Determinants of Corporate Capital Structure: Evidence from Non-financial Listed Belgian Firms

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Biography

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Abstract

Since the work of Modigliani & Miller (1958), the companies’ capital structure has been a theme under debate. Even though this is an issue that has been discussed over the years, there is still not an agreement on the determinants of a companies’ capital structure.

This paper analyses the characteristics that influence the capital structure of Belgian companies. In addition, it aims to study the capital structure theories and analyze which one better explains the managers' decisions concerning how to finance their companies. In this study we use panel data format and Ordinary Least Squares estimations with cross-section fixed effects, year dummy variables and industry dummy variables. Our sample includes 93 non-financial Belgian firms, listed in the Brussels Stock Exchange, for the period between 2005 and 2015 (1023 firm-year observations).

In order to test the results' sensitivity in the use of debt, we used two regressions and, therefore, two dependent variables: (i) total debt and (ii) long term debt. The independent variables used are (i) tangibility of assets, (ii) firm size, (iii) growth opportunities, (iv) non debt tax shields and (v) risk.

Even though our results show that there is not a leading capital structure theory, in general terms, all the independent variables have explanatory power.

In addition, we divided our sample in two periods in order to study the effect (if any) of the economic and financial crisis of 2008 in our model: within the period between 2005 and 2008 and within the period between 2009 and 2015. The results show that the economic crisis had an impact, namely, on the tangibility of assets.

Finally, we also included industry dummy variables and our results show that the level of leverage of a company can vary within industries and with different intensities from industry to industry.

**JEL Codes:** C33, G32

**Keywords:** Capital Structure, Capital Structure Theories, Panel Data, Capital Structure Determinants
Index of contents

BIOGRAPHY ............................................................................................................................. I
ACKNOWLEDGMENTS .................................................................................................................. II
ABSTRACT .................................................................................................................................. III
1 – INTRODUCTION .................................................................................................................. 1
2 – LITERATURE REVIEW ......................................................................................................... 5
  2.1 – DEFINITION OF CAPITAL STRUCTURE .................................................................. 5
  2.2 – CAPITAL STRUCTURE THEORIES .......................................................................... 5
3 - RESEARCH DESIGN ................................................................................................................ 11
  3.1 - OBJECTIVES AND RESEARCH HYPOTHESIS ...................................................... 11
  3.2 - VARIABLES .................................................................................................................... 16
  3.3 - SAMPLE ........................................................................................................................ 18
  3.4 – METHODOLOGY ............................................................................................................. 19
4 – RESULTS AND DISCUSSION ............................................................................................. 23
  4.1 – UNIVARIATE ANALYSIS ............................................................................................. 23
  4.2 – MULTIVARIATE ANALYSIS ......................................................................................... 26
  4.2.1 – Year effect .................................................................................................................. 26
  4.2.2 – Economic and financial crisis effect ...................................................................... 29
  4.2.3 – Industry effect .......................................................................................................... 31
5 – CONCLUSIONS, LIMITATIONS AND FUTURE RESEARCH ............................................. 34
  5.1 – CONCLUSIONS .............................................................................................................. 34
  5.2 – LIMITATIONS OF THIS WORK AND FUTURE RESEARCH .................................... 36
REFERENCES ............................................................................................................................ 37
1 – Introduction

The capital structure is an important area of decision-making that directly affects the cost of capital, capital investment decisions and the market value of the company.

The purpose of studying the capital structure theory is to know how to achieve the highest firm value. This work, by analyzing the determinants of capital structure of companies and evaluating the explanatory capacity of the major capital structure theories, namely, the *trade-off* theory, the *pecking* order theory, the *agency* costs theory and the *market timing* theory, intends to help the companies in their capital structure decisions or, to better understand in which way their capital structures is affected by the determinants of capital structure.

For companies, it is important to ensure the right level of debt in order to maximize the company’s value.

Even though there is a growing literature on the capital structure matter, there is, at least, to the best of our knowledge, still no widespread consensus on the principal determinants of the capital structure of a company.

In this work, we will approach the main capital structure theories, namely the work of Modigliani and Miller, trade-off theory, market timing theory, agency costs theory and the pecking order theory.

The capital structure of a company is associated with the choice of different funding sources that are available to meet their financial needs in order to minimize the cost of capital and increase the company's value. Since the pioneering work of Modigliani and Miller (1958) that the issue of capital structure and its relationship with the company's value has sparked controversy in financial theory. Thus, after the controversy launched on the capital structure, many were the authors who wanted to contribute in this area. In this sense, several theories are trying to justify the business financing decisions, and that merit our attention over this study, namely the trade-off theory that argues that there is an optimal capital structure, as proposed by Kraus and Litzenberger (1973), being obtained the confrontation between the current value of the tax benefit and the present value of the costs of the marginal increase of the company's leverage.
Later, Myers and Majluf (1984) proposed the Pecking Order Theory stating that companies favor internal over the external and debt over equity.

Baker and Wurgler (2002) presented the Market timing theory suggesting that the company issue shares when their price is high and purchase them when their price is low. It is important to note that, in this study, the price is measured by the price to book value ratio. The companies follow this approach to explore temporary fluctuations in the cost of their own capital against the cost of other financing sources alternatives.

As previously mentioned, and even though the capital structure and, more specifically, the determinants of capital structure is a subject that has been studied over the years, there is no consensus regarding the determinants of capital structure and on the theory underlying managers’ decisions. In fact, the sample used and the period under analysis have an impact on the empirical results. Thus, the firms’ characteristics that affect managers’ decisions should continue to be investigated as well as trying to develop a theory that could explain these decisions. In the work of Bayrakdaroglu et al (2013), the authors study if the determinants that are specifics from each firm, in the Turkey market case, support the main capital structure theories.

Further to the above, this study aims to understand the characteristics of non-financial listed firms that have an impact on the managers’ decisions about the financing of their investments or projects (it is important to point out that in this scenario the managers have the option, either they opt for the internal or external funds and opt for short, medium or long term resources) and affect on the company’s capital structure.

In a previous stage, this work aimed to study the Portuguese companies. However, due to the small dimension of the Portuguese market, we understood that it should be more advantageous to analyze a Eurozone market with higher number of firm observation per year. Hence, and after testing several countries, we selected Belgium. It is important to stress the high number of firm-year observations compared to Portugal as well as bearing in mind that this study was performed for several European countries. Within the universe of Belgian firms, we analyzed the subset of non-financial listed companies due to the particularity of the financial results and reporting obligations of the financial companies that cannot be compared with the non-financial companies. We selected the listed firms...
has these are the companies with more information available due to their reporting obligations.

Thus, the sample is composed by 93 non-financial Belgian firms, listed in the Brussels Stock Exchange for the period between 2005 and 2015 (1023 firm-year observations). When defining the empirical model for this study, we used the Ordinary Least Squares estimator, panel data, models with fixed effects and year dummy variables.

This study contributes to the capital structure literature on several aspects. First of all, this study uses a different sample. Even though there is an extensive literature on the subject of the capital structure, namely on the determinants of the capital structure, this literature focus mostly in countries as the United States of America or the United Kingdom, as these are the most developed countries. In addition, developing countries have been recently being under study on this matter in order to compare the results with the ones obtained for the most developed countries. Although it would be interesting to perform this study for the whole European Union or for, at least, a sample including more than one country, it is important to stress that the argument that countries’ specific factors can difficult the comparability between countries has been raised in the previous literature. Thus, we choose to study Belgium. We intended to study a European country. However, there are some recent works for European countries as Germany, France and the United Kingdom. It would also be interesting to perform this study for Portugal, but there are some works for Portugal and it is important that the Portuguese market is a relatively small market so, it would be interesting to study a bigger market. Thus, considering our restrictions to choose a European country, we decided that it would be advantageous to perform this study for Belgium. Additionally, and to the best of our knowledge, there is not any recent study on this matter for Belgium. As we understand that this is a gap in the literature, we intend to fill it with this study.

In addition, this study examines a long period of time, namely from 2005 until 2015. This enables us to compare our results both with other countries and over time. It is important to stress that the world (and the European Union in particular) faces a financial crises since 2008. With our work and our extensive sample, we were able to analyze how manager’s decisions on how to finance the companies’ investments that were affected by the firms’ characteristics changed over time, namely as from the financial crisis. It is
important to stress that the mandatory IFRS adoption happened in 2005, thus our study’
sample was not extended to before 2007.

Cortez & Susanto (2012) conclude, in their work, that some firms use more short term
debt in their capital structure. Thus, in this work, we included both short term and long
term debt as two different dependent variables. On one hand, we use the total debt divided
by the book value of assets and, on the other hand, the long term debt divided by the book
value of assets.

Additionally, we also included in our work both year dummy variables and industry
dummy variables.

Regarding the year dummy variables, which we included instead of performing an
estimation with fixed effects, we were not able to find any clear tendency neither before
nor after the financial crisis. For instance, some variables lose their significance for the
period after the economic and financial crisis, i.e. after 2009. Notwithstanding, we can
also verify that the economic crisis had an impact on the tangibility of assets (Tang)
variable.

In our work we also included industry dummy variables, in order to analyze the impact
of the industry in the determinants of a companies’ capital structure choice.

Our results show that there is not yet a leading theory on the capital structure theme
namely regarding the non-financial listed Belgian firms. It is, however, important to stress
that in the previous literature, the authors were not able to determine any main capital
structure theory. Our results for the variables profitability, tangibility of assets, size and
risk are in line with the previous literature and are statistically significant, which allowed
us to validate some of our hypothesis.

