Corporate governance, credit ratings and the capital structure of Greek SME and large listed firms

Apostolos Dasilas*

Department of Applied Informatics

University of Macedonia

156 Egnatia Str.

54006 Thessaloniki, Greece

Tel: +30-231 0891-848

E-mail: dasilas@uom.gr

and

Nicolas Papasyriopoulos

Department of Balkan Slavic and Oriental Studies

University of Macedonia

156 Egnatia Str.

54006 Thessaloniki, Greece.

Tel: +30 231 0891-492

Fax: +30 231 0891-432

E-mail: papasur@uom.gr

*Corresponding author

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Abstract

The aim of this study is to elucidate the relationship between corporate governance, credit ratings and the capital structure of small-to-medium enterprises (SMEs) and large Greek listed firms for the period spanning from 2005 to 2010. Panel regression analysis demonstrates that corporate governance structures and credit ratings play a significant role in the capital structure of Greek listed firms, especially during the crisis period (2008-2010). Moreover, firm-specific determinants such as size, profitability, asset structure and growth opportunities are also significant determinants of leverage. Finally, we detect that the influence of corporate governance variables on the capital structure of SMEs is less evident compared to large firms. We attribute this to the active involvement of owners in the management of SMEs, which reduces the need for shareholders to bear the costs of monitoring agents.

Keywords: Corporate governance, credit ratings, capital structure, SMEs, ASE

JEL Classifications C23; G32; L26

1. Introduction

Capital structure is one of the most intriguing corporate issues and continues to motivate top management and academics to determine the optimal combination of debt and equity that will maximize firm value and increase investors' pecuniary benefits. Although there has been extensive empirical research on capital structure, to date there is no unanimous consensus regarding the best mix of debt and equity. Academic interest in capital structure dates back to the seminal work of Modigliani and Miller (1958), who proposed that under "perfect" capital markets a firm's value is unaffected by its capital structure. However, the existence of several "imperfections" in the real world (such as adverse selection, moral hazard, agency conflicts, market frictions and taxes) create obstacles to a firm's access to external finance (Vermoesen et al., 2013).

The vast majority of prior studies have focused on understanding the firm-specific determinants of capital structure. Two competing theories (i.e. the pecking order theory and the trade-off theory) have been propounded to explain the heterogeneous effect of each firm factor on capital structure. However, significant factors related to board structure and firm control have been largely ignored when examining capital structure determinants. These factors relate to corporate governance, which is closely connected to financing decisions and a firm's capital structure (Graham and Harvey, 2001; Abor, 2007). According to Claessens et al. (2002), firms may benefit from better corporate governance mechanisms through greater access to capital and money markets, lower cost of debt, better and more efficient performance, and more favourable treatment of all shareholders. Moreover, good corporate governance practices may have a significant influence on the strategic decisions of a company (i.e. external financing) that are taken at board level. Therefore, corporate governance variables such as board size, board composition, leadership structure, and auditing may have a direct impact on capital structure decisions.

The relationship between corporate governance and capital structure is alleged to be significant, though it has not been fully explored. Friend and Lang (1988), Berger et al. (1997), Wen et al. (2002), Abor (2007), Jiraporn and Gleason (2007), Bokpin and Arko (2009) and Morellec et al. (2012) are among the researchers who have investigated the effects of corporate governance practices on capital structure decisions for both developed and emerging markets. We extend the investigation of the relationship between corporate governance and capital structure by taking into account another factor that has been recently considered a major determinant of capital structure, that is, corporate credit ratings. We are

motivated to examine the interaction between credit ratings and capital structure since the former are perceived to influence managerial decision making. Specifically, managers adjust capital structure based on credit rating levels (Kisgen, 2006). Moreover, long-term supply contracts may require firms to maintain a specific credit rating and debt level at the expense of growth and profitability (Bosch and Steffen, 2011).

We incorporate corporate governance mechanisms, credit ratings and firm factors in order to formulate a clear view of capital structure determinants. Moreover, we explore whether capital structure has been affected by the global financial crisis that erupted in September 2008. We employ data from listed firms, both small-and-medium sized enterprises (SMEs) and large ones. The main advantage of listed firms compared to non-listed is the easy access to both equity and debt markets. This advantage allows us to examine the capital structure of firms which do not have innate financial constraints such as those encountered by private firms (i.e. access to market finance).

We examine the relationship between corporate governance, credit ratings and capital structure by employing a sample of non-financial firms listed on the Athens Stock Exchange (ASE) during the period 2005-2010. We opt for analyzing the capital structure of Greek quoted firms due to the presence of idiosyncrasies that are seldom observed in other developed markets. Specifically, the Greek legal framework requires all profitable firms to disgorge a minimum amount of dividends to shareholders. This compulsory minimum distribution of dividends is equal to 35% of net profits. The immediate implication of this requirement is the deprivation of the necessary funds (i.e. retained earnings) to finance the firm's growth internally. As a consequence, the use of external finance through rights issues or debt appears to be the inevitable source of funding.

Another interesting characteristic of the ASE during the period under examination is the high ownership concentration, especially for SMEs. The majority of those listed firms are owned by controlling shareholders who are usually involved in the firm's management. A high ownership concentration is alleged to mitigate the information asymmetry between managers and shareholders, since large shareholders have higher residual rights on firms and, thus, exert more effective monitoring on management (Shleifer and Vishny, 1997). Moreover, lower information asymmetry decreases the cost of equity. In turn, lower equity costs may encourage firms to finance investments using equity, leading to lower debt ratios (Easley and O'Hara, 2004). Further, the ASE allows the trading of both SMEs and large firms by setting listing criteria which are unrelated to the number of employees, turnover and total

assets. This stock market peculiarity allows firms of all sizes to rely both on bank credit and market finance[1].

Finally, the global financial crisis, triggered by the US subprime market, along with Greece's sovereign debt crisis adversely affected the majority of Greek companies. The fallout caused deterioration in credit quality, increase in the cost of debt and imposed constraints on access to bank lending. In addition, local citizens and firms withdrew their savings from domestically-operated banks[2] fearing that a Greek default would bring about a latent bank run. The flight of Greek funds overseas added to the country's financial crisis and deprived domestic firms of necessary external financing. This dramatic change in financial conditions is expected to alter the capital structure of the sample firms during the global credit crunch.

To the best of our knowledge, there is no similar study that incorporates data from corporate governance and credit ratings to examine capital structure. Moreover, this might be the first study that examines the interaction of credit quality, corporate governance mechanisms and debt usage during the global financial crisis.

The empirical results show that the effects of corporate governance mechanisms on capital structure are more profound in the case of large firms vis-à-vis SMEs. The latter are characterized by less information asymmetry and fewer conflicts of interest between managers and owners and, therefore, corporate governance structures are less significant. We find that board size seems to be an important determinant of leverage. In fact, board size is negatively related with the debt level of Greek listed firms. Moreover, we observe that the reputation and magnitude of auditors positively affect the debt level of firms. Firm size, asset structure, profitability and credit ratings are all positively associated with the debt structure of Greek listed firms. On the other hand, growth opportunities are negatively correlated with leverage. Finally, we detect significant alterations in the debt structure of Greek listed firms before and during the crisis. In particular, we find that board independence, external auditing and credit quality are the most crucial capital structure factors for Greek listed firms in the crisis period.

We trust that the empirical results will be useful to firm managers who seek the best combination of internal and external financing under financially-constrained conditions.

[1] According to Vermoesen et al. (2013, p. 434), "because SMEs are more vulnerable to information problems, they will be more bank dependent than large firms, which can rely more on market finance".

[2] Greece's banks have lost €36.7 billion of their deposit base in 2011 and €64.6 billion since the beginning of 2010, which is down from €233 billion to €173 billion in the previous two years.

Moreover, our findings will be valuable to policy makers who wish to implement business-friendly environments that intent to facilitate investments and growth.

The rest of this paper is set out as follows: The second section presents the regulatory framework of the ASE; the third section develops our research hypotheses; the fourth section describes the data selection and the methodology; the fifth section presents the empirical results; and, finally, the sixth section contains the concluding remarks.

2. Regulatory framework in Greece

2.1 The evolution of the ASE and its idiosyncrasies

Until the mid-1990s, investor interest in ASE firms was negligible. In fact, very few Greek firms attempted to raise money from the ASE through IPOs and the majority of domestic and international investors were averse to investing their money in a small, illiquid, peripheral capital market. The reasons behind the underdevelopment of the ASE included the predominance of the banking sector and the heavy reliance of companies on debt finance, the high ownership concentration of listed firms, the broad spectrum of state intervention in the economy, the lack of transparency, and the low credibility of information disclosed by listed companies.

However, Greece's prospective membership of the Euro-zone and the international expansion of many Greek firms into Southeast Europe offered the ASE the necessary impetus to grow and become a developed capital market. The ASE experienced an unprecedented stock price rally at the end of the 1990's. The influx of international funds during that period was so remarkable that it fueled the rise of the ASE composite index to record levels (6,355 units) in September 1999. As a result, the ASE was upgraded to a developed capital market by mid-2000. However, the rally came to an end when international institutional investors discovered that the ASE was overvalued and decided that it was time to start realizing profits. The ASE composite index plummeted from 3,388 in 2000 to 1,748 in 2002. By the end of March 2003, the majority of Greek stocks had lost more than half of their market value and, in some cases, more than 90% of their value. The outbreak of the global credit crunch in September 2008 and Greece's subsequent sovereign debt crisis dramatically affected ASE stocks, driving the main stock index down to rock-bottom levels.

The Greek stock market is characterised by its family-oriented nature, that is, the high ownership concentration by families which usually run the firm. The listing criteria of the

ASE[3] allow both large firms and SMEs to go public. In fact, although the ASE listing criteria require firms to have a minimum level of equity and profits in the pre-listing period, there is no prerequisite regarding the number of employees, turnover or total assets which are the criteria for classifying firms as SMEs or large ones.

Another unique aspect of the ASE is that the Greek corporate law 2190/1920 mandates a minimum annual cash dividend equal to 35% of the net profits, minus the amount needed to maintain regular reserves. This quantifiable floor for the distribution of dividends to shareholders deprives firms of the internally-generated funds necessary for growth and investment. To finance their growth, firms are forced either to issue new equity or to borrow money. However, the recent dramatic deterioration of the Greek economy has adversely affected access to the credit market and the cost of debt. In particular, banks started facing liquidity problems, gaining access to finance only through the European Central Bank and the emergency liquidity assistance (ELA) of the Bank of Greece. Thousands of depositors withdrew their money in the wake of the sovereign debt crisis. Interest rates rose dramatically and banks were unable to lend money to individuals and companies. Under such financial conditions, the investigation of the capital structure of Greek listed firms is compelling.

2.2 The corporate governance law 3016/2002

Corporate governance has dominated the policy agenda of Greek listed firms for over a decade and remains at the top of the policy agenda even now. The implementation of the corporate governance law 3016/2002 in May of 2002 was a necessity in the wake of the fraudulent practices and numerous corporate scandals which occurred during the 1990s (Caramanis and Lennox, 2008). To restore investor confidence, the Hellenic Capital Markets Commission (HCMC) set up a committee on corporate governance which initiated discussions among market participants, auditors, legal practitioners and investors. These discussions eventually led to the enforcement of the corporate governance law 3016/2002, which obliges Greek listed companies to adopt a set of corporate governance rules.

The corporate governance law 3016/2002 describes the best corporate practices that listed firms should adopt such as the minimum board size, the proportion of independent

[3] The Alternative Investment Market (AIM) is among the most prominent capital markets that also allow smaller companies to go listed with a more flexible regulatory system. Flexibility is provided by less regulation and no requirements for capitalization or for the number of shares issued.

board members, the internal organizational structure, the audit committees and the participation of shareholders in the decision-making process (Dimitropoulos and Asteriou, 2010). Specifically, the law 3016/2002 states that the number of non-executive directors should not be less than 1/3 of the total number of directors holding seats on the board. At least two of the non-executive board members should be independent. According to the law, independent and non-executive directors are defined as those board members who do not possess any stocks and are not on the payroll of the firm. Regarding leadership structure, Greek listed firms are free to adopt either a unitary leadership structure, where the same person holds both the positions of CEO and chairman (duality), or a two-tier leadership structure (non-duality). Moreover, the corporate governance law 3016/2002 requires all listed firms to adopt an internal audit scheme in order to ensure the credibility of financial information disclosed by firms.

