Testing the pecking order theory and static trade-off theory of capital structure: Evidence from French listed firms

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ABSTRACT,

The empirical studies have proven that a significant part of the capital structure can be explained by using the two theories. However, there are still many contradictions across these studies about the determinants of capital structure, and therefore a definitive conclusion is far from easy. The aim of this paper was to add to the current research, by analyzing the effects of several firm-level characteristics on total debt leverage and long-term debt leverage. The effects of firm size, profitability, asset tangibility, liquidity, growth opportunities, and non-debt tax shield on leverage have been analyzed by performing OLS regressions, on a sample of 2654 firm-year observations, for the period 2011-2017 of French public listed companies. The results show that firm size and growth opportunities are positively related to total debt leverage, whereas profitability, liquidity, and asset tangibility are negatively related to total debt. Additionally, non-debt tax shields are insignificant for total debt leverage. The partial R^2 results show that the total debt leverage of French listed companies is best explained by the Pecking Order theory. Firm size, asset tangibility, and growth opportunities are positively related to long-term debt, whereas profitability is negatively related. Additionally, liquidity and non-debt tax shields are insignificant for long-term debt. The partial R^2 results show that the Static Trade-Off theory is better at explaining the long-term debt leverage. However, in comparison to the results of the total debt leverage, it seems that there are other unobserved factors significantly influencing the long-term debt of French listed companies, which have not been included in this study. The results of the study indicate that both the STOT and POT are not mutually exclusive. The theories both partially explain the capital structure. The results also underscore that the explanatory power of both theories varies with the definitions used for leverage.

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1. INTRODUCTION

The term capital structure is used for the description of the mix of debt and equity used to finance the assets of a company (Tamilselvi et.al., 2018). A vast amount of studies have analyzed the determinants of capital structure during the past decades. Creating an optimal capital structure is a company's most important objective of financial management, which is done by finding the debt-to-equity ratio that maximizes firm value. An optimal capital structure contributes to the minimization of the cost of capital, the growth of the firm, the maximization of shareholder value, and the ability of the firm to stay competitive (Reznakova et.al., 2010; Aulová & Hlavsa, 2013; Turan & Hasanaj, 2014; Tamilselvi et.al., 2018). The study by Modigliani & Miller (1958) laid the foundations for future capital structure determinants research. However, their study assumed perfect market conditions, which is not realistic in the real world. Subsequently, other scholars started to analyze the determinants of capital structure, which led to the development of additional capital structure theories (Reznakova et.al., 2010).

Two major capital structure theories are the Pecking-Order theory (POT), and the Static Trade-Off theory (STOT) (Li et.al., 2009; De Jong et.al., 2011). On the one hand, the Pecking-Order theory argues that information asymmetry causes firms to develop a certain hierarchy in their financing option. First internal resources are favored, then debt, and as a last option equity is used (Reznakova et.al., 2010; De Jong et al., 2011). On the other hand, the Static Trade-Off theory argues that firms determine the debt ratio by making a trade-off between the costs and benefits of debt. In other words, a company increases its debt until the additional costs of financial distress and tax-benefits are balanced, and the firm value is maximized (Myers, 1984; Fama & French, 2002). These theories provide us with predictions about capital structure determinants by using firm-level characteristics.

Many scholars have conducted empirical researches, testing the above-mentioned theories in an attempt to find support (De Jong et.al., 2011). The empirical researches have indeed proven that a major part of the capital structure can be explained by using the two theories. However, there are still many contradictions across these studies about the determinants of capital structure, and therefore a definitive conclusion is far from easy (Huang & Song, 2006; Frank & Goyal, 2009).

Two studies that are often used by scholars to illustrate the contradiction in the literature are the studies of Titman & Wessels (1988), and Harris & Raviv (1991). The study of Titman & Wessels (1988), argues that there is no significant relationship between debt ratios and non-debt tax shields, asset tangibility, growth, and volatility. Contrary, the study by Harris & Raviv (1991), argues that there is a significant relationship between debt ratios and non-debt tax shields, asset tangibility, growth, and volatility. Then there are empirical studies who are explicitly rejecting the STOT and are supporting the POT in explaining the capital structure (e.g. Shyam-Sunder & Myers, 1999; Li et.al., 2009). However, there are empirical studies that are rejecting the POT and are supporting the STOT in explaining the capital structure (e.g. Singh & Kumar, 2012; Wiagustini et.al., 2017). Lastly, there are also studies that reject none of the theories but argue that both theories explain the capital structure determinants (e.g. Fama & French, 2002; Serrasqueiro & Caetano, 2015).

Therefore, there is much contradiction in the literature regarding the STOT and POT. This study aims to find evidence regarding which theory should be supported. This research will test both the POT and STOT on a sample consisting of French public listed firms. Several scholars have already used a sample with French firms, however, the already existing literature does not focus on public listed French companies, and uses older sample periods. First, there are several studies analyzing capital structure determinants by using a sample with French SME's (Daskalakis & Psillaki, 2008; Adair & Adaskou, 2015). Additionally, the study by Kedzior (2012) uses only French production firms, in combination with other European countries. Lastly, the study by Acedo-Ramirez & Ruiz-Cabestre (2014), uses public French companies, however also in combination with other European countries, and an older sample period of 1998-2008. In other words, this study is the only one to focus on French public listed firms, in combination with a more recent sample period, to test the POT and STOT.

This paper aims to answer the following research question: To what extent do the Pecking order theory and Static Trade-Off theory explain the capital structure of French public listed firms? The research question will be answered by performing an ordinary least squares regression, and then by analyzing the partial R^2's of the firm-level determinants, to determine which theory best explains leverage. The data for the regression was extracted from the Orbis database, which is provided by Bureau van Dijk. The total sample consists of number French public listed companies, and a total of 2540 firm-year observations, over the period 2011-2017

The aim of this paper was to add to the current research, by analyzing the effects of several firm-level characteristics on leverage. The effects of firm size, profitability, asset tangibility, liquidity, and non-debt tax shields on leverage have been analyzed. The results show that the total debt leverage of French listed companies is best explained by the Pecking Order theory. Contrary, it seems that the Static Trade-Off theory is better at explaining the long-term debt leverage. However, in comparison to the results of the total debt leverage, it seems that there are other unobserved factors significantly influencing the long-term debt of French listed companies. The different results between both dependent variables indicate that the definition of leverage may have a significant effect on the results.