The remaining of this work is organized as follows: Section 2 is the literature review of
the capital structure theories and the recent studies on this subject. In Section 3 are
presented the methodological aspects of this work, namely the sample and the model used.
In Section 4 the results obtained are analyzed. Finally, in section 5 are presented the
conclusions of this study with the limitations of this work and suggestions for future
researches.
2 – Literature review

In this section, we will provide a definition of capital structure, analyze capital structure theories and the recent studies on the capital structure matter.

2.1 – Definition of Capital Structure

The capital structure of a firm is a critical theme of corporate finance. The capital structure is how a firm finances its overall operations and growth by using different sources of funds. In general terms, equity is the resources provided by the shareholders and debt is the resources provided by the lenders. Although there are different theories, it turns out that there is still no solid theoretical basis to explain the financing structures choices used by companies. Below, there is a review of the main theories of capital structure.

2.2 – Capital Structure theories

I – Modigliani and Miller

It is important to point out that the theme of the capital structure was originally boosted by Modigliani & Miller (1958). The authors based their work on various assumptions, namely: (i) absence of taxes; (ii) absence of transaction costs to borrow or lend at the risk free interest rate; (iii) absence of bankruptcy costs; (iv) the companies can only seek loans with risk or no risk; (v) the issuance of debt is used to buy stocks and whenever there is the issue of shares, this serves to repay debt; (vi) corporate earnings are fully distributed to shareholders; (vii) cash flows are perpetual and constant and all market participants can anticipate the company’s operating results.

Considering an economy without taxes, Modigliani and Miller formulate two propositions: I – the company cannot change its total value by changing the divisions of its cash flows, in fact, the value of the company is dictated only by its investment decisions: a company is the sum of the net value of its investment projects; II – The expected rate of the shareholders remuneration increases proportionally to the debt ratio, which is calculated based on the market value.
Later, in 1963, the authors added to the initial model the effects of taxes on business and the possibility of tax deduction of finance charges. Therefore, Modigliani and Miller conclude that the value of the company will be greater as higher as the level of debt is.

The theory of Modigliani and Miller was challenged in multiple subsequent investigations, with consecutive deletions of the initial assumptions, yielding different theoretical perspectives on the determinants of capital structure of the companies, namely, trade-off theory, agency costs theory, pecking order theory and market timing theory.

II – Trade-off theory

The trade-off theory arises from the work of Modigliani and Miller (1963) since, by eliminating the assumption that markets are perfect, i.e. including frictions in the market, in this case the taxes, the authors concluded that the capital structure had impact on the company value. This theory defends the existence of an optimal capital structure, based on a balanced relationship between the level of indebtedness and the maximization of enterprise value, i.e. the optimal capital structure is achieved through the confrontation between the current value of tax benefit and the present value of marginal costs of increasing the company's leverage. Being aware of the tax benefits and costs associated with the debt, according to the trade-off theory is necessary to find the breakeven point that maximizes the value of the company, at which the marginal benefits of additional debt unit are equal to their marginal costs.

The trade-off theory seeks to relate the tax advantages of debt with the costs of financial distress, so according to this theory the maximization of the company's value will result from the balance between the tax advantages of debt and the respective financial distress costs, leading to the existence of an optimal level of debt.

Summarizing, the trade-off theory relates to models that are based on a cost / benefit analysis of debt. According to these models, the choice of the proportion of equity and debt changes the value of the company, so, it is possible to determine an optimal combination that maximizes the company’s value.

Miller (1977) and DeAngelo and Masulis (1980) address the involvement of taxes in the capital structure. Baxter (1967), Warner (1977) and Altman (1984) study the bankruptcy
costs and their impact on the capital structure choices, namely on the impact on the tax rates requires by the lenders. Jensen and Meckling (1976), Jensen (1986) and Stulz (1990) study the agency costs.

**III – Market timing theory**

The idea present on these models is that the manager, while making the decision on the financing options, will review the market conditions of the debt and shares, opting for those that are more favorable. According to Frank and Goyal (2007), the market timing theory is based on the following assumptions: i) if there is no favorable alternative, the manager will delay the financing decision as much as possible and ii) if there are exceptional favorable market conditions, he will take advantage of them, even if there are no significant financing needs.

Lucas and McDonald (1990) constructed an empirical model that partially confirm the statement present in the market timing theory: i) the issue of shares, on average, is preceded by a positive abnormal return period of the bonds, although for some companies this period is of negative returns and ii) the issue of shares are higher in periods when the stock market is growing, because the negative market reaction is lower.

Opler and Titman (1998) state that the fact that companies issue shares after a period of rising prices is inconsistent with the existence of optimal debt ratios, because the use of windows of opportunity is inconsistent with the pursuit of any goal. Graham and Harvey (2001) found that the share price is the third most important factor in the decision to issue new equity and the temporal structure of interest rates has a considerable weight upon debt issuance. Korajczyk and Levy (2003) state that changes in macroeconomic conditions such as changes in the relative price of assets leads companies to choose different capital structures over time.

It is important to stress that with the work of Baker & Wurgler (2002) the market timing theory appears. The authors consider the capital structure of the companies as a function of the managers’ options when looking to make the changes in the share price in the capital market and optimize the cash inflow. The practice of market timing suggests that the choice of the optimal moment to issue new shares is the decisive factor in the corporate financing strategy.
IV – Pecking order theory

At this stage, the problems on the capital structure keep on debate and have a high importance as they can be seen in several studies, namely in the work of Cohn et al (2014), where the evolution of capital structure and the performance of the companies after their acquisition in the USA is analyzed and in the work of Lin et al (2013), where the authors study the relationship of the type of corporate structure with the type of business financing (bank debt or issuing of shares) in Asia and Western Europe.

Through a theoretical model, Myers and Majluf (1984) explained how the investment decisions are influenced by the financing decisions, when managers have more information about the value of the assets than the investors. The authors have shown that the discount in the price of the bonds can be of such high form, that projects with positive net present value are not implemented by the management through the issuance of new shares, as it would imply a transfer of the old shareholders’ value to new shareholders. According to the authors, when in are in the presence of information asymmetry, the model showed that companies should finance their new projects first by holding back dividends, then by issuing bonds and only, in a last stage they increase capital, which means, always choose the means with the least risk instead of others. The conclusion drawn in this paper is in line with what Myers (1984) defined as the pecking order theory. According to the author, companies prefer the internal instead of the external financing and indebtedness to the issuance of shares. The author points out that even if the shares are overvalued by the market, the hierarchy is respected, although the seemingly following rule would seems to be to privilege the new assets or risky assets to take full advantage of the new investors. The author clarifies that the problem with this strategy is that investors know that the company will only issue new shares only if they are overvalued, so they only acquire them when the company's debt capacity is exhausted, forcing the management to follow the pecking order. In the hierarchy theory of choices, the tax benefit of interest is a second order effect, so the debt ratios change only when there is an imbalance between internally generated funds and real investment opportunities, there being no notion of optimal debt ratio (Shyam-Sunder and Myers, 1999).
It is important to point out that Fama & French (2001) consider the existence of costs of hierarchical order as the costs of issuing shares and related costs to provide information to managers and to avoid problems with costs and asymmetric information, arguing that the companies should start by financing with retained earnings and then the debt in the market.

Frank & Goyal (2004) consider that the pecking order theory comes from the existence of asymmetric information between managers and investors, concluding that there are three sources of business financing: retained earnings, equity and debt capital, supporting, thus, the study of Myers (1984). This work considers the possibility of the company’s stocks being incorrectly assessed by the marked, i.e. under or overvalued and, in a situation of undervaluation, the resource of issuance of shares to finance the company allows new shareholders to appropriating of a value higher than the fair.

Kayhan and Titman (2007) examine how cash flows, investment expenditures and stock price histories affect debt ratios. The authors find that these variables have a substantial influence on changes in capital structure. Specifically, stock price changes and financial deficits, i.e. the amount of external capital raised, have strong influences on capital structure changes but, in contrast to previous conclusions, the authors find that over long horizons their effects are partially reversed. Even though firm’s histories strongly influence their capital structures, as time goes by, their capital structures tend to move towards target debt ratios consistent with the tradeoff theories of capital structure.

In this work, the authors examine how debt ratios of firms change over time.

V – Agency costs theory

While studying the capital structure theory, we should analyze the work of Harris and Raviv (1991), Frydenberg (2004) and Frank and Goyal (2007), so we can study their contribution to the capital structure theories. Harris and Raviv (1991), in their work, survey of capital structure theories based on agency costs, asymmetric information, product/input market interactions and corporate control considerations, excluding tax-based theories.
Analyzing the models based on agency costs, it is important to point out that there are two types of conflicts. On the one hand we have the conflicts between shareholders and managers and on the other hand we have the conflicts between debtholders and equityholders. After analyzing several papers on this subject, the authors conclude that leverage increasing (decreasing) changes in capital structure caused by a change in one of the exogenous variables considered in the study will be accompanied by stock price increases (decreases).

With regards to the models based on asymmetric information, the authors study the impact of the asymmetric information between the internal and external agents of the company in the definition of the capital structure.

VI – Other theories

On the models based on product/input market interactions, Harris and Raviv (1991) analyze the models that relate the capital structure with the company’s activity. Capital structure models based on product/input market interactions are in their early life.

The studies based on the theories driven by corporate control considerations, and the papers analyzed on this matter provide a theory of capital structure related to takeover contents. The theories surveyed should be viewed as theories of short-term changes in capital structure taken in response to imminent takeover threats, since the capital structure derived in these models can be implemented in response to hostile takeover activity.