3. Literature review and hypotheses development

3.1 Corporate governance factors

While there is a strand of studies that examines the relationship between corporate governance and financial performance, the empirical relationship between corporate governance and a firm's capital structure remains largely under-researched (Haque et al., 2011). The limited research regarding the influence of corporate governance on firms' capital structure has concentrated on internal governance variables[4] such as board size, board composition, auditor, leadership structure, CEO tenure and CEO compensation. However, due to data unavailability, the last two corporate governance variables (i.e. CEO tenure and compensation) are excluded from our analysis.

Pfeffer and Salancick (1978) were the first researchers who found a significant relationship between leverage and board size and between leverage and board composition. In his study, Jensen (1986) found a positive relationship between leverage and board size and between leverage and the proportion of outside directors. He attributed these positive relationships to the fact that debt acts as a monitoring device. Wen et al. (2002) also found a positive relationship between board size and leverage. Their findings imply that large boards make use of high leverage in order to increase company value. Another possible explanation

[4] The study of Morellec et al. (2012) discerned two governance mechanisms: internal and external. External governance mechanisms are represented by institutional ownership, outside blockholder ownership, and antitakeover provisions or shareholder rights. Internal governance mechanisms include CEO tenure, board independence, board committees, etc.

is that large boards encounter difficulties in reaching a unanimous decision, indicating a weak corporate governance structure. Abor (2007) and Bopkin and Arko (2009) verified this positive relationship between board size and leverage for a sample of Ghanaian firms. However, Berger et al. (1997) documented an inverse relationship between debt ratio and board size. They assumed that a large board size tends to put pressure on management to pursue low leverage in order to increase firm performance. In Greece, controlling shareholders hold a portion of board seats and we expect that a large board will be less likely to be overwhelmed by major shareholders, thus exerting more pressure on managers to pursue low levels of debt. Therefore, we expect a negative relationship between board size and leverage.

Another corporate governance variable that we take into account in our analysis is the proportion of outside directors. This variable measures the percentage of independent and non-executive members on the board of directors. Wen et al. (2002) argued that management encounters more rigorous monitoring when the board of directors consists of more outside directors. This leads to the adoption of lower leverage to avoid the performance pressures linked with commitments to pay back large amounts of cash (Jensen, 1986). In line with this proposition, Wen et al. (2002) found a negative relationship between the number of outside directors and leverage. Morellec et al. (2012) showed that board independence as proxied by the number of independent directors or by the existence of independent audit, compensation, nominating, and corporate governance committees, is negatively related to agency costs. The authors asserted that a more independent board of directors is a stronger monitor of management. Pfeffer (1973) and Pfeffer and Salancick (1978) refuted the negative relationship between the proportion of outside directors and leverage and found that a high proportion of outside directors is associated with high leverage. Outside directors are alleged to help firms in raising funds (debt and equity) through the reduction of information asymmetry, the enhancement of a firm's status and the recognition and exploitation of all available resources. Jensen (1986), Berger et al. (1997) and Abor (2007) also found that firms with higher leverage have relatively more outside directors, while firms with a low percentage of outside directors experience lower leverage. Due to the entrenched board composition of Greek listed firms, where the major owners are actively involved in firm management, we expect that the number of outside directors will exert the appropriate monitoring on management to adopt lower leverage. Therefore, we expect a negative association between outside directors and leverage.

Duality is another corporate governance variable that is included in our analysis. Duality refers to the situation where the CEO is also the chairman of the board (a unitary leadership structure). Fama and Jensen (1983) found that duality influences the financing decisions of the firm, but this relationship is not statistically significant. On the other hand, Fosberg (2004) argued that firms with a two-tier leadership structure (non-duality) should be more likely to employ the optimal amount of debt in their capital structures than firms in which there is a duality. He found that firms with split titles have higher debt ratios. Moreover, Abor (2007) found that there is a significant positive relationship between duality and leverage. Since the above evidence is contradictory, we cannot formulate an unequivocal prediction regarding the relationship between duality and leverage.

The last corporate governance variable included in our analysis is auditors, which have been systematically neglected in prior studies investigating the relationship between corporate governance and capital structure. Specifically, we investigate whether companies being audited by Big 4 audit firms (i.e. KPMG, Ernst & Young, Deloitte and PWC) display a different capital structure than those companies audited by other audit firms (non-Big 4). It is widely accepted that the certification provided by Big 4 auditors helps firms to finance their operations with more debt. This is because Big 4 auditing companies provide higher audit quality than their non-Big 4 counterparts (De Franco et al. 2011). Moreover, Big 4 auditors reduce the cost of debt capital (Mansi et al. 2004; Pittman and Fortin 2004). Finally, Big 4 auditors are large, well recognized audit firms that apply stringent accounting and auditing rules when servicing their clients. Their international reputation minimizes the possibility of coalition and fraudulent practices between auditors and clients. Therefore, we expect that Big 4 auditors better facilitate firms' access to external finance vis-à-vis firms that are not audited by Big 4s. Consequently, a positive relationship is expected between firms audited by Big 4s and debt.

3.2 Firm factors

The majority of prior studies have concentrated on investigating the firm-specific determinants of capital structure. We define firm factors as those variables that are particularly relative to firm operation and fundamentals. Prior studies examining the firm factors of capital structure have been mainly based on two theories. The first theory is the pecking-order theory (POT) of Myers and Majluf (1984), which is built upon the existence of asymmetric information between managers and investors. According to the POT, there is no

optimal capital structure for each firm. Instead, firms prefer to finance their operations by using funding sources with the lowest degree of asymmetric information, since borrowing costs are positively associated with the lack of borrower information. For this reason, firms put their corporate financial decisions in hierarchical order, first preferring internally-generated funds (i.e. retained earnings), then debt and finally new equity as a last resort (Degryse et al., 2012; Palacin-Sanchez et al., 2013). The second theory is the trade-off theory (TOT), which argues that there is an optimal capital structure for each firm. This is achieved when a balance is reached between costs and benefits by adopting an additional unit of debt (Palacin-Sanchez et al., 2013). These costs increase with the degree of leverage (Degryse et al., 2012).

Firm size has been considered as one of the determinants of capital structure by both TOT and POT. According to Rajan and Zingales (1995), firm size is an inverse proxy of bankruptcy costs and earnings volatility. The TOT predicts a positive relationship between firm size and leverage. This happens because large firms are generally more diversified and display less volatility (Fama and French 2002). Less volatility in earnings reduces indirect bankruptcy costs, thus helping firms to take on more debt (Degryse et al., 2012). The POT also predicts a positive relationship between firm size and leverage. This happens because large firms[5] mitigate information asymmetry problems due to the greater quality and reliability of the information available to the public. This makes access to credit easier and decreases the cost of debt compared to other sources of finance (Palacin-Sanchez et al., 2013). However, there is an alternative perception on the relationship between size and debt according to which "larger firms accumulate more internal resources and, therefore, would need less debt" (López-Gracia and Sogorb-Mira (2008, p. 128). The vast majority of studies find a positive relationship between firm size and leverage both for large firms and SMEs (see Van Dijk, 1997; De Jong, 1999; Fama and French, 2002; Michaelas et al., 1999; Bevan and Danbolt, 2004; Sogorb-Mira, 2005; Hall et al., 2004; López-Gracia and Sogorb-Mira, 2008; Psillaki and Daskalakis, 2009; Degryse et al., 2012; Palacin-Sanchez et al., 2013). Therefore, we expect a positive relationship between firm size and leverage.

A firm's asset tangibility (the proportion of fixed assets to total assets) is another potential factor that determines capital structure. Tangible assets can be used as collateral when applying for a loan and, therefore, are expected to be positively correlated with debt.

[5] According to Psillaki and Daskalakis (2009), size may also serve as a proxy for the information asymmetry for outside investors, which may result in the increase in their preference for equity relative to debt.

Furthermore, collateral reduces agency problems with debtholders and minimizes bankruptcy costs and credit risk. Therefore, the TOT predicts a positive relationship between collateral and leverage. The POT also predicts a positive relationship between asset tangibility and leverage since collateral mitigates information asymmetry problems (Degryse et al., 2012). De Jong (1999), Michaelas et al. (1999), Bevan and Danbolt (2004), Sogorb-Mira (2005), Degryse et al. (2012) and Mateev et al. (2013) all confirm the positive relationship between tangible assets and leverage. Therefore, we expect a positive relationship between tangible assets and debt ratio. Degryse et al. (2012) and Mateev et al. (2013) assert that asset structure may affect short-term and long-term debt differently. Ortiz-Molina and Penas (2006) argue that collateral and maturity are substitutes for reducing agency problems and find a negative relationship between tangible assets and short-term debt and a positive one between tangible assets and long-term debt. Based on the above, we expect similar relationships between short- and long-term debt and asset structure.

Profitability is another determinant of capital structure, however, there are contradictory predictions regarding the impact of profitability on debt. Jensen's free cash flow theory (1986) argues that more debt disciplines managers if profits increase. A positive relationship between debt and profitability would then be expected. The TOT verifies this positive relationship between profitability and debt, arguing that highly-profitable firms can enjoy the greater tax savings associated with more debt. Moreover, lucrative firms will also encounter less bankruptcy costs, which encourage them to acquire more debt. The POT predicts the opposite effect of profitability on leverage. In fact, higher profitability means more internally-generated cash flow to finance investments; therefore higher profits reduce the necessity to raise debt (Degryse et al., 2012). The negative relationship between debt and profitability both for SMEs and large firms is confirmed by Titman and Wessels (1988), Rajan and Zingales (1995), Michaelas et al. (1999), Fama and French (2002), Bevan and Danbolt (2004), Sogorb-Mira (2005), López-Gracia and Sogorb-Mira (2008), Daskalakis and Psillaki (2008), Psillaki and Daskalakis (2009), Degryse et al. (2012), Palacin-Sanchez et al. (2013) and Mateev et al. (2013). Greek listed firms are obliged to distribute a minimum proportion of their profits to shareholders. This compulsory dividend distribution deprives firms of the much-needed funds (i.e. retained earnings) to finance their growth internally. To replenish the distributed funds, Greek listed firms are compelled either to use debt or to launch a seasoned equity offering scheme. Therefore, we expect a positive relationship between profitability and debt.

Another important factor that affects capital structure is growth opportunities. Myers (1977) contends that firms with growth opportunities tend to have lower debt. The explanation has to do with the moral hazard effects emanating from potential growth opportunities and the consequent increase in risk. In other words, firms with growth opportunities may use more debt to finance growth, possibly by investing in projects with negative net present value (NPV). Therefore, firms encountering growth opportunities will need less debt. The studies of Titman and Wessels (1988), Rajan and Zingales (1995), Graham and Harvey (2001), Fama and French (2002), Jiraporn and Gleason (2007) and López-Gracia and Sogorb-Mira (2008) verify the negative relationship between growth opportunities and leverage. On the other hand, according to the POT, growth opportunities and leverage are expected to be positively related. Firms with growth opportunities are more likely to raise new funds than firms without potential growth (De Jong, 1999). Moreover, firms that grow are more likely to experience a strain on their internal funds and more likely to resort to external finance, preferably debt (Mateev et al., 2013). Michaelas et al. (1999), Sogorb-Mira (2005), Degryse et al. (2012) and Palacin-Sanchez et al. (2013) confirm that growth opportunities have a positive impact on leverage. Greek listed firms, especially SMEs, are characterized by a high ownership concentration and lower information asymmetry. Reduced information asymmetry is linked with a lower cost of equity. Lower equity costs may encourage firms to finance investments using equity, leading to lower debt ratios (Easley and O'Hara, 2004). Moreover, managers of SMEs, who are also the main shareholders of these firms, do not wish to lose control over their own firms, and therefore, they prefer to offer the funds (through equity injections) rather than using external financing (through bank lending). Therefore, we expect a negative relationship between growth opportunities and leverage.