The academic relevance of this research lies in the fact that it adds to the understanding of the explanatory power of both the STOT and POT with regards to capital structure. This is achieved by testing the effects of several firm-level characteristics on capital structure, using a sample that has not been used before, with a more recent time period than most existing literature (2011-2017). The results of the study indicate that both the STOT and POT explain the capital structure and that they are not mutually exclusive. In other words, the theories both partially explain the capital structure. The results also underscore that the explanatory power of both theories varies with the definitions used for leverage.

The practical relevance of the study is that it adds to the understanding of the impacts of several firm-level characteristics on leverage. Consequently, managers are better able to take proper capital structure decisions. Additionally, the results of the study shows managers that different types of debt may be under the influence of different factors.

The remainder of the paper is structured as follows. Chapter 2 contains the literature review, which describes the conceptual framework, and the hypotheses that will be tested. Further, chapter 3 explains the methodology, dependent variables, independent variables, and the data source for this study. Next, In Chapter 4 the collected data is analyzed, the results are presented, and the interpretation of the data is given. Lastly, chapter 5 contains the practical implications, and a conclusion, including gained insights, limitations of the study, and suggestions for future studies.

2. LITERATURE REVIEW

The capital structure studies have been dominated by the analysis of several capital structure theories, such as the Pecking order theory, Static Trade-Off theory, agency theory, and market timing theory. This paper will only focus on the Pecking order theory and Static Trade-Off theory. This section will first review the relevant literature, then based upon the literature several hypotheses will be formulated.

2.1 Capital structure theory

The term capital structure is used for the description of the mix of debt and equity used to finance the assets of a company (Tamilselvi et.al., 2018). It was the study by Modigliani and Miller (1958) that started the discussion of capital structure determinants. Modigliani and Miller (1958) argued in their study that capital structure is irrelevant in a market with perfect conditions. In a perfect market, factors such as corporate taxes, information asymmetry, agency costs, flotation costs, and transaction costs are excluded. These perfect market conditions assumed by Modigliani and Miller (1958) are not realistic in the real world. Consequently, many researchers started to explore the theory with more "loosened" assumptions, which has led to the development of several capital structure theories.

The Static Trade-Off theory was originally introduced by Kraus & Litzenberger (1973). The Static Trade-Off theory argues that a firm moves towards an optimal debt ratio, by making a trade-off between the costs and benefits of additional debt. Frank & Goyal (2009) argue, that these costs and benefits can be viewed from two perspectives, the tax-bankruptcy, and agency perspectives. From the tax-bankruptcy perspective, a company increases its debt until the additional costs of financial distress and tax-benefits are balanced, and the firm value is maximized (Myers, 1984; Fama & French, 2002). The tax-benefits result from tax-deductible interest payments, which decreases the corporate tax liabilities. The agency perspective argues that debt has a disciplinary effect on the managers and decreases agency problems because in order to avoid bankruptcy the debt needs to be repaid (Jensen, 1986; Frank & Goyal, 2009).

Although the roots of the Pecking Order theory have been in the literature for a long period (Frank & Goyal, 2009), it was first clearly discussed in the study by Myers (1984). Basically, the Pecking-Order theory argues that a company follows a certain hierarchical order in their preferences of financing options. Internal resources are favored, if no sufficient internal resources available then debt is chosen, and issuing equity is considered as the last option (Reznakova et.al., 2010; De Jong et al., 2011). It is argued by Fama & French (2002), that this preference is due to costs of issuing additional equity, and information asymmetry between a manager's and investor's knowledge of the actual firm value. When additional equity is issued investors will revalue a firm's securities. This is due to that investors believe that managers issue equity when it is overvalued, therefore the revaluation decreases the value of securities (Frank & Goyal, 2009). This is not beneficial for any company, consequently, equity issuance is only used as a last option. In other words, besides the actual issuing costs, equity is also prone to information asymmetry related costs, while debt and internal resources are not accompanied by issuing costs and cause little information asymmetry.

2.2 Firm-level determinants

Empirical studies suggest that certain firm-level characteristics may contribute significantly to the determination of capital structure. Six commonly used firm-level determinants of capital structure in the literature are firm size, profitability, asset tangibility, liquidity, growth opportunities, and non-debt tax shields. More detailed information about most of the empirical studies mentioned below can be found in table 1 in the appendix.

For firm size and leverage, the empirical evidence seems to mostly support a positive relationship (e.g. Fama & French, 2002; Byoun, 2008; Dang, 2013; Li, 2015; Singh, 2016). However, there are also studies that have found a negative relationship between firm size and leverage (e.g. Faulkender & Petersen, 2006; Pinkova, 2012). Next, the empirical studies seem to support a negative relationship between profitability and leverage (e.g. Rajan & Zingales, 1995; Antoniou et.al., 2008; Psillaki & Daskalkis, 2009; Dang, 2013; Serrasqueiro & Nunes, 2014; Pacheco & Tavares, 2017). However, there are also several studies that have found a positive relationship (e.g. Danis et.al. 2014). Further, there seems to be more evidence for a positive relationship between asset tangibility and leverage (e.g. Rajan & Zingales, 1995; Chen, 2004; Ramlall, 2009; Janbaz, 2010; Qiu & La, 2010; Pinkova, 2012). However, there are also studies that have found a negative relationship (e.g. Booth et.al., 2001; Drobez & Fix, 2003). Moreover, for liquidity and leverage, there seems to be more evidence for a negative relationship (e.g. Reznakova et.al., 2010; Pinkova, 2012; Singh, 2016; Mota & Moreira, 2017). Contrary, the study by Nemati & Muhammad (2012), has found a positive relationship. Furthermore, most empirical studies have found a negative relationship between growth opportunities and leverage (e.g. Rajan & Zingales, 1995; Fama & French, 2002; Frank & Goyal, 2009; Lious et.al., 2016). However, there are also some studies that have found a positive relationship (e.g. Titman & Wessels, 1988; Chen, 2004). Lastly, the empirical evidence also seems to support a negative relationship between non-debt tax shields and leverage (e.g. Antoniou et.al., 2008; Reznakova et.al., 2010; Mota & Moreira, 2017). However, there are also some studies that have found inconsistent results for different countries (e.g. Dang, 2013). Additionally, some studies also find no significant relationship (e.g. Serrasqueiro & Nunes, 2010; Ahmed-Sheikh & Wang, 2011).

