IMPACT OF THE SOVEREIGN DEBT CRISIS ON THE DETERMINANTS OF THE CAPITAL STRUCTURE IN REAL ESTATE AND CONSTRUCTION RELATED FIRMS – EVIDENCE FROM PORTUGAL

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Biographical Note

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The conclusion of this dissertation represents the achievement of a very important milestone in my life because it was a goal that I established to myself since I started the University Education.

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Abstract

Portugal was one of the most affected countries by the sovereign debt crisis, whose impact was felt mostly in the peripheral European countries, being one of the reasons for the development of this topic. We have focused on only one industry, being the real estate and construction related firms, because there are few studies that make an exhaustive analysis of a single industry. Additionally, this industry in particular, is very pro-cyclical, in the sense that it depends a lot on the existence of good economic conditions to gather construction contracts as well as public investment.

The purpose of this dissertation is to understand if the sovereign debt crisis had an impact over the capital structure of the companies and on the firm-specific variables. There are some theories that try to explain how companies decide about their capital structure that alongside with the support of empirical studies were used in the formulation of several hypotheses.

An unbalanced panel of 404 firms, whose information was gathered from the database SABI Bureau Van Dijk, was used in the econometric estimations. We have estimated two main models for four different dependent variables, namely debt ratios, to assess if the results were the same for long-term and short-term debt.

In the end, we provide evidence of a reduction in the debt ratios during the period of crisis, which may be a sign that a credit shortage occurred, at least for this industry. This event could have been caused by the huge distress banks were experiencing as well as all the austerity measures implemented during those years, due to the bailout applied in Portugal by the *TROIKA*. However, the robustness tests demonstrated that this evidence was relatively weak. We also have found some interesting results relative to the determinants of the literature included in the models.

JEL–Codes: C12; C33; G01; G30; G32.

Key-words: Capital Structure, capital structure determinants, sovereign debt crisis, panel data.

Resumo

Portugal foi um dos países mais afetados pela crise de dívida soberana, cujo o impacto foi maior para os países europeus periféricos, e esta foi uma das razões que me levou ao desenvolvimento deste tema. O nosso foco foi apenas numa indústria, nomeadamente imobiliário e empresas que atuam no mercado da construção, porque existe uma certa escassez de estudos exaustivos em relação a uma indústria em particular e por ser uma indústria pró-cíclica, no sentido em que está dependente da existência de boas condições económicas para garantir contractos de construção, bem como para obter investimentos públicos.

O objetivo desta dissertação é compreender se a crise de dívida soberana teve, ou não, impacto na estrutura de capital das empresas e sobre os determinantes da estrutura de capital. Existem algumas teorias que tentam explicar como as empresas decidem a sua estrutura de capital e juntamente com outros estudos empíricos foram empregues na formulação de hipóteses.

Utilizamos um painel não-balanceado de 404 empresas, cuja a informação foi retirada da base de dados SABI Bureau Van Dijk, nas estimações econométricas. Foram estimados dois modelos base principais para quatro variáveis dependentes diferentes, nomeadamente rácios de dívida, para avaliar se os resultados são os mesmos para dívida de curto e de longo prazo.

No final a nossa evidência empírica mostra uma redução dos rácios da dívida, durante o período de crise, que pode ser um indício de que ocorreu uma diminuição da oferta de crédito, pelo menos para este setor. Este acontecimento pode ter sido causado pelas dificuldades que o setor bancário estava a atravessar, bem como pelas medidas de austeridade aplicadas a Portugal pela *TROIKA*. No entanto, os testes de robustez demonstraram que esta evidência era relativamente fraca. Os resultados relativos aos determinantes da estrutura de capital presentes na literatura e incluídos nos modelos também mostraram ser bastante interessantes.

Códigos-JEL: C12; C33; G01; G30; G32.

Palavras-chave: Estrutura de capital, determinantes da estrutura de capital, crise dívida soberana, dados em painel.

Index

Biographical Note i
Acknowledgments ii
Abstract iii
Resumo iv
List of Tables vi
List of Figures vii
1. Introduction 1
2. Literature Review 3
2.1) The Main Theories of Capital Structure 3
2.2) Determinants of Capital Structure 7
2.2.1) Tangibility 8
2.2.2) Size 9
2.2.3) Profitability 10
2.2.4) Growth 11
2.2.5) Volatility of Earnings 12
2.2.6) Liquidity 12
2.2.7) Age 13
2.3) Sovereign Debt Crisis 13
3. Methodology 21
4. Sample and Descriptive Statistics 25
4.1) Evolution of the Debt Ratios 27
4.2) Correlation 29
5. Empirical Results 30
6. Robustness Checks 37
7. Conclusion 40
8. References 43
Appendix 50

List of Tables

Table 1 - Summary of the hypotheses formulated. 20
Table 2 - Summary of the key variables. 24
Table 3 - Descriptive statistics. The variables *SALES*, *TD*, *EBITDA* and *TA* are stated in thousands. 25
Table 4 - Pearson's correlation matrix. 29
Table 5 - Results of the fixed effects estimations for two dependent variables: DBTR and LTDR. 30
Table 6 - Results of the fixed effects estimations for two dependent variables: STDR and DCR. 34
Table 7 - List of the robustness models. 37
Table 8 - Estimations' results including only firms with a growth higher than the average. 50
Table 9 - Estimations' results including only firms with a growth lower than the average. 51
Table 10 - Estimations' results including only firms with a size higher than the average. 52
Table 11 - Estimations' results including only firms with a size lower than the average. 53
Table 12 - Estimations' results including only firms with an EBIT higher than zero. 54
Table 13 - Estimations' results including only firms with an EBIT lower than zero. 55
Table 14 - Estimations' results including only firms with a profitability higher than the average. 56
Table 15 - Estimations' results including only firms with a profitability lower than the average. 57

List of Figures

Figure 1 – Ratios of debt over the period of 2003 to 2016 (using yearly means). ...28

Figure 2 - Debt composition ratio over the period between 2003 and 2016 (using yearly means) 28

1. Introduction

First of all, with this dissertation, we intend to assess whether or not the sovereign debt crisis affected the capital structure of the construction firms that operate in the Portuguese market. Moreover, it is also our intention to evaluate which firm-specific variables have explanatory power over the debt level of the companies. Then, we will analyze if the results are in accordance with the main studies and theories of capital structure and if the capital structure determinants were affected by the crisis.

The interest over this topic primarily emerged because Portugal was one of the most affected European countries by this crisis, which ultimately led to its bailout by the so-called Troika (International Monetary Fund, European Commission and European Central Bank). For this reason, this study is different from the previous ones since it focuses on a particular industry that depends largely on favorable economic conditions to provide incentives and encourage investment in infrastructures. On the other hand, there are not as many studies focusing only in just one specific industry during economically unstable periods.

The construction industry is a pro-cyclical industry, consequently, it can be anticipated that the sovereign debt crisis affected the business of those firms and more specifically its capital structure. It is argued that the instability of the banking and financial system and budgetary restrictions on government spending may have led to some credit constraints, lower investment in public works, a decrease in the profitability of these firms and a low level of confidence by investors that may have strongly influenced the construction sector.

To accomplish these objectives, a sample of Portuguese unlisted firms from the construction sector between the period of 2003 and 2016 was gathered in SABI. In the end, we used a sample of 404 firms and estimated eight different econometric models using a panel data model, the fixed effects model.

Concerning the models, we have used four different dependent variables, all of which are debt ratios (total debt over total assets, long-term-debt over total assets, short-term debt over total assets and short-term debt over long-term debt). Then, we estimated two models for each debt ratio, one only with the firm-specific variables and another with the same independent variables plus a temporal dummy variable and interactive variables, which were the interaction between the dummy and each firm-specific variable. The models comprise

six firm-specific variables (size, profitability, growth, volatility of earnings, liquidity and age) and one dummy variable that will take the value of 1 if an observation takes place during the sovereign debt crisis period (considered between the years of 2011 and 2014) or 0 otherwise.

We have found that the sovereign debt crisis significantly affected the capital structure of the industry in focus, causing a reduction of the debt ratios (total debt and long-term debt). This result was already expected since banks were under huge stress and facing several liquidity problems. However, these results demonstrated to be weak after the execution of the robustness tests. Moreover, we achieved interesting results related with the firm specific variables where we corroborated several hypothesis such has a positive relation between size, age and tangibility with the total debt ratio. Conversely, we found a significant negative relation between the profitability of the company and all the debt ratios.

The second section of this dissertation is divided in three main sub-sections. The first comprises the literature review of the most important authors that have developed the main theories of capital structure throughout the years. In the second subsection, we have formulated the hypotheses to be tested with the support of the related literature, and in the third subsection we present the main literature about the sovereign debt crisis and how it may have caused any effect in the firms' capital structure.

Afterwards, it is presented the methodology used on this dissertation in section 3, followed by an analysis of the sample including an examination over the debt ratios, namely how they evolved over the years of the sample in section 4. Thereafter, we make a detailed analysis over the results provided by the econometric estimations in section 5 that will be tested by the robustness tests performed in section 6. In the last section, we present the main conclusions of the dissertation.

2. Literature Review

The literature review presented in this section is divided into three main sections. Firstly, we describe the general theories and studies related with the capital structure of the firms. In the following, we include a section where we will formulate the hypotheses with the support of previous studies that used firm-specific variables. The final section analyses the impact that the crisis may have had on the capital structure of the real estate and construction related firms.

2.1) The Main Theories of Capital Structure

Unquestionably, the study conducted by Modigliani and Miller (1958) was the trigger that has revolutionized financial theory, and consequently the interest of academics regarding the capital structure decisions and their impact on firms' valuation. Their model was developed under powerful assumptions that result in the formulation of two propositions. The first is that the value of a company is not affected by the capital structure's decisions and the second, which is directly related with the homemade leverage assumption, states that as the level of leverage increases within the company the equity holders would require a higher return because of the greater risk they entail.

The study, mentioned previously, encouraged other authors to further investigate these questions by relaxing some of the assumptions to reach more realistic conclusions and explanations, such as Baumol and Malkiel (1967), where the capital structure would be relevant in the presence of transaction costs or in the presence of bankruptcy costs (Bierman and Thomas,1972). Stiglitz (1988) also alerted for the importance of the M&M model in the sense that it encouraged researchers to investigate these issues particularly regarding four of the assumptions, which are the homemade leverage, no information asymmetry, non-existence of taxes and the assumption where firms can be identified by "risk class".

One of the biggest concerns of researchers has been the role played by taxes. Since interest payments are tax deductible, the value of a company could increase with the substitution of debt relative to equity, however considering the bankruptcy costs that increase with leverage, this effect is offset. In this perspective, Modigliani and Miller (1963) were also forced to reformulate their first paper to take into account the influence of income

taxation on the value and cost of capital of the companies. Hence, many authors tried to develop models of an optimal capital structure under those circumstances. However, Miller (1977) under that framework still argues in his model, that in equilibrium the value of the company is still independent of capital structure decisions. He demonstrated that the tax advantage at corporate level exactly offsets the tax disadvantage at personal level, considering the assumptions of his model.

On the contrary, DeAngelo and Masulis (1980) extended the previous model with the inclusion of non-debt corporate tax shields and as a result invalidated the irrelevancy theorem. Furthermore, they predict a negative relation between non-debt corporate tax shields and level of debt, where the optimal level of leverage depended only on the interactions between personal and corporate tax treatment.

In a different kind of study, Ross (1977) develops a model explaining the capital structure, under perfect market assumptions, where he considers the role of the manager in the financing decisions of the company and the possession of inside information. Under those circumstances, if the company increases its amount of debt it signals information to the market, increasing market's perception value of the firm. However, his model has been considered too simple and was not intertemporal and continuous in time.

Indeed, the inclusion of debt related costs was one of the main reasons that led to the development of the trade-off theory, by researchers. Briefly, this theory argues about the existence of an optimal capital structure, balancing the benefits provided by debt tax advantages against the bankruptcy and financial distress costs. According to this theory, it is favorable for the company to increase its level of debt until the point where the marginal benefits are exactly counterbalanced by marginal costs.

One of the first studies related with the development of this theory was Kraus and Litzenberger (1973) paper, where they developed a single period valuation model. It incorporated the tax advantages provided by debt and bankruptcy penalties and computed different states leading to the optimum level of debt that maximized the market value of the company. Moreover, these authors showed that the total market value of the firm is not in general a concave function of the level of debt.

Similarly, the study of Scott (1976) also contributed to the theory with the construction of a multi-period model where he assumed that besides the expected future earnings, the value of a company was also a function of the liquidation value of its assets. In

the end, he claimed that the optimum level of leverage was as an increasing function of the liquidation value of the assets, the corporate tax rate and the size of the company.

Alternatively, Kim (1978) argues that the concept of an optimal capital structure is valid only if the optimal level of debt is lower than the debt capacity of the company. He analyses this issue for companies subjected to stochastic bankruptcy costs and corporate income taxes, being the results achieved in a perfect capital market situation where the market value of the firm is a concave function of the level of debt.

Bradley et al. (1984) have created a cross-sectional model that led them to argue that the optimal capital structure is influenced by the costs of financial distress, the variability of the firm value and the amount of non-debt tax shields. As they expected the volatility of the firm and the R&D investment exhibited a negative sign in their empirical evidence whereas the non-debt tax shields had a positive coefficient contradicting their own predictions and other studies like DeAngelo and Masulis (1980). Their results suggested that firms that have more tangible assets' investments have higher levels of debt which in accordance to Scott (1977). Companies can borrow at lower interest rates if they secure their debt with tangible assets, hence they will have higher levels of leverage. Lastly, they have found evidence of intra-industries similarities and inter-industry differences in the firm's debt ratios.

Along the years an alternative explanation came along, the pecking order theory. In contrast to the previous, this theory does not imply the existence of an optimal capital structure and it considers that the financing decisions are related with the adverse selection problem and information costs. In essence, it states that the financing of a company is made in a hierarchical way: first, firms use the cash flow generated by the operations of the company, i.e. internal financing, and if this is not enough they would recur to debt and lastly, issuance of shares, i.e. external financing. As firms climb the financing hierarchy, the higher will be the asymmetric information related costs.

The first study that referred about the preference for internal financing by firms, was made by Donaldson (1961) (apud Long and Malitz, 1985). Nevertheless, the first to use this nomenclature was Myers (1984) in a very interesting study that provided curious insights about financing decisions. He begins by arguing that the capital structure cannot be explained by a single theory, although he believes pecking order theory is consistent with the empirical evidence. On his opinion, firms will only issue equity when the managers feel their company is overvalued, otherwise they will issue debt once internal financing is not sufficient.

However, if investors know about this, they will refuse to buy firms' stock unless they know that the firm have used up all its debt capacity.

Myers and Majluf (1984) developed a model incorporating information asymmetry. They demonstrated in the model a preference for self-financing and that companies prefer debt to equity even if that means the abandon of some investment opportunities. If the firms need to invest and the stock price is too undervalued, they prefer to forego the investment instead of incurring in a loss to existing shareholders. They affirm it is better to issue safe securities than risky ones. In addition, if managers have superior information in the case of stock issuance the stock price will fall, and under the same conditions if they issue debt the price will not fall.

Fama and French (2002) found some evidence supporting the pecking order theory, namely a negative relation between profitability and leverage, as Frank and Goyal (2003) did. They also found a negative relation between R&D investment and level of debt as predicted by trade-off theory. Likewise, Long and Malitz (1985) empirical evidence also has shown a significant negative relationship between R&D investment and level of debt and a significant positive relationship between capital expenditure and debt. Furthermore, their evidence pointed to the existence of a moral hazard problem.

According with Frank and Goyal (2003) smaller high-growth firms should suffer from more information asymmetries, therefore their financing should follow the pecking order theory hierarchy, although their evidence did not reflect that. They also found that external finance is greatly used, where debt financing does not dominate equity finance in magnitude, suggesting that internal financing is not sufficient for firms' investment.

The agency theory, mainly developed by Jensen and Meckling (1976), also provided a great contribution for the explanation of financing decisions by firms, although the development of this theory has not been centered on the capital structure issues. It is very difficult to maintain an alignment between the interests of shareholder and managers, since they are both two individual agents and each have their own self-interests. For this reason, the main worries are that the managers tend to waste the free cash flow of the company in perquisites or unprofitable investments, resisting paying out to investors. This argument was advanced by Jensen (1986) in his free cash flow hypothesis.

Therefore, this theory encourages profitable firms, with agency problems, to engage in more debt to discipline the management, so that they are constrained not to waste free cash flow and at the same time to provide payouts to investors, in this case debtholders.