DeAngelo and Masulis (1980) extended Miller's (1977) study of non-debt tax shields (NDTS) and found that, apart from interest expenses, depreciation and investment tax credits (non-debt tax shields) could also provide tax benefits to firms. They also argued that a firm with larger non-debt tax shields is expected to use a smaller amount of debt. In his empirical work, Wald (1999) employed the ratio of depreciation expense to total assets and found a negative correlation between leverage and non-debt tax shields. Empirical tests of the non-debt tax shield (NDTS) effect on debt policy are mixed. For example, Givoly et al. (1992), Graham (1996) and López-Gracia and Sogorb-Mira (2008) found a negative relationship between the firm's debt and NDTS supporting DeAngelo and Masulis' (1980) substitutability hypothesis, that is, non-debt tax deductions substitute for the tax shield benefits of debt.

Bradley et al. (1984), Bathala et al. (1994) and Jiraporn and Gleason (2007) found a positive relationship between leverage and NDTS. Finally, Degryse et al. (2012) found a negative (positive) relationship between long-term debt (short-term debt) and NDTS using a sample of Dutch SMEs. Based on the above evidence, we cannot formulate a clear prediction regarding the relationship between leverage and NDTS.

Age is another firm factor that is considered to affect leverage. The POT predicts a negative relationship between age and debt. Specifically, the POT argues that the number of years a business is in operation is significant as it helps firms to generate more internal resources over time, thus minimizing the need for external finance. Moreover, Palacin-Sanchez et al. (2013, p. 507) state that "young firms will find themselves obliged to use debt in the face of their limitations to mount up resources retained in their first years of life". This relationship has been verified by Chittenden et al. (1996), Jordan et al. (1998), Michaelas et al. (1999), Hall et al. (2004), Bhaird and Lucey (2010) and Noulas and Genimakis (2011). Based on the above, we expect a negative relationship between age and leverage.

3.3 Credit quality factors

Although there has been plethora of prior studies examining the determinants of capital structure, there is limited research regarding the role of credit ratings in capital structure decisions. The importance of credit ratings in explaining firms' capital structure can be attributed to Graham and Harvey's (2001) survey, which revealed that CFOs identified credit ratings as the second most important factor affecting debt policy (Kemper and Rao, 2013). This survey spurred the academic interest of Kisgen (2006) who proposed the credit rating–capital structure hypothesis (CR-CS) according to which "credit ratings are a material consideration in managers' capital structure decisions due to the discrete costs (benefits) associated with different rating levels". Kisgen (2006) found that credit ratings directly influenced capital structure decisions on the US market in the period 1986-2001. In particular, he found that companies near a credit rating upgrade or downgrade issue less debt relative to net equity as a percentage of total assets vis-a-vis firms, which do not alter their credit rating. This finding was at odds with the traditional capital structure theories (POT and TOT) which ignored the impact of credit ratings on capital structure decisions. In a later study, Kisgen (2009) modified his model and tested the impact of realized change in a firm's credit rating on its capital structure than merely the effect of a firm being close to receive an upgrade or downgrade. Consistent with the CR-CS hypothesis, Kisgen (2009) showed that

firms issue less debt relative to equity in the subsequent year of a downgrading. However, no effect on firms experiencing upgrading was detected.

Replicating the methodology in Kisgen (2006, 2009) to test if the CR-CS model is valid for a wide spectrum of rating classes as well as for subsamples classified by attributes (i.e. frequency of access to capital markets, commercial paper use, and firm growth opportunities), Kemper and Rao (2013) were unable to confirm that the CR-CS motivation is systematically related to any of these attributes. The authors concluded that credit ratings are not a first-order concern in capital structure decisions, though they pointed out that this does not necessarily mean that firms and CFOs should ignore the role of credit ratings in determining capital structure policies.

More recently, Drobetz and Heller (2014) used a sample of listed US firms and one of listed and non-listed German firms in order to test the CR-CS hypothesis. The results from the US sample corroborated Kisgen's (2006, 2009) CR-CS hypothesis, suggesting that there exists a minimum target rating and that financial distress concerns are only of secondary importance. In stark contrast, German companies were immune to changes in their creditworthiness due to extensive bank-internal monitoring in a bank dominated financial regime.

In the Greek context, the study of Noulas and Genimakis (2011) made use of credit ratings in order to interpret capital structure behavior for a sample of Greek listed firms. The authors employed data on credit scorings from a locally operating company (i.e. ICAP[6]) and found that credit ratings have a positive and statistically significant impact on Greek firms' debt ratios. This suggests that low credit quality increases the probability of default and this, in turn, makes creditors reluctant to finance a firm's project.

Our study incorporates credit ratings as an additional capital structure determinant since our examination period extends to the years of sovereign crisis, which severely inflicted the creditworthiness of the vast majority of Greek listed companies. We speculate that firms with low creditworthiness encounter difficulties in accessing debt markets and experience higher cost of debt. On the other hand, firms that enjoy high credit quality are expected to have easy access to credit and enjoy lower cost of debt. Therefore, we expect a positive relationship between credit ratings and leverage.

[6] According to Noulas and Genimakis (2011, p. 381) "ICAP is involved in credit risk services and credit rating evaluation of Greek companies".

3.4 Greek evidence on capital structure

The capital structure of Greek listed and privately-held firms has been at the epicenter of the academic research in the last decade. Greece's accession in the Eurozone, the abolition of import tariffs and export subsidies, the deregulation of the banking sector and the extensive use of e-commerce have been propounded to be the factors that led to the increase in competition of Greek firms, especially in the manufacturing sector (Voulgaris et al., 2004). This sector was the focus of the study of Voulgaris et al. (2004) who discerned two samples of firms, that is, small-and-medium sized enterprises (SMEs) and large sized enterprises (LSEs) in terms of employment and growth. The authors investigated the capital structure determinants of these two sub-samples and found that profitability was a major determinant of capital structure for both size groups. In fact, debt levels were correlated negatively with profitability as indicated by the POT. However, size and growth were positively associated with debt for both groups of firms. Looking at the differences between the two groups, the asset structure and growth were documented to exert significant effect on the debt structure of LSEs. On the contrary, efficiency of current assets, size, sales growth and high fixed assets were found to affect considerably the credibility of SMEs.

Eriotis et al. (2007), using panel data for a sample of 129 Greek listed companies during 1997-2001, analyzed the characteristics of capital structure determinants. The results showed a negative relation between debt ratio and a number of variables such as growth, liquidity (measured by the quick ratio) and interest coverage ratio. Size appeared to be positively related with leverage. Eriotis et al. (2007) contended that the above results were congruent with the pecking order financing. The study of Daskalakis and Psilaki (2008) investigated the capital structure determinants of SMEs employing a sample of Greek and French firms between 1998 and 2002. Using panel data methods, they found that debt to assets ratio of firms is linked with their asset structure, size, profitability and growth rate. In particular, size was positively related to leverage and this relationship was much stronger for Greek SMEs rather than for French ones. Daskalakis and Psilaki (2008) found a negative relationship between leverage and profitability consistent with the prediction of the POT. On the other hand, the effect of earnings growth on debt level was positive and significant for France but non-significant for Greece. Overall, the authors observed some similarities in the capital structure determinants of the SMEs in the two countries.

Vasiliou and Daskalakis (2009) examined whether differences in institutional characteristics resulted in heterogeneous capital structure determination among countries. The

authors conducted a survey to detect the factors that affected the capital structure of the Greek non-financial firms and were compared with those of the European and US firms. One of the most important findings was that Greek firms tried to avoid long-term debt financing and this was attributed to the large amounts of capital raised during the frenzy investment period that the majority of Greek listed firms experienced during the period 1998-2000. In conclusion, Vasiliou and Daskalakis (2009) asserted that neither the pecking order theory nor the signalling theory held for Greek listed firms. Noulas and Genimakis (2011) investigated the capital structure determinants of a sample of 250 Greek listed firms over a 9-year period (1998-2006). Apart from the classical firm specific factors (size, growth, tangibility, profitability) the researchers made also use of credit ratings as an additional factor construing capital structure. They found positive correlations among firm's debt and sales, growth rate, tangibility, depreciation, profit volatility and credit rating. In contrast, profitability and firm's age were negatively correlated with leverage.

Overall, the above studies make use of different sample firms, examination period and factors explaining capital structure. This is probably the reason why their empirical findings do not provide clear-cut support to any of the existing capital structure theories, though the pecking order theory seems to overwhelm that of trade-off. Our study differentiates from the above, since we incorporate a gamut of corporate governance variables along with the firm-specific factors and credit quality in order to probe into the effects of the credit crunch on capital structure determinants. For our purpose, the examination period includes pre-crisis as well as crisis years. Moreover, the full sample of firms is split into the SMEs and large firms in order to detect possible heterogeneous capital structure behavior.

4. Data and methodology

4.1 Dataset and variables

Our sample consists of firms listed on the Athens Stock Exchange (ASE) for the period 2005-2010. We opt to investigate the capital structure of Greek listed firms just after the adoption of the International Financial Reporting Standards (IFRSs) on January 1st 2005. The IFRSs allow us to compare our results from the capital structure of Greek listed firms with those from other markets that have also adopted IFRSs. To form the final sample, we exclude financial firms and public utilities. We also exclude firms for which the financial year is different from the calendar year. To investigate the capital structure of different sized firms, we partition our sample into large and small-to-medium enterprises (SMEs), adopting the

European Commission's (2003) definition for SMEs and large firms[7]. Accordingly, SMEs should meet the following criteria: (i) employ less than 250 employees; (ii) their annual turnover does not exceed €50 million or their annual balance sheet total does not exceed €43 million and (iii) be an independent firm, that is, no more than 25% of total shares are held by any other firm (or joint firms) unless they are also SMEs (López-Gracia and Sogorb-Mira (2008). Following Bhaird and Lucey (2010) and Vermoesen et al. (2013), we exclude micro enterprises from our sample, that is, firms which employ fewer than 10 people and whose annual turnover or annual balance sheet total does not exceed €2 million. The final dataset consists of 231 SMEs and large firms for the examination period 2005-2010[8]. The distribution of sample firms by SIC code is presented in Table 1. 130 firms are defined as SMEs and 101 as large ones. 67 firms belong to the mining and construction industry (29%); 53 to the wholesale and retail industry (22.94%); 34 firms operate in manufacturing (14.72%), 29 firms provide services (12.55%); 24 firms (10.39%) belong to either the transportation or agriculture industry.

The data for firm-specific factors of capital structure and credit ratings were culled from Amadeus[9]. Data for corporate governance (e.g. board size, board composition, CEO duality, and auditors) were hand-collected from the annual financial reports of 231 companies listed on the ASE. All these variables were trimmed at the 1st and 99th percentiles in order to reduce the influence of outliers.

[Insert Table 1 about here]

4.2 Variables

Following previous studies (e.g. Degryse et al., 2012; Palacin-Sanchez et al., 2013) we employ three different proxies for a firm's capital structure. The most commonly used capital structure measure is the total debt ratio (DR), defined as the ratio of total debt (liabilities) to total assets (see Rajan and Zingales, 1995). The other two measures of capital structure are

[7] Daskalakis and Psillaki (2008), Bhaird and Lucey (2010), Vermoesen et al. (2013) and Mateev et al. (2013) have also adopted the European Commission's definition for identifying SMEs.

[8] In order to mitigate survivorship bias, we include companies even if data is not available for every year. Consequently, the number of observations in each year varies, with a maximum of 1,386 firm-year observations. A similar approach was followed by Bevan and Danbolt (2004).