To sum up, the empirical studies indeed provide evidence for the significance of the mentioned firm-level determinants of capital structure. The Static Trade-Off theory and Pecking Order theory can be used to make predictions about the relationships between the firm-level characteristics and leverage. Interestingly, just like the contradictions within the empirical evidence, the STOT and POT also contradict each other in most of the expected relationships. Therefore, analyzing the effects of these firm-level characteristics may help us to better interpret which theory explains best the capital structure. In the next sub-sections, the hypotheses for each firm-level determinant will be formulated by using the STOT and POT.

2.2.1 Firm size

Firm size may be seen as an inverse proxy for bankruptcy risk (De Jong et.al., 2008). Larger firms are more diversified, consequently making bankruptcy risks less likely (Titman & Wessels, 1988). Additionally, larger firms have greater debt capacities and are able to issue large amounts of debt, which allows them to spread costs (Byoun, 2008; Kayo & Kimura, 2011). Therefore, larger firms will use more leverage, as the cost of debt decreases, and debt is preferred as a financing. Based upon these arguments, the Trade-Off theory predicts a positive relationship between firm size and leverage.

Contrary, the relationship between firm size and leverage could also be negative. Larger firms have likely less information asymmetry problems (Rajan & Zingales, 1995). Therefore, companies are able to issue additional equity without incurring costs related to information asymmetry, consequently reducing the need for debt. Additionally, larger sized companies are in

general more profitable and have higher retained earnings available (Frank & Goyal, 2009; Dang et.al., 2012), which in turn enables them to use internal sources as a financing option. Based upon these arguments, the Pecking Order theory predicts a negative relationship between firm size and leverage.

H1a: *According to the STOT, a positive relationship exists between firm size and leverage.*
H1b: *According to the POT, a negative relationship exists between firm size and leverage.*

2.2.2 Profitability

Fama & French (2002), argue that low profitability causes a company to be more prone to bankruptcy, which in turn leads to that the company has to lower its leverage levels. Contrary, more profitable firms are less prone to bankruptcy, and can, therefore, use more leverage. Additionally, as more profitable firms are able to issue more debt, they are also able to benefit more from debt tax shields. Based upon these arguments, the Trade-Off theory predicts a positive relationship between profitability and leverage.

Profitability reflects the earning power of a firm and gives information on a company's ability to retain earnings (Titman & Wessels, 1988). Consequently, more profitable companies may be able to retain more earnings (Kayo & Kimura, 2011). In other words, as companies become more profitable, more internal sources will be available for investments, consequently reducing the needs for debt (Fama & French, 2002). The Pecking Order theory, argues that first internal sources are favored, then debt, and lastly equity. Based on the arguments given above, the Pecking Order Theory expects a negative relationship between profitability and leverage.

H2a: *According to the STOT, a positive relationship exists between profitability and leverage.*
H2b: *According to the POT, a negative relationship exists between profitability and leverage.*

2.2.3 Asset tangibility

Tangible assets can be used as a collateral for leverage, which could be used for securing bank loans (Viviani, 2008). This way, a company can raise its debt levels, as it is perceived as less risky (Dang, 2013). Additionally, tangible assets can be valued easier by outsiders, which consequently decreases financial distress costs (Frank & Goyal, 2009), and it results in a greater liquidation value of the firm (Viviani, 2008). From the Static Trade-Off theory perspective, the collateral value of tangible assets, the reduced financial distress costs, and a higher liquidation value predict a positive relationship between asset tangibility and leverage.

The relationship between asset tangibility and leverage could also be negative. Higher asset tangibility leads to lower information asymmetry costs (Dang, 2013). In return, lower information asymmetry costs decreases equity issuance costs, due which equity becomes more attractive (Frank & Goyal, 2009; Dang, 2013). Contrary, less tangible assets increases information asymmetry, which increases equity issuance costs, and hence making debt the preferred option (Harris & Raviv, 1991). Therefore, from the perspective of the Pecking Order theory, the relationship between asset tangibility and leverage is expected to be negative.

H3a: *According to the STOT, a positive relationship exists between asset tangibility and leverage.*
H3b: *According to the POT, a negative relationship exists between asset tangibility and leverage.*

2.2.4 Liquidity

Higher liquidity ratios may make the companies better able to support high leverage ratios, as they will be better able to meet the obligations of their debts (Viviani, 2008). Following the Static Trade-Off theory, a positive relation between liquidity and leverage is expected.

Contrary, companies with higher liquidity most likely have access to more internal resources for their investments. This in return, might lead to that those companies will finance the investments with their internal funding, instead of raising debt levels (Viviana, 2008). Based upon these arguments, the Pecking Order theory expects a negative relationship between liquidity and leverage.

H4a: *According to the STOT, a positive relationship exists between liquidity and leverage.*
H4b: *According to the POT, a negative relationship exists between liquidity and leverage.*

2.2.5 Growth opportunities

According to the TOT, high growth firms face higher financial distress costs and a debt overhang problem (Myers, 1977). Consequently, those companies may refrain from positive net present value investments, leading to a suboptimal investment strategy (Viviani, 2008). Additionally, growth opportunities are a form of intangible assets, and therefore do not have any collateral value (Myers, 1984; Harris & Raviv, 1991). As a result, companies with high growth opportunities will prefer equity over debt financing, and therefore reducing the leverage. In other words, the TOT expects a negative relationship between growth opportunities and leverage.

High growing firms will need external financing, as they are likely to exhaust their internal resources (Acedo-Ramirez & Ruiz-Cabestre, 2014). The POT argues that internal resources and debt are preferred over equity issuance, due to less information asymmetry. Therefore, it is expected that high growth firms will increase their debt levels over time (Viviani, 2008; Frank & Goyal, 2009). In other words, the POT expects a positive relationship between growth opportunities and leverage.

H5a: *According to the STOT, a negative relationship exists between growth opportunities and leverage.*
H5b: *According to the POT, a positive relationship exists between growth opportunities and leverage.*

2.2.6 Non-debt tax shield

According to the Static Trade-Off theory, companies take advantage of tax shields by increasing their debt levels. However, according to DeAngelo & Masulis (1980), companies with access to higher non-debt tax shields are less encouraged to take advantage of debt tax shields. Examples of non-debt tax shields are R&D expenditures and depreciation (Fama & French, 2002). More non-debt tax shield means less reliance on tax advantages of debt, consequently reducing leverage levels (Dang, 2013). Both the Static Trade-Off theory and Pecking Order theory expect a negative relationship between non-debt tax shields and leverage.