Jensen and Meckling (1976) believed that in addition to positive bankruptcy costs, taxes, and tax advantages on the payment of interests, the existence of agency costs contributes to the rejection of the irrelevance theorem advanced by M&M. Furthermore, they point out at the existence of agency costs between shareholders and bondholders. Some investments or projects have to be withdrawn due to previous financing decisions that had led to imposition of covenants (e.g. limit the acquisition of other companies). These covenants limit some of the decisions of the companies, which lead to agency costs. In addition, there are monitoring and bonding costs supported by the company as well as bankruptcy and reorganization costs. This problem may arise because there is the possibility of expropriation of value of debtholders by the shareholders (e.g. by engaging in very risky investments at the expense of creditors) or expand their wealth with the increase of dividends (Niu, 2008).

Concerning the agency problems for SMEs, Mac an Bhaird and Lucey (2010) state that these problems occur mainly between insider and outsider's contributors of capital being significant particularly at the start-up stage when there is higher informational asymmetry and where it is more costly for this smaller firms to solve this problems with the debt providers.

2.2) Determinants of Capital Structure

Along this literature reviews' subsection, we will document the determinants that were used in previous literature, as well as some studies of capital structure in periods of crisis so that we can develop predictions and formulate the hypotheses.

However, there are some studies like the one made by Lemmon et al., 2015 that argue against the explanatory power of these type of determinants. They report that firm's capital structure tends to converge and is stable through time, suggesting that the debt ratios are explained by a transitory and permanent component and that the usual firm-specific determinants models are not well specified because firm's management is more apprehensive with long-term variations of the determinants than short-term variations. Antoniou et al. (2008) provided a study about the differences on the determinants of the capital structure between firms in countries that perform their activities in market-oriented economies and bank oriented economies. They found that the leverage ratio is also affected by the market conditions, concluding that the determinants are affected by the country's legal and financial

traditions. Additionally, Faccio and Xu (2015) argue that both corporate and personal income are significant determinants in the explanation of the capital structure.

Most of the predictions will rely on the main capital structure theories. "It appears that both the tradeoff and pecking order theories are at work in real life. The economic factors that drive the theories – taxes, costs of financial distress and information asymmetries – clearly are important." (Myers, 2002)

2.2.1) Tangibility

This variable is, certainly, one of the most reported ones in the literature that is suggested to affect financing decisions of companies. Overall, the rationale of the trade-off theory is to measure the benefits of debt against the costs. Therefore, a firm has more capacity to borrow capital if its structure is composed with a higher ponderation of safer tangible assets than if it is composed with more risky assets (Myers, 2001).

If a large part of the company's investment is on tangible assets it has the possibility to engage in higher levels of debt (Long and Malitz, 1985). Considering the asymmetric information issues, the tangibility of the firm's assets is important to reduce the costs of issuing securities, being secured debt more advantageous for the company (Myers and Majluf, 1984). In addition, the shareholders of the companies may invest sub optimally expropriating the wealth of the creditors (Jensen and Meckling, 1976; Myers, 1977) and in this sense, tangible assets can be used as collateral. In addition, in case of liquidation this type of assets retain more value. (Rajan and Zingales, 1995; Deesomsak et al., 2004; Gaud et al., 2005).

Considering most empirical studies and theories, we state the first hypothesis as:

H1: The relation between tangibility and the debt ratio is expected to be positive.

Some authors debate that the maturity of debt is linked to the maturity of the assets, hence long-term debt will be secured with long-term assets and short-term debt secured with short-term assets (Hall et al., 2000). Considering that, tangible assets are long-term investments a negative relation is expected between short-term debt and tangible assets (Palacín-Sánchez et al., 2013; Proença et al., 2014).

Taking into account these differences in maturity, we postulate our first hypothesis divided in two:

H1a: The relation between tangibility and long-term debt ratio is expected to be positive.

H1b: The relation between tangibility and short-term debt ratio is expected to be negative.

2.2.2) Size

The variable size was also largely included in empirical models related with capital structure. For example Titman and Wessels (1988) and Rajan and Zingales (1995) advance that bigger companies have the tendency to be more diversified, thus they have a lower probability of bankruptcy. This is also stated by the tradeoff theory that predicts that firm size positively affects the levels of debt.

The bigger the company is, the more will also potentially be the separation between managers and shareholders, therefore higher agency costs are expected (Jensen and Meckling, 1976). Since this type of companies have a more stable stream of cash flow the manager may have an incentive to engage in investments that provide lower returns than the cost of capital returns or consume it with perquisites. One way presented by (Jensen, 1986) to discipline managers decisions is to increase the leverage of the company.

Additionally, the agency costs of debt are lower for large size companies and require more debt to take full advantage from the tax shield provided by debt. Therefore, all the previous argumentation leads us to expect that larger firms engage in higher debt levels.

H2: The relation between size and the debt ratio is expected to be positive.

On the other hand, smaller firms may be charged with high debt costs because of their higher risk and higher asymmetric information problems that they entail (Palacín-Sánchez et al., 2013). They also argue that when firms grow in size they tend to substitute short-term debt with long-term debt. In addition, the costs of issuing long-term debt may be higher for smaller firms (Titman and Wessels, 1988). Thus, all the previous statements point out for a possible preference of small firms to borrow on a short-term rather than on a long-term basis.

All things considered, we formulate the following hypothesis:

H2a: The relation between firm size and long-term debt ratio is expected to be positive.

H2b: The relation between firm size and short-term debt ratio is expected to be negative.

2.2.3) Profitability

One of most ambiguous determinants used on the models is the profitability of firms because the tradeoff theory, agency theory and pecking order theory predict different signs for the relation with the level of leverage. Although notwithstanding, it is a variable of great importance, as it can be seen in Wald (1999) who showed in his study that profitability was the only largest determinant of debt in his cross-sectional model for several countries.

The pecking order theory presented by Myers (1984) states that the companies have a preference to finance themselves internally, and if it is insufficient then they will issue debt and then equity. The higher we climb in the hierarchy of financing the higher will be the asymmetric information costs. Thus, this theory predicts that more profitable firms will have lower debt levels.

Ozkan (2001) agrees with the previous theory and argues that highly profitable firms with slow growth will have a lower ratio of debt comparing with the industry average and that unprofitable firms will have higher debt ratios.

The tradeoff theory predicts a different relation since debt provides tax advantages on the payment of interests, so if firms are profitable it means that they have more taxable income to shield and have more capacity to service debt without staying at the risk of financial distress (Myers, 2001). Regarding this theory, Antão and Bonfim (2008) state that as profitability increases the bankruptcy costs decrease, leading companies to engage in higher debt levels.

Harris and Raviv (1991) state based on asymmetric information models that their main empirical result is the positive relation between debt and profitability. The agency theory also states that a way to align the interests of shareholders and managers is to issue debt, particularly when the firms have high levels of free cash flow (Jensen, 1986).

In spite of the theories predicting different outcomes, we expect a negative relation between profitability and debt because it is the result most often found in the empirical

evidence of many studies (e.g. Harris and Raviv, 1991; Rajan and Zingales, 1995; de Jong et al., 2008). Plus, Talberg *et al.* (2008) in a study of the capital structure on different industries found a high and significant negative relation between profitability and debt for the construction industry. They state: "…it would suggest that the construction industry will use very little debt in their financing when they have profitable years and instead use their profits to build up an equity buffer."

H3: The relation between profitability and the debt ratio is expected to be negative.

2.2.4) Growth

Myers (1977) predicts a negative relation between growth opportunities and level of debt. In addition, unobservable growth opportunities reduce the effectiveness of bond covenants which limits the amount of risky debt supported by the company (Long and Malitz, 1985). Moreover, high growth firms whose value comes from intangibles, prefer not to rely on debt financing because of the uncertain availability of income to service the debt (Deesomsak et al., 2004).

In this case, the agency costs related with debt may also be higher because there is a higher probability of expropriation of value as a result of risky investments (Deesomsak et al., 2004). Hence, it is expected a negative relation between long-term debt and growth, but this agency costs could be mitigated if the companies issue short-term debt instead of long-term debt (Myers, 1977).

Taking into account the agency costs between shareholders and managers, companies that have more growth opportunities will have less cash flow available for expenditures in perquisites so in that sense debt will be less needed for disciplinary reasons. It is expected that firms with good investment opportunities will have lower debt levels comparing to those mature, slow growth firms (Jensen, 1986).

However, the pecking order theory predicts that companies with more opportunities, for the same level of profitability, should increase their leverage (Frank and Goyal, 2009). The internal funds generated by a growing company may be insufficient so they will need to be financed with debt. Gaud *et al.* (2005) states that growth firms with financing needs will issue short-term debt. Despite all these arguments, previous studies are not conclusive about the expected relation over this firm-specific determinant (Palacín-Sánchez et al., 2013).

Thus, we expect the following relation:

H4: The relation between growth and the debt ratio is expected to be negative.

2.2.5) Volatility of Earnings

The simulation performed by Bradley et al. (1984) showed that firm leverage ratios have a negative relation with the volatility of the earnings in the presence of distress costs as they observed in their empirical evidence. The probability of financial distress increases with the volatility as well as a decrease in debt capacity of the earnings of the firm because it can make more difficult the fulfilment of the debt service (Michaelas et al., 1999; Deesomsak et al., 2004). According with Antão and Bonfim (2008), higher volatility leads to higher bankruptcy costs.

Therefore, we present the following hypothesis:

H5: The relation between volatility of earnings and the debt ratio is expected to be negative.

2.2.6) Liquidity

There are not as many authors using this variable to formulate a research hypothesis. However, under the pecking order theory if a firm has more liquidity, in theory, it will have a higher capacity to finance itself with the generated internal funds, hence it predicts that more liquid firms will borrow less. Plus, Deesomsak et al. (2004) advance that the management can manipulate liquid assets favoring the shareholders against the interests of debtholders, resulting in higher agency costs of debt.

Although notwithstanding, firms with higher liquidity can also support more debt because they have greater capacity to meet the short-term obligations when they fall due (Ozkan, 2001). This argument provides a different prediction. On the other hand, if firms do not have liquidity, it means that they have less ability to meet short-term obligations, so they would need to borrow on short-term basis.

The empirical evidence also suggests a significant negative relation between liquidity and debt (Ozkan, 2001; Deesomsak, Paudyal and Pescetto, 2004; Akdal, 2012)

According with these studies we formulate that:

H6: The relation between liquidity and the debt ratio is expected to be negative.

2.2.7) Age

The empirical evidence found by Talberg *et al.* (2008) shows that the coefficient related with age has a negative sign for construction sector firms and for the other industries they analyzed, therefore contributing to the idea that older firms borrow less.

The previous evidence makes sense under the pecking order theory because older firms have higher ability to generate internal funds, thus the need to incur in borrowings is lower than for an younger firm that may have insufficient profitability in the first years to face up the financing needs (Michaelas et al., 1999; Palacín-Sánchez et al. 2013). Their empirical evidence also reflects the predictions of Hall et al. (2000) who also found a negative relation.

Considering the previous studies, we postulate the following:

H7: The relation between age and the debt ratio is expected to be negative.

2.3) Sovereign Debt Crisis

Antão and Bonfim (2008) state that until 2007 the dependence of non-financial firms from bank financing was very high. They have shown, in relation to Portuguese firms, an increase in indebtedness ratios during the previous decade, which almost doubled between 1995 and 2007, being one of the largest across the European countries. This increase in debt could have led to some corrections in the capital structure, during the years of crisis.

To figure out if the sovereign debt crisis and consequently the bailout applied to Portugal might have had a structural effect on the capital structure of the firms we will introduce a dummy variable and some interactive variables. On the following, we will present some literature related with those issues.

In mid-2007, the global financial crisis began to manifest itself in US and then it spread out to the rest of the world after the bankruptcy of Lehman Brothers in 2008 that caused a huge turmoil in the financial markets. It was found that some of the causes were related with the lack of regulation regarding high risk securities, high levels of leverage and high-risk mortgage-loans allied with the real estate prices bubble.

Thereafter, the global financial crisis slowly became in 2009, the sovereign debt crisis in Europe when Greece Prime-Minister announced that the country was struggling against severe fiscal problems and presented a revised budget deficit that was the double of the previously estimated one, causing an alert signal in Europe causing an abrupt rise in sovereign

spreads (De Santis, 2014). Varoufakis et al. (2013) argument that this crisis can be unfolded in four interrelated domains namely: a banking crisis, a debt crisis, an investment crisis and a social crisis

Portugal was one of the most affected countries by this crisis due to the aggravating effect caused by its balance-of-trade deficit (Neri, 2010). Consequently, this environment led to international assistance carried out by the so-called Troika (European Commission, International Monetary Fund and European Central Bank) in May 2011, where "the presence of an asymmetric shock was noticed, with the periphery and the center of the European Union being targeted with different magnitudes."(Alves and Francisco, 2013). In the end, Portugal received a €78 billion financial assistance package and in return was obliged to implement a wide range of sectorial reforms and to be subject to regular evaluations. During the program the level of unemployment reached all-time records reflecting the high instability of the Portuguese economy (Gorjão, 2012).

Banks, at this time of crisis, were under serious liquidity problems and suffering pressure to rebuild their capital bases, which led to the deterioration of the euro area banking system and a flow of credit to the private sector (Allen and Moessner, 2012). The lack of common European policy in the resolution of the banking crisis led to the rescue of several troubled banks by governments (De Bruyckere *et al.*, 2013). Iyer *et al.* (2014) also studied this subject for the 2007-2009 crisis in Portugal and found that banks more dependent on interbank borrowing before the crisis decreased the supply of credit during crisis, being the smaller and those with weak banking relationship firms, the most affected ones by this credit shortage.

In short, the banking sector acts as an intermediary, by channeling money from lenders to households and firms to support the investments needed for their operations, and in some countries the governments rely on the banking sector for private funding. By their turn, the states promote economic growth and stability to promote good bank performance (Kanda and Iqbal, 2014). Additionally, sovereign debt was an important collateral that banks used prior the crisis, and the decrease in the value of this asset brought problems to the financing of banks. This may be translated into higher constraints for banks to lend money to other non-financial firms, like real estate and construction firms.

During crises, firms find it harder to borrow since there is a reduction in credit supply and on the demand side firms may need more debt because of less internal funds generated (Zeitun et al., 2016). In addition, lenders may stop rolling-over short-term debt (Demirguc-

Kunt et al., 2015) and the composition of the maturity of debt can be important for the outcomes on the corporate behavior of the firm when it occurs shocks in credit and liquidity (Custódio et al. , 2013). However, the empirical evidence of (Fosberg, 2012) has shown a significant increase in firms debt ratios in the US, contrarily to what was expected due to the reduction of credit supply and banking distress, during the global financial crisis.

In countries that were severely affected by the crisis, there is less credit channeled to non-financial firms and this could lead firms to a financially constrained situation, therefore these firms could experience credit rationing and higher costs for borrowing and ultimately forego profitable investment opportunities (Harrison and Widjaja, 2014). Arteta and Hale (2008) even found significant statistical evidence of a decline in foreign credit to domestic private firms. All these constraints could have led to changes in the way firms decide about their financing in periods of crisis and recessions, and periods of growth.

Using an European dataset during financial crisis Campello *et al.* (2012) have shown that firms with restricted access to credit like small and private firms use more financing from credit lines than large and public firms. Their evidence suggests that credit lines are not constrained by banks to the firms during these economic unstable environments, providing some liquidity to the firms.

This credit supply shock caused by the sovereign debt crisis led to significant distress in the banking sector in most of the peripheral countries. As a result, the cost of loans increased for non-financial firms and households since 2010 (Neri, 2010), being this one of the main reasons for my expectation of capital structure changes in Portuguese construction companies. Similarly, Albertazzi *et al.* (2014) refers conditionings for Italian banks to provide credit on firms and households. The article written by Lane (2012) stated that in countries like Spain and Ireland the construction sector was one that suffered the most from the "cessation of credit boom", and that this decline was a profound shock for the economy of both countries.

Even so, Kahle and Stulz (2013) argue that firms have other channels to finance themselves besides bank loans, such as the use of cash holdings, issue public debt, selling assets or obtain more trade credit, and that way the impact of a shock on credit would be lower. Casey and O'Toole (2014) also tested the use of alternative financing but for European SMEs with bank lending constraints, and found that those are more likely to use financing like trade credit, informal lending and loans from other companies. SMEs are more dependent on bank financing when they have higher needs for external finance, although,

this means higher asymmetric information costs for banks, hence higher risk which may induce banks to reduce loan maturity and increase interest rate (Hernandez-Canovas and Koeter-Kant, 2008). The authors suggest this can encourage SMEs to create closer relations with banks to optimize loan conditions.