Further to the above, it is possible to conclude that the capital structure is a theme under constant studying and with no consensus between the several authors that studied this theme. In our work we will study the determinants of capital structure bearing also in mind the industry effect as well as the year effect on the results obtained.

Our work will focus on the Belgian market. The Belgian market has an economic system different when compared with the United States of America and the United Kingdom. The United Kingdom and the United States of America are “market-oriented” economies (Rajan & Zingales, 1995) and Belgium is, typically, a “bank-oriented” economy.

In addition, we also analyze the industry effect. To the best of our knowledge, there are few works studying the industry effect on the capital structure choices.
3 - Research design

3.1 - Objectives and research hypothesis

In fact, there is a growing empirical literature related to the capital structure issues, however, most of these studies focus on one aspect of the capital structure issue. In order to provide a more comprehensive analysis on the determinants of the capital structure choices, we analyzed several determinants that are proved to affect the capital structure choices for the specific case of Belgium. Further to what was previously mentioned and taking into account the theories before mentioned, we formulate the research questions for our study.

In the capital structure literature, the majority of authors state that, namely, the tangibility of assets, the profitability, the firm size, the growth opportunities and the non-debt tax shield are the most relevant firms’ characteristics that affect the corporate leverage. It is important to stress that other firm characteristics have also been studied over the years, however, those others characteristics were not relevant to explain the firms’ capital structure.

Further to the above, in this work we use the five characteristics before mentioned to analyze the capital structure.

Tangibility of assets

In order to measure the nature of a firm’s assets, we use the tangibility of assets.

In the majority of studies analyzing the determinants of the firms’ capital structure, the authors state that the firms’ leverage level is affected by the nature of assets. The work of Myers & Majluf (1984) suggest, as per their arguments, that firms may find the sale of secured debt more advantageous, associated with the fact that the issuing of securities that the firm’s managers have better information than outside shareholders may have costs associated.

In accordance with Frank & Goyal (2009) and in the trade-off theory perspective, firms with more tangible assets have a tendency to be more leveraged. For Titman & Wessels
(1988), the use of tangible assets to collateralize the loans is a justification for this, thus, the firms that issue more debt tend to be the firms that have more tangible assets.

In addition to the above, and in line with what was before mentioned, Rajan & Zingales (1995) state that in liquidation, the tangible assets retain more value which decreases the agency cost of debt for creditors. This is in line with Berger & Udell (2002) that state that the agency costs of debt financing can be mitigated by tangible assets as they can be considered as collateral for debt.

Notwithstanding the above, it is important to stress that for firms that have more tangible assets (high value of tangible assets) have difficulties in shifting their investments to riskier projects, provided that against these assets, their debt is secured (Johnson, 1997).

Berger & Udell (2002) work also shows that for companies that have a close relationship with the lenders, this relationship replaces the physical collateral resulting in a less need of collateral for these companies. Further to the above, we understand that the tangibility of assets could be less important in bank-oriented countries, as it is the case of Spain.

Notwithstanding the above, firms with higher levels of debt have limitations in the use of their internal funds as creditors constantly monitor them. Thus, following Pandey (2001) work there is a negative correlation between debt and assets.

Additionally, following the perspective of the pecking order theory the managers of companies prefer to issue more debt over equity when the firms have more tangible assets. In fact, in line with the Trade-off theory, namely following the work of Zurigat (2009), it is predicted that tangibility and leverage are positively related.

Marsh (1982) also found the tangibility of assets relevant to explain the firm’s leverage.

Many previous works have supported the positive relation between leverage and tangibility, such as Rajan & Zingales (1995), Fan et al. (2012), Akdal (2010) and Acedo-Ramírez & Ruiz-Cabestre (2014).

Further to the above, the hypothesis to be studied is presented as below:

**H1: There is a positive association between tangibility and leverage**
**Profitability**

From the Pecking order theory point of view, the companies that have the lower amounts of debt should be the more profitable ones, as they should use their internal funds before resort to external funds. Thus, and under this theory, we expect a negative correlation between profitability and leverage.

As per the work of Rajan & Zingales (1995), there is a negative correlation between profitability and leverage in all countries, except in the case of Germany.

On another hand, according to the Trade-off theory, the firms should have higher levels of debt, because companies with more Free Cash Flow should use their internal resources in a responsible manner in order to minor the agency costs (Jensen, 1986, and Harris & Raviv, 1991).

Further to the above, the hypothesis to be studied is presented as below:

**H2: There is a negative association between profitability and leverage.**

**Companies’ size**

Previous literature on the capital structure defends that the companies’ size is a determinant that has impact on the capital structure of a firm.

According to the Trade-off theory, larger firms, the ones that are more diversified and, due to that diversification, are more likely to have higher amounts of debt because they are safer, their credit ratings are higher and consequently their interest rates are lower.

Further to the above, and according to Ferri & Jones (1979) work, there is a positive relation between the companies’ size and the leverage.

Notwithstanding the above, Ozkan (2001) found, even though it was not relevant, a negative relation between leverage and the firms’ size. Rajan & Zingales (1995) suggested that this negative relation exists because larger firms issue equity over debt due to the existence of lower degrees of asymmetric information. Thus, according to the Pecking Order theory, it is expected a negative relation between the companies’ size and leverage.
For Marsh (1982), an important explanatory variable for debt is the companies’ size.

Further to the above, the hypothesis to be studied is presented as below:

**H3: There is a positive association between the firms’ size and leverage.**

**Growth opportunities**

Another determinant of capital structure might be the growth opportunities. Growth opportunities are usually measured by the market-to-book ratio and they are the intangible capital assets, valuable to the company, and that cannot be collateralized. According to the Pecking Order theory, growth opportunities and leverage should be positively correlated, due to the fact that the firms that have more investment projects need external funds and, therefore, they will have higher amounts of debt.

Notwithstanding the above, Ozkan (2001) found a negative relation between these variables. This could be justified with the existence of debt that is risky, which could lead the companies to stop issuing debt and not taking some investment opportunities.

Additionally, the Market Timing theory predicts a negative correlation between the growth opportunities and leverage. In fact, according to this theory, and when the stock price is higher (comparatively with the companies’ earnings or its book value), the companies prefer to issue equity over debt, because the sale price of the new shares is higher, which will result in a lower amount of debt. Rajan & Zingales (1995) and Antoniou et al. (2002) proved in their works the negative relation between the growth opportunities and leverage.

Under the Trade-off theory, we expect a negative relation between the variables before mentioned. According to Zurigat (2009), the intangible assets cannot be used as collateral which will lead to a quickly decline of their value in a scenario of bankruptcy. Thus, creditors demand interest rates that are higher which will increase the cost of debt.

Further to the above, the hypothesis to be studied is presented as below:

**H4: There is a negative association between the growth opportunities and leverage.**
Non-debt tax shield and tax gains

The non-debt tax shield is considered another determinant of the capital structure of a company.

When a firm has tax shields from different sources (than the tax shield arising from the interest from debt) that company does not have advantage in the issuance of debt (Ozkan, 2001). In fact, according to Deangelo & Masulis (1980), the non-debt tax shields and leverage have a negative relation.

According to the Trade-off theory the deductibility of tax is considered as the most benefit of debt, so this theory supports the negative relation between the non-debt tax shield and leverage.

Notwithstanding, and in a scenario where the non-debt tax shield is achieved via the collateral assets, we could expect a positive relation between leverage and the non-debt tax shield (Uddin, 2015).

Further to the above, the hypothesis to be studied is presented as below:

**H5: There is a negative association between the non-debt tax shield and leverage.**

Risk

In order to determine a firms’ probability of bankruptcy, we use this proxy that we expect to have a negative relation with leverage.

According to the Pecking order theory, risk and leverage should have a negative relation, due to the fact that, for the more profitable firms and which earnings are more instable should reduce their debt in order for them to raise debt in the future and when necessary. An evidence for this negative relation was found in the work of Acedo-Ramírez and Ruiz-Cabestre (2014) and Bradley et al. (1984).

Further to the above, the hypothesis to be studied is presented as below:

**H6: There is a negative association between risk and leverage.**
3.2 - Variables

Dependent variables

In our work we considered as dependent variables the firms’ debt. In order to study the relationship between the firms’ characteristics and their capital structure, the previous literature used the debt ratios.

In our work we use the two following variables, measured as the ratio of total debt and the book value of total assets and the ratio of total long term debt and the book value of total assets.

By using two dependent variables we are able to test the sensitivity of the model to the use debt that have different maturity. It is important to separate the debt with different maturities due to the fact that some firms use more short term debt in their capital structure over long term debt (Cortez & Susanto, 2012).

In order to avoid the movements in the financial markets, we calculated the two variables before mentioned using book values.

\[ TDEBT_{i,t} = \frac{\text{Total Debt}_{i,t}}{\text{Book Value of Total Assets}_{i,t}}, \text{ where } i \text{ is the firm and } t \text{ is the year}; \]

\[ LDEBT_{i,t} = \frac{\text{Long Term Debt}_{i,t}}{\text{Book Value of Total Assets}_{i,t}}, \text{ where } i \text{ is the firm and } t \text{ is the year}; \]

Independent variables

In this work we considered as explanatory variables the ones found in previous literature as the core determinants of capital structure.