[9] Amadeus is a widely recognized database that, among other things, provides information about the financial strength for thousands of listed and unlisted non-financial firms across Europe. The credit rating system is based on the Multi Objective Rating Evaluation (MORE) model. The basic idea of the model is to analyze a set of financial and economic ratios in a predictive corporate bankruptcy model with the purpose of creating a fundamental credit scoring model for each industrial sector.

the short-term ratio (SDR) and the long-term ratio (LDR). Following Van der Wijst and Thurik (1993), Chittenden et al. (1996), Michaelas et al. (1999), Hall et al. (2004), Sogorb-Mira (2005), Psillaki and Daskalakis (2009), Degryse et al. (2012), Palacin-Sanchez et al. (2013) and Mateev et al. (2013), among others, we estimate the latter two ratios as the quotient between corresponding debt and total assets.

The first corporate governance factor is board size (BOARD). This is measured as the logarithm of the number of board members. The second corporate governance determinant of capital structure is the proportion of independent and non-executive board members (OUTSIDERS) (see Wen et al., 2002; Abor, 2007). We also include a dummy variable (CEO) that takes the value of 1 when the same person does not simultaneously hold the CEO and chairman positions (non-duality) and 0 otherwise (see Abor, 2007). Finally, we include a dummy variable (AUDITOR) that takes the value of 1 when one of the Big 4 is the main auditor and 0 otherwise.

Regarding firm-specific determinants of capital structure, we employ firm size (SIZE), which is measured as the logarithm of sales (see Titman and Wessels, 1988; Rajan and Zingales, 1995; Bevan and Danbolt, 2004; Jiraporn and Gleason, 2007; Psillaki and Daskalakis, 2009; Kemper and Rao, 2013). The second firm factor is asset tangibility (TANGIBILITY), which is computed as the net fixed assets divided by the total assets of the firm at the end of the fiscal year (see Rajan and Zingales, 1995; Titman and Wessels, 1988; Frank and Goyal, 2003; Bevan and Danbolt, 2004; Sogorb-Mira 2005; Psillaki and Daskalakis 2009; Palacin-Sanchez et al., 2013, Mateev et al., 2013). The third firm factor is profitability (PROFIT) defined as earnings before interest and taxes (EBIT) divided by total assets (see Sogorb-Mira 2005; Degryse et al., 2012; Palacin-Sanchez et al., 2013; Mateev et al., 2013). We also consider the effect of age on capital structure. We define age (AGE) as the logarithm of the number of years of business operation (see Chittenden et al., 1996; Michaelas et al., 1999; Hall et al., 2004; Palacin-Sanchez et al., 2013). Growth opportunities (GROWTH) are proxied by Tobin's Q ratio, which is defined as the market value of equity divided by the book value of total assets (see Bevan and Danbolt, 2004; Jiraporn and Gleason, 2007; Kemper and Rao, 2013). We also make use of the non-debt tax shields (NDTS) which are defined as the annual depreciation charges divided by total assets (see DeAngelo and Masulis, 1980; Titman and Wessels, 1988; Wald, 1999; Jiraporn and Gleason, 2007; López-Gracia and Sogorb-Mira, 2008; Degryse et al., 2012).

Following the credit rating system of Amadeus[10], we identify four discernible groups of companies based on their creditworthiness (CR): "Healthy" companies, "balanced" companies, "vulnerable" companies and "risky" companies. The first group of firms enjoys ratings between A and AAA (high-rated). In this group, a company's capacity to meet its financial commitments is notably strong and its creditworthiness and solvency are high. The second group of firms is awarded ratings between BB and BBB. In this group, a firm's capital structure and economic equilibrium are considered adequate. However, companies may face some ongoing uncertainties or exposure to adverse business and economic conditions. The third group of firms receives ratings between CCC and B. In this group, companies display vulnerable signals with regard to their economic fundamentals, adverse market events and inadequate management. The fourth group of firms contains ratings between D and CC. In this group, companies display high vulnerability, a low capacity to meet financial commitments and a high probability of insolvency. We cardinalize these credit ratings, employing a 4-point scale: 4 for "healthy" firms, 3 for "balanced", 2 for "vulnerable" firms, and 1 for "risky" firms.

Table 2 presents descriptive statistics for the capital structure measures, firm factors, corporate governance variables and credit ratings. The results show that for the period under examination Greek listed firms utilize more debt than equity. Specifically, the mean total debt ratio is 54% for the full sample, 53% for SMEs and 54% for large firms. Moreover, Greek listed firms have a higher short-term debt ratio (40%) than long-term debt ratio (20%). This difference is more profound in the case of SMEs (42% vs. 18%) than large firms (37% vs. 22%). A similar debt composition has been observed in Spanish SMEs (see Palacin-Sanchez et al., 2013). Greek listed firms have a mean of more than 7 board members and more than half of them are independent (54%). The mean number of board members is lower for SMEs than for large firms. 42% of the sample firms have a unitary leadership structure, where CEO and Chairman positions are held by the same person. However, duality is less evident in the case of large firms (31%). The mean age of operation exceeds 33 years and the tangible assets account for 55% (49%) of total assets for large firms (SMEs). Finally, the mean credit score is 2.77 for SMEs and slightly higher (2.89) for large firms.

[Insert Table 2]

[10] In the appendix, there is a table which describes the credit rating categories provided by Amadeus.

Table 3 displays the correlations between all the variables investigated. Consistent with prior studies, we observe a significant correlation between short-term debt and total debt and between long-term debt and total debt. As expected, there is a positive and significant correlation between tangible assets and long-term debt confirming that the former are used as physical collateral for the latter. Credit ratings have the expected positive sign, implying that the higher the firm's credit quality, the higher the level of debt. Profitability is also positively associated with total and long-term debt. Board size appears to affect long-term debt positively and short-term debt negatively. This implies that as the board size increases, the use of long-term debt is more preferable than short-term debt. The proportion of outsiders appears to negatively affect long-term debt, implying that higher board independence imposes constraints on long-term debt issuance. The leadership structure appears to play a significant role in external finance, especially in short-term debt. Finally, the correlations between independent variables as well as variance inflation factors (VIFs) are relatively low, showing that multicollinearity is not a problem in our analysis.

[Insert Table 3 about here]

4.3 Model specification

We employ panel data analysis, as our dataset contains a number of cross-sectional units and is applied over six years. Panel models are deemed to provide superior estimates compared to the cross-sectional models employed in most previous capital structure studies (Daskalakis and Psillaki, 2008; Psillaki and Daskalakis, 2009). First, models using panel data are less likely to suffer from multicollinearity among the explanatory variables, thus providing better econometric estimates (Hsiao, 2003; Wooldridge, 2010). Second, panel data models control for the presence of firm-specific effects in regression analysis (Arrelano, 2003; Baltagi, 2005). Finally, panel data can better detect and measure effects that simply cannot be observed in pure cross-section or pure time-series data (Hsiao, 2003; Arrelano, 2003; Baltagi, 2005).

Following several capital structure studies (e.g. Van der Wijst and Thurik 1993; Michaelas et al., 1999; Bevan and Danbolt, 2004; Sogorb-Mira, 2005; Degryse et al., 2012; Vermoesen et al., 2013, Mateev et al., 2013), we use a fixed-effects panel data model which

controls for all time-invariant differences among sample firms[11] (Arrelano, 2003; Hsiao, 2003; Baltagi, 2005; Wooldridge, 2010). The method of analysis employed is the Ordinary Least Squares (OLS). The resulting model can be written as:

$$DEBT_{i,t} = \beta_0 + \beta_1 AGE_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 TANGIBILITY_{i,t} + \beta_4 GROWTH_{i,t} + \beta_5 CR_{i,t} + \beta_6 PROFIT_{i,t} + \beta_7 NDTS_{i,t} + \beta_8 BOARD_{i,t} + \beta_9 OUTSIDERS_{i,t} + \beta_{10} CEO_{i,t} + \beta_{11} AUDITOR_{i,t} + \beta_{12} SME_{i,t} * AGE_{i,t} + + \beta_{13} SME_{i,t} * SIZE_{i,t} + \beta_{14} SME_{i,t} * TANGIBILITY_{i,t} + \beta_{15} SME_{i,t} * GROWTH_{i,t} + \beta_{16} SME_{i,t} * CR_{i,t} + \beta_{17} SME_{i,t} * PROFIT_{i,t} + \beta_{18} SME_{i,t} * NDTS_{i,t} + \beta_{19} SME_{i,t} * BOARD_{i,t} + \beta_{20} SME_{i,t} * OUTSIDERS_{i,t} + \beta_{21} SME_{i,t} * CEO_{i,t} + \beta_{22} SME_{i,t} * AUDITOR_{i,t} + \varepsilon_{i,t}$$

$$i = 1, ..., N \quad t = 1, ..., T \tag{1}$$

where *i* denotes firms ranging from 1 to 231 and *t* denotes years ranging from 1 to 6. In the above model we use interchangeably a SME dummy that takes the value of 1 for SMEs and 0 for large firms and a CRISIS dummy that takes the value of 1 in the crisis period (2008-2010) and 0 in the pre-crisis period (2005-2007). The SME dummy is interacted with all independent variables to test for differences between the samples of SMEs and large firms. The CRISIS dummy is also interacted with all independent variables to test for differences between pre-crisis and crisis period.

5. Empirical Results

5.1 Capital structure determinants of SME and large firms

Table 4 displays the regression results for total debt, long-term debt, and short-term debt (regressions 1, 2 and 3). The years of firm operation (AGE) appear to positively (negatively) affect long-term debt (short-term debt). However, the coefficient of this variable is not statistically significant for total debt. These results imply that better-established firms tend to take on more long-term debt rather than short-term debt. This seems reasonable, since older firms have the necessary assets to offer as collateral to ensure long-term debt compared to younger firms with fewer assets available for physical collateral. Consistent with the TOT predictions, we find that firm size is positively and significantly related with total and short-term debt. These results are in line with the majority of prior studies around the world (see Van der Wijst, 1993; Bevan and Danbolt, 2004; Sogorb-Mira, 2005; Degryse et al., 2012; Palacin-Sanchez et al., 2013) as well as in Greece (see Voulgaris et al, 2004; Eriotis et al, 2007; Daskalakis and Psillaki, 2008; Psillaki and Daskalakis, 2009; Noulas and Genimakis,

[11] The Hausman test was employed to check for fixed-effects versus random-effects.

2011), displaying a positive relationship between firm size and all proxies of debt. Tangible assets are also significantly related to the three proxies of debt. However, tangible assets are positively associated with total debt and long-term debt, and negatively linked with short-term debt. This finding is consistent with the assertion of Ortiz-Molina and Penas (2006) that collateral has a positive effect on long-term debt and a negative one on short-term debt. This entails that a proportion of fixed assets is used as collateral for long-term loans, while tangible assets are not necessary for short-term loan guarantees. Our findings are also in line with those of Van der Wijst and Thurik (1993), Chiienden et al. (1996), Hall et al. (2000), Sogorb-Mira (2005), Palacin-Sanchez et al. (2013) and Mateev et al. (2013). Compared to the prior Greek evidence, our results are congruent with those found by Noulas and Genimakis (2011) and at odds with Daskalakis and Psillaki (2008) and Psillaki and Daskalakis (2009).

Growth opportunities, as measured by Tobin's Q, have a negative and statistically significant impact on total and long-term debt. This finding is in line with our expectations, since the majority of Greek listed firms are characterized by a high ownership concentration and lower information asymmetry which, in turn, is linked with a low cost of equity. Thus, the major shareholders of Greek listed firms prefer to offer the necessary equity injections to fuel growth themselves rather than resort to debt. The negative coefficient on growth is consistent with Titman and Wessels (1988), Rajan and Zingales (1995), Fama and French (2002), Lopez-Gracia and Sogorb-Mira (2008) among others. Moreover, the negative relationship between growth opportunities and debt is in line with Eriotis et al. (2007) and Psillaki and Daskalakis (2009), but in contrast to Voulgaris et al. (2004) and Noulas and Genimakis (2011) who also employed Greek data.

As expected, high credit quality facilitates a firm's access to credit of a short or long maturity. In particular, credit ratings have a strong and positive impact on all measures of debt implying that high creditworthiness allows firms to have access to more debt. The positive coefficient of profitability is also in line with our prediction. In specific, due to the current corporate regulation, all Greek listed firms are required to distribute a minimum percentage of their profits to shareholders. This compulsory dividend distribution deprives firms of the internally-generated funds needed to finance growth. Therefore, the use of debt seems to be a rational alternative financing choice. Non-debt tax shields have a negative,

though non-significant, effect on total and short-term debt in line with Titman and Wessels (1988) who also find a negative[12] but not significant relationship between NDTS and debt ratios.