H6a: *According to the STOT, a negative relationship exists between non-debt tax shields and leverage.*
H6b: *According to the POT, a negative relationship exists between non-debt tax shields and leverage.*

3. METHODOLOGY AND DATA

In this part, first an explanation of the methodology will be given. Next, the measurements of the variables are discussed. Lastly, the data source, sample and time period are explained.

3.1 Methodology

3.1.1 OLS regression model

The hypotheses will be tested by conducting several ordinary least squares (OLS) regression analyses. This technique is widely used by scholars to test hypotheses regarding capital structure theory (e.g. Deesomsak et.al., 2004; De Jong et.al., 2008; Akhtar & Oliver, 2009; Yazici et.al., 2013). The OLS regression model for this study incorporates lagged explanatory variables. In other words, the explanatory variables are lagged one year relative to the dependent variable. As Deesomsak et.al. (2004) argues, the incorporation of lagged independent variables minimizes the possibility of reverse causality between the dependent and independent variables.

To sum up, an OLS regression analysis will be conducted to test the formulated hypotheses, with leverage as the dependent variable and several firm-level explanatory variables. For the definitions of the variables please see table 2 in the appendix.

$$Lev_{i,t} = \alpha + \beta_1 {}^{*}Size_{i,t-1} + \beta_2 {}^{*}Prof_{i,t-1} + \beta_3 {}^{*}Tang_{i,t-1} + \beta_4 {}^{*}Liq_{i,t-1} + \beta_5 {}^{*}NDTS_{i,t-1} + \beta_6 {}^{*}Indus_{i,t-1} + \varepsilon_{i,t}$$

The leverage will be the dependent variable of the regression model. There are different definitions available in the literature, and a commonly used definition of leverage, is the ratio of book value of total debt to book value of total assets (Köksal & Orman, 2014; Alipour et.al., 2015; M'ng et.al., 2017), which will be used in the above-mentioned model. However, the model will also be conducted with a different leverage definition, which is the book value of total long-term debt will be used (Titman & Wessels, 1988; Hall et.al., 2004). It is argued that short-term debt consists of mostly trade credit, which is in turn affected by different determinants than long-term debt (De Jong et.al., 2008), therefore the second definition consisting of only long-term debt is included. This leads to the following second model:

$$LevL_{i,t} = \alpha + \beta_1 {}^{*}Size_{i,t-1} + \beta_2 {}^{*}Prof_{i,t-1} + \beta_3 {}^{*}Tang_{i,t-1} + \beta_4 {}^{*}Liq_{i,t-1} + \beta_5 {}^{*}NDTS_{i,t-1} + \beta_6 {}^{*}Indus_{i,t-1} + \varepsilon_{i,t}$$

3.2 Dependent variables

Leverage is the dependent variable of this research. In previous literature, either book leverage or market leverage was used as a measure of capital structure (Fama & French, 2002; Kayo & Kimura, 2011). In this study book leverage is used, as it is expected that a change of definition should not have any significant effect on the conclusion (Titman & Wessels, 1988; Huang & Song, 2006; Frank & Goyal, 2009; Baxamusa & Jalal, 2014).

Following previous research, leverage will be operationalized as the ratio of book value of total debt to book value of total assets (Köksal & Orman, 2014; Alipour et.al., 2015; M'ng et.al., 2017). Additionally, leverage will also be defined as the ratio of book value of total long-term debt to book value of total assets (Huang & Song, 2006).

3.3 Independent variables

Following prior research on capital structure, several firm-level variables are used: size, profitability, asset tangibility, liquidity, and non-debt tax shield. It is important to control for these variables, as the Trade-off and Pecking Order theory argue that these variables are significantly related to capital structure, which is supported by many empirical studies.

3.3.1 Firm size

First, following previous literature, this study will operationalize firm size (Size) as the logarithm of total assets (De Jong et.al, 2008; Gao et.al., 2011; Chang et.al., 2014).

3.3.2 Profitability

Second, following previous literature, profitability (Prof) will be operationalized as the ratio of operating income to book value of total assets (Titman & Wessels, 1988; De Jong et.al, 2008; Yazici et.al. 2013). The operating income is the earnings before interest and taxes (EBIT).

3.3.3 Asset tangibility

Third, asset tangibility (Tang) will be operationalized as the ratio of the total fixed assets to total assets, which is a commonly used definition by previous literature (De Jong et.al., 2008; Reznakova et.al., 2010; Kayo & Kimura, 2011).

3.3.4 Liquidity

Next, following previous literature, liquidity (Liq) will be operationalized as the current ratio, which is calculated as the ratio of total current assets to total current liabilities (Deesomsak et.al., 2004; De Jong et.al., 2008; Singh, 2016).

3.3.5 Growth opportunities

Further, following previous literature, the proxy for growth opportunities will be the market-to-book ratio (Rajan & Zingales, 1995; Frank & Goyal, 2009; Dang, 2011; Lious et.al., 2016; Wiagustini et.al., 2017).

3.3.6 Non-debt tax shield

Lastly, following previous literature, non-debt tax shields (NDTS) will be operationalized as the ratio of depreciation to book value of total assets (Titman & Wessels, 1988; Degryse et.al., 2012). Both Bradley et.al. (1984) and Chen (2004), argue that depreciation is important to the non-debt tax shield.

3.3.7 Industry classification

The model also includes industry dummies (Ind) to control for industry effects. Studies have shown that the industry of a company may significantly affect the leverage (e.g. Harris & Raviv, 1991; Islam & Khandaker, 2015; Lious et.al, 2016). To test for industry effects, the companies are grouped following the Standard Industrial Classification (SIC). Industry_0 refers to the agricultural, forestry and fishing industry; Industry_1 refers to the mining industry; Industry_2 and Industry_3 refer to manufacturing companies; Industry_4 refers to the transportation industry; Industry_5 consists of wholesale trade and retail trade companies; Industry_7 and Industry_8 refer to the service industry. For example, if a company belongs to Industry_5, it gets a value 1 for that dummy and a 0 for the others.