- **Tangibility of assets** is, as per the work of Hall et al. (2004) and Fan et al. (2012), the ratio between tangible fixed assets and total assets.

\[ TANG_{i,t} = \frac{\text{Tangible Fixed Assets}_{i,t}}{\text{Total Assets}_{i,t}}, \text{ where } i \text{ is the firm and } t \text{ is the year}; \]
• **Profitability** is, as per the work of Chui et al (2012), measured using a proxy. The ratio between Earnings Before Interest and Taxes (EBIT) and total assets proxies profitability in our study. In order to compare firms with different capital structures we use the EBIT instead of other earnings’ measures.

\[
PROF_{i,t} = \frac{EBIT_{i,t}}{Total\ Assets_{i,t}}, \text{ where } i \text{ is the firm and } t \text{ is the year;}
\]

• **Firm size** is, as per the work of Titman and Wessels (1988) and Gaud et al. (2005), measured using a proxy. The natural logarithm of net sales proxies firm size in our study.

\[
SIZE_{i,t} = \log \text{Net Sales}_{i,t}, \text{ where } i \text{ is the firm and } t \text{ is the year;}
\]

• **Growth opportunities** are, as per the work of Frank and Goyal (2009) and Fan et al. (2012), measured using a proxy. The market-to-book ratio proxies the growth opportunities in our study.

\[
GROW_{i,t} = \frac{Market\ Value\ of\ Equity_{i,t}}{Book\ Value\ of\ Equity_{i,t}}, \text{ where } i \text{ is the firm and } t \text{ is the year;}
\]

• **Non debt tax shields** are, as per the work of Ozkan (2001) and Cortez and Susanto (2012), calculated using the ratio between the total depreciation and amortization expenses and total assets.

\[
NDTS_{i,t} = \frac{Total\ Depreciation\ and\ Amortization\ Expenses_{i,t}}{Total\ Assets_{i,t}}, \text{ where } i \text{ is the firm and } t \text{ is the year;}
\]

• **Risk** is, as per the work of Titman and Wessels (1988) and Booth et al. (2001), measured using a proxy. The standard deviation of return on equity proxies the risk in our study.

\[
RISK_{i,t} = SD(ROE_{i,t}), \text{ where } i \text{ is the firm and } t \text{ is the year;}
\]
**Table 1:** Definition of both the dependent and independent variables and expected signs

<table>
<thead>
<tr>
<th>Definition</th>
<th>Variable</th>
<th>Expected Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dependent Variable</strong></td>
<td>Total Debt / Book Value of Total Assets</td>
<td>Total debt</td>
</tr>
<tr>
<td></td>
<td>Long Term Debt / Book Value of Total Assets</td>
<td>Long term debt</td>
</tr>
<tr>
<td><strong>Independent Variable</strong></td>
<td>Tangible Fixed Assets / Total Assets</td>
<td>Tangibility</td>
</tr>
<tr>
<td></td>
<td>EBIT / Total Assets</td>
<td>Profitability</td>
</tr>
<tr>
<td></td>
<td>Log Net Sales</td>
<td>Size</td>
</tr>
<tr>
<td></td>
<td>Market Value of Equity / Book Value of Equity</td>
<td>Growth opportunities</td>
</tr>
<tr>
<td></td>
<td>Total Depreciation and Amortization Expenses / Total Assets</td>
<td>Non debt tax shield</td>
</tr>
<tr>
<td></td>
<td>Standard Deviation (Return on Equity)</td>
<td>Risk</td>
</tr>
</tbody>
</table>

When the positive sign is expected, we anticipate a positive relationship between debt and the variable. When the negative sign is expected, we anticipate a negative relationship between debt and the variable.

### 3.3 - Sample

In our study we aim to determine which of the Belgian companies’ characteristics most affect their capital structure and understand which of the capital structure theories better explain the managers’ decisions on the companies’ capital structure. Thus, we selected a list of firms listed in the Brussels stock exchange.

The sample of our study is composed by 93 non-financial companies listed in the Brussels Stock Exchange (1023 firm-year observations). In a first stage, we excluded the firms that did not have a valid SIC Code. In addition, we excluded the financial companies from our study due to the fact that such companies should meet some minimum capital requirements. These requirements have an impact on their capital structure, thus, the capital structure choices do not rely on the managers’ decisions.

The data used in our study was obtained via Datastream, in an annual basis, for the years between 2005 and 2015. We collected the necessary accounting data to allow us to
calculate both dependent variables (Total Debt and Long Term Debt) and the independent variables (Tangibility, Profitability, Firm Size, Growth Opportunities, Non Debt Tax Shields and Risk). Regarding the sample period, it is important to stress that in 2005 in the European Union, all listed firms were obligated to adopt the IFRS standards. Choosing a sample period before 2005 could have an impact on our results due to the transition to IFRS. 2015 is the last year with information available in the Datastream database.

The sample used in our work is structured in panel date, i.e. our sample contains data over time and across companies. According to the work of Hsiao (1986), the panel models offer a number of advantages over cross-sectional models or time-series models, namely due to the fact that these models control the heterogeneity present in individuals. The use of panel data allows the control of the effects of the unobserved variables.

The panel data allow the use of more observations, increasing the number of degrees of freedom and decreasing the collinearity between the explanatory variables. It is known that when multicollinearity exists it becomes difficult to establish if an individual regressor influences the response variable. Once this problem is eliminated, an improvement in the quality of the parameter estimation can be obtained.

In addition, using panel data we are able to identify and measure effects that are not possible to detect by cross-sectional or time-series analysis alone.

However, and in line with the work of Hsiao (1986), since the variables are analyzed over time, the panel data model demands a great number of observations and, therefore, is more difficult to implement.

**3.4 – Methodology**

Our study aims to determine which factors have a major impact on the managers’ decision on how to finance the companies. In addition, in our work, we will analyze if three specific effects have an impact on the determinants of the capital structure, the year effect, the industry effect and the economic crisis effect.

As previously mentioned, the data used in our work will be organized through panel data.
We will use the Ordinary Least Squares (OLS) as an estimator of the coefficients. In our work we will estimate the two regressions that follow:

\[
(1) \quad T_{\text{Debt},i,t} = \beta_0 + \beta_1 \text{Tang}_{i,t} + \beta_2 \text{Prof}_{i,t} + \beta_3 \text{Size}_{i,t} + \beta_4 \text{Growth}_{i,t} + \beta_5 \text{NDTS}_{i,t} + \beta_6 \text{Risk}_{i,t} + e_{i,t}
\]

\[
(2) \quad L_{\text{Debt},i,t} = \beta_0 + \beta_1 \text{Tang}_{i,t} + \beta_2 \text{Prof}_{i,t} + \beta_3 \text{Size}_{i,t} + \beta_4 \text{Growth}_{i,t} + \beta_5 \text{NDTS}_{i,t} + \beta_6 \text{Risk}_{i,t} + e_{i,t}
\]

For the equations above, \( i \) represents the company and \( t \) the company.

For equation (1), with no effects specification, the determination coefficient (\( R^2 \)) was 22.14%.

It is important to stress that the determination coefficient represents the explanatory capacity of the model and the Tangibility of assets (Tang), Profitability (Prof) and Firm size (Size) were significant variables.

In order to analyze the time effect on the series we introduced ten year dummy variables. With the introduction of the year dummy variables, we conclude that the dummies are significant in 2006, 2009, 2010, 2011, 2012, 2013, 2014 and 2015. The determination coefficient is now 24.19%, which is higher than our previous coefficient.

Additionally, we also estimated the before mentioned equations with year fixed effects. As the results for the equations with fixed effects were similar to the results previously found, we estimated the two regressions with time fixed effects using year dummy variables. The use of these variables allow us to determine if the debt levels are affected by any other factor, e.g. economic crisis, or if they just varied each year.

In order to determine if we should use random or fixed effects, we performed the Hausman test. We rejected the null hypothesis, which says that unobservable individual effects are uncorrelated with the explanatory variables, at 1% level, thus, we concluded that the random effects model is not suitable and we should use the fixed effects model. By introducing the cross-section fixed effects, the determination coefficient increases from 24.19% to 73.55%, which means that the explanatory capacity of the model has increased.
Further to the above, we will analyze the year effect and the economic crisis effect.

For the year effect, we used 10 year dummy variables in order to verify the interaction between the debt level and the year.

\[(3) \quad TDebt_{it} = \beta_0 + \beta_1 \text{Tang}_{it} + \beta_2 \text{Prof}_{it} + \beta_3 \text{Size}_{it} + \beta_4 \text{Growth}_{it} + \beta_5 \text{NDTS}_{it} + \beta_6 \text{Risk}_{it} + \beta_7 \text{Y06}_{it} + \beta_8 \text{Y07}_{it} + \beta_9 \text{Y08}_{it} + \beta_{10} \text{Y09}_{it} + \beta_{11} \text{Y10}_{it} + \beta_{12} \text{Y11}_{it} + \beta_{13} \text{Y12}_{it} + \beta_{14} \text{Y13}_{it} + \beta_{15} \text{Y14}_{it} + \beta_{16} \text{Y15}_{it} + e_{it}\]

\[(4) \quad LDebt_{it} = \beta_0 + \beta_1 \text{Tang}_{it} + \beta_2 \text{Prof}_{it} + \beta_3 \text{Size}_{it} + \beta_4 \text{Growth}_{it} + \beta_5 \text{NDTS}_{it} + \beta_6 \text{Risk}_{it} + \beta_7 \text{Y06}_{it} + \beta_8 \text{Y07}_{it} + \beta_9 \text{Y08}_{it} + \beta_{10} \text{Y09}_{it} + \beta_{11} \text{Y10}_{it} + \beta_{12} \text{Y11}_{it} + \beta_{13} \text{Y12}_{it} + \beta_{14} \text{Y13}_{it} + \beta_{15} \text{Y14}_{it} + \beta_{16} \text{Y15}_{it} + e_{it}\]

For the equations above, i represents the company and t the year. In addition to the year effect, we also aim to study the economic crisis effect. Thus, we will estimate the before mentioned equations, firstly for the period between 2005 and 2008 and secondly for the period after 2008 and until 2015. The main purpose of these estimations is to determine whether the economic and financial crisis of 2008 had any impact on the capital structures’ determinants.