The research made particularly for Portugal about bank restrictions reflect what has been documented previously. For instance, Antunes and Martinho (2012) state that Portuguese banks lost access to debt markets, plus they suggest the existence of constraints in credit for businesses that could be the result of the increase in bank financing costs. Lastly, they report a decrease for loans, especially for first time loans. Farinha and Félix (2014) produced a report analyzing only Portuguese SMEs and their results suggest a positive relation, on credit supply side, for collateral and negative for the leverage of the company. On the credit demand side, they found a positive relation for short-term needs and negative on interest rates. Their estimation showed credit constraints for these companies, even though they had a positive credit demand.

Meanwhile, several studies were done with the purpose of finding if changes occurred in the capital structure of firms caused by periods of crisis. "Any recession would be expected to cause changes in firm profitability and other capital structure determinants and, therefore, cause a change in firm capital structure."(Fosberg, 2012).

Akbar et al. (2013) performed a study on private UK firms regarding how the shock on credit supply, like the financial global crisis, affects the capital structure of the firms. The authors concluded that there was a significant negative impact caused by the crisis on the leverage ratio of the firms, being stronger on the short-term ratio. Then, they suggest that the supply of credit is an important factor for the capital structure of firms, meaning that when credit supply shocks happen, there is a contraction of the external financing activities. However, the evidence found for long-term financing is insignificant, which could mean that this financing channel is not influenced by the financial shocks.

Also, Iqbal and Kume (2013) studied the impact of the financial crisis in UK, Germany and France. An interesting perspective of their study is the fact that the UK economy is more market based (like in the US) while the German and French economies are more bank based, so it is possible to achieve different types of conclusions. They found that firms from Germany and UK increased their leverage ratios during the crisis period and registered a decrease on post-crisis period. Nevertheless, the authors found no significant relation for French firms. In addition, they found that firms with debt ratios lower (higher)

than the average industry, in pre-crisis period, have a progressive increase (decrease) in their leverage in both the crisis and post-crisis periods.

Proença et al. (2014) report a decreasing trend for leverage ratios of Portuguese SMEs after the 2008 financial crisis, although "due to the limitation in the longevity of the sample, the impact of the financial crisis was not evident enough as was expected." Greece also went through economic and social difficulties caused by sovereign debt crisis and Balios *et al.* (2016) performed a study on the SMEs of that country but strangely did not found any evidence of changes in the determinants as a result of the crisis, similar to Proença et al. (2014).

On the other hand, Brendea (2013) found an increase in the leverage levels of Romanian Listed firms after the crisis. The coefficient of the dummy variable was significant suggesting that the crisis influences the capital structure of the firms. Similar evidence was found for Croatian firms (Mostarac and Petrovic, 2013). Zeitun et al. (2016) developed a study on firms from Gulf Cooperation Council countries to see if those also suffered an impact in its capital structure caused by crisis. Their results reflected a negative and significant impact of the crisis on the leverage ratios due to the shortage of credit supply.

Harrison and Widjaja (2014) study is particularly interesting in the sense that they found changes in the determinants of capital structure after the crisis. Profitability lost some of its economic relevance in the model, and on the other hand, the tangibility increased its influence during crisis periods. The lower profitability of firms during crisis periods could be one of the explanations for the loss in explanatory power because it will be difficult for the firm to use the internal generated funds to finance its investments. The authors suggest that for lenders to account for the increase of adverse selection during financial crisis they give higher emphasis to higher values of tangible assets.

Even though we are focusing on studies from more recent crises Deesomsak, Paudyal and Pescetto (2004) made a study focused on the 1997 Asian financial crisis, that produced interesting conclusions in the way determinants of capital structure change in response of crisis periods. First, the evidence points out to changes in capital structure decisions caused by crisis. The size of the firm variable was insignificant in pre-crisis period and became significant after the crisis, which could mean that lenders could have preference for larger firms when trying to reduce default risk. They also found changes between pre-crisis and post-crisis period in other variables like liquidity and growth opportunities.

It is expected that during periods of economic turmoil there is an increase in the volatility of the earnings that for one side will decrease the tax advantage of debt and on the other will increase the business risk (Mostarac and Petrovic, 2013), thus capital structure decisions could be affected.

Since our study encompasses only private unlisted companies, and Portuguese firms have heavier reliance on bank financing than on financial markets, it is expected that the difficulties imposed by the crisis on banks would cause an impact on the way companies finance themselves. We also expect that the bailout and subsequent period of austerity, to cause a significant impact on the capital structure determinants of the Portuguese real estate and construction firms, since this type of companies rely a lot on the existence of public works and financing. We can consider this as being a very pro-cyclical industry and during crisis the ability of the government to invest in public works was damaged because one of Portugal´s main problems were to finance its public debt (Éltető, 2011) and rebalance public finances (Sgherri and Zoli, 2011). Also, "… in February 2012, the amount of credit given by banks to companies reached a new historical low" (Gorjão, 2012), hence all the conjectures point to changes and adaptations that companies in Portugal were forced to do regarding financing decisions.

According with the empirical evidence of previous studies, we expect a decrease on the leverage of Portuguese construction firms, due to the shortage on credit supply, caused by the sovereign debt crisis, that constrained the ability of banks to finance themselves and consequently the existence of constraints on the way firms finance themselves. However, a different result would not be a surprise since firms will have a lower capacity to finance themselves due to lower profitability and liquidity. Therefore, it is expected an increase in short-term-debt during crisis (Farinha and Félix, 2014). Likewise, Michaelas et al. (1999) found evidence of an increase of short-term debt in SME's capital structure during periods of crisis, and on the other hand the long-term debt ratios have a positive relationship with changes in economic growth, so that means lower long-term debt levels during a crisis. However, the more firms use short-term debt the more they are exposed to credit supply shocks since it implicates more frequent renegotiations (Custódio et al. , 2013).

Our hypotheses are then stated as follows:

H8: It is expected a decrease in the debt ratio caused by the crisis.

H9: It is expected an increase in the short-term debt ratio caused by the crisis.

Regarding the firm specific variables, it is expected that during the crisis, higher tangibility to be associated with higher levels of debt (Harrison and Wisnu Widjaja, 2014), because banks will require greater guarantees to provide financing to firms and these assets can be used as collateral (Rajan and Zingales, 1995; Farinha and Félix, 2014). Additionally, it reduces information costs to creditors (Myers and Majluf, 1984).

For similar reasons, we also expect the same relation between the size of the company and periods of recession because it is expected that these firms are more stable and safer for financial institutions to lend their money because they have lower default risk (Deesomsak et al. 2004). Mostarac and Petrovic (2013) empirical evidence demonstrates that the size of the firm has more explanatory power during the period of crisis than in the pre-crisis sub-sample.

After all, our hypotheses can be formulated in the following manner:

H10: It is expected a larger positive effect of tangibility on the debt ratio during the crisis.

H11: It is expected a larger positive effect of the variable size on the debt ratio during the crisis.

We anticipate a reduction in the profits of the Portuguese construction firms during the crisis due to the lack of investment by the government and other investors, especially after the downgrading of the Portuguese debt rating. Therefore, during the crisis economic environment we expect that banks will lend to firms not based on their profitability at that time but on future prospects or other factors, therefore the profitability of the company will not exert any significant effect during the crisis. In this sense, we develop the last hypothesis, that is similar to the empirical evidence shown by Harrison and Widjaja (2014). Although we anticipate a significant negative relation overall, between profitability and the total debt ratio, we do not expect any significant marginal effect, caused by the crisis.

H12: It is expected that the profitability will produce an insignificant marginal effect on the debt ratio, during the period of crisis.

To measure the level of debt we will use four ratios, being, a short-term debt ratio (short-term debt over total assets), a long-term debt ratio (long-term debt over total assets) and a total debt ratio (total debt over total assets). Lastly, we will also use a ratio to understand how the different determinants and the crisis affect the composition of debt that will be given by the ratio between the short-term and long-term debt, which we nominated as debt composition ratio.

Table 1 - Summary of the hypotheses formulated.

Variable	Hypotheses
Tangibility	**H1:** The relation between tangibility and the debt ratio is expected to be positive.
	H1a: The relation between tangibility and the long-term debt ratio is expected to be positive.
	H1b: The relation between tangibility and the short-term debt ratio is expected to be negative.
Size	**H2:** The relation between size and the debt ratio is expected to be positive.
	H2a: The relation between firm size and the long-term debt ratio is expected to be positive.
	H2b: The relation between firm size and the short-term debt ratio is expected to be negative.
Profitability	**H3:** The relation between profitability and debt ratio is expected to be negative.
Growth	**H4:** The relation between growth and the debt ratio is expected to be negative.
Volatility of Earnings	**H5:** The relation between volatility of earnings and the debt ratio is expected to be negative.
Liquidity	**H6:** The relation between liquidity and the debt ratio is expected to be negative.
Age	**H7:** The relation between age and the debt ratio is expected to be negative.
Sovereign Debt Crisis	**H8:** It is expected a decrease in the debt ratio caused by the crisis.
	H9: It is expected an increase in the short-term debt ratio caused by the crisis.
	H10: It is expected a larger positive effect of tangibility on the debt ratio during the crisis.
	H11: It is expected a larger positive effect of the variable size on the debt ratio during the crisis.
	H12: It is expected that the profitability will produce an insignificant marginal effect on the debt ratio, during the period of crisis.

3. Methodology

In this section we will describe the methodology that will be used in this dissertation. To assess the impact of the firm-specific variables, and even more important, whether the sovereign debt crisis affected or not the capital structure of firms, we will estimate some econometric models for a sample of 404 Portuguese real estate and construction companies, from 2003 to 2016. We used two main models, that are described below by equations (1) and (2), where the first will be used to assess the impact of the capital structure determinants and the second will be used to assess the impact of the crisis in the debt ratios.

$$DebtRatio = f(tangibility, age, liquidity, size, profitability, growth, volatility\ of\ earnings) \quad (1)$$

$$DebtRatio = f(tangibility, age, liquidity, size, profitability, growth, volatility\ of\ earnings, crisis, tangibility * crisis, age * crisis, liquidity * crisis, size * crisis, profitability * crisis, growth * crisis, volatility\ of\ earnings * crisis) \quad (2)$$

We will use four debt ratios to account for the differences in debt maturity, namely long-term debt ratio, short-term debt ratio, total debt ratio and debt composition ratio. The first main model will include six different firm-specific variables to test the hypotheses related with those variables and to understand how they affect the capital structure, as formulated in (3). The second model includes all the previous variables, but also incorporates one dummy variable accounting for the crisis period and interactive variables, as formulated in (4). The interactive variables are computed by multiplying the respective firm-specific variable and the dummy. We will estimate eight different models, two for each dependent variable, that will be based on the following equations.

$$Debratio_{i,t} = \alpha + \beta_1 GROWTH_{i,t} + \beta_2 LAGE_{i,t} + \beta_3 PROF_{i,t} + \beta_4 TANG_{i,t} + \beta_5 VOL_{i,t} + \beta_6 SIZE_{i,t} + \beta_7 LIQ_{i,t} + c_i + \varepsilon_{i,t} \quad (3)$$

$$i = Portuguese\ Construction\ Firms; \quad t = 2006, \dots, 2014$$

$$
\begin{aligned}
Debratio_{i,t} = \ & \alpha + \beta_1 GROWTH_{i,t} + \beta_2 LAGE_{i,t} + \beta_3 PROF_{i,t} + \beta_4 TANG_{i,t} \\
& + \beta_5 VOL_{i,t} + \beta_6 SIZE_{i,t} + \beta_7 LIQ_{i,t} \\
& + \lambda crisis + \lambda TANG * CRISIS_i + \lambda LAGE * CRISIS_i + \lambda LIQ * CRISIS_i \\
& + \lambda SIZE * CRISIS_i + \lambda PROF * CRISIS_i + \lambda GROWTH * CRISIS_i \\
& + \lambda VOL * CRISIS_i + c_i + \varepsilon_{i,t}
\end{aligned} \tag{4}
$$

$$
i = Portuguese\ Construction\ Firms; \quad t = 2006, \ldots, 2014
$$

The dependent variables will be defined as the ratio between debt (short-term debt, long-term debt and total debt) and total assets, and the debt composition ratio will be given by the ratio of short-term debt over long-term debt.

The variable *GROWTH* is defined by the growth rate of total assets.

The variable *LAGE* is given by the logarithm of the number of years that the firm has been operating.

The variable *PROF* is defined by the ratio of earnings before interest, taxes depreciation and amortization over total assets.

The variable *TANG* is measured by the ratio between fixed assets and total assets.

The variable *VOL* is given by the ratio between gross margin (the difference of sales and the costs of goods sold) and the EBIT, that is, the degree of operating leverage.

The variable *SIZE* is defined by the logarithm of total assets.

The variable *LIQ* is given by the ratio between current assets and current liabilities.

The variable *crisis* is a binary variable that takes the value of 0 if it corresponds to the period between 2003 to 2009 or 2015 to 2016 and takes the value of 1 if it corresponds to the period of 2011 to 2014. "By February 2010 the 2008 blast had reached Europe" (Varoufakis, Y. 2016). We could have considered the starting point of the crisis to be 2010 as some authors referred, but in our opinion, this year was too noisy to isolate as much as possible the effects caused by the sovereign debt crisis only. In addition, we have chosen this period because Portugal was under the Economic Adjustment Programme, developed by *TROIKA*, during this time frame.

The model will use panel data, also known as longitudinal data. We can consider it as the combination of cross-section data and time-series data providing a set of observations with two dimensions, one observation for each individual over a time period. We considered the panel variable to be the name of the companies and the time variable to be the years of

the sample. In addition, the panel used is an unbalanced panel since some of the cross-sectional units (firms) have some missing years in the sample.

According with Hsiao (2003), panel data provides some advantages comparing with the other types of data, like giving a higher amount of data with more detail, which helps to increase the degrees of freedom and reducing collinearity among the independent variables. Also, improves the efficiency of the econometric estimation. With the existence of multiple observations on the same firms, it is possible to control for some unobserved characteristics of firms, although panel data as well as time series should have special treatment due to the correlation across time (Wooldridge, 2012). We applied two methods of panel data estimation. The random effects model and fixed effects model. The general panel data model is given by the following equation:

$$y_{it} = \boldsymbol{x}_{it}\boldsymbol{\beta} + c_i + u_{it}, \qquad t = 1,2,\dots,T \tag{5}$$

The *i* represents the firms and *t* represents the periods of time. The explanatory variables observed are represented by x_{it} and the parameter c_i captures the unobserved heterogeneity and all the unobserved time constant factors that affect the dependent variable (Wooldridge, 2012). It is commonly known as unobserved effect. The parameter u_{it} is the random error, and captures the unobserved factors that change over time and that affect the dependent variable (Wooldridge, 2012). It is often called idiosyncratic error.

The main issue associated with these panel data models is related with the unobserved effect (c_i), namely if it exists a correlation between this parameter and the explanatory variables. If we find a correlation between c_i and x_{it}, i.e., $Cov(x_{it}, c_i) \neq 0 \; for \; t = 1,2,\dots,T$ then c_i is considered a fixed effect. Otherwise, if it is not found correlation between c_i and x_{it}, i.e., $Cov(x_{it}, c_i) = 0 for \; t = 1,2,\dots,T$ then c_i is considered an individual random effect.

In the end, to decide which model is more appropriate we employed a Hausman (1978) test to understand which of the models better suits the estimation where the null hypothesis was rejected. After performing the test, we concluded that the fixed effects model was still consistent, and the random effects model became inconsistent. Therefore, in the empirical results' section we will only present the fixed effects models results.

Table 2 - Summary of the key variables.