3.4 Data

The data sample for this research has been extracted from the database ORBIS, provided by Bureau van Dijk. The dataset is on public stock listed French firms. In order to get to the final sample, several criteria had been set:

First, only public French companies that are stock listed are incorporated in the data sample. Second, following previous literature, financial firms (SIC code 6000-6999), and regulated public utility firms (SIC code 4900-4999) have been excluded from the data sample. This is because those firms face different regulations and accounting practices (Gao et.al., 2011; Arena & Dewally, 2012; Baxamusa & Jalal, 2014; Wang et.al., 2018). For example, financial companies face certain regulations on minimum capital requirements, which could, in turn, affect their capital structures (Deesomsak et.al., 2004). Further, following De Jong et.al. (2008), only companies with at least 3 years

available data are included in the dataset. Next, to reduce the effect of outliers, the variables will be winsorized at the 1st and 99th

percentiles. This is a commonly used method by other studies to reduce noise in the sample (e.g. Dang, 2011; Chang et al., 2014). Lastly, the sample period for the dependent variable leverage is 2011-2017, and the sample period for the independent firm-level variables is 2010-2016. This difference is due to the lagging of the explanatory variables, as explained in the previous part. For example, leverage data from 2013 is explained by firm-level variables of 2012, leverage data from 2014 is explained by firm-level variables of 2013, etc.

The sample starts with 3746 firm-year observations for the period 2009-2017. After dealing with outliers, correcting for missing data, and removing the 2009-2010 data, we are left with a sample of 2540 firm-year observations for the period 2011-2017.

3.5 Summary

Table 2 in the appendix, provides an overview of all the variables employed, with their labels and operationalizations. The dependent variables are total debt leverage (Lev), and long-term debt leverage (LevL). The independent variables are firm size (Size), profitability (Prof), asset tangibility (Tang), liquidity (Liq), growth opportunities (Growth), non-debt tax shields (NDTS), and the industry dummies.

4. METHODOLOGY AND DATA

4.1 Descriptive statistics

Table 3 contains the descriptive statistics of the dependent and independent variables used in the model. Table 1 shows that the mean total debt leverage (Lev) is 0.566 over the period 2011-2017. Therefore, the total debt of companies in this sample constitutes on average to around 56.6% of the total assets, whereas equity contributes with 43.4%. This value of the total debt leverage is close to the study by Acedo-Ramirez & Ruiz-Cabestre (2014), which found a mean total debt leverage of 0.60 for French public companies for the period 1998-2008. Additionally, Kedzior (2012) found a mean total debt leverage of 0.583, and a mean long-term debt leverage of 0.288 for French production firms. The mean total debt leverage is in line with the results of this study, however the difference for long-term debt leverage is likely caused due to the definition difference. Next, if we look at the long-term debt (LevL), we see that it constitutes on average 14.1% to the total assets. In other words, from the 56.6% mean total debt leverage, 14.1% is long-term debt leverage. The variable "LevL" only includes the long-term debt of companies that could be used to achieve for example tax benefits. In other words, it excludes current liabilities and "other" non-current liabilities (e.g. deferred revenue).

Further, the mean firm size (Size) in this sample is 5.415, whereas Acedo-Ramirez & Ruiz-Cabestre (2014) found a mean firm size of 6.04. This difference is likely caused due to the difference in the definition (logarithm of sales), and the different time period. Moreover, the mean profitability (Prof) is 0.018, which means that the EBIT is on average 1.8% of the total assets. Furthermore, the asset tangibility (Tang), is 0.460, meaning that the total assets of a company consists on average 46% of fixed assets. It should be noted that the maximum tangibility in the dataset is 0.989, which means that some companies' assets are almost completely tangible. This is due to that there are companies in the dataset that need many tangible assets due to their origin (e.g. mining firms, hotels, casino's. etc.). The mean liquidity is 1.826, meaning that the companies in the sample have on average 1.826 times as much current assets as current liabilities. Further, the mean growth opportunities are 2.127, meaning that on average the market value of the company is around two times as high as its book value. Lastly, the mean non-debt tax shield (NDTS) is 0.027.

4.2 Correlations

Table 3 contains the bivariate correlations between the dependent and independent variables.

The independent variable firm size (Size) showcases a significant positive correlation with both independent variables Lev and LevL. However, the correlation with the long-term debt leverage ratio (LevL) is stronger than the correlation with the total debt leverage ratio (Lev).

The independent variable profitability (Prof) showcases significant a negative correlation with both independent variables Lev and LevL. However, the negative correlation with the long-term debt leverage ratio (LevL) is much stronger than the correlation with the total debt leverage ratio (Lev).

The correlation between asset tangibility (Tang) and the dependent variables delivers contradicting results. The independent variable asset tangibility (Tang) showcases significant a negative correlation with the independent variable Lev, while a much stronger significant positive correlation with LevL can be observed.

Table 3: Descriptive statistics & Correlations (N= 2540)

	Descriptive statistics					Correlations (Two-tailed)							
	Mean	Median	Std. Deviation	Min.	Max.	Lev	LevL	Size	Prof	Tang	Liq	Growth	NDTS
Lev	0.566	0.571	0.180	0.138	1.023	1.000							
LevL	0.141	0.111	0.120	0.000	0.534	0.434**	1.000						
Size	5.415	5.246	1.048	2.739	8.341	0.178**	0.212**	1.000					
Prof	0.018	0.049	0.162	-2.274	0.535	-0.018	-0.051**	0.276**	1.000				
Tang	0.460	0.449	0.213	0.010	0.989	0.004	0.356**	0.443**	0.169**	1.000			
Liq	1.826	1.434	1.841	0.058	32.83	-0.425**	-0.093**	-0.215**	-0.167**	-0.335**	1.000		
Growth	2.127	1.457	2.348	-0.762	15.81	0.072**	0.009	-0.179**	-0.310**	-0.264**	0.15**	1.000	
NDTS	0.027	0.021	0.029	0.000	0.683	0.029	0.095**	-0.006	-0.067**	0.174**	-.094**	-0.010	1.000

Table 3 presents the descriptive statistics and correlations of the independent variables. See table 2 in the appendix for the variable definitions.
** indicates a correlation significant at the 0.01 level (2-tailed).

The independent variable liquidity (Liq) showcases a significant negative correlation with both independent variables Lev and LevL. However, the negative correlation with the total debt leverage ratio (Lev) is much stronger than the correlation with the long-term debt leverage ratio (LevL).

The correlation between growth opportunities (Grow) is positively related to both dependent variables. The correlation with Lev does seem to be stronger than with LevL.

The independent variable non-debt tax shield (NDTS) showcases a significant positive correlation with both independent variables Lev and LevL. However, the correlation with the long-term debt leverage ratio (LevL) is stronger than the correlation with the total debt leverage ratio (Lev).