Additionally to the above, we also tested if the industry has any impact on the companies’ capital structure. In order to perform this test, we used the Fama and French (1997) industry classification to categorize the companies in our sample, according to their SIC Code. According to the work of Fama and French (1997), the industries sectors are: (i) Consumer Nondurables – Food companies, Tobacco companies, Textile companies, Apparel companies, Leather companies and Toys companies; (ii) Consumer Durables – Car companies, TV companies, Furniture companies and Household Appliances companies; (iii) Manufacturing – Machinery companies, Truck companies, Plane companies, Paper companies and Printing companies; (iv) Energy – Oil companies, Gas companies and Coal Extraction and Products companies; (v) Chemicals and Allied Products; (vi) Business Equipment – Computer companies, Software companies and Electronic Equipment companies; (vii) Telecommunications - Telephone and Television Transmission companies; (viii) Utilities; (ix) Shops - Wholesale, Retail and Some Services (Laundries, Repair Shops); (x) Health - Healthcare, Medical Equipment and
Drugs; (xi) Finance; (xii) Other - Mines, Construction, Transportation, Hotels, Business Services, Entertainment companies, among others.

In order to test the industry effect, we introduced eleven dummy variables, as per the two equations below:

\[ (5) \ TDebt_{i,t} = \beta_0 + \beta_1 \text{Tang}_{i,t} + \beta_2 \text{Prof}_{i,t} + \beta_3 \text{Size}_{i,t} + \beta_4 \text{Growth}_{i,t} + \beta_5 \text{NDTS}_{i,t} + \beta_6 \text{Risk}_{i,t} + \beta_7 \text{D02}_{i,t} + \beta_8 \text{D03}_{i,t} + \beta_9 \text{D04}_{i,t} + \beta_{10} \text{D05}_{i,t} + \beta_{11} \text{D06}_{i,t} + \beta_{12} \text{D07}_{i,t} + \beta_{13} \text{D08}_{i,t} + \beta_{14} \text{D09}_{i,t} + \beta_{15} \text{D10}_{i,t} + \beta_{16} \text{D11}_{i,t} + \beta_{17} \text{D12}_{i,t} + e_{i,t} \]

\[ (6) \ LDebt_{i,t} = \beta_0 + \beta_1 \text{Tang}_{i,t} + \beta_2 \text{Prof}_{i,t} + \beta_3 \text{Size}_{i,t} + \beta_4 \text{Growth}_{i,t} + \beta_5 \text{NDTS}_{i,t} + \beta_6 \text{Risk}_{i,t} + \beta_7 \text{D02}_{i,t} + \beta_8 \text{D03}_{i,t} + \beta_9 \text{D04}_{i,t} + \beta_{10} \text{D05}_{i,t} + \beta_{11} \text{D06}_{i,t} + \beta_{12} \text{D07}_{i,t} + \beta_{13} \text{D08}_{i,t} + \beta_{14} \text{D09}_{i,t} + \beta_{15} \text{D10}_{i,t} + \beta_{16} \text{D11}_{i,t} + \beta_{17} \text{D12}_{i,t} + e_{i,t} \]

For the equations above, \( i \) represents the company and \( t \) the year.

The 12 industry classification codes, as per the work of Fama and French (1997) can be found in Table 2 below. We did not include the Consumer Nondurables (dummy variable defined as D1) in our regressions. Our sample is heterogeneous and does not include any financial firms as those firms were excluded from our sample as better explained before.

**Table 2: Industry classification according to Fama and French (1997)**

<table>
<thead>
<tr>
<th>Industry classification</th>
<th>Percentage</th>
<th>Dummy variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumer Nondurables</td>
<td>17%</td>
<td>D01</td>
</tr>
<tr>
<td>Consumer Durables</td>
<td>3%</td>
<td>D02</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>17%</td>
<td>D03</td>
</tr>
<tr>
<td>Energy</td>
<td>8%</td>
<td>D04</td>
</tr>
<tr>
<td>Chemicals and Allied Products</td>
<td>5%</td>
<td>D05</td>
</tr>
<tr>
<td>Business Equipment</td>
<td>11%</td>
<td>D06</td>
</tr>
<tr>
<td>Telephone and Television Transmission</td>
<td>3%</td>
<td>D07</td>
</tr>
<tr>
<td>Utilities</td>
<td>2%</td>
<td>D08</td>
</tr>
<tr>
<td>Shops</td>
<td>11%</td>
<td>D09</td>
</tr>
<tr>
<td>Health</td>
<td>10%</td>
<td>D10</td>
</tr>
<tr>
<td>Finance</td>
<td>0%</td>
<td>D11</td>
</tr>
<tr>
<td>Other</td>
<td>13%</td>
<td>D12</td>
</tr>
</tbody>
</table>
After analyzing the table above, we can verify that the industries with the largest number of companies are the consumer nondurables and the manufacturing ones. Utilities is the industry with the least companies.

4 – Results and discussion

This section presents the results of our study and the discussion of the empirical results obtained.

Firstly, in the univariate analysis we will discuss the descriptive statistics and the Pearson correlation coefficients between the variables used in the previously mentioned regressions.

Secondly, in the multivariate analysis we will discuss the companies’ capital structure’s determinants considering three effects: the year effect, the economic crisis effect and the industry dummy effect.

4.1 – Univariate analysis

In table 3 below, we can find the descriptive statistics for the dependent variables, i.e. Total debt and Long term debt and for the explanatory variables, i.e. Tangibility, Profitability, Size, Growth opportunities, Non-debt tax shields and risk, that we used in equations (1) and (2) for the years between 2005 and 2015.

Table 3: Descriptive statistics

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Std. Deviation</th>
<th>Maximum</th>
<th>Minimum</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>TDebt</td>
<td>0.235069</td>
<td>0.222223</td>
<td>0.226832</td>
<td>4.152982</td>
<td>0.000000</td>
<td>842</td>
</tr>
<tr>
<td>LDebt</td>
<td>0.149197</td>
<td>0.112118</td>
<td>0.159004</td>
<td>0.922307</td>
<td>0.000000</td>
<td>842</td>
</tr>
<tr>
<td>Tang</td>
<td>0.632394</td>
<td>0.529196</td>
<td>0.598781</td>
<td>7.539726</td>
<td>0.000000</td>
<td>842</td>
</tr>
<tr>
<td>Prof</td>
<td>0.026534</td>
<td>0.052729</td>
<td>0.207237</td>
<td>0.876881</td>
<td>-2.319362</td>
<td>842</td>
</tr>
<tr>
<td>Size</td>
<td>12.09379</td>
<td>12.35629</td>
<td>2.489867</td>
<td>17.49267</td>
<td>-2.302585</td>
<td>842</td>
</tr>
<tr>
<td>Growth</td>
<td>1.954423</td>
<td>1.335000</td>
<td>4.109769</td>
<td>37.30000</td>
<td>-57.12000</td>
<td>842</td>
</tr>
<tr>
<td>NDTDS</td>
<td>0.047436</td>
<td>0.043235</td>
<td>0.035097</td>
<td>0.322702</td>
<td>0.000000</td>
<td>842</td>
</tr>
<tr>
<td>Risk</td>
<td>4.438583</td>
<td>2.250000</td>
<td>5.463137</td>
<td>28.49500</td>
<td>0.000000</td>
<td>842</td>
</tr>
</tbody>
</table>
We can see, as per the table above that, in average, Belgian non financial listed firms have low leverage. In fact, the mean of the total debt is 23.51% and long term debt is 14.92%. It is possible to see that that the total debt mean is higher than the long term debt mean (23.51% and 14.92%, respectively) and that looking to the standard deviation we can verify that the total debt mean varies more for the total debt that for the long term debt. We understand that this is due to the fact that companies can better control their levels of debt in the long term (and therefore have lower levels of variation in their debt) than when we are also analyzing the short term period (included in the total debt).

In addition, we can verify that some of the Belgian firms under study did not have any debt as we see that the minimum value of total debt is zero. Additionally, we can verify that the maximum value for the Total Debt variable is higher than the value for the Long Term Debt variable.

With regard to the independent variables, and as per the information available in table 3, the volatility of the variables Profitability, Growth opportunities and risk is a bit high due to the fact that the standard deviation is higher than the mean of these variables. However, the Tangibility, size and non debt tax shield have a volatility lower than the average of these variables.

As previously mentioned, and in order to avoid any bias of the data, the dependent variables are linearized. In fact, the Tangibility, Profitability, Growth opportunities and Non debt tax shields variables are defined as ratios and for all of these variables, total assets is the denominator.

It is important to state that the minimum value for the Tangibility, Non Debt Tax Shields and Risk is zero, which is consistent with the fact that there are no negative amounts of assets, negative depreciations and amortizations and negative risk.

Additionally, we can verify that the high value of the standard deviation regarding the Growth variable. In fact, we can see that the firms in our sample are in different stages of their lives and, in consequence, the maximum and minimum values are apart from each other.
In addition, it is important to stress that the relation between the Profitability, Growth and Size with Total Assets can be negative, which justifies a negative minimum amount for these variables.

In table 4 below is possible to find the correlation matrix for the independent variables present in equations (1) and (2).