Variables	Formulas
DEBTR	$\text{DEBTR} = \frac{\text{TOTAL DEBT}}{\text{TOTAL ASSETS}}$
LTDR	$\text{LTDR} = \frac{\text{LONG} - \text{TERM DEBT}}{\text{TOTAL ASSETS}}$
STDR	$\text{STDR} = \frac{\text{SHORT} - \text{TERM DEBT}}{\text{TOTAL ASSETS}}$
DCR	$\text{DCR} = \frac{\text{SHORT} - \text{TERM DEBT}}{\text{LONG} - \text{TERM DEBT}}$
TANG	$\text{TANG} = \frac{\text{FIXED ASSETS}}{\text{TOTAL ASSETS}}$
SIZE	$\text{SIZE} = \text{LN}(\text{TOTAL ASSETS})$
PROF	$\text{PROF} = \frac{\text{EBITDA}}{\text{TOTAL ASSETS}}$
GROWTH	$\text{GROWTH} = \text{LN}(\text{FIXED ASSETS}_{\text{T}}) - \text{LN}(\text{FIXED ASSETS}_{\text{T}-1})$
VOL	$\text{VOL} = \frac{\text{GROSS MARGIN}}{\text{EBIT}} = \frac{\text{SALES} - \text{COST OF SALES}}{\text{EBIT}}$
LIQ	$\text{LIQ} = \frac{\text{CURRENT ASSETS}}{\text{CURRENT LIABILITIES}}$
LAGE	$\text{LAGE} = \text{LN}(\text{YEAR} - \text{YEAR OF FOUNDATION})$
CRISIS	$CRISIS = 1, if\ it\ corresponds\ to\ the\ period\ between\ 2011\ and\ 2014$ $CRISIS = 0, if\ it\ corresponds\ to\ the\ period\ between\ 2003 - 2010\ and\ 2015 - 2016.$

4. Sample and Descriptive Statistics

We gathered the data from the database SABI Bureau van Dijk that contains information about a wide range of Portuguese and Spanish firms. The following criteria was used in order to select a proper sample for this dissertation. We selected only firms with the primary industry code 41 (Real Estate Promotion) and 43 (Specialized Construction Activities) from the CAE rev. 3 (the Portuguese Classification of Economic Activities), firms that are unlisted and based in Portugal, and lastly, firms that present at least 50 workers, for at least one of the years from the period between 2005 and 2016.

Moreover, we made an individual research over each firm of the dataset to confirm if they really had operations related with the real estate or construction sector. Then, we only kept firms with at least eight years of observations, where part of the years must be during the crisis and other part must be during a non-crisis period. The observations where the value of fixed asset and sales was zero were removed from the sample. In the end, we obtained an unbalanced panel of 404 firms.

Table 3 - Descriptive statistics. The variables are $DEBTR_{i,t}$ = (Total Debt/Total Assets); $LTDR_{i,t}$ = (Long-Term Debt/Total Assets); $STDR_{i,t}$ = (Short-Term Debt/Total Assets; $TANG_{i,t}$= (Fixed Assets/Total Assets); $LIQ_{i,t}$= (Current Assets/Current Liabilities); $SIZE_{i,t}$= LN(Total Assets); $PROF_{i,t}$= (EBITDA/Total Assets); $GROWTH_{i,t}$= LN(Fixed Assets $_t$) - (Fixed Assets $_{t-1}$); $VOL_{i,t}$= (Gross Margin/EBIT). The variables *TA* (total assets), EBITDA, TD (total debt) and *SALES* are stated in € thousands.

	Observations	Mean	Median	Std. Dev.	Minimum	Maximum
DEBTR	4767	0.2655424	0.2261296	0.2294457	0	1.595269[1]
LTDR	4767	0.1729957	0.1069893	0.2090484	0	1.571101[1]
STDR	4767	0.0925466	0.042412	0.1282517	0	1.470097[1]
TANG	4767	0.1612615	0.1184266	0.1525249	0.010981	0.9919481
AGE	4734	19.72851	16	14.30849	0	86
LIQ	4760	2.411235	1.463615	5.549143	0.05952	140.5399
SIZE	4767	8.164284	8.187639	1.734264	3.270588	13.71592
PROF	4314	0.0686974	.0612888	0.1214856	-1.347175	0.8266337
GROWTH	4288	0.062972	.0318515	0.3129695	-2.747227	2.822285
VOL	4130	22.51021	14.83028	87.50315	-1156.711	840.566
TA	4767	18472.82	3596.223	65458.69	26.32681	905210
EBITDA	4314	655.8898	201.2443	3608.815	-57351.29	56527.81
TD	4767	6553.833	677.6302	27225.24	0	386785.8
SALES	4638	11068.13	3210.38	32722.74	16.68	626544.5

[1] These ratios are higher than one because total equity is negative, i.e., the level of debt is higher than the value of the assets. We have looked at each of these situations to assure that the equity value was negative. Those firms where the equity value was positive were excluded.

In addition, it is very important to highlight that most of the companies presented in this sample are SME's. The table 2 provides some descriptive statistics, namely the number of observations, mean, median, standard deviation, the minimum and maximum value for each relevant variable.

On average, the firms in the sample have a ratio of debt that is approximately 26.6% of the total assets, where 17.3% corresponds to long term-debt and 9.3% corresponds to short-term debt. Therefore, we can conclude that the firms on the sample have higher amounts of long-term debt than short-term debt. This outcome was expected since long-term loans are usually made for larger amounts than short-term loans. Some firms have no debt in their capital structure while others are fully indebted.

The firms in the sample have, on average, 16% tangible assets out of the total assets. Some firms have their asset structure almost completely constituted by tangible assets whereas others have almost any.

On the profitability side, we can observe that the mean is positive where the *EBITDA* represents approximately 7% of total assets. We can see that there are companies where the *EBITDA* represents more than 80% of total assets and others where the *EBITDA* is 130% lower than the value of total assets. The average value of the *EBITDA* is approximately 655.9€ thousand and we can observe that there is a substantial dispersion of the values in the sample.

We can see that 50% of the firms have at least 146.4% of current assets in relation to current liabilities, thus the firms on the sample present some liquidity, although there is a great dispersion of values. The firms in the sample also present, on average, a positive value for growth, where half of the sample grew at least 3.2%, in one-year period.

On average firms have 19.7 years being that the oldest firm has 86 years. The variable *VOL* is the variable in the model that presents more volatility and where the gross margin is approximately 22.5 times higher than the *EBIT*, on average. Half of the firms have at least 677.6€ thousand in debt and the observation with the highest amount of debt presents a value of 386 785.8€ thousand. The biggest company, measured in total assets, has 905210€ thousands of total assets and the smaller has, approximately, 26.33€ thousands of total assets. The firms, on average, are constituted by 18 473€ thousand of total assets.

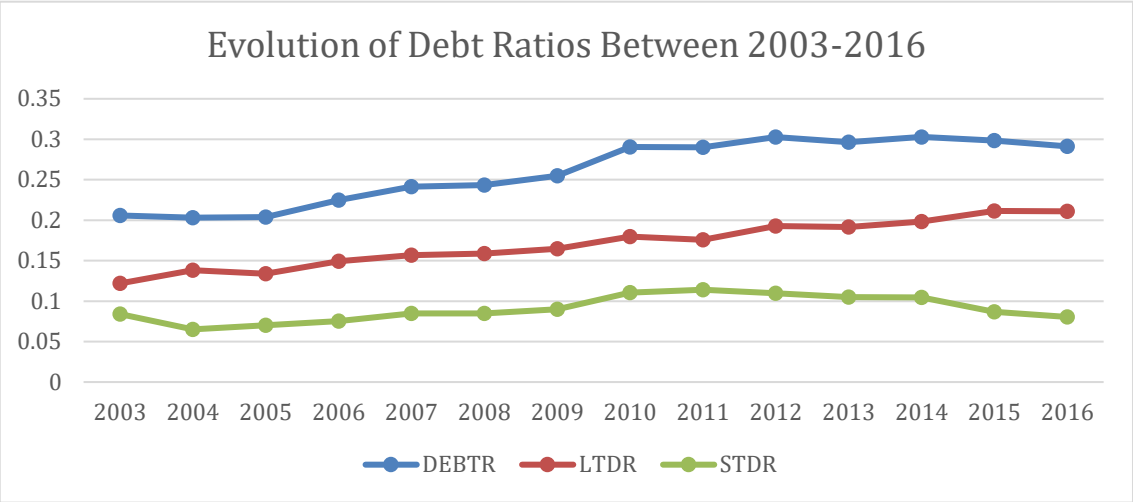
The variables *LAGE, VOL* and *PROF* have fewer observations than the others do because some of the companies did not have observations for all the years and the dataset had some flaws in the values relative to the costs of sales. This data is strictly necessary for

the computation of the gross margin, which is one of the inputs of the degree of operating leverage.

4.1) Evolution of the Debt Ratios

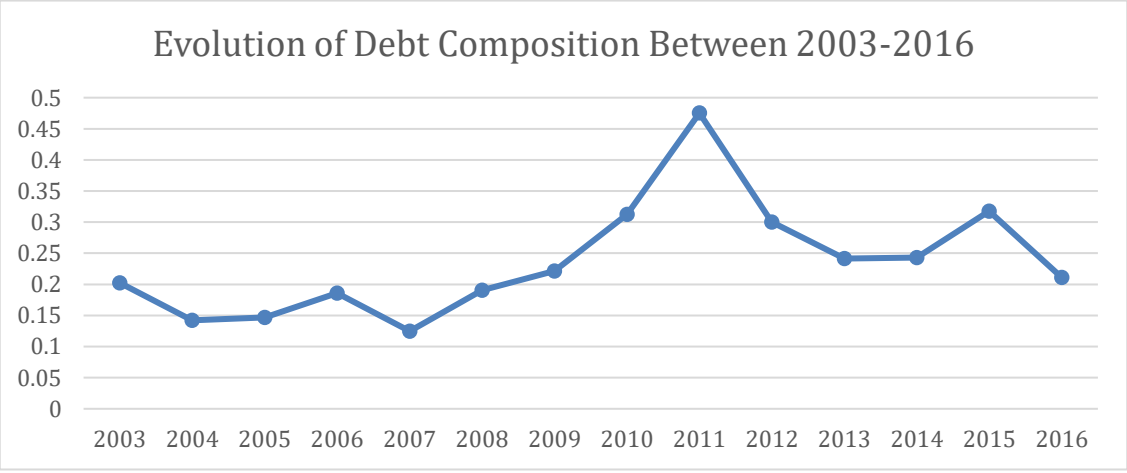
In figure 1, we can observe that firms were slightly increasing their levels of debt until 2010, coinciding with the early stages of the sovereign debt crisis, and could be a sign that firms had engaged in debt during and after the global financial crisis. Then, the ratio of total debt remained constant. Before 2010, the ratios of total debt were around 25%, but then these increased to levels around 29% and 30% for the rest of the years. It is interesting to notice that the ratio of long term-debt shows a slight positive trend along the years and it remained somewhat constant after the year of 2010, therefore, maybe it did not occur a shortage over this type of credit, even though this ratio slightly increased in the years after the crisis. On the other hand, the ratio of short-term debt reached its peak on 2011, and then decreased along the years reaching lower values than in 2003 on the year of 2016, which may indicate some short-term credit shortage. Therefore, the ratios of debt except, the short-term debt ratio, experienced a substantial rise after the year of 2008, that is the year of the beginning of the global financial crisis.

Figure 1 – Ratios of debt over the period of 2003 to 2016 (using yearly means).



In figure 2, it is easily perceptible that the composition of debt is much more volatile than the level of debt as a whole, thus we can state that the firms of this industry continuously change the proportions of their debt. We can see a huge peak in the year of 2011, coinciding with the year of the bailout. At this year, the short-term debt represented almost one-half of the long-term debt. Afterwards, the level of short-term debt decreased against the level of long-term debt, although the levels remained higher compared with the period before crisis. This could be an indication that during the crisis firms had more difficulties in obtaining long-term debt, or that companies were in difficulties, so they preferred to reduce the proportion of long-term debt in its balance sheet.

Figure 2 - Debt composition ratio over the period between 2003 and 2016 (using yearly means)



4.2) Correlation

Recurring to table 3 it is possible to analyze the correlations between the variables. It is interesting to mention that the tangibility of the assets and liquidity have a positive correlation with the debt ratio and the long-term debt ratio, but a negative correlation with the short-term debt ratio. The variables *growth* and *profitability* have a negative correlation with the debt ratios and *size* shows the opposite relation. The dummy *crisis* is associated with a positive correlation with the debt ratios.

Table 4 - Pearson's correlation matrix. The variables are given by: $DEBTR_{i,t}$ = (Total Debt/Total Assets); $LTDR_{i,t}$ = (Long-Term Debt/Total Assets); $STDR_{i,t}$ = (Short-Term Debt/Total Assets); $DCR_{i,t}$ = (Short-Term Debt/Long-Term Debt); $TANG_{i,t}$ = (Fixed Assets/Total Assets); $LAGE_{i,t}$ = LN(Year-Year of Constitution); $LIQ_{i,t}$ = (Current Assets/Current Liabilities); $SIZE_{i,t}$ = LN(Total Assets); $PROF_{i,t}$ = (EBITDA/Total Assets); $GROWTH_{i,t}$ = LN(Fixed Assets $_t$) - LN(Fixed Assets $_{t-1}$) and $VOL_{i,t}$ = (Gross Margin/EBIT).

	DEBTR	LTDR	STDR	DCR	TANG	LAGE	LIQ	SIZE	PROF	GROWTH	VOL	CRISIS
DEBTR	1.00											
LTDR	0.8548	1.00										
STDR	0.3921	-0.1421	1.00									
DCR	-0.0584	-0.1746	0.1980	1.00								
TANG	0.2629	0.2876	-0.0085	-0.0616	1.00							
LAGE	0.0022	0.0121	-0.0173	-0.0074	-0.1459	1.00						
LIQ	0.1163	0.2122	-0.1543	-0.0349	-0.0307	0.0525	1.00					
SIZE	0.0943	0.0351	0.1175	-0.0185	-0.1563	0.5320	-0.0136	1.00				
PROF	-0.3087	-0.2667	-0.1161	0.0153	0.0225	-0.2686	-0.0291	-0.1679	1.00			
GROWTH	-0.1485	-0.1309	-0.0513	0.0360	-0.0334	-0.2420	-0.0674	-0.0336	0.3403	1.00		
VOL	-0.0570	-0.0505	-0.0193	0.0055	-0.0340	0.0053	-0.0409	-0.0225	0.0128	-0.0147	1.00	
CRISIS	0.0635	0.0226	0.0809	-0.0311	-0.0379	0.0638	0.0022	-0.0463	-0.1897	-0.2067	0.0094	1.00

The explanatory variables do not show a high correlation between them, except between *age* and *size,* indicating that probably it will not exist a multi-collinearity problem in the models.

5. Empirical Results

Table 5 - Results of the fixed effects estimations for two dependent variables: DBTR and LTDR. The dependent variables are given by $DEBTR_{i,t}$ = (Total Debt/Total Assets) and $LTDR_{i,t}$ = (Long-Term Debt/Total Assets). The independent variables are $TANG_{i,t}$ = (Fixed Assets/Total Assets); $LAGE_{i,t}$ = LN(Year-Year of Constitution); $LIQ_{i,t}$ = (Current Assets/Current Liabilities); $SIZE_{i,t}$ = LN(Total Assets); $PROF_{i,t}$ = (EBITDA/Total Assets); $GROWTH_{i,t}$ = LN(Fixed Assets $_t$) - (Fixed Assets $_{t-1}$); $VOL_{i,t}$ = (Gross Margin/EBIT); The standard deviations are within the parentheses. The coefficients of the variables are significant at 1%(***), 5%(**) and 10%(*) levels of significance.

	DEBTR (1)	DEBTR (2)	LTDR (3)	LTDR (4)
C	−0.0874963* (0.0526565)	−0.0783244 (0.0552545)	0.0205136 (0.0519588)	−0.0065162 (0.0359741)
TANG	0.2889169*** (0.0349481)	0.2936458*** (0.036576)	0.3159701*** (0.0344851)	0.3136164*** (0.036297)
LAGE	0. 0378481*** (0.0095335)	0.0404102*** (0.0100614)	0.0500261*** (0.0094072)	0.0567354*** (0.0098959)
LIQ	0.0057595 *** (0.0007043)	0.0045271*** (0.0007918)	0.0104858*** (0.000695)	0.007838*** (0.0007787)
SIZE	0.0267218*** (0.0064881)	0.0240709*** (0.0067015)	−0.004626 (0.0064021)	−0.0030203 (0.0065912)
PROF	−0.3655798 *** (0.0237796)	−0.3278044*** (0.031908)	−0.2536672*** (0.0234645)	−0.210474 *** (0.0313829)
GROWTH	−0.0172208* (0.0093723)	−0.0079945 (0.0106881)	0.0078149 (0.0092481)	0.0002596 (0.0105122)
VOL	−0.0000421 (0.0000266)	−0.0000501 (0.0000353)	−0.000029 (0.0000263)	−0.0000527 (0.0000348)
CRISIS		−0.0930377*** (0.0300369)		−0.0595108** (0.0295426)
TANG*CRISIS		−0.0232698 (0.0323631)		−0.0054806 (0.0318305)
LAGE*CRISIS		0.0078356 (0.0091738)		0.0113246 (0.0090228)
LIQ*CRISIS		0.0051039*** (0.0014081)		0.0102777*** (0.0013849)
SIZE*CRISIS		0.0092074** (0.0035992)		0.0004467 (0.00354)
PROF*CRISIS		−0.0519991 (0.0439666)		−0.1024561** (0.0432431)
GROWTH*CRISIS		−0.0256443 (0.0204962)		0.021686 (0.020159)
VOL*CRISIS		0.0000346 (0.0000525)		0.0000602 (0.0000517)
N	3776	3776	3919	3919
Prob (F-statistic)	0.0000	0.0000	0.0000	0.0000

Above all, the aim of this dissertation is, as it was previously mentioned, to assess the impact of the sovereign debt crisis over the capital structure of the real estate and construction related Portuguese firms. Nevertheless, we also want to study what are the main drivers that explain the amount of debt used by firms. Therefore, we estimated eight different models using four different dependent variables, which will be analyzed along this section. The estimation model used is the fixed effects model, and all the regressions are presented in the tables 5 and 6.