As explained above and can be seen in table 3, there are significant correlations between most variables in the model. Therefore, it is important to check whether there is multicollinearity between the independent variables. To check for multicollinearity, the variance inflation factors (VIF) of the independent variables will be analyzed. There are no formal thresholds in the literature, however, VIF values of 5 or 10 are often used as a minimum threshold (Kennedy, 1992; Menard, 2002). If the VIF of a certain variable exceeds these values, then there may be a significant multicollinearity problem within the dataset. The VIF values for the independent variables of this study are all close to the minimum of 1, and there is no VIF value close to the thresholds of 5 and 10. This means that there is no multicollinearity in the dataset, consequently, all independent variables can be employed in the regression analysis.

4.3 Regression assumptions

Before executing the OLS regression analysis, the four linear regression assumptions will be controlled for. In other words, the data will be controlled for linearity, normality, independence, and homoscedasticity.

First, the linearity assumption was controlled for by plotting the dependent variables with the residuals. The scatter plots show that the linearity assumption is fulfilled. Second, the normality assumption was tested by analyzing a histogram of the residuals. The histogram shows that there is not much skewness and that the normality assumption is generally fulfilled. Third, the assumption of independence wat controlled for by using the Durbin-Watson test. The Durbin-Watson test scores range from 0 to 4, and generally, in the literature, a score close to 2 is considered as proof for no auto-correlation. The Durbin-Watson test scores for the dependent variables Lev and LevL, are 2.042 and 1.966, respectively. This indicates that no auto-correlation is present, thus fulfilling the independence assumption. Fourth, the data was checked for homoscedasticity by analyzing a scatterplot of the residuals. The scatterplot shows that although most of the residuals are equally distributed, some unequal distribution can still be observed. This might mean that there is some heteroscedasticity in the data, and to reduce this problem the macros of Darlington & Hayes (2017) are used, adding heteroscedasticity-consistent standard error estimators to the model.

4.4 Regression results

To test the hypotheses as formulated in section 2, two regressions have been run. First for the dependent variable total debt leverage ratio (Lev), and then for the long-term debt leverage ratio (LevL). As explained above, in both regressions the macros of Darlington & Hayes (2017) are used, adding heteroscedasticity-consistent standard error estimators to the model.

Table 4 shows the results of the OLS regressions. Model 1, using the total debt leverage ratio (Lev) as dependent variable, has an adjusted R squared value of 0.277. This means that the independent variables of the model are able to explain 27.7% of the variance of Lev. Model 2, using the long-term debt leverage ratio (LevL) as dependent variable, has an adjusted R squared value of 0.162. This means that the independent variables of the model are able to explain 16.2% of the variance of LevL.

4.4.1 Total debt leverage

The results indicate that the coefficient of firm size is positive, and the p-value shows that the relationship is significant. The partial R^2 indicates that 3.2% of the variation in Lev can be explained by firm size. Consequently, this leads to the rejection of H1b, and the acceptance of H1a. This result is in line with the STOT, which predicts a positive relationship between firm size and leverage. The arguments of the STOT are that larger firms have less bankruptcy risks, greater debt capacities, and are able to issue large amounts of debt, therefore increasing the leverage.

Table 4: Regression results (N = 2540)

	1) Total debt (Lev)		2) Long-term debt (LevL)		Hypotheses		Results	
	Coefficient & p-value	Partial R^2	Coefficient & p-value	Partial R^2	STOT	POT	Lev	LevL
Size	0.039* (0.000)	0.032	0.01* (0.000)	0.045	+ (H1a)	- (H1b)	+ (H1a)*	+ (H1a)*
Prof	-0.098** (0.018)	0.000	-0.068* (0.001)	0.003	+ (H2a)	- (H2b)	- (H2b)**	- (H2b)*
Tang	-0.215* (0.000)	0.000	0.193* (0.000)	0.127	+ (H3a)	- (H3b)	- (H3b)*	+ (H3a)*
Liq	-0.058* (0.00)	0.181	0.002 (0.302)	0.009	+ (H4a)	- (H4b)	- (H4b)*	
Growth	0.008* (0.000)	0.006	0.004* (0.002)	0.000	- (H5b)	+ (H5b)	+ (H5b)*	+ (H5b)*
NDTS	0.156 (0.134)	0.001	0.103 (0.293)	0.009	- (H6a)	- (H6b)		
Indus_0	-0.014 (0.657)		0.038 (0.186)					
Indus_1	0.014 (0.365)		0.006 (0.645)					
Indus_2	-0.024 (0.133)		-0.003 (0.751)					
Indus_3	-0.006 (0.664)		-0.009 (0.384)					
Indus_4	0.014 (0.657)		-0.038 (0.186)					
Indus_5	0.011 (0.448)		-0.004 (0.749)					
Indus_7	0.005 (0.723)		-0.028* (0.005)					
Indus_8	0.058* (0.002)		0.023 (0.113)					
Model adj. R^2	0.277		0.162					

Table 4 presents the results of the OLS regression, an overview of the hypotheses, and which hypotheses are accepted. See table 2 in the appendix for the variable definitions. The p-values are reported in parentheses. * indicates significance at the 0.05 level; ** indicates significance at the 0.01 level. The grey cells in the hypotheses results indicate an insignificant relationship, and therefore the rejection of both hypotheses.

Next, coefficient and p-value of profitability show that the relationship is negatively significant. Consequently, this leads to the rejection of H2a, and the acceptance of H2b, which is in line with the POT, predicting a negative relationship between profitability and leverage. This is due to that more profitable firms have more internal resources available, therefore reducing leverage. However, the partial R^2 of profitability seems to be very low, indicating that it does not explain much of the variation of Lev.

Further, the coefficient and p-value of asset tangibility show that the relationship is negatively significant. Consequently, we can reject H3a and accept H3b. This result is in line with the POT, which predicts a negative relationship between asset tangibility and leverage. It seems that more tangible assets decreases information asymmetry, which makes equity issuance more attractive, consequently reducing leverage. Again, the partial R^2 of asset tangibility seems to be very low, indicating that it does not explain much of the variation of Lev.

Moreover, table 4 shows that the coefficient of liquidity is negative, and the p-value indicates a significant relationship. Additionally, the partial R^2 of liquidity is 0.181, indicating that it can explain 18.1% of the variation of Lev. Consequently, we can reject H4a and accept H4b. This result is in line with the POT, which predicts a negative relationship between liquidity and leverage. It seems to hold that more liquid firms have access to more internal resources, reducing the dependence on leverage.