As we can verify after analyzing table 4, the correlations among the independent variables are generally less than 0.30, suggesting that collinearity is not a serious problem (Aivazian, et al., 2005).

<table>
<thead>
<tr>
<th></th>
<th>Tang</th>
<th>Prof</th>
<th>Size</th>
<th>Growth</th>
<th>NDT</th>
<th>Risk</th>
<th>TDebt</th>
<th>LDebt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tang</td>
<td>1.0000</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Prof</td>
<td>0.1033</td>
<td>1.0000</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Size</td>
<td>0.3237</td>
<td>0.2191</td>
<td>0.3237</td>
<td>0.1033</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Growth</td>
<td>0.1184</td>
<td>0.1184</td>
<td>0.1184</td>
<td>0.2191</td>
<td>0.0821</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>NDT</td>
<td>0.4597</td>
<td>0.4597</td>
<td>0.4597</td>
<td>0.1184</td>
<td>0.1635</td>
<td>0.0802</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Risk</td>
<td>0.0409</td>
<td>0.0409</td>
<td>0.0409</td>
<td>0.1184</td>
<td>0.1635</td>
<td>0.0471</td>
<td>0.0100</td>
<td>-</td>
</tr>
<tr>
<td>TDebt</td>
<td>0.3347</td>
<td>0.3347</td>
<td>0.3347</td>
<td>0.1184</td>
<td>0.1635</td>
<td>0.0769</td>
<td>0.2166</td>
<td>1.0000</td>
</tr>
<tr>
<td>LDebt</td>
<td>0.1720</td>
<td>0.1720</td>
<td>0.1720</td>
<td>0.1184</td>
<td>0.1635</td>
<td>0.1151</td>
<td>0.1151</td>
<td>0.6643</td>
</tr>
</tbody>
</table>

Table 4: Pearson correlation coefficients
4.2 – Multivariate analysis

The purpose of this work is to determine the capital structure determinants’ of the Belgian non financial firms, listed in the Brussels’ Stock Exchange, for the period between 2005 and 2015. Thus, we estimated the equations (3), (4), (5) and (6), and the results of this estimation can be found in tables 5, 6 and 7 below.

We estimated the regressions before mentioned using the Ordinary Least Squares (OLS) technique, with year dummy variables and cross-section fixed effects.

As before mentioned in this work, we aim to analyze the determinants of the companies’ capital structure considering the (i) year effect; (ii) economic crisis effect; and (iii) industry effect.

4.2.1 – Year effect

In order to determine by which determinants the capital structure is influenced, we estimated equations (3) and (4). In table 5 below, we present the results of these equations, namely, we present the independent variables’ coefficients as well as the results for the dependent variables.

First of all, it is important to analyze the relevance of the models that we are using to explain the dependent variables. For that purpose, we analyze the F-statistic that, in our study, is 19,27735 and 15,00077 for equations (3) and (4), respectively. This means that the F-statistic is significant for both the equations and at 1% level. Thus, we can say that the explanatory variables are important to determine the Belgian companies’ capital structure.

In order to measure the explanatory capacity of the model, we should analyze the determination coefficient, presented in the table below as $R^2$. The determination coefficient of our model is 73,54% and 68,49% for the equations with the dependent variables total debt and long term debt, respectively.

For equation (3), i.e. when the dependent variable is total debt, we can see that the independent variables tangibility, profitability, size and risk are significant at 1% level.
The same thing happens for equation (4), i.e. when the dependent variable is long term debt.

With regard to the independent variable Tangibility of assets (Tang), as predicted by the trade-off theory, the pecking order theory and the agency costs theory, this variable presents a positive sign for both the total debt and long term debt equations. This positive sign means that firms with more tangible assets have a tendency to present higher values of debt, namely, and as previously mentioned, due to the fact that the companies are able to collateralize their assets. This significant result at 10% supports our first hypothesis. For equation (3), as per the information in table 5, when the tangible assets of a firm increases 1%, total debt increases 6.52‰. For equation (4), when the tangible assets increase 1%, long term debt increases by 3.15‰.

Regarding the independent variable Profitability (Prof), and in line with the Pecking order theory, this variable presents a negative sign for both equations estimated. In line with the previous literature, namely according to Myers & Majluf (1984), the most profitable firms, i.e. the companies that have most funds do not need to resort to external funds so, we expect for the most profitable firms to have lower levels of debt, which is more significant in the short term, as for the long term decisions profitability is not the most determinant factor to be taken into account due to the fact that it is variable. This significant result at 10% supports our second hypothesis. For equation (3), as per the information in table 5, when the profitability of a firm increases 1%, total debt decreases 63.78‰. For equation (4), when the tangible assets increase 1%, long term debt decreases by 9.01‰.

The Size independent variable, and in line with the trade-off theory, presents a positive, although low, sign for both the total debt and long term debt equations. In line with the previous literature, namely according to Acedo-Ramirez & Ruiz-Cibestre (2014), the largest firms are more diversified and the default risk that they face is lower. This significant result at 10% supports our third hypothesis. For equation (3), according to the information in table 5, when the size of a firm increases 1%, total debt increases 4.34‰. For equation (4), when the tangible assets increase 1%, long term debt increases by 1.23‰.
With regard to the Growth and Non Debt Tax Shields (NDTS) variables, these ones are not statistically significant for neither of the equations estimated and, thus, our model did not confirm our fourth and fifth hypothesis.

The Risk independent variable, presents a negative sign for both the total debt and long term debt equations. This significant result at 5% supports our sixth hypothesis.

In addition, it is important to analyze the results for the year dummy variables. In fact, we introduced the year dummy variables to verify if the years have any impact on the debt levels or if these levels are only affected by the determinants before mentioned.

For both the equations we can see that all the year dummy variables are statistically significant for, at least, at the 10% level of significance.

In addition, all the year dummies present a negative sign. This means that as from 2005, the total debt of the Belgian companies have been decreasing. With these results, we can see a tendency of decreasing of the debt through the years.

### Table 5: Panel Data regressions

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>Dependent variables</th>
<th>Expected sign</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TDebt</td>
<td>LDebt</td>
</tr>
<tr>
<td>( \beta_0 )</td>
<td>-0.213527**</td>
<td>0.063214</td>
</tr>
<tr>
<td></td>
<td>(-2.084740)</td>
<td>(1.617427)</td>
</tr>
<tr>
<td>Y06</td>
<td>-0.067468**</td>
<td>-0.080314*</td>
</tr>
<tr>
<td></td>
<td>(-2.310400)</td>
<td>(-2.309638)</td>
</tr>
<tr>
<td>Y07</td>
<td>-0.073274**</td>
<td>-0.062305*</td>
</tr>
<tr>
<td></td>
<td>(-2.507779)</td>
<td>(-1.791481)</td>
</tr>
<tr>
<td>Y08</td>
<td>-0.074166**</td>
<td>-0.058341*</td>
</tr>
<tr>
<td></td>
<td>(-2.525500)</td>
<td>(-1.676801)</td>
</tr>
<tr>
<td>Y09</td>
<td>-0.112229***</td>
<td>-0.075612*</td>
</tr>
<tr>
<td></td>
<td>(-3.832911)</td>
<td>(-2.186471)</td>
</tr>
<tr>
<td>Y10</td>
<td>-0.112191***</td>
<td>-0.077922*</td>
</tr>
<tr>
<td></td>
<td>(-3.818501)</td>
<td>(-2.245809)</td>
</tr>
<tr>
<td>Y11</td>
<td>-0.113761***</td>
<td>-0.093610*</td>
</tr>
<tr>
<td></td>
<td>(-3.839204)</td>
<td>(-2.677537)</td>
</tr>
<tr>
<td>Y12</td>
<td>-0.102797***</td>
<td>-0.085073*</td>
</tr>
<tr>
<td></td>
<td>(-3.474732)</td>
<td>(-2.455945)</td>
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<tr>
<td>Y13</td>
<td>-0.087431***</td>
<td>-0.085988*</td>
</tr>
<tr>
<td></td>
<td>(-2.953343)</td>
<td>(-2.482866)</td>
</tr>
<tr>
<td></td>
<td>Y14</td>
<td>Y15</td>
</tr>
<tr>
<td>-----</td>
<td>-----------------</td>
<td>-----------------</td>
</tr>
<tr>
<td></td>
<td>-0.115921***</td>
<td>-0.102167***</td>
</tr>
<tr>
<td></td>
<td>(-3.890298)</td>
<td>(-2.929351)</td>
</tr>
<tr>
<td></td>
<td>-0.107471***</td>
<td>-0.096547***</td>
</tr>
<tr>
<td></td>
<td>(-3.6033700)</td>
<td>(-2.772342)</td>
</tr>
<tr>
<td>Tang</td>
<td>0.065184***</td>
<td>0.031499***</td>
</tr>
<tr>
<td></td>
<td>(4.456912)</td>
<td>(2.800472)</td>
</tr>
<tr>
<td>Prof</td>
<td>-0.637797***</td>
<td>-0.090106***</td>
</tr>
<tr>
<td></td>
<td>(-16,00720)</td>
<td>(-2.979675)</td>
</tr>
<tr>
<td>Size</td>
<td>0.043385***</td>
<td>0.012257***</td>
</tr>
<tr>
<td></td>
<td>(5.299708)</td>
<td>(4.865102)</td>
</tr>
<tr>
<td>Growth</td>
<td>0.001135</td>
<td>0.000102</td>
</tr>
<tr>
<td></td>
<td>(0.883330)</td>
<td>(0.074600)</td>
</tr>
<tr>
<td>NDTS</td>
<td>-0.216504</td>
<td>0.020146</td>
</tr>
<tr>
<td></td>
<td>(-0.753008)</td>
<td>(0.107228)</td>
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<tr>
<td>Risk</td>
<td>-0.0000000194**</td>
<td>-0.000000286***</td>
</tr>
<tr>
<td></td>
<td>(-2.4932285)</td>
<td>(2.800472)</td>
</tr>
<tr>
<td>R²</td>
<td>0.735459</td>
<td>0.683882</td>
</tr>
<tr>
<td>Adjusted R²</td>
<td>0.697308</td>
<td>0.638292</td>
</tr>
<tr>
<td>F-Statistic</td>
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<td>15.00077</td>
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<tr>
<td>Total panel</td>
<td>842</td>
<td>842</td>
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</tbody>
</table>

