0.444	0.349	0.015	0.023	0.400	1.153	2.282	6.400	0.330	9.400	77.00	72.90
	Median	0.435	0.321	0.022	0.025	0.400	1.150	2.272	6.000	0.327	9.000	75.00	73.00
	SD	0.163	0.167	0.018	0.012	0.000	0.191	0.076	0.800	0.019	0.800	7.811	1.375
	Min	0.030	0.031	-0.028	-0.004	0.400	0.797	2.163	6.000	0.299	9.000	70.00	71.00
	Max	0.962	0.965	0.033	0.038	0.400	1.402	2.405	8.000	0.354	11.00	90.00	76.00
<b>Total</b>	Mean	0.291	0.247	0.010	0.015	0.360	0.927	2.309	5.637	0.484	7.174	65.83	74.34
	Median	0.264	0.218	0.017	0.016	0.380	1.022	2.271	6.000	0.442	7.000	70.00	74.00
	SD	0.178	0.159	0.023	0.014	0.050	0.331	0.758	1.436	0.151	2.247	15.52	8.267
	Min	0.006	0.002	-0.056	-0.013	0.230	0.145	1.035	0.000	0.299	2.000	30.00	39.00
	Max	0.962	0.965	0.047	0.045	0.410	1.500	3.665	8.000	0.869	11.00	90.00	89.00

*This table presents the descriptive statistics for the G7 countries. In this respect the means, medians, standard deviations, minimums and maximums are stated for the dependent as well as independent variables.*