Regarding corporate governance variables, we observe that board size explains all proxies of debt. Similar to Berger et al. (1997), we find a negative relationship between total (and short-term debt) and board size, attributing this to the fact that large boards tend to exert pressure on management to pursue lower leverage in order to increase firm performance. However, the effect of board size alters when long-term debt is investigated. Specifically, confirming prior studies (e.g. Jensen, 1986; Wen et al., 2002; Abor, 2007; Bopkin and Arko, 2009), we see that large boards make use of more long-term leverage. Surprisingly, the proportion of outside directors does not appear to exert any significant effect on capital structure. This result does not support Wen et al.'s (2002) suggestion that outside directors tend to monitor managers more actively, pressurizing them to adopt lower leverage. Consistent with Abor (2007), we find that firms adopting a two-tier leadership structure (non-duality) are less likely to employ more debt. However, the CEO dummy displays a non-significant coefficient in all measures of debt. Finally, the audit variable (AUDITOR) displays a positive and statistically significant correlation with total and short-term debt. This result implies that firms audited by a Big 4 company raise more debt, since Big 4 auditors are perceived to provide higher audit quality than their non-Big 4 counterparts.

To test whether SMEs and large firms exert a differential effect on capital structure, we investigate the interaction of the SME dummy with all independent variables. The results show that the coefficient of SME*AGE is negative and statistically significant in the case of total and short-term debt. This finding means that the years of operation of SMEs exert less effect on the level of total and short-term debt compared to large firms. Differential behavior between large and SME firms is also observed when the SME dummy is interacted with size (SME*SIZE). In fact, the size of SMEs has less effect on total and short-term debt vis-à-vis large firms, while the impact of SME size is greater regarding long-term debt. Tangible assets of SMEs influence less total and short-term debt, whereas the growth opportunities of SMEs are more powerful in explaining total and long-term debt. As expected, the credit quality of SMEs plays a more significant role in issuing total and short-term debt than it does for large firms. Moreover, the influence of large firms' tax deductions on long-term debt is more evident than for SMEs.

[12] In Greek context, Noulas and Genimakis (2011) employ the ratio of depreciation over total assets to proxy NDTS and find a positive association with the debt level.

Looking at the role of corporate governance mechanisms in SMEs and large companies, we see that the board size and leadership structure of SMEs exert less influence on long-term debt. The reason behind this weak impact of corporate governance mechanisms of SMEs on their capital structure lies in the entrenched board composition, where the majority of board seats are held by major shareholders and information asymmetry is deemed to be lower. In such cases, corporate governance is of limited use in decision-making regarding debt issues. Finally, we find that the auditing services provided by Big 4s better explain total and short-term debt levels of SMEs than large companies. In other words, the audit provided by large, internationally-renowned companies adds more credibility to small-to-medium enterprises than it does to large companies.

[Insert Table 4 about here]

5.2 Capital structure determinants during global financial crisis

Another task of our study is the investigation of the capital structure of SMEs and large firms during the onset of the global financial crisis in 2008. Table 5 displays the regression results for total debt, long-term debt and short-term debt, employing the same independent variables as in Table 4 and adding a dummy variable (CRISIS) that takes the value of 1 in the crisis period (2008-2010) and 0 in the pre-crisis period (2005-2007). The CRISIS dummy is interacted with all independent variables to test for differences between the samples of pre-crisis and crisis periods. We find that age is negatively associated with short-term debt, while size has a positive association with total and long-term debt. Tangibility shows the same statistical significance with all types of debt as in Table 4, while growth opportunities are negatively associated with all debt levels. As in Table 4, credit ratings have a positive impact on all debt measures. Profitability seems to positively affect total and long-term debt, while NDTS are positively linked with total and short-term debt. Regarding corporate governance variables, we demonstrate a positive impact of board size on long-term and a negative impact on short-term debt. Notably, the coefficient of outside directors is negative and statistically significant with total and short-term debt, implying that as the number of independent directors increases proportionally to the board size the level of debt, especially that of short-maturity, decreases. This result suggests that as board independence increases management encounters more rigorous monitoring (Morellec et al. 2012) and adopts lower levels of debt

in order to avoid the performance pressures linked with commitments to pay down large amounts of cash (Jensen, 1986).

Focusing on the interactions of CRISIS dummy and the set of independent variables, we attempt to detect heterogeneous capital structure behavior before and after the outbreak of the global credit crunch. The regression results show that size affects more total and short-term leverage in the crisis period compared to the pre-crisis period. A similar effect on total debt is observed when tangibility is interacted with the CRISIS dummy. However, growth opportunities appear to increase debt levels less in the crisis period, implying that the consequences of the global financial crisis made firms more conservative with regards to growth through leverage. The role of credit ratings in determining the amount of total and short-term debt was strengthened in the crisis period, while the interaction of firm profitability and the CRISIS dummy provides mixed results. On the one hand, firms' long-term debt is increasingly reliant on profitability in the crisis period and, on the other hand, profitability is associated more with short-term debt in the pre-crisis period. Non-debt tax shields seem to relate less to total and short-term debt in the crisis period.

Looking at corporate governance variables, we see that the impact of outside directors on total and short-term debt is stronger in the crisis period. This result suggests that the global credit crunch brought to light the significant role of independent board members in pursuing a minimum level of transparency, minimizing the use of excessive debt on the part of top management and exerting more active monitoring on managers' decision making. Board size and leadership structure display a negative, though non-significant, coefficient when interacted with the CRISIS dummy. Finally, the effect of auditing by a Big 4 company on debt is greater in the crisis period. Collectively, the above evidence suggests that the consequences of the credit crunch necessitated for more board independence and stronger audit certification.

[Insert Table 5 about here]

5.3 Sensitivity tests

To check the robustness of our results, we re-run all regressions while replacing some of the independent variables. Specifically, we use SIZE as measured by the logarithm of total assets instead of sales. Moreover, we replace PROFIT with return on equity (ROE) defined as the ratio of net income to total equity. Finally, we use three dummy variables for three of the

credit rating groups[13]. CR1 is a dummy taking the value of 1 for firms with a credit rating between D and CC (low-rated) and 0 otherwise. CR2 is a dummy taking the value of 1 for firms with a credit rating between CCC and B and 0 otherwise. CR4 is a dummy taking the value of 1 for firms with a credit rating between A and AAA (highly-rated) and 0 otherwise.

The results are illustrated in Table 6. Firm factors, corporate governance variables and their interactions display quite similar signs and statistical significances as they do in Table 4. However, looking at the dummies that proxy the three distinct credit ratings groups, we observe a differential effect on all measures of leverage. The lowest group of credit quality (CR1) is significantly negatively related with all debt proxies. In contrast, the group of firms with the highest credit scores (CR4) has a positive and statistically significant impact on the three proxies of debt. The positive effect of those firms enjoying high creditworthiness is also present when looking at SMEs and large firms separately. In particular, the interaction of the SME dummy with CR4 has a positive and significant coefficient, indicating that the effect of the highest credit quality on total and short-debt debt is more evident in the case of SMEs. From the above, we can assert that there are significant differences between the highest-rated vs. lowest-rated firms and their capital structure. These differences are magnified when analyzing the two samples of firms separately and finding that SMEs take advantage of their high creditworthiness by issuing more debt compared to large firms. In other words, high credit quality lifts many of the barriers encountered by SMEs when accessing debt markets.

[Insert Table 6 about here]

To corroborate our earlier results that capital structure determinants have been altered in the crisis period, we repeat the regressions shown in Table 5 by using dummy variables for three of the credit rating groups. Table 7 confirms our earlier prediction that firms benefit from their high credit rating by issuing more debt in the crisis period. Contrarily, middle-rated (CR2) firms face more difficulties in raising long-term debt capital in the crisis period. Finally, the effect of independent directors and auditing by a Big 4 company on total debt is greater in the crisis period. Collectively, the above results signify the importance of credit ratings and auditing in periods of financial distress as conduits of reliable and unbiased corporate information.

[13] To avoid perfect collinearity among all credit rating groups, we leave out the dummy for the third group of credit ratings (BB and BBB).

[Insert Table 7 about here]

In addition to the "static" trade-off models tested above, we reformulate our model by performing "dynamic" panel regressions as suggested by Shyam-Sunder and Myers (1999). According to them, the "dynamic" model assumes that changes in the debt ratio are explained by deviations in the current ratio from the target. The TOT assumes that the adjustment coefficient should be constant across the sample and have a clearly positive value between 0 and 1 (López-Gracia and Sogorb-Mira, 2008).

In order to estimate the dynamic regression model using panel data, we use Generalized Method of Moments (GMM)-system estimator[14] developed by Arellano and Bover (1995) and Blundell and Bond (1998). Using instrumental variable (IV) techniques, GMM-system estimator controls for the presence of unobserved firm-specific effects and for endogeneity of explanatory variables (Hsiao, 2003; Baltagi, 2005). Instrument validity is tested employing the Sargan test of over-identifying restrictions. We run the regression for three different model specifications using DR, LDR and SDR as dependent variables. As explanatory variables[15] we use AGE, SIZE, TANGIBILITY, GROWTH, CR, PROFIT, NDTS, BOARD and OUTSIDERS.

Table 8 reports the results obtained for the GMM estimate of our capital structure model as well as a set of tests to check for the robustness of the estimates. In particular, we report (i) the Wald test of joint significance of regressors, (ii) the Arrelano-Bond test of no second-order autocorrelation in the residuals, and (iii) the Sargan test of over-identifying restrictions. In all regressions, we control for time and firm fixed effects. The estimated value of the coefficient of the lagged leverage (DR_{t-1}, LDR_{t-1} and SDR_{t-1}), is positive (0.308, 0.544 and 0.196) and statistically significant in all regressions, thus implying a high-adjustment parameter of 0.692, 0.456 and 0.804, respectively. These results are in line with those found in Spain by López-Gracia and Sogorb-Mira (2008) and in contrast with those found in Central and Eastern Europe by Mateev et al. (2013). The relationship between age and total debt ratio is found to be positive and statistically significant at the 1% level. This implies that as the number of years of firms' operation increases, more debt is used to finance their investment activities and growth. However, the coefficient of age is not statistically

[14] For more information regarding GMM estimates, see Arellano (2003) and Wooldridge (2010).
[15] We did not include CEO and AUDITOR and all interactions (SME or Crisis) since these are dummy variables and cannot be used in dynamic panel regressions.

significant in the cases of long- and short-term debt. Firm size and asset structure display positive and significant coefficients when regressed against total debt in line with the TOT predictions. Regarding the relationship between leverage and tangibility, we find that total and long-term debt ratios are positively associated with assets structure, while the relationship between short-term debt and tangibility is negative but non-significant.

As expected, growth opportunities exert a negative and statistically significant impact on total and short-term debt, while credit ratings show a positive and statistically significant coefficient on all types of debt. The positive coefficient on profitability lends support to the TOT, which implies that more profitable firms tend to utilize more debt (especially long-term debt) when financing their activities. The impact of NDTS is negative and statistically significant on total and short-term debt a result which serves to confirm the trade-off theory. Similar result is obtained from the dynamic model of López-Gracia and Sogorb-Mira (2008). Finally, as in the "static" model, the number of board members furnish negative effect on total and short-term debt, while the percentage of independent directors do not affect significantly debt levels.

Overall, the results obtained from the "dynamic" model are mostly congruent with the expectations of the TOT rather than with those of the POT. Moreover, our results partly refute those found by prior studies examining the capital structure of Greek listed firms. Specifically, we find a positive relationship between profitability and leverage, while Daskalakis and Psillaki (2008), Psillaki and Daskalakis (2009) and Noulas and Genimakis (2011) find an inverse relationship. Also, we document a negative correlation between growth opportunities and debt levels, while Voulgaris et al. (2004) and Noulas and Genimakis (2011) find a positive one. Nevertheless, we confirm prior evidence on the positive effect of firm size on debt as well that of credit ratings.