Note: In this table we can find the results for the estimation of both equations (3) and (4). We estimated the equations using the Ordinary Least Squares (OLS) technique, using panel data, with cross-section fixed effects, for 93 Belgian companies for the period between 2005 and 2015. The dependent variables can be defined as Total Debt/Book Value of Total Assets (TDebt) and Long term debt/Book Value of Total Assets (LDebt). The independent variables can be defined as follows: (i) Tangible fixed assets/Total assets (Tang); (ii) EBIT/Total assets (Prof); (iii) Natural logarithm of net sales (Size); (iv) Market value of equity/Book value of equity (Growth); (v) Depreciation and amortization expenses/Total assets (NDTS); and (vi) Standard deviation of the Return on Equity (Risk). In the first row, for each variable, it’s presented the coefficient values. In the second row, and in brackets, it’s presented the t-statistics. *, **, and ***, means that the coefficients are statistically significant at the 10%, 5% and 1% level, respectively.

### 4.2.2 – Economic and financial crisis effect

During 2008 the world was facing an economic and financial crisis. Thus, it is important to analyze if the crisis had any impact on the determinants of the companies’ capital structure. In order to confirm if the impact of the variables under study on the companies’ capital structure changed with the world’s economic and financial crisis of 2008, we split our sample in two periods, on one hand we estimated equations (3) and (4) for the period before the crisis, i.e. between 2005 and 2008 and, on the other hand, we estimated equations (3) and (4) for the period after the crisis, i.e. between 2009 and 2015. The results of these estimations can be found in table 6 below.

The profitability variable (Prof), in line with the pecking order theory, is negative and significant, at least, at a 10% level over the years.
For equation (3), i.e. when total debt is the dependent variable (TDebt), the coefficients of the variables Profitability (Prof) and Non Debt Tax Shields (NDTS) are statistically significant.

For equation (4), i.e. when long term debt is the dependent variable (LDebt), the coefficients of the variable Profitability (prof) is statistically significant for both periods.

As before mentioned, the Non Debt Tax Shields independent variable (NDTS) is significant before and after 2008, when the dependent variable is the total debt (TDebt). This result is consistent with some previous literature, namely, this result is in line with Cortez & Susanto (2012). We can see that the economic crisis did not have an impact on this variable.

The Risk variable is only significant for the period between 2005 and 2008 and for equation (3), i.e. when we are considering the amount of total debt.

The Size variable is only significant for the period between 2005 and 2008, for both equations (3) and (4). However, the variable loses its significance for the period between 2009 and 2015.

With regard to the Tangibility variable (Tang), it is only highly significant for the period between 2005 and 2008 for equation (4), but loses its significance for the period between 2009 and 2015. When we consider equation (3), we can see that the Tang variable is not significant for the period between 2005 and 2008 but gains significance for the period between 2009 and 2015. We can see that the economic crisis had an impact on this variable.

Table 6: Panel data regressions considering the economic and financial crisis of 2008

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>TDebt</th>
<th>LDebt</th>
</tr>
</thead>
<tbody>
<tr>
<td>β0</td>
<td>-0.016239 (-0.104258)</td>
<td>-0.254616* (-1.860000)</td>
</tr>
<tr>
<td>Y06</td>
<td>-0.042727** (-2.268302)</td>
<td>-</td>
</tr>
<tr>
<td>Y07</td>
<td>-0.044202** (-2.344910)</td>
<td>-</td>
</tr>
<tr>
<td>Y08</td>
<td>-0.033987* (-1.805149)</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>----</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>Y09</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Y10</td>
<td>-</td>
<td>0.001246 (0.064344)</td>
</tr>
<tr>
<td>Y11</td>
<td>-</td>
<td>-0.005585 (-0.285258)</td>
</tr>
<tr>
<td>Y12</td>
<td>-</td>
<td>0.006067 (0.308877)</td>
</tr>
<tr>
<td>Y13</td>
<td>-</td>
<td>0.014638 (0.750580)</td>
</tr>
<tr>
<td>Y14</td>
<td>-</td>
<td>0.0000478 (0.002398)</td>
</tr>
<tr>
<td>Y15</td>
<td>-</td>
<td>0.010236 (0.517487)</td>
</tr>
<tr>
<td>Tang</td>
<td>0.032884 (1.092822)</td>
<td>0.142378*** (7.252429)</td>
</tr>
<tr>
<td>Prof</td>
<td>-0.312527*** (-4.930438)</td>
<td>-0.715041*** (-14.97010)</td>
</tr>
<tr>
<td>Size</td>
<td>0.028822* (2.277420)</td>
<td>0.033772*** (3.006537)</td>
</tr>
<tr>
<td>Growth</td>
<td>-0.000629 (-0.655182)</td>
<td>0.001908 (0.795604)</td>
</tr>
<tr>
<td>NDTS</td>
<td>-0.972441*** (-2.648845)</td>
<td>-0.388209 (-0.902094)</td>
</tr>
<tr>
<td>Risk</td>
<td>-0.00000011** (-2.112721)</td>
<td>-0.0000361 (-0.213306)</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.892246</td>
<td>0.808701</td>
</tr>
<tr>
<td>Adjusted $R^2$</td>
<td>0.848052</td>
<td>0.766773</td>
</tr>
<tr>
<td>F-Statistic</td>
<td>20.18934</td>
<td>19.28763</td>
</tr>
</tbody>
</table>

Note: In this table we can find the results for the estimation of both equations (3) and (4) for the period between 2005 and 2008 and for the period between 2009 and 2015. We estimated the equations using the Ordinary Least Squares (OLS) technique, using panel data, with cross-section fixed effects, for 93 Belgian companies for the period between 2005-2008 and 2009-2015. The dependent variables can be defined as Total Debt/Book Value of Total Assets (TDebt) and Long term debt/Book Value of Total Assets (LDebt). The independent variables can be defined as follows: (i) Tangible fixed assets/Total assets (Tang); (ii) EBIT/Total assets (Prof); (iii) Natural logarithm of net sales (Size); (iv) Market value of equity/Book value of equity (Growth); (v) Depreciation and amortization expenses/Total assets (NDTS); and (vi) Standard deviation of the Return on Equity (Risk). In the first row, for each variable, it’s presented the coefficient values. In the second row, and in brackets, it’s presented the t-statistics. *,**, and *** means that the coefficients are statistically significant at the 10%, 5% and 1% level, respectively.

4.2.3 – Industry effect

It is important to test if the companies’ industry has an impact on the determinants of the firms’ capital structure. It is possible to find the results for the estimation of the equations (5) and (6) in table 7 below.
We estimated our equation considering the fixed effects and cross-section weights, in order to obtain a higher determination coefficient ($R^2$).

Following the results presented in table 7 below, we can see that the coefficients for each industry dummy is different.

In line with previous work, it is proved to be difficult to explain and interpret the significant industry dummy variables (Talberg, et. Al., 2008). In fact, industry can be considered as a proxy for other variables, for instance, for risk, tangibility and growth, among others. Further to the above, the explanation for the differences between the coefficients could be found on the factors that we cannot control, e.g. human capital (Talberg, et. Al., 2008). Regarding the Risk, Tangibility and Growth variables, however, and as we included these variables in our work, we have their control.

The constant is positive for both equations and the dummy coefficients for D04 – Energy, D05 – Chemicals and Allied Products, D07 – Telephone and Television Transmission, D08 – Utilities and D12 – Others are statistically significant for equation (5), i.e. when the dependent variable is TDebt. The dummy coefficients for D02 – Consumer Durables, D04 – Energy, D05 – Chemicals and Allied Products, D7 – Telephone and Television Transmission and D8 – Utilities are statistically significant for equation (6), i.e. when the dependent variable is LDebt. D11 – Finance does not have any result for neither the equations as this dummy respects to the finance industry and, as better explained in the sample section, we did not include this industry in our work.

Analyzing the results for equation (5), i.e. when the dependent variable is the total debt, the industry dummy coefficients for D02 – Consumer Durables, D03 – Manufacturing, D06 – Business Equipment, D09 – Shops and D10 – Health are not statistically significant. D02 – Consumer Durables, D05 – Chemicals and Allied Products, D10 – Health and D12 – Others are the only industry dummy with negative coefficients: -5.39‰, -5.34‰, -1.55‰ and -11.79‰, respectively.

Analyzing the results for equation (6), i.e. when the dependent variable is the long term debt, the industry dummy coefficients for D03 – Manufacturing, D06 – Business Equipment, D09 – Shops, D10 – Health and D12 – Others are not statistically significant. D04 – Energy, D07 – Telephone and Television Transmission, D08 – Utilities and D10
– Health are the only industry dummy with positive coefficients: 19,00‰, 15,52‰, 28,36‰ and 2,40‰, respectively. After analyzing the results of table 7, we can verify that the level of leverage of a company can vary within industries and with different intensities from industry to industry.