The first econometric estimation, with the total debt ratio (*DEBTR*) as the dependent variable, gives us some interesting results where five out of the seven variables are significant at one percent level. The non-significant variable is *VOL,* leading us then, to reject hypothesis H5.

The variable *TANG* is positively related with the *DEBTR*, as it was expected, corroborating the first hypothesis (H1). With an increase of 1 p.p. of the tangibility of the firm it is expected an increase of, approximately, 0.29 p.p. on the total debt ratio, *ceteris paribus*. This result was also found by Rajan and Zingales (1995) for most of the countries in their sample, as well as by Michaelas et al. (1999) and Frank and Goyal (2003). Thus, we can infer that firms with higher amount of fixed assets are less risky to the debtholders, which can be related with the fact that this type of assets is associated with lower levels of asymmetric information costs and they can be used as collateral to the loans.

The variable *LAGE* also exerts a significant positive impact over the level of total debt as in Palacín-Sánchez et al. (2013) study. However, we were expecting a negative relation since older firms should be more stable and would have more capability to finance their own operations, as it was stated by the seventh hypothesis (H7), which was rejected according with this result. Regardless of we were expecting another result, this is not surprising because older firms may had already established good relations with credit institutions and are safer to be credit granted. On the contrary, the study performed by Michaelas et al. (1999), has given the opposite result, where younger firms had, on average shown higher leverage ratios.

The relation between the profitability of the firm and the level of debt is negative. This result is several times reported in other studies, for instance those of Rajan and Zingales (1995) and Talberg *et al.* (2008). In addition, this variable is one of the variables that causes more economic impact in the model. On average, it is estimated that a 1 p.p. increase of the profitability will cause a 0.37 p.p. decrease on the level of leverage of the firm, *ceteris paribus*. Thus, firms with higher profitability, on average, will engage in lower levels of debt, which is

in accordance with the pecking order theory, which states that firms will use first the internal funds generated and confirms our hypothesis 3.

The rejection of the hypothesis H6 relates with the fact that liquidity is associated with a positive correlation with debt. Although, the result of the variable liquidity it is not surprising because firms with higher levels of liquidity also have more capacity to service the debt, this result is different from the studies of these authors: Ozkan (2001), Deesomsak et al. (2004) and Akdal (2012). Yet, the economic impact of this variable is very small.

The variable *SIZE* exhibits a positive correlation with the level of debt. We were already expecting that larger firms would be less risky to creditors since the agency costs of debt are lower for these firms, although, in theory, they also would have more capacity to finance themselves. Most studies give a similar result, like the studies of Fama and French (2002), Frank and Goyal (2003) and Titman and Wessels (1988). The result validates hypothesis H2.

According with the results, there is a negative statiscal significant relation between the variable *GROWTH* and total debt, at 10% level of significance. As such, we confirm the hypothesis H4, which states that growing firms carry higher risk to credit institutions, although the result is different from the studies of Palacín-Sánchez et al. (2013) and Titman and Wessels (1988) but it is in accordance with Talberg *et al.* (2008) either for the whole sample or only for construction firms subsample.

In the second model, it is included the dummy variable, *CRISIS,* and the variables interacting with the dummy. We can see that, on average, during periods of crisis, the total debt ratio is lower than in non-crisis periods, and that the dummy crisis is significant at 1% level of significance. With this result, the hypothesis H8 is validated. This result is in accordance with Akbar et al. (2013) for UK private firms but in opposition against the results obtained by Iqbal and Kume (2013) that have shown an increase in debt ratios for German and UK companies.

However, this effect caused by crisis is attenuated for firms that are bigger and those that have more liquidity, according with the results of the estimation. Therefore, we can conclude that during the sovereign debt crisis firms with more liquidity and bigger in size were less credit constrained, everything else constant. Additionally, this econometric estimation led us to corroborate the hypotheses H12 because we do not find any significant effect on the variable *PROF* caused by crisis. There are similar results provided by other studies like Harrison and Widjaja (2014) or Mouton and Smith (2016). This could be related

with a decrease in earnings during economically unstable periods. Since *SIZE* exerts a significant positive effect on the *DBTR*, during crisis, we can corroborate hypothesis H11. The interaction between *TANG* and *CRISIS* is insignificant, thus we reject hypothesis H10.

In the third model, where the dependent variable is the long-term debt ratio (*LTDR*) we can observe that the variables that were significant in the previous model were also significant in this one, except for the variable *SIZE* and *GROWTH*. The signs also remained the same, for the significant variables. Booth *et al.*, (2001) also found similar results between the estimations of total debt ratio and long-term debt ratio. We can highlight that the economic impact caused by the variable *TANG* increased, which makes sense since credit institutions will require more collateral to grant long-term. On the other hand, *PROF* reduced its economic impact but maintained the negative sign like in Michaelas et al. (1999). They suggest that as more internal profits are accumulated, the long-term financing will be substituted by equity. We corroborate hypothesis H1a and we reject H2a because the variable is insignificant in this model. The variable *GROWTH* is insignificant in this model.

The fourth model also has the long-term debt ratio as the dependent variable, but variables related with the impact of crisis were also included. Like the previous model, in this one the results are almost the same as those on the model with the *DEBTR*. The sovereign debt crisis still exerts a negative impact over the level of leverage of the firms. However, the negative impact is smaller for this type of financing, which could mean that the supply of long-term debt was not as affected as debt as a whole. In addition, the level of significance also reduced to 5%.

Again, the level of liquidity attenuates the impact of the crisis. It could be related with higher ability to service the debt, although, firms that are more profitable have lower levels of debt during crisis, so they could prefer to finance their own operations.

Table 6 - Results of the fixed effects estimations for two dependent variables: STDR and DCR. The dependent variables are given by $STDR_{i,t}$ = (Short-Term Debt/Total Assets) and $DCR_{i,t}$ = (Short-Term Debt/Long-Term Debt). The independent variables are $TANG_{i,t}$ = (Fixed Assets/Total Assets); $LAGE_{i,t}$ = LN(Year-Year of Constitution); $LIQ_{i,t}$ = (Current Assets/Current Liabilities); $SIZE_{i,t}$ = LN(Total Assets); $PROF_{i,t}$ = (EBITDA/Total Assets); $GROWTH_{i,t}$ = LN(Fixed Assets $_t$) - (Fixed Assets $_{t-1}$); $VOL_{i,t}$ = (Gross Margin/EBIT); The standard deviations are within the parentheses The coefficients of the variables are significant at 1%(***), 5%(**) and 10%(*) levels of significance.

	STDR (5)	STDR (6)	DCR (7)	DCR (8)
C	-0.1080099^{***} (0.0383089)	-0.0718082^{*} (0.0264912)	-1.061931 (5.618111)	-0.5563139 (5.966643)
TANG	-0.0270531 (0.0254256)	-0.0199705 (0.0262343)	0.2181853 (3.486137)	0.2499148 (3.689693)
LAGE	-0.0121779^{*} (0.0069359)	-0.0163252^{**} (0.0072873)	0.1333085 (0.9889161)	0.1642729 (1.041768)
LIQ	-0.003638^{***} (0.005124)	-0.0033109^{***} (0.0005735)	-0.082415 (0.063691)	-0.0722055 (0.0715675)
SIZE	0.0313478^{***} (0.0047202)	0.0270913^{***} (0.0048538)	0.3962728 (0.6630651)	0.2043195 (0.6903147)
PROF	-0.1119125^{***} (0.0173002)	-0.1173305^{***} (0.0231103)	-1.138483 (2.498139)	-1.63853 (3.589587
GROWTH	-0.0250357^{***} (0.0068186)	-0.008254 (0.0077412)	1.673414^{*} (1.015628)	1.939286^{***} (1.185546)
VOL	-0.0000132 (0.0000194)	$2.55e-06$ (0.0000256)	0.0016002 (0.0025808)	0.0002438 (0.0033869)
CRISIS		-0.0335268 (0.0217551)		-0.1938421 (3.063735)
TANG*CRISIS		-0.0177893 (0.0234399)		-0.2027137 (3.105359)
LAGE*CRISIS		-0.003489 (0.0066444)		-1.67737^{*} (0.8922235)
LIQ*CRISIS		-0.0051738^{***} (0.0010198)		-0.0394244 (0.1291748)
SIZE*CRISIS		0.0087607^{***} (0.0026068)		0.594033^{*} (0.3513879)
PROF*CRISIS		0.0504571 (0.0318441)		0.3317407 (4.644498)
GROWTH*CRISIS		-0.0473303^{***} (0.014845)		-0.7070725 (2.157361)
VOL*CRISIS		-2.0000257 (0.0000381)		0.0028191 (0.0051622)
N	3918	3918	3169	3169
Prob (F-statistic)	0.0000	0.0000	0.0000	0.0000

The table 6 gives us the models that incorporate the short-term debt ratio (*STDR*) and the debt composition ratio (*DCR*) as dependent variables. The model 5 rejects the hypotheses H2b because the variable *SIZE* is associated with a positive signal. We were expecting that smaller firms would rely more on short-term debt because it would be more difficult and expensive for them to be financed by long-term debt. However, the evidence demonstrates that larger firms have more short-term debt, which can be related with more working capital fluctuations and the use of different types of short-term debt. Regarding the variable *GROWTH*, in theory we could expect that growing companies would rely more on short-term due to their higher risk for banks, however we observe a negative relation with the *STDR*.

The tests also rejected the hypothesis H1b since the variable *TANG* became insignificant in this model unlike the previous specifications. Thus, this could be a sign that the tangibility of the assets is important for companies with regard to long-term debt, but it is not that important for banks when they provide short-term debt.

LIQ as in Proença et al. (2014) study presented a negative coefficient for *STDR* and a positive coefficient for *LTDR*, suggesting that firms with higher liquidity levels tend to issue long-term debt instead of short-term debt. We can also observe a negative relation between *LAGE* and *STDR*, although it is only significant at a 10% level of confidence. This is an interesting result because it shows that younger firms have more short-term credit than older firms do and taking into account that age is associated with a positive relation with *LTDR*, it helps to support the evidence that younger firms are riskier than older firms are and that the costs of long-term debt are higher for smaller firms.

Our statistical evidence demonstrates that the crisis did not affect the short-term ratio. Therefore, we reject H9 that stated that firms would have higher amounts of short-term debt during periods of crisis. Even so, this result can indicate that banks were less restricted in offering short-term debt comparing with long-term debt, which is an interesting result.

In relation to the other variables, during the crisis, bigger firms have greater ability to access short-term credit, everything else constant. On the other hand, firms with more liquidity engage, on average, in lower levels of short-term debt during crisis, which can be related with less working capital management problems since the firms have more liquid assets, therefore may not need so much short-term financing. In addition, firms that are growing more have a lower *STDR* during the crisis, which is reasonable since these firms

present higher risk to the banks, in theory, and in unstable economic periods banks may be even more averse in granting finance to these firms.

The purpose of model 7 and 8 was to understand which factors led to the decision of the composition of debt by companies. Most of the variables are not significant. In model 7, we observe that *GROWTH* is significant at 10% level of significance. The sign and significance of the variable *GROWTH* is very interesting, the positive coefficient may be a sign that firms in growth have more short-term debt necessity than long-term-debt comparing with more stagnated firms, or it may be related with the risk associated with these companies. Banks may be reluctant to grant credit to firms that are growing because they may have more incentives to engage in riskier investments, and it may be harder to monitor them, so they will have a higher ponderation of short-term debt.

Results from model 8 show us that the sovereign debt crisis by itself did not cause an effect over the level of short-term debt in relation to long-term debt. Although we can see that age exercises a negative impact over this ratio during the sovereign debt crisis, size exercises a positive impact on the ratio during crisis.

6. Robustness Checks

Along this section, we will analyze several models that will be used as a complement to our overall results. Those models will be important to test the robustness of our conclusions by dividing the sample in different subsamples. Our models will follow the specifications described in table 7.

Table 7 - List of the robustness models.

Models	Specification
Model 9	The model includes only firms with a growth higher than the average.
Model 10	The model includes only firms with a growth lower than the average.
Model 11	The model includes only firms with a size higher than the average.
Model 12	The model includes only firms with a size lower than the average.
Model 13	The model includes only firms where the EBIT is positive.
Model 14	The model includes only firms where the EBIT is negative.
Model 15	The model includes only firms with a profitability higher than the average.
Model 16	The model includes only firms with a profitability lower than the average.

We will estimate each of these models using three different dependent variables: *DEBTR, LTDR* and *STDR*. After analyzing the estimations, we want to assess if these sample restrictions cause a substantial difference either on the capital structure determinants either on the impact of the crisis, comparing with the overall results of this dissertation, estimated in the previous section. We decided not to include an estimation with the dependent variable *DCR* since it became explicit in the previous section that the variables included in the model did not contribute to the explanation of this ratio.

The estimations concerning the models described in table 7 can be found in the appendix of this dissertation. The first model (9), which includes only firms with a growth higher than the average, presents some interesting results. It is easily perceptible that the determinants of capital structure, in general, maintain the signs, except for the variable related with age that is insignificant for the *DEBTR* estimation while in the model of the previous

section was positive and significant. In addition, the variable *SIZE* is positive and significant for the *LTDR*, and it was insignificant in model 3. However, the most interesting result is related with the dummy crisis because the results are substantially different from those of the previous section. First, the variable crisis is not significant for the dependent variable *DEBTR*, and is positive and negative for *LTDR* and *STDR*, respectively. Therefore, the companies that have a growth higher than the average have more long-term debt and less short-term debt during the crisis. This result was unanticipated since we were expecting that firms with higher growth would be riskier for banks, thus, they would have less long-term debt and more short-term debt during crisis, however, the model provides different evidence.

In model 10, which includes firms with growth lower than the average, we found similar results to those of section 5, except for certain exceptions. It is the first model where the variable *VOL* is significant at a 10% level of significance and shows a negative sign, as expected, although the economic impact of this variable is practically nil. Overall, the signs of the determinants are similar to the overall results and to the previous one. However, unlike the previous model, in this one the dummy *CRISIS* has exactly the same signs of the overall results, meaning that firms that have lower growth than the average have lower ratios of debt during the crisis period.

Both models 11 and 12, which divide firms between those that are bigger and smaller than the average, do not show any evidence of an impact caused by crisis on the capital structure of the firms, since the dummies related with the crisis are insignificant in all estimations of these models. Therefore, this evidence combined with that from model 9 suggests that the evidence, related with crisis, of the overall results described in the previous section, was not as robust as we might have thought. Nevertheless, the signs of the determinants are similar between these models and those of the overall results, except for the estimations that uses *STDR* as the dependent variable. In model 12, there is only one significant variable and in model 11, the variable *TANG* is negative, which could mean that firms with a lower value of tangible assets have more short-term debt because they have less flexibility in collateralize long-term debt, in relation to the sub-sample of firms that are bigger than the average.

Models 13 and 14 reflect similar results to the previous two. Again, there is not any evidence of an impact caused by the crisis. We can infer by the number of observations of the model 14 that there are few observations with negative values for EBIT. The evidence related with the determinants is similar to the overall results, although we have an interesting

significant negative coefficient for the variable *SIZE* in model 14, which could mean that bigger firms with negative EBIT prefer not to engage in long-term debt or that banks input more restrictions for these firms.

Some interesting evidence is provided by model 15 because it shows that firms with higher profitability than the average have higher long-term debt ratios and lower short-term debt ratios, during the sovereign debt crisis. In our opinion this could mean that these firms were not so affected by the restrictions imposed by banks and that they had less necessity to engage in short-term debt due to the higher profitability. In addition, this model has less significant variables than the overall results. Thus, firms that are more profitable have less determinants explaining its capital structure which could be sign that this firms are submitted to less constraints by banks, since *SIZE* and *LAGE* are insignificant.

Firms that have lower profitability than the average, described by model 16 provide results that are substantially different from the previous model. In this model, we have more significant variables than in the other. Even *VOL* is significant at 10% although its economic impact is residual. This evidence could indicate that less profitable firms are exposed to more conditionings by banks, in opposition to the more profitable ones. None of the estimations of this model provides evidence of an impact in the capital structure of firms caused by the crisis.