[Insert Table 8 about here]

6. Conclusions

There is no doubt that capital structure is one of the most puzzling corporate issues remaining unresolved to date. Several studies have been conducted with the aim of ascertaining the determinants of capital structure. However, the main limitation of these studies is the neglect of many factors that could affect capital structure. The burgeoning literature on the capital structure of SMEs has partly satisfied that deficit, although the topic is still in its infancy

(Bhaird and Lucey, 2010). The current study contributes to the ongoing debate on capital structure by incorporating corporate governance and credit quality variables into the analysis. Apart from the classical firm-specific factors that have been examined as potential capital structure determinants (e.g. age, size, asset structure, growth, profitability, non-debt tax shields), we include corporate governance mechanisms such as board size, board composition, leadership structure and auditing as an additional gamut of variables that may affect leverage. Moreover, we investigate whether corporate credit quality, as measured by credit ratings, affects capital structure. In addition, we analyze the differential effects that corporate governance and firm-specific factors might have on the capital structure of SMEs and large firms. Finally, we examine whether capital structure determinants altered during the global financial crisis of 2008.

We explore the above relationships using data from a sample of non-financial firms listed on the Athens Stock Exchange (ASE) during the period 2005-2010. The ASE presents some idiosyncrasies that are rarely observed in other developed markets, thus making the examination of capital structure within this context an interesting subject. First, the Greek corporate law (2190/1920) requires all profitable firms to distribute at least 35% of their profits to shareholders, depriving firms of much of the funds necessary for financing growth. Second, ASE firms are characterized by a high ownership concentration and an entrenched board composition. Third, the ASE allows the public trading of both SMEs and large firms. Additional market peculiarities of the period under examination are the global financial turmoil and Greece's sovereign debt crisis, that is, two factors that severely affected the majority of Greek listed companies by increasing the cost of debt and undermining corporate credit quality.

The empirical results show that board size is the first corporate governance variable that is statistically related with capital structure. In fact, we find that, as board size increases, debt of short maturity decreases. This result is consistent with that of Berger et al. (1997) and we attribute it to the fact that large boards tend to exert pressure on management to pursue lower leverage in order to increase firm performance. The second corporate governance mechanism that affects debt is the presence of a Big 4 company in the auditing process of Greek listed firms. Shareholders and lenders are privy to information disclosed by certified financial statements and, therefore, the accreditation provided by a well-recognized auditor is the safest route for firms that wish to take on more debt. Size, tangibility, profitability and credit ratings are also significant determinants of capital structure for the whole period under

examination. In fact, all these variables affect leverage positively. On the other hand, growth opportunities are negatively correlated with leverage. Regarding age and non-debt tax shields, there is no clear picture of their effects on total, long-term or short-term debt. Overall, our results seem to lend more support to the predictions of the trade-off hypothesis.

When examining the capital structure of SMEs vis-à-vis large firms, we detect significant differences in debt structure that merit explanation. Specifically, we find that the effect of age, size, tangibility and non-debt tax shields on all proxies of debt was stronger in the case of large firms. In contrast, the impact of growth opportunities and credit ratings on debt was more prominent in the case of SMEs. As expected, corporate governance mechanisms seem more relevant to the capital structure of large firms, where agency problems between management and ownership are more evident. In contrast, conflicts of interest between owners and managers are less likely to occur in SMEs, where major owners are usually involved in management and information asymmetry is minimal.

Another objective of the current study is to assess the capital structure behavior before and after the eruption of the financial crisis that severely affected all Greek companies. The results reveal that board independence is the key corporate governance factor, which construes the debt levels of Greek firms in the crisis period. In fact, the level of board independence overshadows board size as the most important corporate governance variable relating to debt level. We ascribe this change in governance behavior to the fact that shareholders started pursuing more transparency and less risky transactions (such as levered growth) that would jeopardize their stakeholdings and the viability of their firms. In a similar vein, we observe that the reputation of auditors (i.e. Big 4) and credit rating agencies provide firms with the necessary certification to take on more debt. In sum, we assert that board independence and external auditing and accreditation are the key capital structure determinants for firms that operate in a financially-constrained environment.

Our results present useful practical implications for managers and public policy makers who wish to use corporate governance as a system of structuring, operating and controlling a company with the aim of achieving a long-term equilibrium between equity and debt. This equilibrium is expected to lead to the minimization of the consequences of excessive leverage use that could put corporate viability at risk. Moreover, our results highlight the importance of credit ratings as the corporate mechanism that facilitates access to credit during financially-constrained periods.

The limitations of the current research relate to the omission of other significant corporate governance variables such as CEO compensation, CEO tenure, audit fees and nominating committees that could affect capital structure. Moreover, the strength of shareholder rights and the use of anti-shareholder mechanisms (e.g. poison pills, golden parachutes, white knights, etc) to protect firms against, for example, hostile takeovers could be added to the set of variables that affect capital structure. The inclusion of the cost of debt in our analysis could be another interesting dimension in the capital structure behavior. Moreover, the inclusion of all years encompassing crisis period (i.e. 2010 onwards) would allow us to further strengthen our conclusions with regards to the repercussions of the ongoing sovereign debt crisis on capital structures. Finally, a multi-country analysis of all issues tackled in the current study would allow for the appropriate generalizations of our findings.

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Table 1: Firm distribution by SIC code

SIC code range	Industry segment	Full sample	%	SME Sample	%	Large sample	%
0000-0999	Agriculture, forestry and fishing	24	10.39%	16	12.31%	8	7.92%
1000-1999	Mining and construction	67	29.00%	40	30.77%	27	26.73%
2000-3999	Manufacturing	34	14.72%	16	12.31%	18	17.82%
4000-4999	Transportation and communication	24	10.39%	8	6.15%	16	15.84%
5000-5999	Wholesale and retail trade	53	22.94%	31	23.85%	22	21.78%
7000-8999	Services	29	12.55%	19	14.62%	10	9.90%
Total		231	100%	130	100.00%	101	100.00%

Table 2: Descriptive statistics of dependent and independent variables

Panel A: Descriptive statistics for the full sample

	Definition	No. obs	Mean	Median	St. Dev.	Max	Min
DR	Total debt/total assets	1,386	0.54	0.54	0.28	5.82	0.01
LDR	Long-term debt/total assets	1,386	0.20	0.18	0.16	1.81	0.00
SDR	Short-term debt/total assets	1,350	0.40	0.35	0.34	6.16	0.01
Board size	No. of board members	1,386	7.70	7.00	2.35	17.00	3.00
Outside directors	Proportion of outside directors	1,386	0.54	0.50	0.16	0.92	0.17
Duality	Same person is CEO and Chairman	1,386	0.58	0.00	0.49	1.00	0.00
Auditors	Big-Four auditors (i.e. PWC, KPMG, Ernst & Young, Deloitte)	1,386	0.22	0.00	0.41	1.00	0.00
Tangibility	Tangible fixed assets/total assets	1,275	0.52	0.54	0.22	0.99	0.01
Tobin's Q	Market value of equity/book value of assets	1,362	0.66	0.44	0.81	9.75	0.02
NDTS	Annual depreciation/total assets	1,361	0.03	0.02	0.03	0.40	0.00
Profitability	EBIT/total assets	1,368	0.01	0.02	0.19	0.69	-0.70
Age	No. of years of operation	1,386	33.30	29.00	20.71	131.00	1.00
Size	Annual sales (in millions €)	1,368	50.22	50.08	164.15	2,264.58	2.01
CR	Credit score (1 for risky, 4 for healthy)	1,346	2.82	3.00	0.69	4.00	1.00

Panel B: Descriptive statistics for the SME sample

	Definition	No. obs	Mean	Median	St. Dev.	Max	Min
DR	Total debt/total assets	780	0.53	0.52	0.33	5.82	0.01
LDR	Long-term debt/total assets	780	0.18	0.16	0.17	1.81	0.00
SDR	Short-term debt/total assets	754	0.42	0.35	0.42	6.16	0.01
Board size	No. of board members	780	6.91	7.00	1.77	13.00	4.00
Outside directors	Proportion of outside directors	780	0.52	0.50	0.15	0.91	0.17
Duality	Same person is CEO and Chairman	780	0.50	0.00	0.50	1.00	0.00
Auditors	Big-Four auditors (i.e. PWC, KPMG, Ernst & Young, Deloitte)	780	0.12	0.00	0.32	1.00	0.00
Tangibility	Tangible fixed assets/total assets	705	0.49	0.50	0.23	0.99	0.01

Tobin's Q	Market value of equity/book value of assets	768	0.57	0.38	0.67	7.05	0.03
NDTS	Annual depreciation/total assets	765	0.03	0.02	0.03	0.40	0.00
Profitability	EBIT/total assets	772	-0.01	0.01	0.12	0.69	-0.70
Age	No. of years of operation	780	33.32	28.00	21.16	131.00	5.00
Size	Annual sales (in millions €)	772	9.57	5.62	9.13	49.99	2.01
CR	Credit score (1 for risky, 4 for healthy)	751	2.77	3.00	0.69	4.00	1.00

Panel C: Descriptive statistics for the large sample

	Definition	No. obs	Mean	Median	St. Dev.	Max	Min
DR	Total debt/total assets	606	0.54	0.56	0.20	1.21	0.01
LDR	Long-term debt/total assets	606	0.22	0.20	0.15	0.86	0.00
SDR	Short-term debt/total assets	596	0.37	0.34	0.19	1.46	0.03
Board size	No. of board members	606	8.72	9.00	2.60	17.00	3.00
Outside directors	Proportion of outside directors	606	0.56	0.55	0.17	0.92	0.27
Duality	Same person is CEO and Chairman	606	0.69	0.00	0.46	1.00	0.00
Auditors	Big-Four auditors (i.e. PWC, KPMG, Ernst & Young, Deloitte)	606	0.35	0.00	0.48	1.00	0.00
Tangibility	Tangible fixed assets/total assets	570	0.55	0.58	0.21	0.97	0.03
Tobin's Q	Market value of equity/book value of assets	594	0.77	0.50	0.96	9.75	0.02
NDTS	Annual depreciation/total assets	596	0.04	0.03	0.03	0.34	0.00
Profitability	EBIT/total assets	596	0.02	0.02	0.09	0.53	-0.44
Age	No. of years of operation	606	33.34	31.00	20.19	122.00	1.00
Size	Annual sales (in millions €)	596	138.77	106.13	286.61	2,264.58	50.01
CR	Credit score (1 for risky, 4 for healthy)	595	2.89	3.00	0.67	4.00	1.00