The tangibility variable (Tang) is positive and highly significant for equation (5). This result validates our first hypothesis. Firms with more assets, assets that can be collateralized tend to have more debt. This is in line with the Trade-off theory, Pecking order theory and Agency Costs theory.

The profitability variable (Prof) is negative and highly significant for both equations. This result validates our second hypothesis and is consistent with the Pecking order theory.

The Size variable is positive and highly significant for both equations. This result validates our third hypothesis and is consistent with the Trade-off theory. This result tells us that the bigger firms have higher level of debt.

The variables Growth, NDTS and Risk, even though the signs of their coefficients are as expected (except for NDTS in equation (6)), they are not statistically significant so, we are not able to validate our fourth, fifth and sixth hypothesis, respectively.

Table 7: Panel data regressions considering the industry effect

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>Dependent variables</th>
<th>TDebt</th>
<th>LDebt</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>β0</td>
<td>0.047135</td>
<td>0.014354</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1.171565)</td>
<td>(0.473280)</td>
</tr>
<tr>
<td>D02</td>
<td>-0.053936</td>
<td>-0.095131***</td>
<td>(-3.532235)</td>
</tr>
<tr>
<td></td>
<td>(-1.509633)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D03</td>
<td>0.020154</td>
<td>-0.000246</td>
<td>(-0.014963)</td>
</tr>
<tr>
<td></td>
<td>(0.923783)</td>
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<td></td>
</tr>
<tr>
<td>D04</td>
<td>0.143884***</td>
<td>0.1900155***</td>
<td>(9.001674)</td>
</tr>
<tr>
<td></td>
<td>(0.143884)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D05</td>
<td>-0.053437*</td>
<td>-0.069950***</td>
<td>(-2.937487)</td>
</tr>
<tr>
<td></td>
<td>(-1.691580)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D06</td>
<td>0.003554</td>
<td>-0.020142</td>
<td>(-1.061267)</td>
</tr>
<tr>
<td></td>
<td>(0.141155)</td>
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<td></td>
</tr>
<tr>
<td>D07</td>
<td>0.128651***</td>
<td>0.155165***</td>
<td>(5.072889)</td>
</tr>
<tr>
<td></td>
<td>(3.170602)</td>
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<td></td>
</tr>
<tr>
<td>D08</td>
<td>0.436534***</td>
<td>0.283599***</td>
<td>(8.326923)</td>
</tr>
<tr>
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<td>(9.661917)</td>
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<tr>
<td>Variable</td>
<td>Coefficient</td>
<td>t-statistic</td>
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<tr>
<td>----------</td>
<td>-------------</td>
<td>-------------</td>
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</tr>
<tr>
<td>D09</td>
<td>0.020956</td>
<td>(0.863841)</td>
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<td></td>
<td>-0.003125</td>
<td>(-0.170861)</td>
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<td>D10</td>
<td>-0.015505</td>
<td>(0.499031)</td>
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</tr>
<tr>
<td></td>
<td>0.023999</td>
<td>(1.024721)</td>
<td></td>
</tr>
<tr>
<td>D11</td>
<td>-</td>
<td>-</td>
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</tr>
<tr>
<td>D12</td>
<td>-0.117928***</td>
<td>(-4.845687)</td>
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<tr>
<td></td>
<td>-0.032413</td>
<td>(-1.766787)</td>
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</tr>
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<td>Tang</td>
<td>0.057966***</td>
<td>(4.106988)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-0.002252</td>
<td>(-0.211631)</td>
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<tr>
<td>Prof</td>
<td>-0.438825***</td>
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</tr>
<tr>
<td></td>
<td>-0.086721***</td>
<td>(-3.120174)</td>
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</tr>
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<td>Size</td>
<td>0.013057***</td>
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<tr>
<td></td>
<td>0.010656***</td>
<td>(4.563363)</td>
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</tr>
<tr>
<td>Growth</td>
<td>-0.001584</td>
<td>(-1.004922)</td>
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</tr>
<tr>
<td></td>
<td>-0.001894</td>
<td>(-1.594520)</td>
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<tr>
<td>NDTs</td>
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<td>(-0.50475)</td>
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<tr>
<td></td>
<td>0.045423</td>
<td>(0.250259)</td>
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</tr>
<tr>
<td></td>
<td>-0.000000446</td>
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<td>0.275439</td>
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<td>Adjusted R²</td>
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<td>0.261387</td>
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</tr>
<tr>
<td>F-Statistic</td>
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<td>19.60132</td>
<td></td>
</tr>
<tr>
<td>Total Panel</td>
<td>842</td>
<td>842</td>
<td></td>
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</tbody>
</table>

Note: In this table we can find the results for the estimation of equations (5) and (6). We estimated the equations using the Ordinary Least Squares (OLS) technique, using panel data, with cross-section fixed effects, for 93 Belgian companies for the period between 2005 and 2015. The dependent variables can be defined as Total Debt/Book Value of Total Assets (TDebt) and Long term debt/Book Value of Total Assets (LDebt). The independent variables can be defined as follows: (i) Tangible fixed assets/Total assets (Tang); (ii) EBIT/Total assets (Prof); (iii) Natural logarithm of net sales (Size); (iv) Market value of equity/Book value of equity (Growth); (v) Depreciation and amortization expenses/Total assets (NDTS); and (vi) Standard deviation of the Return on Equity (Risk). The dummy variables are: Consumer Nondurables (D01), Consumer Durables (D02), Manufacturing (D03), Energy (D04), Chemicals and Allied Products (D05), Business Equipment (D06), Telephone and Television Transmission (D07), Utilities (D08), Shops (D09), Health (D10), Finance (D11) and Others (D12). In the first row, for each variable, it’s presented the coefficient values. In the second row, and in brackets, it’s presented the t-statistics. *, ** and *** means that the coefficients are statistically significant at the 10%, 5% and 1% level, respectively.

5 – Conclusions, Limitations and Future Research

5.1 – Conclusions

The capital structure of the companies is a theme that has been discussed over the years and for several authors. In fact, it is a theme with such relevance due to the fact that it is taken into consideration by the managers when they are making the optimal capital structure decision, i.e. which should be the debt-equity ratio for the companies they manage, in order to obtain the highest firm value.

There are several theories on the capital structure theme. It is important to stress the work of Modigliani & Miller (1958), where the authors understand that the market value of a firm cannot be different by changing the debt-equity ratio of a firm. In different words,
for the authors, there is not a capital structure that is any better or worse than any other capital structure for the companies’ stockholders.

Even though the capital structure theme have been discussed over the years, there is not yet a universal theory on the capital structure choice. However, several theories have been under study throughout the years and we studied in our work the Pecking Order theory, the Trade-Off theory, the Market timing theory and the Agency costs theory.

According to the Pecking order theory, when the companies’ internal funds, i.e. cash flow is not enough to finance its capital expenditures, the firms prefer to borrow than to issue equity. The Trade-off theory states that there is an optimal capital structure with an optimal debt-equity ratio. The Market timing theory states that the managers follow the Market-to-book ratio and issue debt when the firms’ market value is higher and repurchase the shares when the market value is lower. The agency costs theory analyzes the relationship between the managers and the shareholders keeping in mind their conflict of interests.

The main purpose of this work is to determine which determinants have in impact on the capital structure of the Belgian non financial listed firms.

For that purpose, we estimated equations where the independent variables were, in line with the previous literature on this matter: (i) tangibility of assets, (ii) profitability, (iii) the companies’ size, (iv) the growth opportunities, (v) the non debt tax shields and (vi) the risk. The dependent variables considered in our equations were the total debt and long term debt. Our sample is composed by 93 Belgian companies listed in the Brussels Stock Exchange for the period between 2005 and 2015 (1023 observations). We estimated our equations using the Ordinary Least Squares (OLS) technique, with cross-section fixed effects, year dummy variables and industry dummy variables. In addition, we also performed the estimation of the equations for two distinct periods within the period of our sample, in fact, we estimated the equations for the periods before and after the crisis, i.e. for the period between 2005 and 2008 and for the period between 2009 and 2015 in order to confirm if the economic and financial crisis of 2008 had an impact on the companies’ capital structure determinants.
The results obtained from the estimation of the equations before mentioned show that there is not a unique theory that can justify the capital structure choices taken by the managers (on how to finance the firms’ investment expenditures). We can relate to all theories in accordance with the results obtained.

It is important to stress that the year dummy variables had a negative impact on both total debt and long term debt. We also observed that the industry had an impact on the capital structure choice and is a determinant to be taken into account. With regard to the economic and financial crisis of 2008, we can see that this did not have an impact, especially as from 2009, as the coefficients of the dummy variables were not, generally, statistically significant.

With regard to the industry effect on the capital structure choice, we verify that the coefficients of the dummy variables differ in terms of signs and significance levels. The results obtained for the equations where we included the industry dummies were different for the different types of debt, i.e. total debt or long term debt. In addition, we understand that the levels of debt differ within industries.

5.2 – Limitations of this work and Future research

First of all, we should be careful while comparing this work with other works on this topic, namely, because our sample was chosen according to some restrictions and assumptions taken, our methodology is different as some previous literature consider that the countries’ specific factors can have an impact on the capital structure choices, making it difficult to compare our work with the works for other countries.

Additionally, we only used the companies’ book leverage and did not take into account their market leverage. It should be interesting to perform this study considering the market leverage of the firms.

Finally, it would be interesting to include the effect of taxes in the capital structure choices.
References