To summarize, on one hand these models give us evidence that the results related with the determinants of the capital structure are relatively strong but on the other hand, the evidence related with crisis seems to be weak. Therefore, it is difficult to formulate accurate conclusions regarding the impact of the sovereign debt crisis on the capital structure of the Portuguese real estate and construction related firms.

7. Conclusion

The main question, which led to the development of this dissertation, was related with the impact that the sovereign debt crisis caused on the capital structure of real estate and construction related companies.

The results obtained in the study did not provide a strong evidence that the crisis has produced any type of impact over the capital structure of the firms. Although the empirical evidence of the overall results had demonstrated that during periods of crisis firms have, on average, a lower ratio of total debt and long-term debt ratio, the robustness tests of section 6 demonstrate that the evidence related with the impact of the crisis is weak. Therefore, this dissertation cannot fully support the previous studies that found modifications in the capital structure of companies caused by economic recession periods, like the crisis in focus.

According with the overall results in section 5, the industry in focus (real estate and construction), in Portugal, was affected by the sovereign debt crisis regarding credit access, but not all of the tested debt ratios were affected. The short-term debt ratio as well as the composition of debt within the companies, given by the debt composition ratio, were not significantly affected by the crisis. Other studies, like Fosberg (2012) or Brendea (2013) also found changes in capital structure caused by the crisis, however their evidence showed a positive impact in the ratios of debt.

The overall results reflect some of the consequences advanced by the studies that focused on the modifications in the credit supply caused by the sovereign debt crisis in the peripheral European countries. At the time, society in general was not aware of the huge problems banks were experiencing, but they were serious. This instability of the banking system also could have contributed to this negative impact of the crisis in the debt ratios, like the severe liquidity problems that they were suffering. Thus, one of the conclusions that can be drawn from this study is that there was a credit supply shortage (Zeitun et al., 2016; Albertazzi et al.,2014), that can be related with Portuguese banks losing access to debt markets (Antunes and Martinho, 2012), however it appears that the short-term debt supply was not so affected. Additionally, it could have occurred some increase in the costs of the loans for non-financial firms (Neri, 2010). Therefore, the negative impact on the debt ratios could also have been caused by a lower corporate demand due to the higher costs, mainly

caused by higher spreads and not by reference interest rates that have fallen to historically low values.

Nevertheless, we have to mention that the intervention in Portugal's bailout by the *TROIKA* also could had contributed to credit restrictions by the banking system and the way firms financed their operations during this period, with the implementation of several austerity measures in the economy.

In relation to the firm-specific variables, we have found very interesting results, where we rejected and confirmed some of the formulated hypotheses in section 2. In relation to the variable *TANG* we validated two out of the three hypotheses. We found a significant positive relation between the tangibility of the firm and the total debt and long-term debt ratios and an insignificant relation with the short-term debt ratio, suggesting that banks do not take into account in this industry the relative importance of tangible assets within firms when they grant short-term debt.

Only one of the hypotheses related with *SIZE* was corroborated. The empirical evidence showed a significant positive relation between *SIZE* and the total debt ratio, as the majority of studies. However, the relation with the long-term debt ratio was insignificant and positive with short-term debt. This last result was unexpected because we were expecting that smaller firms would rely more on short-term debt.

PROF was the variable with higher economic impact and significant in the most relevant models. It kept a negative coefficient in the models, like in the study of Proença et al. (2014), giving support to the pecking order theory.

The variable *GROWTH* was significant and negative for the total debt ratio and the short-term ratio, being insignificant for the long-term debt ratio. Therefore, the respective hypothesis was confirmed. This negative relation suggests that growing companies are riskier for banks.

The variable *VOL* was not significant in any of the models. This could mean that these variables are not important in the explanation of the capital structure for the firms of this industry or that the proxies used to assess the impact of the variables were not good. The coefficients of the variables *LIQ* and *AGE* presented signs that were the opposite of what we were expecting. Thus, firms with more liquidity or older, on average present higher levels of leverage.

During the crisis period, we have found that larger firms had more facility to grant credit and that individually, the variable *TANG* did not exercise any effect during crisis, for

any of the models, which is in accordance with the results given by Deesomsak et al. (2004). The variable *PROF*, also did not exert any effect during crisis on the total and short-term debt ratio.

The main differences between the models was the change in sign (from positive to negative) of the variable *LIQ* for short-term debt. The variable *SIZE* had explanatory power in the models for *DEBTR* and *STDR,* while in the *LTDR* the variable was not significant anymore. Regarding the composition of debt, our models 7 and 8 did not found much evidence about which variables are important to its explanation.

The robustness tests performed in the last section gave support to the overall results related with the determinants of capital structure, although they have exhibited that the evidence associated with the impact of the crisis to be weak.

8. References

Akbar, S., ur Rehman, S. and Ormrod, P. (2013), "The impact of recent financial shocks on the financing and investment policies of UK private firms", *International Review of Financial Analysis*, Vol. 26, pp. 59–70.

Akdal, S. (2012), "How do firm characteristics affect capital Structure? Some UK evidence.', Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1775706 Accessed on 10/10/2017.

Albertazzi, U., Ropele, T., Sene, G., and Signoretti, F. M. (2014), "The impact of the sovereign debt crisis on the activity of Italian banks", *Journal of Banking and Finance*, Vol. 46, Nº 1, pp. 387–402.

Allen, William A. and Moessner, Richhild (2012), "The Liquidity Consequences of the Euro Area Sovereign Debt Crisis", *BIS Working Paper*, No. 390, Available at SSRN: https://ssrn.com/abstract=2195954, Accessed on 5/10/2017.

Alves, P. and Francisco, P. (2013), "The Impact of Institutional Environment in Firms' Capital Structure during the Recent Financial Crisis", Available at: http://mpra.ub.uni-muenchen.de/51300/, Accessed on 10.11.2017.

Antão, P. and Bonfim, D. (2008), "Capital Structure Decisions in the Portuguese corporate sector", *Banco de Portugal, Financial Stability Report*, pp. 173–190.

Antoniou, A., Guney, Y. and Paudyal, K. (2008), "The determinants of capital structure: capital market-oriented versus bank-oriented institutions", *Journal of Financial and Quantitative Analysis*, Vol. 43, Nº 1, pp. 59-92.

Antunes, A. and Martinho, R. (2012), "Access to Credit by Non-Financial Firms", *Banco de Portugal, Financial Stability Report*, pp. 165–183.

Arteta, C. and Hale, G. (2008), "Sovereign debt crises and credit to the private sector", *Journal of International Economics*, Vol. 74, Nº 1, pp. 53–69.

Balios, D., Daskalakis, N., Eriotis, N., and Vasiliou, D. (2016), "SMEs Capital Structure Determinants During Severe Economic Crisis : The Case of Greece", *Cogent Economics & Finance*, Vol. 4, Nº 1, pp. 1–11.

Baumol, W. J. and Malkiel, B. G. (1967), "The Firm's Optimal Debt-Equity Combination and the Cost of Capital", *The Quarterly Journal of Economics*, Vol. 81, Nº 4 , pp. 547–578.

Bierman, H. and Thomas, L. J. (1972), "Ruin Considerations and Debt Issuance", *Journal of Financial and Quantitative Analysis*, Vol. 7, Nº 1, pp. 1361–1378.

Booth, L., Aivazian, V., Demirguc-Kunt, A. and Maksimovic, V. (2001), "Capital Structures in Developing Countries", *The Journal of Finance*, Vol. 56, Nº 1, pp. 87–130.

Bradley, M., Jarrell, G. a and Kim, E. H. (1984), "On the Existence of an Optimal Capital Structure: Theory and Evidence", *Journal of Finance*, Vol. 39, Nº 3, pp. 857-858.

Brendea, G. (2013), "The impact of the recent financial crisis on the capital structure choices of the Romanian listed firms", *Review of Economic Studies and Research Virgil Madgearu*, Nº 2, pp. 15–26.

De Bruyckere, V., Gerhardt, M., Schepens, G., and Vander Vennet, R. (2013), "Bank/sovereign risk spillovers in the European debt crisis", *Journal of Banking and Finance*, Vol. 37, Nº 12, pp. 4793–4809.

Campello, M., Giambona, E., Graham, J. R., and Harvey, C. R. (2011), "Access to liquidity and corporate investment in Europe during the financial crisis", *Review of Finance*, Vol. 16, Nº 2, pp. 323–346.

Casey, E. and O'Toole, C. M. (2014), "Bank lending constraints, trade credit and alternative financing during the financial crisis: Evidence from European SMEs", *Journal of Corporate Finance*, Nº 27, pp. 173–193.

Custódio, C., Ferreira, M. A. and Laureano, L. (2013), "Why are US firms using more short-term debt?", *Journal of Financial Economics*, Vol. 108, Nº1, pp. 182–212.

DeAngelo, H. and Masulis, R. W. (1980), "Optimal capital structure under corporate and personal taxation", *Journal of Financial Economics*, Vol. 8, Nº1, pp. 3–29.

Deesomsak, R., Paudyal, K. and Pescetto, G. (2004), "The determinants of capital structure: Evidence from the Asia Pacific region", *Journal of Multinational Financial Management*, Vol. 14, Nº 4, pp. 387–405.

De Jong, A., Kabir, R. and Nguyen, T. T. (2008), "Capital structure around the world: The roles of firm- and country-specific determinants", *Journal of Banking and Finance*, Vol. 32, Nº 9, pp. 1954–1969.

Demirguc-Kunt, A., Martinez-Peria, M. S. and Tressel, T. (2015), "The impact of the global financial crisis on firms' capital structure: The Role of Financial Markets and Institutions", World Bank Group: Policy Research Working Paper nº 7522.

Éltető, A. (2011), "Portugal and Spain: Causes and effects of the crisis", *Baltic Journal of European Studies*, Vol.1, Nº 2, pp. 34–48.

Faccio, M. and Xu, J. (2015), "Taxes and Capital Structure", *Journal of Financial and Quantitative Analysis*, Vol. 50, Nº3, pp. 277–300.

Fama, E. F. and French, K. R. (2002), "Testing Trade-Off and Pecking Order Predictions About Dividends and Debt", *Review of Financial Studies*, Vol. 15, Nº 1, pp. 1–33.

Farinha, L. and Félix, S. (2014), "An analysis of financing constraints for Portuguese SMEs", *Banco de Portugal, Financial Stability Report*, pp. 1–20.

Fosberg, R. H. (2012), "Capital structure and the financial crisis", *Journal of Finance and Accountancy*, Nº 11, pp. 1–10.

Frank, M. Z. and Goyal, V. K. (2003), "Testing the pecking order theory of capital structure", *Journal of Financial Economics*, Vol. 67, Nº 2, pp. 217-248.

Frank, M. Z. and Goyal, V. K. (2009), "Capital structure decision: Which factors are reliably important", *Financial Management*, Vol. 38, Nº 1, pp. 1–37.

Gaud, P., Jani, E., Hoesli, M. and Bender, A. (2005), "The Capital Structure of Swiss Companies: an Empirical Analysis Using Dynamic Panel Data", *European Financial Management*, Vol. 11, Nº 1, pp. 51–69.

Gorjão, P. (2012), "Portugal and the Straitjacket of the European Financial Crisis", *The International Spectator*, Vol. 47, N º 4, pp. 64–68.

Hall, G., Hutchinson, P. and Michaelas, N. (2000), "Industry Effects on the Determinants of Unquoted SMEs Capital Structure", *International Journal of the Economics of Business*, Vol. 7, Nº 3, pp. 297–312.

Harris, M., and Raviv, A. (1991), "The theory of capital structure", *The Journal of Finance*, Vol. 46, Nº 1, 297-355.

Harrison, B. and Wisnu Widjaja, T. (2014), "The Determinants of Capital Structure: Comparison between Before and After Financial Crisis", *Economic Issues*, Vol, 19, Nº 2, pp. 55–82.

Hernandez-Canovas, G. and Koeter-Kant, J. (2008), "Debt Maturity and Relationship Lending: An Analysis of European SMEs", *International Small Business Journal*, Vol. 26, Nº 5, pp. 595–617.

Hsiao, C. (2003) 'Analysis of panel data (Vol. 34)', *Econometric Society Monographs*.

Iqbal, A. and Kume, O. (2014), "Impact of financial crisis on capital structure of UK firms", *Multinational Finance Journal*, Vol. 18, Nº 3/4, pp. 249-280.

Iyer, R., Peydró, J. L., da-Rocha-Lopes, S., and Schoar, A (2014), "Interbank liquidity crunch and the firm credit crunch: Evidence from the 2007-2009 crisis", *Review of Financial Studies*, Vol. 27, Nº 1, pp. 347–372.

Jensen, M. C. (1986) "Agency Costs of Free Cash Flow, Corporate Finance and Takeovers", *The American Economic Review*, Vol. 76, Nº 2, 323-329.

Jensen, M. C. and Meckling, W. H. (1976), "Theory of the Firm : Managerial Behavior , Agency Costs and Ownership Structure", *Journal of Financial Economics*, Vol. 3, Nº 4, pp. 0–5.

Kahle, K. M. and Stulz, R. M. (2013), "Access to capital, investment, and the financial crisis", *Journal of Financial Economics*, Vol 110, Nº 2, pp. 280–299.

Kanda, S. and Iqbal, T. (2014), "How the Sovereign Debt Crisis Affected the Capital Structure of Euro Zone Banks", *Innovative Space of Scientific Research Journals*, Vol. 9, Nº 4, pp. 1887–1908.

Kim, E. H. (1978), "A Mean-Variance Theory of Optimal Capital Structure and Corporate Debt Capacity", *The Journal of Finance*, Vol. 33, Nº 1, pp. 45–63.

Kraus, A., and Litzenberger, R. H. (1973), "A State-Preference Model of Optimal Financial Leverage", *The Journal of Finance*, Vol. 28, Nº 4, pp. 911–922.

Lane, P. R. (2012), "The European sovereign debt crisis", *The Journal of Economic Perspectives*, Vol. 26, Nº 3, pp. 49–67.

Lemmon, M. L., Roberts, M. R., and Zender, J. F. (2008), "Back to the Beginning : Persistence and the Cross-Section of Corporate Capital Structure", *The Journal of Finance*, Vol. 63, Nº 4, pp. 1575–1608.

Long, M. S. and Malitz, I. B. (1985), "Investment Patterns and Financial Leverage", Benjamin M. Friedman, *Corporate Sapital structures in the United States*, pp. 325–352.

Mac an Bhaird, C., and Lucey, B. (2010), "Determinants of capital structure in Irish SMEs", *Small Business Economics*, Vol. 35, Nº 3, pp. 357–375.

Michaelas, N., Chittenden, F. and Poutziouris, P. (1999), "Financial policy and capital structure choice in UK SMEs: evidence from company panel data", *Small Business Economics*, Vol. 12, Nº 2, pp. 113–130.

Miller, M. H. (1977), "Debt and Taxes", *The Journal of Finance*, Vol. 32, Nº 2, pp. 261–275.

Modigliani, F. and Miller, M. H. (1958), "The cost of capital, corporation finance and the theory of investment", *The American Economic Review*, Vol. 48, Nº 3, pp. 261–297.

Modigliani, F. and Miller, M. H. (1963), "Corporate Income Taxes and the Cost of Capital: A Correction', *The American Economic Review*, Vol. 53, Nº 3, pp. 433–443.

Mostarac, E. and Petrovic, S. (2013), "Determinants of Capital Structure of Croation Enterprises Before and During the Financial Crisis", *UTMS Journal of Economics*, Vol. 4, Nº 2, pp. 153–162.

Mouton, M. and Smith, N. (2016), "Company Determinants of Capital Structure on the Jse Ltd and the Influence of the 2008 Financial Crisis", *Journal of Economic and Financial Sciences*, Vol. 9, Nº 93, pp. 789–806.

Myers, C. (1977), "Determinants of Corporate Borrowing", *Journal of Financial Economics*, Vol. 5, Nº 2, pp. 147–175.

Myers, S. C. (1984), "The Capital Structure Puzzle", *The Journal of Finance*, Vol. 39, Nº 3, pp. 574-592.

Myers, S. C. (2001), "Capital Structure", *The Journal of Economic Perspectives*, Vol. 15, Nº 2, pp. 81–102.

Myers, S. C. (2002), "Financing of Corporations", *Handbook of the Economics of Finance*, Nº1, pp. 1–43.

Myers, S. C. and Majluf, N. S. (1984), "Corporate financing and investment decisions when firms have information that investors do not have", *Journal of Financial Economics*, Vol. 13, Nº 2, pp. 187–221.