Table 3: Pearson correlation matrix for the variables employed in regressions

	DR	LDR	SDR	AGE	SIZE	TANGIBILITY	GROWTH	CR	PROFIT	NDTS	BOARD	OUTSIDERS	CEO
LDR	0.366												
	(12.70)***												
SDR	0.823	-0.226											
	(6.90)***	(-7.49)***											
AGE	0.006	0.183	-0.105										
	(0.20)	(6.01)***	(-3.40)***										
SIZE	0.029	0.303	-0.154	0.146									
	(0.93)	(10.25)***	(-5.03)***	(4.78)***									
TANGIBILITY	-0.136	0.142	-0.227	0.158	0.054								
	(-4.45)***	(4.62)***	(-7.53)***	(5.16)***	(1.75)*								
GROWTH	0.003	-0.040	0.028	-0.027	-0.244	0.086							
	(0.09)	(-1.30)	(0.89)	(-0.88)	(-8.11)***	(2.78)***							
CR	0.455	0.202	0.354	0.131	-0.046	0.111							
	(16.51)***	(6.65)***	(12.21)***	(4.28)***	(-1.50)	(3.61)***							
PROFIT	0.257	0.394	0.028	0.089	-0.075	-0.116	-0.004	0.113					
	(8.57)***	(13.84)***	(0.91)	(2.88)***	(-2.44)**	(-3.78)***	(-0.13)	(3.67)****					
NDTS	0.013	-0.039	0.037	-0.107	0.083	-0.047	0.027	-0.006	-0.043				
	(0.41)	(-1.26)	(1.21)	(-3.49)***	(2.69)***	(-1.53)	(0.86)	(-0.19)	(-1.41)				
BOARD	-0.066	0.097	-0.128	0.078	0.469	0.039	-0.003	-0.077	-0.068	0.006			
	(-2.14)**	(3.16)***	(-4.15)***	(2.53)**	(17.14)***	(1.27)	(-0.09)	(-2.48)**	(-2.21)**	(0.20)			
OUTSIDERS	0.001	-0.056	-0.032	0.003	0.181	-0.076	0.025	-0.046	0.084	0.111	0.173		
	(0.01)	(-1.81)*	(-1.05)	(0.09)	(5.93)***	(-2.45)**	(0.80)	(-1.47)	(2.71)***	(3.63)***	(5.68)***		
CEO	-0.075	0.003	-0.078	0.123	0.187	0.059	-0.059	-0.021	-0.063	-0.023	0.306	-0.015	
	(-2.41)**	(0.09)	(-2.54)**	(4.01)***	(6.15)***	(1.90)*	(-1.92)*	(-0.69)	(-2.05)**	(-0.75)	(10.38)***	(-0.49)	
AUDITOR	-0.026	0.091	-0.082	0.091	0.452	0.069	-0.024	-0.038	-0.024	0.006	0.221	0.329	0.123
	(-0.83)	(2.95)**	(-2.64)***	(2.96)***	(16.36)***	(2.25)**	(-0.79)	(-1.24)	(-0.79)	(0.18)	(7.31)***	(11.26)***	(3.99)***

	AGE	SIZE	TANGIBILITY	GROWTH	CR	PROFIT	NDTS	BOARD	OUTSIDERS	CEO	AUDITOR	MEAN
VIF values	1.08	1.53	1.08	1.04	1.07	1.06	1.04	1.36	1.19	1.13	1.38	1.18

Table 4: Regression outputs for the period 2005-2010

Explanatory variables	Expected sign	DR	LDR	SDR
Constant		0.328	-0.003	0.328
		(5.76)***	(-0.08)	(5.71)***
AGE	-	-0.001	0.001	-0.001
		(-0.56)	(2.62)***	(-2.12)**
SIZE	+	0.043	0.005	0.038
		(6.21)***	(1.28)	(5.43)***
TANGIBILITY	+	0.135	0.114	-0.248
		(3.48)***	(4.89)***	(-6.37)***
GROWTH	-	-0.028	-0.020	-0.008
		(-2.50)**	(-2.98)***	(-0.70)
CR	+	0.138	0.026	0.112
		(9.79)***	(3.06)***	(7.91)***
PROFIT	+	0.001	0.017	0.016
		(2.04)**	(2.14)**	(2.63)***
NDTS	+/-	-0.286	0.045	-0.331
		(-1.22)	(0.32)	(-1.40)
BOARD	-	-0.009	0.007	-0.016
		(-2.30)**	(2.99)***	(-4.06)***
OUTSIDERS	-	-0.042	0.005	-0.047
		(-0.78)	(0.15)	(-0.85)
CEO	+/-	-0.028	-0.001	-0.028
		(-1.59)	(-0.05)	(-1.53)
AUDITOR	+	0.057	0.004	0.053
		(2.77)***	(0.33)	(2.56)**
SME*AGE	?	-0.004	-0.001	-0.004
		(-4.69)***	(-0.26)	(-4.52)***
SME*SIZE	?	-0.068	0.017	-0.086
		(-4.71)***	(1.93)*	(-5.89)***
SME*TANGIBILITY	?	-0.212	-0.027	-0.180
		(-3.12)***	(-0.68)	(-2.63)***
SME*GROWTH	?	0.029	0.020	0.009
		(2.58)***	(2.97)***	(0.79)
SME*CR	?	0.153	0.015	0.137
		(7.15)***	(1.15)	(6.38)***
SME*PROFIT	?	0.010	-0.004	0.014
		(0.42)	(-0.26)	(0.55)

SME*NDTS	?	0.186	-0.515	0.704
		(0.43)	(-1.99)**	(1.64)
SME*BOARD	?	-0.004	-0.018	0.014
		(-0.41)	(-3.12)***	(1.43)
SME*OUTSIDERS	?	0.096	0.045	0.058
		(0.95)	(0.74)	(0.57)
SME*CEO	?	0.052	-0.038	0.092
		(1.60)	(-1.88)*	(2.75)***
SME*AUDITOR	?	0.175	-0.021	0.198
		(2.78)***	(-0.56)	(3.12)***
Adjusted-R^2		0.351	0.303	0.280
F-statistic		26.61***	21.60***	19.48***
Hausman specification test χ^2		1,168.74***	1,039.09***	1,145.86***

Notes: The dependent variables are (i) the debt ratio which is defined as the total debt to total assets, (ii) the long-term debt which is defined as the long-term debt to total assets, (iii) the short-term debt which is defined as the short-term debt to total assets. AGE is the logarithm of number of years of operation. SIZE is the logarithm of sales. TANGIBILITY is the ratio of fixed (tangible) assets to total assets. GROWTH is the ratio of market value of equity to the book value of total assets. CR is the credit-rating quality of firms taking the value of 1 for firms with a credit rating between D and CC (low-rated), 2 for firms with a credit rating between CCC and B, 3 for firms with a credit rating between BB and BBB, and 4 for firms with a credit rating between A and AAA (highly-rated). PROFIT is the ratio of earnings before interest and taxes (EBIT) to total assets. NDTS is the ratio of annual depreciation to total assets. BOARD is the board size defined as the logarithm of the number of board members. OUTSIDERS is the proportion of independent and non-executive board members to the total number of board members. CEO is a dummy that takes the value of 1 for companies having a CEO different from the chair of the board and 0 otherwise. AUDITOR is a dummy that takes the value of 1 if the company is audited by a Big 4 and 0 otherwise. SME is a dummy that takes the value of 1 for small-to-medium firms and 0 otherwise. T-statistics are in parentheses. *. ** . *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

Table 5: Regression outputs in the pre-crisis and crisis periods

Explanatory variables	Expected sign	DR	LDR	SDR
Constant		0.210	-0.077	0.284
		(4.48)***	(-2.74)***	(6.01)***
AGE	-	-0.001	0.001	-0.001
		(-1.59)	(1.26)	(-2.32)**
SIZE	+	0.023	0.023	-0.001
		(2.99)***	(5.07)***	(-0.02)
TANGIBILITY	+	0.243	0.085	-0.328
		(5.05)***	(2.96)***	(-6.77)***
GROWTH	-	-0.063	-0.048	-0.111
		(-2.50)**	(-3.23)***	(-4.42)***
CR	+	0.243	0.035	0.208
		(15.40)***	(3.76)***	(13.14)***
PROFIT	+	0.011	0.013	-0.002
		(6.63)***	(12.68)***	(-0.94)
NDTS	+/-	0.714	0.056	0.658
		(2.17)***	(0.28)	(1.99)**
BOARD	-	-0.006	0.006	-0.012
		(-1.14)	(1.76)*	(-2.17)**
OUTSIDERS	-	-0.158	0.046	-0.203
		(-2.20)**	(1.08)	(-2.81)***
CEO	+/-	-0.013	-0.010	-0.003
		(-0.52)	(-0.68)	(-0.12)
AUDITOR	+	0.031	0.043	0.012
		(1.00)	(2.35)**	(0.39)
Crisis*AGE	?	0.001	0.001	0.001
		(0.78)	(1.15)	(0.08)
Crisis*SIZE	?	0.021	-0.007	0.028
		(2.08)**	(-1.08)	(2.70)***
Crisis*TANGIBILITY	?	0.108	0.058	0.054
		(1.71)*	(1.53)	(0.85)
Crisis*GROWTH	?	-0.061	-0.048	-0.110
		(-2.44)**	(-3.21)***	(-4.35)***
Crisis*CR	?	0.072	0.005	0.068
		(3.67)***	(0.41)	(3.46)***
Crisis*PROFIT	?	-0.002	0.009	-0.011
		-(0.40)	(2.60)***	(-1.93)*

Crisis*NDTS	?	-1.225	-0.210	-1.013
		(-2.96)***	(-0.85)	(-2.44)**
Crisis*BOARD	?	-0.004	-0.002	-0.002
		(-0.57)	(-0.49)	(-0.29)
Crisis*OUTSIDERS	?	0.168	-0.086	0.254
		(1.93)*	(-1.64)	(2.90)***
Crisis*CEO	?	-0.014	-0.002	-0.011
		(-0.45)	(-0.11)	(-0.35)
Crisis*AUDITOR	?	0.009	0.066	0.074
		(2.22)**	(2.83)***	(1.90)*
Adjusted-R^2		0.317	0.284	0.246
F-statistic		23.01***	19.79***	16.48***
Hausman specification test $\chi 2$		1,014.54***	1,095.57***	963.04***

Notes: The dependent variables are (i) the debt ratio which is defined as the total debt to total assets, (ii) the long-term debt which is defined as the long-term debt to total assets, (iii) the short-term debt which is defined as the short-term debt to total assets. AGE is the logarithm of number of years of operation. SIZE is the logarithm of sales. TANGIBILITY is the ratio of fixed (tangible) assets to total assets. GROWTH is the ratio of market value of equity to the book value of total assets. CR is the credit-rating quality of firms taking the value of 1 for firms with a credit rating between D and CC (low-rated), 2 for firms with a credit rating between CCC and B, 3 for firms with a credit rating between BB and BBB, and 4 for firms with a credit rating between A and AAA (highly-rated). PROFIT is the ratio of earnings before interest and taxes (EBIT) to total assets. NDTS is the ratio of annual depreciation to total assets. BOARD is the board size defined as the logarithm of the number of board members. OUTSIDERS is the proportion of independent and non-executive board members to the total number of board members. CEO is a dummy that takes the value of 1 for companies having a CEO different from the chair of the board and 0 otherwise. AUDITOR is a dummy that takes the value of 1 if the company is audited by a Big 4 and 0 otherwise. CRISIS is a dummy that takes the value of 1 in the crisis period (2008-2010) and 0 in the pre-crisis period (2005-2007). T-statistics are in parentheses. *. ** . *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

Table 6: Regression outputs for the period 2005-2010 assessing the impact of credit ratings

Explanatory variables	Expected sign	DR	LDR	SDR
Constant		0.753	-0.029	0.782
		(15.47)***	(-0.88)	(15.72)***
AGE	-	-0.001	0.001	-0.001
		(-0.25)	(2.33)**	(-1.81)*
SIZE	+	0.016	0.034	0.017
		(1.89)*	(5.73)***	(1.98)**
TANGIBILITY	+	0.155	0.116	-0.270
		(4.25)***	(4.66)***	(-7.26)***
GROWTH	-	-0.023	-0.018	-0.006
		(-2.12)**	(-2.39)**	(-0.50)
CR1	-	-0.235	-0.083	-0.152
		(-7.10)***	(-3.68)***	(-4.50)***
CR2	-	-0.054	-0.001	-0.053
		(-2.79)***	(-0.08)	(-2.69)***
CR4	+	0.429	0.112	0.317
		(7.27)***	(2.78)***	(5.26)***
ROE	+	0.047	0.049	-0.002
		(2.22)**	(3.41)***	(-0.10)
NDTS	+/-	-0.187	-0.169	-0.017
		(-0.83)	(-1.11)	(-0.07)
BOARD	-	-0.006	0.001	-0.006
		(-1.68)*	(0.03)	(-1.66)*
OUTSIDERS	-	-0.019	0.032	-0.051
		(-0.37)	(0.91)	(-0.97)
CEO	+/-	-0.023	0.006	-0.029
		(-1.37)	(0.53)	(-1.69)*
AUDITOR	+	0.024	0.031	0.007
		(2.22)**	(2.30)**	(0.34)
SME*AGE	?	-0.003	0.001	-0.004
		(-4.25)***	(1.47)	(-5.17)***
SME*SIZE	?	-0.002	0.039	-0.043
		(-0.09)	(2.86)***	(-2.10)**
SME*TANGIBILITY	?	-0.108	-0.141	0.040
		(-1.62)	(-3.10)***	(0.59)
SME*GROWTH	?	0.025	0.019	0.005
		(2.26)**	(2.59)***	(0.49)