Further, the coefficient and p-value of growth opportunities show that it is positively and significantly related to total debt. This is in line with the POT, which argues that for high growth firms internal resources and debt are preferred over equity issuance, due to less information asymmetry.

Next, the results show that the non-debt tax shield is insignificantly positively related to total debt. Therefore we can reject both hypotheses H6a and H6b.

Lastly, table 4 shows that industry_8 significantly affects the capital structure. It seems that companies in the service industry have significantly higher total debt leverage.

4.4.2 Long-term debt leverage

The results indicate that the coefficient of firm size is positive, and the p-value shows that the relationship is significant. Consequently, this leads to the rejection of H1b, and the acceptance of H1a. This result is also in line with the Static Trade-Off theory, which is the same as with the total debt leverage.

Next, the results indicate that the coefficient of profitability is negative, and the p-value shows that the relationship is significant. Consequently, this leads to the rejection of H2a, and the acceptance of H2b. This result is in line with the POT, which is also the same with the total debt leverage.

Further, the table shows that the coefficient of asset tangibility is positive, and the p-value indicates a significant relationship. Consequently, we can reject H3b and accept H3a. In contrast to the total debt leverage, this result is in line with the STOT, which predicts a positive relationship between firm size and leverage. The collateral value of fixed assets, the reduced financial distress costs, and a higher liquidation value due to asset tangibility enables the companies to increase their long-term debts.

Further, the coefficient and p-value of growth opportunities show that it is positively and significantly related to long-term debt leverage. This is in line with the expectations of the POT.

The relationship of long-term debt leverage with both liquidity and non-debt tax shield was found to be insignificant. This means that we can reject H4a, H4b, H6a, and H6b.

Lastly, the regression results show that industry_7 significantly affects the capital structure. It seems that companies with SIC-codes 7000-7999 have significantly lower long-term debt leverage.

4.4.3 Summary

For the total debt leverage, a negative relationship with profitability, asset tangibility, and liquidity were observed (H2b, H3b, H4b), which is in accordance with the Pecking Order theory. Additionally, a positive relationship between growth opportunities and total debt leverage was found (H5b), which is also in line with the POT. Contrary, a positive relationship between firm size and total debt leverage was found (H1a), which is in accordance with the STOT. Lastly, the relationship with non-debt tax shield was found to be insignificant. The variables supporting the POT, namely profitability, asset tangibility, liquidity, and growth opportunities, have together an R^2 of around 0.187. On the other hand, the variable supporting the STOT, namely firm size, has an R^2 of 0.032. Therefore, based on the results, it seems that the Pecking Order theory best explains the total debt leverage structure.

For the long-term debt ratio, a positive relationship with firm size and asset tangibility was found (H1a, H3a), which support the STOT. Additionally, for profitability, a negative relationship was found (H2b), and for growth opportunities, a positive relationship was found (H5b), which both support the POT. Lastly, the relationship of long-term debt leverage with both liquidity and non-debt tax shield was found to be insignificant. If we only look at the number of hypotheses supporting the theories, then the results seem to be mixed. However, if we analyze the partial R^2 of the variables we come to different conclusions. The variables supporting the STOT, namely firm size, and asset tangibility, have together an R^2 of around 0.172. Contrary, the variables supporting the POT, namely profitability, and growth opportunities, have together an R^2 of around 0.003. Therefore, based on the results, it seems that the STOT best explains the long-term debt leverage structure.

5. CONCLUSION

Capital structure determinants have been a hot topic of discussion among scholars in the past decades. Many researchers have tested the several capital structure theories to find explanations. The aim of this paper was to add to the current research, by analyzing the effects of several firm-level characteristics on leverage. The effects of firm size, profitability, asset tangibility, liquidity, growth opportunities, and non-debt tax shields on leverage have been analyzed. Additionally, industry dummies have been used to control for industry effects.

5.1 Findings

The results of the study show that firm size is a significant capital structure determinant. Firm size has a positive relationship with both total debt leverage and long-term debt leverage, thus following the Static Trade-Off theory. Next, profitability has a significant negative impact on both the total debt leverage and long-term debt leverage. This is in accordance with the Pecking Order theory. Regarding asset tangibility, the results are mixed. Although asset tangibility is a significant capital structure determinant for both the total debt leverage and long-term debt leverage, the direction of the coefficient is different. Asset tangibility has a negative relationship with the total debt leverage, following the Pecking Order theory, while it has a positive relationship with long-term debt leverage, following the Static Trade-Off theory. Further, liquidity is a significant determinant of the total debt leverage, with a negative impact, thus following the Pecking Order theory. However, the results show that liquidity is an insignificant determinant for the long-

term debt leverage. Growth opportunities are significant for both total debt and long-term debt with a positive impact, thus following the Pecking Order theory. With regards to non-debt tax shields, the results show that it is an insignificant determinant for both the total debt and long-term debt leverage.

If we compare the results to the study of Acedo-Ramirez & Ruiz-Cabestre (2014), which uses public French companies, we see some similar and different results. First, they find a significant negative relationship between non-debt tax shields, whereas this study has found an insignificant relationship for leverage. Next, the positive relationship of growth opportunities of this study is in line with Acedo-Ramirez & Ruiz-Cabestre (2014). Further, the significant positive relationship of firm size with leverage is also in line with the study. Lastly, the significant positive relationship of asset tangibility with long-term debt is in line with the mentioned study, whereas the negative impact on the total debt contradicts the study.

The results can also be compared to studies analyzing capital structure determinants in other countries than France. The positive relationship of firm size with both the total debt and long-term debt leverage is in line with studies such as Reznakova et.al. (2010), and Pacheco & Tavares (2017). The negative relationship of profitability with both the total debt and long-term debt leverage is in line with studies such as Titman & Wessels (1988), and Booth et.al. (2001). The positive relation of asset tangibility with long-term debt is in line with Rajan & Zingales (1995), and Antoniou et.al. (2008). Whereas, The negative relation of asset tangibility with total debt is in line with Drobez & Fix (2003). Additionally, the negative relationship of liquidity with total debt is in line with for example Reznakova et.al. (2010), and Nemati & Muhammad (2012). The positive impact of growth opportunities on leverage is in line with the results of Chen (2004), and Singh (2016). Lastly, the insignificance of non-debt tax shields for leverage is in line with the studies of Titman & Wessels (1988), and Serrasqueiro & Nunes, 2010.