Neri, S. (2010), "The impact of the sovereign debt crisis on bank lending rates in the euro area", Bank of Italy Occasional Paper No. 170, Available at SSRN: https://ssrn.com/abstract=2284804, Accessed on: 29.10.2017.

Niu, X. (2008), "Theoretical and Practical Review of Capital Structure and its Determinants", *International Journal of Business and Management*, Vol. 3, Nº 3, pp. 133–139.

Ozkan, A. (2001), "Determinants of capital structure and adjustment to long run target: Evidence from UK company panel data", *Journal of Business Finance and Accounting*, Vol. 28, Nº (1–2), pp. 175–198.

Palacín-Sánchez, M. J., Ramírez-Herrera, L. M. and di Pietro, F. (2013), "Capital structure of SMEs in Spanish regions", Small Business Economics, Vol. 41, Nº 2, pp. 503–519.

Proença, P., Laureano, R. M. S. and Laureano, L. M. S. (2014), "Determinants of Capital Structure and the 2008 Financial Crisis: Evidence from Portuguese SMEs", *Procedia - Social and Behavioral Sciences*, Nº 150, pp. 182–191.

Rajan, R. G. and Zingales, L. (1995), "What Do We Know about Capital Structure? Some Evidence from International Data", *The Journal of Finance*, Vol. 50, Nº 5, pp. 1421–1460.

Ross, S. A. (1977), "The Determination of Financial Structure: The Incentive-Signalling Approach", *The Bell Journal of Economics*, Vol. 8, Nº 1, pp. 23–40.

De Santis, R. A. (2014), "The euro area sovereign debt crisis: Identifying flight-to-liquidity and the spillover mechanisms", *Journal of Empirical Finance*, Nº 26, pp. 150–170.

Scott, J. H. (1976), "A Theory of Optimal Capital Structure", *The Bell Journal of Economics*, Vol. 7, Nº 1, pp. 33–54.

Scott, J. H. (1977), "Bankruptcy, Secured Debt, and Optimal Capital Structure", *The Journal of Finance*, Vol. 32, Nº 1, pp. 1–19.

Sgherri, S. and Zoli, E. (2011), "Euro Area Sovereign Risk During the Crisis', Sovereign Debt: From Safety to Default", *IMF Working Papers*, Available at SSRN: https://ssrn.com/abstract=1490223, Accessed on 15.11.2017.

Stiglitz, J. E. (1988), "Why Financial Structure Matters", *The Journal of Economic Perpectives*,Vol. 2, Nº 4, pp. 121-126.

Talberg, M. , M., Winge, C., Frydenberg, S., and Westgaard, S. (2008), "Capital Structure Across Industries", *International Journal of the Economics of Business*, Vol. 15, Nº 2, pp. 181–200.

Titman, S. and Wessels, R. (1988), "The Determinants of Capital Structure Choice", *The Journal of Finance*, Vol. 43, Nº 1, pp. 1–19.

Varoufakis, Y. (2016), And the weak suffer what they must?: Europe, austerity and the threat to global stability, Random House.

Varoufakis, Y., Holland, S. and Galbraith, J. K. (2013), "A Modest Proposal for Resolving the Euro Crisis", Available at: https://varoufakis.files.wordpress.com/2013/07/a-modest-proposal-for-resolving-the-eurozone-crisis-version-4-0-final1.pdf, Accessed on: 19.06.2018

Wald, J. K. (1999), "How firm characteristics affect capital structure: an international comparison.", *Journal of Financial Research*, Vol. 22, Nº 2, pp. 161–187.

Wooldridge, J. M. (2012) 'Introductory Econometrics: A Modern Approach, South-Western: Cengage Learning.

Zeitun, R., Temimi, A. and Mimouni, K. (2016), "Do financial crises alter the dynamics of corporate capital structure? Evidence from GCC countries", *The Quarterly Review of Economics and Finance*, Nº 63, pp. 1–40.

Appendix

Table 8 - Estimations' results including only firms with a growth higher than the average. The standard deviations are within the parentheses. The variables are given by: $DEBTR_{i,t}$ = (Total Debt/Total Assets); $LTDR_{i,t}$ = (Long-Term Debt/Total Assets); $STDR_{i,t}$ = (Short-Term Debt/Total Assets); $TANG_{i,t}$= (Fixed Assets/Total Assets); $LAGE_{i,t}$= LN(Year-Year of Constitution); $LIQ_{i,t}$= (Current Assets/Current Liabilities); $SIZE_{i,t}$= LN(Total Assets); $PROF_{i,t}$= (EBITDA/Total Assets); $GROWTH_{i,t}$= LN(Fixed Assets $_t$) - (Fixed Assets $_{t-1}$) and $VOL_{i,t}$= (Gross Margin/EBIT). The coefficients of the variables are significant at 1%(***), 5%(***) and 10%(***) levels of significance.

Model 9	DEBTR	DEBTR	LTDR	LTDR	STDR	STDR
C	-0.173806^{***} (0.0491978)	-0.1926275^{***} (0.0512542)	-0.0938893^{**} (0.0466529)	-0.1750318^{***} (0.0478086)	-0.0799167^{**} (0.0376268)	-0.0175956 (0.0387508)
TANG	0.310604^{***} (0.044233)	0.3305153^{***} (0.0456445)	0.3497026^{***} (0.041945)	0.3926416^{***} (0.042576)	$-.0390986$ (0.0338297)	-0.0621263^{*} (0.0345096)
LAGE	-0.002332 (0.0106634)	-0.0015987 (0.0112066)	0.0173002^{*} (0.0101118)	0.0147902 (0.0104533)	-0.0196322^{**} (0.0081554)	-0.0163888^{*} (0.0084728)
LIQ	0.0225445^{***} (0.0014511)	0.0267662^{***} (0.0029163)	0.0284988^{***} (0.001376)	0.0423513^{***} (0.0027202)	-0.0059543^{***} (0.0011098)	-0.015585^{***} (0.0022048)
SIZE	0.0471415^{***} (0.0071685)	0.04598^{***} (0.007476)	0.015695^{**} (0.0067977)	0.0216832^{***} (0.0069735)	0.0314464^{***} (0.0054825)	0.0242968^{***} (0.0056523)
PROF	-0.3650116^{***} (0.0318375)	-0.2577781^{***} (0.0405548)	-0.2685642^{**} (0.0301906)	-0.1698124^{**} (0.0378285)	-0.0964474^{***} (0.0243495)	-0.0879656^{***} (0.0000409)
VOL	-0.0000365 (0.000043)	$-.000032$ (0.0000541)	-0.0000363 (0.0000407)	-0.0000427 (0.0000505)	$-2.12e-07$ (0.0000329)	0.0000107 (0.0301306)
CRISIS		0.0402679 (0.0398526)		0.1747153^{***} (0.0371735)		-0.1344475^{***} (0.0376833)
TANG*CRISIS		-0.0932393^{*} (0.0498422)		-0.1960208^{**} (0.0464915)		0.1027816^{***} (0.009809)
LAGE*CRISIS		-0.0102599 (0.0129739)		-0.0105692 (0.0121017)		0.0003093 (0.0024248)
LIQ*CRISIS		-0.0051858 (0.0032072)		-0.0177816^{**} (0.0029916)		0.0125958^{***} (0.0037814)
SIZE*CRISIS		0.0052181 (0.0050015)		-0.0089499^{*} (0.0046653)		0.014168^{***} (0.0454726)
PROF*CRISIS		-0.2612768^{***} (0.0601448)		-0.2667637^{**} (0.0561015)		0.0054869 (0.000065)
VOL*CRISIS		-0.0000201 (0.000086)		0.0000145 (0.0000802)		-0.0000345 (0.0387508)
N	1639	1639	1639	1639	1639	1639
Prob (F-statistic)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Table 9 - Estimations' results including only firms with a growth lower than the average. The standard deviations are within the parentheses. The variables are given by: $DEBTR_{i,t}$ = (Total Debt/Total Assets); $LTDR_{i,t}$ = (Long-Term Debt/Total Assets); $STDR_{i,t}$ = (Short-Term Debt/Total Assets); $TANG_{i,t}$ = (Fixed Assets/Total Assets); $LAGE_{i,t}$ = LN(Year-Year of Constitution); $LIQ_{i,t}$ = (Current Assets/Current Liabilities); $SIZE_{i,t}$ = LN(Total Assets); $PROF_{i,t}$ = (EBITDA/Total Assets); $GROWTH_{i,t}$ = LN(Fixed Assets $_t$) - (Fixed Assets $_{t-1}$) and $VOL_{i,t}$ = (Gross Margin/EBIT). The coefficients of the variables are significant at 1%(***), 5%(***) and 10%(***) levels of significance.

Model 10	DEBTR	DEBTR	LTDR	LTDR	STDR	STDR
C	-0.2938286^{***} (0.0919388)	-0.2241301 (0.0960053)	-0.077816 (0.0923559)	-0.0926288 (0.0963149)	-0.2160126^{***} (0.066004)	0.1315013^{*} (0.0681264)
TANG	0.2212626^{***} (0.0433562)	0.208508^{***} (0.0458738)	0.2471482^{***} (0.0435529)	0.2114659^{***} (0.0460217)	-0.0258857 (0.0311259)	-0.0029579 (0.0098187)
LAGE	0.0868411^{***} (0.0124595)	0.0832875^{***} (0.0138367)	0.0729993^{***} (0.0125161)	0.2114659^{***} (0.0138814)	0.0138417 (0.0089449)	0.0000819 (0.0006063)
LIQ	0.0024526^{***} (0.0008106)	0.0030422^{***} (0.0008544)	0.0071019^{***} (0.0008142)	0.0061629^{***} (0.0008571)	-0.0046493^{***} (0.0005819)	-0.0031207^{***} (0.0069212)
SIZE	0.0340118^{***} (0.0095033)	0.0267333^{***} (0.0097535)	0.0001532 (0.0095464)	-0.0007469 (0.0097849)	0.0338586^{***} (0.0068225)	0.0274802^{***} (0.0288755)
PROF	-0.3194998^{***} (0.0293835)	-0.3084508^{***} (0.040692)	-0.1921174^{***} (0.0295168)	-0.1810321^{***} (0.0408232)	-0.1273824^{***} (0.0210947)	-0.1274187^{***} (0.0000302)
VOL	-0.0000549^{*} (0.0000323)	$-.0000659$ (0.0000425)	-0.0000345 (0.0000325)	-0.0000534 (0.0000427)	$-.0000204$ (0.0000232)	-0.0000125 (0.0319191)
CRISIS		-0.1409719^{***} (0.0449812)		-0.1771753^{***} (0.0451262)		0.0362034 (0.0291163)
TANG*CRISIS		0.0245933 (0.0410313)		0.0927721^{**} (0.0411636)		-0.0681788^{**} (0.0098105)
LAGE*CRISIS		0.020493 (0.0138252)		0.0332243^{**} (0.0138698)		-0.0127313 (0.001371)
LIQ*CRISIS		-0.0033796^{*} (0.0019321)		0.0072004^{***} (0.0019383)		-0.01058^{***} (0.0034062)
SIZE*CRISIS		0.0109598^{**} (0.0048)		0.0045743 (0.0048155)		0.0063855^{*} (0.0382446)
PROF*CRISIS		-0.0018989 (0.0538951)		-0.035957 (0.0540689)		0.0340581 (0.0000458)
VOL*CRISIS		0.0000397 (0.0000645)		0.0000521 (0.0000647)		-0.0000124 (0.0000458)
N	2474	2474	2474	2474	2474	2474
Prob (F-statistic)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Table 10 - Estimations' results including only firms with a size higher than the average. The standard deviations are within the parentheses. The variables are given by: $DEBTR_{i,t}$ = (Total Debt/Total Assets); $LTDR_{i,t}$ = (Long-Term Debt/Total Assets); $STDR_{i,t}$ = (Short-Term Debt/Total Assets); $TANG_{i,t}$ = (Fixed Assets/Total Assets); $LAGE_{i,t}$ = LN(Year-Year of Constitution); $LIQ_{i,t}$ = (Current Assets/Current Liabilities); $SIZE_{i,t}$ = LN(Total Assets); $PROF_{i,t}$ = (EBITDA/Total Assets); $GROWTH_{i,t}$ = LN(Fixed Assets $_t$) - (Fixed Assets $_{t-1}$) and $VOL_{i,t}$ = (Gross Margin/EBIT). The coefficients of the variables are significant at 1%(***), 5%(***) and 10%(***) levels of significance.

Model 11	DEBTR	DEBTR	LTDR	LTDR	STDR	STDR
C	0.0224555	0.0549161	−0.0556792	−0.0412955	0.0781347**	0.0962116**
	(0.0478236)	(0.0514553)	(0.0488967)	(0.0527109)	(0.0357548)	(0.0379327)
TANG	0.2391747***	0.295483***	0.3223608***	0.3360352***	−0.0831861**	−0.0405522
	(0.0501762)	(0.0526493)	(0.0513021)	(0.0539341)	(0.0375137)	(0.0388129)
LAGE	0.0861581***	0.0724489***	0.0660098***	0.0634821***	0.0201483*	0.0089668
	(0.0145642)	(0.0159158)	(0.014891)	(0.0163042)	(0.0108887)	(0.0117331)
LIQ	0.0020257**	0.0025794***	0.0066119***	0.0056701***	−0.0045862***	−0.0030907***
	(0.0007929)	(0.0008284)	(0.0008107)	(0.0008486)	(0.0005928)	(0.0006107)
PROF	−0.5307516***	−0.5963052***	−0.3010986***	−0.379708***	−0.229653***	−0.2165972***
	(0.0377456)	(0.0524059)	(0.0385925)	(0.0536848)	(0.0282201)	(0.0386335)
GROWTH	−0.017607	−0.0130704	0.0002598	−0.0043821	−0.0178668*	−0.0086883
	(0.0140053)	(0.016422)	(0.0143196)	(0.0168227)	(0.0104709)	(0.0121062)
VOL	−0.0000595*	−0.0000674	−0.0000465	−0.0000747	−0.000013	$7.24e-06$
	(0.0000346)	(0.0000468)	(0.0000354)	(0.000048)	(0.0000259)	(0.0000345)
CRISIS		−0.0182205		−0.0488422		0.0306217
		(0.0399912)		(0.0409672)		(0.0294814)
TANG*CRISIS		−0.1078744***		−0.0365768		−0.0712976**
		(0.0397135)		(0.0406826)		(0.0292767)
LAGE*CRISIS		0.0163107		0.0095438		0.0067669
		(0.0116551)		(0.0119396)		(0.0085921)
LIQ*CRISIS		−0.0047036**		0.0066721***		−0.0113758***
		(0.0019097)		(0.0019563)		(0.0014078)
PROF*CRISIS		0.1610351**		0.1351885*		0.0258466
		(0.0695354)		(0.0712322)		(0.0512613)
GROWTH*CRISIS		−0.0160957		−0.0024002		−0.0136955
		(0.0312903)		(0.0320539)		(0.0230671)
VOL*CRISIS		0.0000288		0.0000564		−0.0000276
		(0.0000683)		(0.00007)		(0.0000504)
N	2188	2188	2188	2188	2188	2188
Prob (F-statistic)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Table 11 - Estimations' results including only firms with a size lower than the average. The standard deviations are within the parentheses. The variables are given by: $DEBTR_{i,t}$ = (Total Debt/Total Assets); $LTDR_{i,t}$ = (Long-Term Debt/Total Assets); $STDR_{i,t}$ = (Short-Term Debt/Total Assets); $TANG_{i,t}$= (Fixed Assets/Total Assets); $LAGE_{i,t}$= LN(Year-Year of Constitution); $LIQ_{i,t}$= (Current Assets/Current Liabilities); $SIZE_{i,t}$= LN(Total Assets); $PROF_{i,t}$= (EBITDA/Total Assets); $GROWTH_{i,t}$= LN(Fixed Assets $_t$) - (Fixed Assets $_{t-1}$) and $VOL_{i,t}$= (Gross Margin/EBIT). The coefficients of the variables are significant at 1%(***), 5%(***) and 10%(***) levels of significance.