SME*CR1	?	-0.099	-0.018	-0.080
		(-1.96)*	(-0.52)	(-1.55)
SME*CR2	?	-0.058	-0.031	-0.027
		(-1.56)	(-1.23)	(-0.71)
SME*CR4	?	0.633	0.078	0.556
		(7.66)***	(1.38)	(6.59)***
SME*ROE	?	-0.053	-0.050	-0.003
		(-2.45)**	(-3.40)***	(-0.13)
SME*NDTS	?	0.195	-0.368	0.563
		(0.49)	(-1.35)	(1.38)
SME*BOARD	?	-0.001	-0.018	0.015
		(-0.22)	(-2.96)***	(1.73)*
SME*OUTSIDERS	?	0.173	0.132	0.050
		(1.82)*	(2.03)**	(0.51)
SME*CEO	?	0.052	-0.057	0.111
		(1.67)*	(-2.68)***	(3.47)***
SME*AUDITOR	?	0.098	-0.001	0.099
		(1.67)*	(-0.01)	(1.66)*
Adjusted-R^2		0.417	0.231	0.334
F-statistic		30.53***	13.44***	21.76***
Hausman specification test $\chi 2$		1,132.21***	1,088.77***	1,137.18***

Notes: The dependent variables are (i) the debt ratio which is defined as the total debt to total assets, (ii) the long-term debt which is defined as the long-term debt to total assets, (iii) the short-term debt which is defined as the short-term debt to total assets. AGE is the logarithm of number of years of operation. SIZE is the logarithm of total assets. TANGIBILITY is the ratio of fixed (tangible) assets to total assets. GROWTH is the ratio of market value of equity to the book value of total assets. CR1 is a dummy taking the value of 1 for firms with a credit rating between D and CC (low-rated) and 0 otherwise. CR2 is a dummy taking the value of 1 for firms with a credit rating between CCC and B and 0 otherwise. CR4 is a dummy taking the value of 1 for firms with a credit rating between A and AAA (highly-rated) and 0 otherwise. ROE is the ratio of net income to total equity. NDTS is the ratio of annual depreciation to total assets. BOARD is the board size defined as the logarithm of the number of board members. OUTSIDERS is the proportion of independent and non-executive board members to the total number of board members. CEO is a dummy that takes the value of 1 for companies having a CEO different from the chair of the board and 0 otherwise. AUDITOR is a dummy that takes the value of 1 if the company is audited by a Big 4 and 0 otherwise. SME is a dummy that takes the value of 1 for small-to-medium firms and 0 otherwise. T-statistics are in parentheses. *. ** . *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

Table 7: Regression outputs during the global crisis assessing the impact of credit ratings

Explanatory variables	Expected sign	DR	LDR	SDR
Constant		0.676	-0.028	0.701
		(6.64)***	(-1.02)	(6.98)***
AGE	-	-0.001	0.001	-0.001
		(-1.08)	(2.16)**	(-2.49)**
SIZE	+	0.020	0.042	0.022
		(2.17)**	(6.75)***	(2.34)**
TANGIBILITY	+	0.200	0.021	-0.221
		(4.53)***	(0.71)	(-4.92)***
GROWTH	-	-0.045	-0.045	-0.090
		(-1.83)*	(-2.71)***	(-3.60)***
CR1	-	-0.294	-0.063	-0.230
		(-7.09)***	(-2.26)**	(-5.46)***
CR2	-	-0.026	0.023	-0.048
		(-1.05)	(1.39)	(-1.95)*
CR4	+	0.989	0.230	0.760
		(7.54)***	(6.04)***	(3.25)***
ROE	+	-0.007	0.001	-0.007
		(-1.37)	(0.17)	(-1.46)
NDTS	+/-	-0.560	-0.255	-0.816
		(-1.80)*	(-1.21)	(-2.58)***
BOARD	-	-0.006	-0.003	-0.003
		(-1.17)	(-0.92)	(-0.53)
OUTSIDERS	-	-0.039	0.117	-0.154
		(-0.59)	(2.65)***	(-2.32)**
CEO	+/-	0.010	-0.018	0.029
		(0.45)	(-1.22)	(1.25)
AUDITOR	+	0.013	0.059	0.045
		(0.46)	(3.03)***	(1.54)
Crisis*AGE	?	0.001	0.001	0.001
		(0.33)	(0.42)	(0.03)
Crisis*SIZE	?	0.009	-0.002	0.010
		(0.74)	(-0.24)	(0.86)
Crisis*TANGIBILITY	?	0.026	0.079	-0.050
		(0.45)	(2.05)**	(-0.87)
Crisis*GROWTH	?	-0.044	0.046	-0.089
		(-1.78)*	(2.74)***	(-3.57)***

Crisis*CR1	?	-0.008	-0.024	0.016
		(-0.16)	(-0.71)	(0.31)
Crisis*CR2	?	-0.057	-0.045	-0.014
		(-1.75)*	(-2.03)**	(-0.42)
Crisis*CR4	?	0.527	0.161	0.366
		(6.34)***	(2.88)***	(4.34)***
Crisis*ROE	?	0.028	0.001	0.027
		(1.58)	(0.12)	(1.49)
Crisis*NDTS	?	-1.032	-0.064	-0.966
		(-2.64)***	(-0.24)	(-2.43)**
Crisis*BOARD	?	0.001	0.001	0.001
		(0.14)	(0.10)	(0.06)
Crisis*OUTSIDERS	?	0.082	-0.090	0.173
		(2.04)**	(-1.69)*	(2.15)**
Crisis*CEO	?	-0.038	0.005	-0.043
		(-1.30)	(0.28)	(-1.43)
Crisis*AUDITOR	?	0.031	0.046	0.045
		(2.01)**	(1.89)*	(1.23)
Adjusted-R^2		0.384	0.203	0.302
F-statistic		26.73***	11.50***	18.85***
Hausman specification test $\chi 2$		965.28***	1,149.33***	935.05***

Notes: The dependent variables are (i) the debt ratio which is defined as the total debt to total assets, (ii) the long-term debt which is defined as the long-term debt to total assets, (iii) the short-term debt which is defined as the short-term debt to total assets. AGE is the logarithm of number of years of operation. SIZE is the logarithm of total assets. TANGIBILITY is the ratio of fixed (tangible) assets to total assets. GROWTH is the ratio of market value of equity to the book value of total assets. CR1 is a dummy taking the value of 1 for firms with a credit rating between D and CC (low-rated) and 0 otherwise. CR2 is a dummy taking the value of 1 for firms with a credit rating between CCC and B and 0 otherwise. CR4 is a dummy taking the value of 1 for firms with a credit rating between A and AAA (highly-rated) and 0 otherwise. ROE is the ratio of net income to total equity. NDTS is the ratio of annual depreciation to total assets. BOARD is the board size defined as the logarithm of the number of board members. OUTSIDERS is the proportion of independent and non-executive board members to the total number of board members. CEO is a dummy that takes the value of 1 for companies having a CEO different from the chair of the board and 0 otherwise. AUDITOR is a dummy that takes the value of 1 if the company is audited by a Big 4 and 0 otherwise. CRISIS is a dummy that takes the value of 1 in the crisis period (2008-2010) and 0 in the pre-crisis period (2005-2007). T-statistics are in parentheses. *. ** . *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

Table 8: GMM-system results for total debt, long-term and short-term debt

Explanatory variables	Expected sign	DR	LDR	SDR
DR_{t-1}		0.308		
		(3.42)***		
LDR_{t-1}			0.544	
			(5.41)***	
SDR_{t-1}				0.196
				(2.07)**
AGE	-	0.012	0.001	0.006
		(3.09)***	(0.22)	(1.52)
SIZE	+	0.152	0.001	0.163
		(11.73)***	(0.13)	(10.77)***
TANGIBILITY	+	0.351	0.199	-0.150
		(4.41)***	(2.82)***	(-1.63)
GROWTH	-	-0.004	-0.001	-0.004
		(-5.73)***	(-0.19)	(-5.18)***
CR	+	0.053	0.006	0.058
		(4.39)***	(2.59)***	(4.08)***
PROFIT	+	0.010	0.008	0.001
		(6.64)***	(6.18)***	(0.63)
NDTS	+/-	-1.273	-0.142	-1.161
		(-4.15)***	(-0.52)	(-3.26)***
BOARD	-	-0.017	0.018	-0.018
		(-2.29)**	(0.36)	(-2.28)**
OUTSIDERS	-	-0.111	-0.081	-0.031
		(-1.20)	(-0.99)	(-0.30)
No. of Obs.		627	627	627
Wald test		439.180	104.810	231.490
Arrelano –Bond test for AR(2) p-value		0.205	0.289	0.156
Sargan test p-value		0.079	0.107	0.662

Notes: The dependent variables are (i) the debt ratio which is defined as the total debt to total assets, (ii) the long-term debt which is defined as the long-term debt to total assets, (iii) the short-term debt which is defined as the short-term debt to total assets. AGE is the logarithm of number of years of operation. SIZE is the logarithm of sales. TANGIBILITY is the ratio of fixed (tangible) assets to total assets. GROWTH is the ratio of market value of equity to the book value of total assets. CR is the credit-rating quality of firms taking the value of 1 for firms with a credit rating between D and CC (low-rated), 2 for firms with a credit rating between CCC and B, 3 for firms with a credit rating between BB and BBB, and 4 for firms with a credit rating between A and AAA (highly-rated). PROFIT is the ratio of earnings before interest and taxes (EBIT) to total assets. NDTS is the ratio of annual depreciation to total assets. BOARD is the board size defined as the logarithm of the number of board members. OUTSIDERS is the proportion of independent and non-executive board members to the total number of board members. All regressions are carried out by GMM-system taking the model in first differences where dependent and independent variables have been instrumented with all their lags. All models include dummies to control for time and firm fixed effects. The Wald test statistic refers to the null hypothesis that all coefficients on the explanatory variables are jointly equal to zero. The Arrelano-Bond test statistic applies to the null hypothesis of no second-order autocorrelation in the residuals. The Sargan test statistic applies to the null hypothesis that over-identifying restrictions are valid. Z-statistics are in parentheses. *. ** . *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

APPENDIX

Table A. Description of credit rating categories (Multi Objective Rating Evaluation -MORE)

Category	Rating	Risk Assessment
Healthy firms	AAA	The firm's capacity to meet its financial commitments is extremely strong. The firm shows an excellent economic and financial flow and fund equilibrium.
	AA	The firm has a strong creditworthiness. It also has a good capital structure and economic and financial equilibrium. Difference from "AAA" is slight.
	A	The firm has a high solvency. The firm is, however, more susceptible to the adverse effect of changes in circumstances and economic conditions than firms in higher rated categories.
Balanced firms	BBB	Capital structure and economic equilibrium are considered adequate. The firm's capacity to meet its financial commitments could be affected by serious unfavorable events.
	BB	A firm rated "BB" is more vulnerable than companies rated "BBB". Furthermore, the firm faces major ongoing uncertainties or exposure to adverse business, financial or economic conditions.
Vulnerable firms	B	The firm presents vulnerable signals with regard to its fundamentals. Adverse business, financial or economic conditions will be likely to impair the firm's capacity or willingness to meet its financial commitments.
	CCC	A firm rated "CCC" has a dangerous disequilibrium on the capital structure and on its economic and financial fundamentals, adverse market events and an inadequate management could affect with high probability the firm's solvency.
Risky firms	CC	The firm shows signals of high vulnerability. In the event of adverse market and economic conditions, the firm's strong disequilibrium could increase.
	C	The firm shows considerable pathological situations. The firm's capacity to meet its financial commitment is very low.
	D	The firm does not have the capacity to meet its financial commitments any longer.

Source: Amadeus.