Model 12	DEBTR	DEBTR	LTDR	LTDR	STDR	STDR
C	0.0976162	0.0977547***	−0.0090294	−0.0301135	0.1066456***	0.1278682***
	(0.0309143)	(0.0321282)	(0.0293655)	(0.0304295)	(0.0226016)	(0.0234603)
TANG	0.2615271***	0.2235845***	0.3128349***	0.2929753***	−0.0513079	−0.0693909*
	(0.0463371)	(0.0491678)	(0.0440158)	(0.0465682)	(0.0338774)	(0.0359027)
LAGE	0.0350623***	0.0382121***	0.0344129***	0.0453049***	0.0006494	−0.0070928
	(0.0110061)	(0.0116889)	(0.0104547)	(0.0110709)	(0.0080466)	(0.0085353)
LIQ	0.0161868***	0.011878***	0.0213059***	0.0185873***	−0.0051191***	−0.0067093***
	(0.0013776)	(0.0021408)	(0.0013086)	(0.0020276)	(0.0010072)	(0.0015632)
PROF	−0.2559434***	−0.1887411***	−0.2289349***	−0.1319695***	−0.0270085	−0.0567716*
	(0.0301079)	(0.0398306)	(0.0285996)	(0.0377247)	(0.0220121)	(0.0290846)
GROWTH	0.0142404	0.0110854	0.0178078	0.0063693	−0.0035674	0.0047161
	(0.0115857)	(0.0133762)	(0.0110053)	(0.0126689)	(0.0084704)	(0.0097674)
VOL	−0.0000202	−0.0000239	−0.0000109	−0.0000244	$-9.24e-06$	$4.19e-07$
	(0.00004)	(0.000052)	(0.000038)	(0.0000493)	(0.0000292)	(0.000038)
CRISIS		−0.0498918		−0.0275384		0.0223534
		(0.0377114)		(0.0357175)		(0..0275372)
TANG*CRISIS		0.0943244*		0.0125263		0.0817981**
		(0.0534941)		(0.0506657)		(0..0390618)
LAGE*CRISIS		0.0122829		0.0064208		0.0058621
		(0.0133588)		(0.0126524)		(0.0097547)
LIQ*CRISIS		0.0069171***		0.0045696*		0.0023475
		(0.0026007)		(0.0024632)		(0.001899)
PROF*CRISIS		−0.1280209**		−0.2283848***		0.1003639**
		(0.0565553)		(0.0535651)		(0.0412972)
GROWTH*CRISIS		0.0096377		0.0323104		−0.0226726
		(0.0266611)		(0.0252514)		(0.0194681)
VOL*CRISIS		0.0000278		0.0000534		−0.0000255
		(0.0000793)		(0.0000751)		(0.0000579)
N	1588	1588	1588	1588	1588	1588
Prob (F-statistic)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Table 12 - Estimations' results including only firms with an EBIT higher than zero. The standard deviations are within the parentheses. The variables are given by: $DEBTR_{i,t}$ = (Total Debt/Total Assets); $LTDR_{i,t}$ = (Long-Term Debt/Total Assets); $STDR_{i,t}$ = (Short-Term Debt/Total Assets); $TANG_{i,t}$= (Fixed Assets/Total Assets); $LAGE_{i,t}$= LN(Year-Year of Constitution); $LIQ_{i,t}$= (Current Assets/Current Liabilities); $SIZE_{i,t}$= LN(Total Assets); $PROF_{i,t}$= (EBITDA/Total Assets); $GROWTH_{i,t}$= LN(Fixed Assets $_t$) - (Fixed Assets $_{t-1}$) and $VOL_{i,t}$= (Gross Margin/EBIT). The coefficients of the variables are significant at 1%(***), 5%(***) and 10%(***) levels of significance.

Model 13	DEBTR	DEBTR	LTDR	LTDR	STDR	STDR
C	−0.2455601***	−0.2317903***	−0.1042646**	−0.1339191***	−0.1412955***	−0.0978712**
	(0.0486614)	(0.050729)	(0.0468132)	(0.1339191)	(0.0374649)	(0.0388136)
TANG	0.2091422***	0.2081152***	0.2732591***	0.284859***	−0.064117**	−0.0767439***
	(0.0342256)	(0.0359612)	(0.0329257)	(0.0344102)	(0.0263506)	(0.0275145)
LAGE	0.033087***	0.0303617***	0.0438378***	0.0464454***	−0.0107508	−0.0160837**
	(0.008862)	(0.0093014)	(0.0085254)	(0.0089003)	(0.0068229)	(0.0071167)
LIQ	0.0073965***	0.006419***	0.0135391***	0.0113245***	−0.0061426***	−0.0049056***
	(0.0008768)	(0.0009462)	(0.0008435)	(0.0009054)	(0.0006751)	(0.0007239)
SIZE	0.0420582***	0.0410451***	0.0079131	0.0112*	0.0341451***	0.0298451***
	(0.0063417)	(0.0065674)	(0.0061009)	(0.0062841)	(0.0048826)	(0.0050248)
GROWTH	0.000368	0.0080326	0.0127209	0.0084099	−0.0123528*	−0.0003773
	(0.0087944)	(0.009878)	(0.0084604)	(0.009452)	(0.0067709)	(0.0075578)
VOL	0.0000592*	0.0000584	0.0000431	0.0000284	0.0000161	0.00003
	(0.0000314)	(0.00004)	(0.0000302)	(0.0000383)	(0.0000242)	(0.0000306)
CRISIS		−0.0393694		−0.0395717		0.0002024
		(0.0301608)		(0.0288601)		(0.0230765)
TANG*CRISIS		0.0065612		−0.0534068		0.059968**
		(0.037863)		(0.03623)		(0.0289696)
LAGE*CRISIS		0.0011619		0.0132438		−0.0120819*
		(0.0094157)		(0.0090097)		(0.0072041)
LIQ*CRISIS		0.0054553***		0.0118179*		−0.0063626***
		(0.0019931)		(0.0019071)		(0.001525)
SIZE*CRISIS		0.0044648		−0.0026365		0.0071013**
		(0.0039707)		(0.0037995)		(0.003038)
GROWTH*CRISIS		−0.0039707		0.0073397		−0.0330157**
		(0.0202614)		(0.0193875)		(0.0155023)
VOL*CRISIS		$-7.90e-06$		0.00000361		−0.000044
		(0.0000604)		(0.0000578)		(0.0000462)
N	3095	3095	3095	3095	3095	3095
Prob (F-statistic)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Table 13 - Estimations' results including only firms with an EBIT lower than zero. The standard deviations are within the parentheses. The variables are given by: $DEBTR_{i,t}$ = (Total Debt/Total Assets); $LTDR_{i,t}$ = (Long-Term Debt/Total Assets); $STDR_{i,t}$ = (Short-Term Debt/Total Assets); $TANG_{i,t}$= (Fixed Assets/Total Assets); $LAGE_{i,t}$= LN(Year-Year of Constitution); $LIQ_{i,t}$= (Current Assets/Current Liabilities); $SIZE_{i,t}$= LN(Total Assets); $PROF_{i,t}$= (EBITDA/Total Assets); $GROWTH_{i,t}$= LN(Fixed Assets $_t$) - (Fixed Assets $_{t-1}$) and $VOL_{i,t}$= (Gross Margin/EBIT). The coefficients of the variables are significant at 1%(***), 5%(***) and 10%(***) levels of significance.

Model 14	DEBTR	DEBTR	LTDR	LTDR	STDR	STDR
C	0.3387935	0.3636506	0.7701712**	0.6690929*	−0.4313777*	−0.3054423
	(0.3602376)	(0.3751084)	(0.3755968)	(0.3879563)	(0.2415254)	(0.2466995)
TANG	0.3966398***	0.4257697***	0.3455489***	0.3728286***	0.051091	0.0529411
	(0.1271878)	(0.1330003)	(0.1326107)	(0.1375557)	(0.0852745)	(0.087471)
LAGE	0.0972303*	0.0769429	0.1040128*	0.0928221	−0.0067824	−0.0158792
	(0.0511983)	(0.0575761)	(0.0533812)	(0.0595482)	(0.0343265)	(0.0378664)
LIQ	0.0006712	0.0007873	0.0042005***	0.0026029	−0.0035294***	−0.0018156
	(0.0014625)	(0.0017111)	(0.0015249)	(0.0017697)	(0.0009806)	(0.0011254)
SIZE	−0.0361878	−0.0330682	−0.1018463***	−0.0857316***	0.0656585***	0.0526634**
	(0.0302268)	(0.0313918)	(0.0315155)	(0.032467)	(0.0202659)	(0.0206456)
GROWTH	−0.0945902**	−0.1009282*	−0.0140672	−0.0687006	−0.080523***	−0.0322275
	(0.0384759)	(0.0555445)	(0.0401163)	(0.057447)	(0.0257966)	(0.0365302)
VOL	0.0000534	0.0001336	0.0000285	0.0000826	0.0000249	0.0000511
	(0.0000801)	(0.0001251)	(0.0000836)	(0.0001293)	(0.0000537)	(0.0000822)
CRISIS		0.1045413		0.1934228		−0.0888815
		(0.1188271)		(0.122897)		(0.0781496)
TANG*CRISIS		−0.0340974		−0.0150636		−0.0190338
		(0.0772518)		(0.0798977)		(0.0508066)
LAGE*CRISIS		−0.0125546		−0.0271664		0.0146119
		(0.0307478)		(0.0318009)		(0.0202221)
LIQ*CRISIS		−0.000137		0.0054215*		−0.0055585***
		(0.0028812)		(0.0029799)		(0.0018949)
SIZE*CRISIS		−0.0055843		−0.0146636		0.0090793
		(0.0099015)		(0.0102407)		(0.006512)
GROWTH*CRISIS		0.0117514		0.0738617		−0.0621103
		(0.0761028)		(0.0787094)		(0.0500509)
VOL*CRISIS		−0.0001458		−0.0001087		−0.0000371
		(0.0001655)		(0.0001711)		(0.0001088)
N	681	681	681	681	681	681
Prob (F-statistic)	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000

Table 14 - Estimations' results including only firms with a profitability higher than the average. The standard deviations are within the parentheses. The variables are given by: $DEBTR_{i,t}$ = (Total Debt/Total Assets); $LTDR_{i,t}$ = (Long-Term Debt/Total Assets); $STDR_{i,t}$ = (Short-Term Debt/Total Assets); $TANG_{i,t}$ = (Fixed Assets/Total Assets); $LAGE_{i,t}$ = LN(Year-Year of Constitution); $LIQ_{i,t}$ = (Current Assets/Current Liabilities); $SIZE_{i,t}$= LN(Total Assets); $PROF_{i,t}$= (EBITDA/Total Assets); $GROWTH_{i,t}$= LN(Fixed Assets $_t$) - (Fixed Assets $_{t-1}$) and $VOL_{i,t}$= (Gross Margin/EBIT). The coefficients of the variables are significant at 1%(***), 5%(***) and 10%(***) levels of significance.

Model 15	DEBTR	DEBTR	LTDR	LTDR	STDR	STDR
C	−0.0991581	−0.1207293**	−0.0592968	−0.1029981	−0.0398613	−0.0177312
	(0.0579892)	(0.0602718)	(0.051714)	(0.0537272)	(0.0418629)	(0.0430073)
TANG	0.2737445***	0.2684163***	0.3002585***	0.3141958***	−0.0265141	−0.0457795
	(0.0422448)	(0.0443699)	(0.0376734)	(0.039552)	(0.0304969)	(0.0316604)
LAGE	0.0169762	0.0153796	0.022893**	0.0229312**	−0.0059168	−0.0075516
	(0.0108285)	(0.0113659)	(0.0096568)	(0.0101317)	(0.0078172)	(0.0081102)
LIQ	0.0173406***	0.0186807***	0.0229219***	0.0307959***	−0.0055813***	−0.0121153***
	(0.0014374)	(0.0028136)	(0.0012818)	(0.0025081)	(0.0010376)	(0.0020076)
SIZE	0.0254585	0.0276949***	0.0050417	0.0086441	0.0204168***	0.0190507***
	(0.0081227)	(0.0084095)	(0.0072437)	(0.0074964)	(0.0058639)	(0.0060007)
GROWTH	−0.0130116	0.0125472	0.0093524	0.0178098	−0.022364***	−0.0052626
	(0.0113125)	(0.0130202)	(0.0100883)	(0.0116064)	(0.0081666)	(0.0092906)
VOL	−1.75e − 06	−0.0000155	−0.0000114	−0.00003	0.9.62e − 06	0.0000145
	(0.0000371)	(0.0000521)	(0.0000331)	(0.0000464)	(0.0000268)	(0.0000372)
CRISIS		−0.0029483		0.0727329**		−0.0756812**
		(0.0415891)		(0.0370732)		(0.0296761)
TANG*CRISIS		0.0318178		−0.0310964		0.0629142*
		(0.0498631)		(0.0444487)		(0.03558)
LAGE*CRISIS		−0.0139246		0.0087866		−0.0227112**
		(0.0124711)		(0.0111169)		(0.0088988)
LIQ*CRISIS		−0.0016765		−0.0100343***		0.0083578***
		(0.003074)		(0.0027402)		(0.0021935)
SIZE*CRISIS		0.006638		−0.0099029*		0.0165409***
		(0.0057868)		(0.0051584)		(0.0041292)
GROWTH*CRISIS		−0.0851498***		−0.0271459		−0.0580039***
		(0.0243532)		(0.0217088)		(0.0173773)
VOL*CRISIS		0.0000305		0.0000288		1.74e − 06
		(0.0000727)		(0.0000648)		(0.0000519)
N	1723	1723	1723	1723	1723	1723
Prob (F-statistic)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Table 15 - Estimations' results including only firms with a profitability lower than the average. The standard deviations are within the parentheses. The variables are given by: $DEBTR_{i,t}$ = (Total Debt/Total Assets); $LTDR_{i,t}$ = (Long-Term Debt/Total Assets); $STDR_{i,t}$ = (Short-Term Debt/Total Assets); $TANG_{i,t}$ = (Fixed Assets/Total Assets); $LAGE_{i,t}$ = LN(Year-Year of Constitution); $LIQ_{i,t}$ = (Current Assets/Current Liabilities); $SIZE_{i,t}$= LN(Total Assets); $PROF_{i,t}$= (EBITDA/Total Assets); $GROWTH_{i,t}$= LN(Fixed Assets $_t$) - (Fixed Assets $_{t-1}$) and $VOL_{i,t}$= (Gross Margin/EBIT). The coefficients of the variables are significant at 1%(***), 5%(***) and 10%(***) levels of significance.

Model 16	DEBTR	DEBTR	LTDR	LTDR	STDR	STDR
C	−0.5067707	−0.4835756***	−0.1987205**	−0.2569989**	−0.3080503***	−0.2265767
	(0.0957152)	(0.101712)	(0.097065)	(0.103093)	(0.069183)	(0.0725797)
TANG	0.2971982***	0.3151005***	0.3268548***	0.3310138***	−0.0296565	−0.0159132
	(0.0572422)	(0.0605702)	(0.0580495)	(0.0613926)	(0.0413747)	(0.0432217)
LAGE	0.1681544***	0.159295***	0.1515633***	0.1539557***	0.0165911	0.0053393
	(0.0168506)	(0.0186722)	(0.0170882)	(0.0189257)	(0.0121796)	(0.0133241)
LIQ	0.002854***	0.0030452***	0.0074559***	0.0061231***	−0.0046018***	−0.0030778***
	(0.0008657)	(0.0009114)	(0.000878)	(0.0009238)	(0.0006258)	(0.0006504)
SIZE	0.0293628***	0.0284647***	−0.0130118	−0.0071457	0.0423746***	0.0356103***
	(0.0101912)	(0.0106077)	(0.0103349)	(0.0107517)	(0.0073662)	(0.0075695)
GROWTH	−0.0812798***	−0.0566613***	−0.0323862**	−0.0290923*	−0.0488936***	−0.0275691**
	(0.0145321)	(0.0169451)	(0.0147371)	(0.0171752)	(0.0105038)	(0.0120917)
VOL	−0.0000746**	−0.0000603	−0.0000412	−0.0000605	−0.0000334	$2.65e-07$
	(0.0000381)	(0.000049)	(0.0000386)	(0.0000496)	(0.0000275)	(0.0000349)
CRISIS		−0.068392		−0.0504338		−0.0179583
		(0.0530006)		(0.0537202)		(0.0378202)
TANG*CRISIS		−0.0555432		−0.0044952		−0.0510479
		(0.0444198)		(0.0450229)		(0.0316971)
LAGE*CRISIS		0.0316178**		0.0231317		0.0084861
		(0.0144602)		(0.0146565)		(0.0103185)
LIQ*CRISIS		−0.0004751		0.0096112***		−0.0100863***
		(0.0020587)		(0.0020867)		(0.0014691)
SIZE*CRISIS		−0.0001261		−0.0047409		0.0046149
		(0.0050053)		(0.0050732)		(0.0035717)
GROWTH*CRISIS		−0.0606497**		−0.0154221		−0.0452276**
		(0.0305182)		(0.0309326)		(0.0217772)
VOL*CRISIS		$42e-06$		0.000038		−0.0000445
		(0.0000765)		(0.0000775)		(0.0000546)
N	2053	2053	2053	2053	2053	2053
Prob (F-statistic)	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000