This paper shows that the total debt leverage of French listed companies is best explained by the Pecking Order theory. Contrary, it seems that the Static Trade-Off theory is better at explaining the long-term debt leverage. However, in comparison to the results of the total debt leverage, the variables explain less of the variance in the long-term debt. It seems that there are several other unobserved factors significantly influencing the long-term debt of French listed companies. The different results between both dependent variables indicate that the definition of leverage may have a significant effect on the results.

5.2 Academic relevance

The academic relevance of this research lies in the fact that it adds to the understanding of the explanatory power of both the STOT and POT with regards to capital structure. This is achieved by testing the effects of several firm-level characteristics on capital structure, using a sample that has not been used before, with a more recent time period than most existing literature (2011-2017). The results of the study indicate that both the STOT and POT explain the capital structure and that they are not mutually exclusive. In other words, the theories both partially explain the capital structure. The results also underscore that the explanatory power of both theories varies with the definitions used for leverage.

5.3 Practical implications

The practical relevance of the study is that it adds to the understanding of the impacts of several firm-level characteristics on leverage. In other words, managers of French public firms are provided with knowledge on which firm-level characteristics should be taken into consideration in the determination of the capital structure of their companies. Additionally, the results of the study stresses the fact that different types of debt (e.g. total debt, long-term debt) are under the influence of different determinants.

5.4 Limitations

This study is also subject to several limitations. Before the analysis, companies with some missing data have been removed and outliers have been dealt with, which may have reduced the generalizability of the findings. Further, a change from book value leverage to market value leverage may also yield significant effects, despite that some scholars discuss that this is not the case (e.g. Titman & Wessels, 1988; Huang & Song, 2006). Additionally, the R^2 of the regression models show that there may be several significant explanatory variables that have not been taken into consideration in this study. Lastly, this study uses industry dummy variables to control for industry effects, which may not have captured all of the industry effects.

5.5 Suggestions for future studies

Several suggestions for future research can also be made. First, both book value and market value of leverage should be included, to ensure robustness of the results. Second, as the results indicate, other explanatory variables should be taken into consideration. This could be in the form of more firm-level determinants, e.g. earnings volatility (Fama & French, 2002; Akhtar & Oliver, 2009), but also in the form of country-specific characteristics, which have been shown to have significant effects on capital structure (De Jong et.al., 2008), e.g. GDP growth rate and creditor right protection. Lastly, to control for industry effects, future studies should use fixed effect models (e.g. Plümper and Troeger, 2007), or random effect models (e.g. Bell & Jones, 2015).

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8. APPENDIX

Table 1: Overview literature

Author	Sample & period	Dependent variables	Results
Titman & Wessels (1988)	U.S. manufacturing firms, 1974-1982	LTD book, STD book	Size (-), Profitability (-), Tangibility, Growth, Non-debt tax shield
Rajan & Zingales (1995)	Non-financial stock listed G-7 companies, 1987-1991	TD book	Size (+), Profitability (-), Tangibility (+), Growth (-)
Booth et.al. (2001)	Stock listed companies of developing countries, 1980-1990	TD book, LTD book, LTD market	Size (+), Profitability (-), Tangibility (-), Growth,
Fama & French (2002)	Stock listed U.S. firms, 1965-1999	TD book, TD market	Size (+), Profitability (-), Growth (-), Non-debt tax shields (-)
Drobez & Fix (2003)	Non-financial stock listed Swiss companies, 1997-2001	TD book, LTD book	Size (+), Tangibility (-), Growth,
Chen (2004)	Stock listed Chinese companies, 1995-2000	TD book, LTD book	Size (+), Profitability (-), Tangibility(+), Growth (+), Non-debt tax shield (-)
Antoniou et.al. (2008)	France, Germany, Japan, U.K., U.S. non-financial stock listed firms, 1987-2000	TD book, TD market	Size (+), Profitability (-), Tangibility (+), Growth (-), Non-debt tax shield (+)
Serrasqueiro & Nunes, 2010	Stock listed Portuguese firms, 1998-2006	TD book	Size (+), Profitability (-), Tangibility, Growth, Non-debt tax shield (-)
Reznakova et.al. (2010)	Slovakian companies, 2002-2007	TD book, LTD book, STD book	Size (+), Profitability (+), Tangibility(+), Liquidity (-), Growth (-), Non-debt tax shield (-)
Pinkova (2012)	Czech automotive companies, 2006-2010	TD book, LTD book, STD book	Size (-), Profitability (+), Tangibility (+), Growth, Liquidity (-)
Nemati & Muhammad (2012)	Stock listed Iranian companies, 2001-2008	TD book	Size (-), Profitability, Tangibility (-), Liquidity (-)
Dang (2013)	Non-financial France, Germany, UK companies, 1980-2007	TD market	Size (+), Profitability (-), Tangibility (+), Growth (-), Non-debt tax shield (+)
Serrasqueiro & Nunes, 2014	Portuguese SME's, 2000-2009	TD book	Size (+), Profitability (-), Tangibility (+), Growth (-), Non-debt tax shield (-)

Table 1 (continued)

Singh (2016)	Non-financial Oman companies, 2011-2015	TD book	Size (+), Profitability (-), Tangibility (-), Liquidity (-), Growth (+), Non-debt tax shield
Mota & Moreira (2017)	Portuguese companies with investments in Angola, 2006-2010	TD book	Size (+), Profitability (+), Tangibility(+), Liquidity (-), Non-debt tax shield (-)
Pacheco & Tavares, 2017	Portuguese SME's, 2004-2013	TD book, LTD book,	Size (+), Profitability (-), Tangibility, Liquidity (-), Growth

Table 1 presents a number of empirical studies on the determinants of capital structure. TD book = total debt book value; TD market = total debt market value; LTD book = long-term debt book value; LTD market = long-term debt market value; STD book = short-term debt book value. (+) indicates a significant positive relationship; (-) indicates a significant negative relationship; if no (+) or (-) is given, then an insignificant relationship is indicated

Table 2: Overview variables and operationalization

Variable	Label	Operationalization
Total debt leverage	Lev	= book value total debt / book value total assets
Long-term debt leverage	LevL	= book value total long-term debt / book value total assets
Firm size	Size	= the logarithm of total assets
Profitability	Prof	= operating income (EBIT) / book value total assets
Asset tangibility	Tang	= book value total fixed assets / book value total assets
Liquidity	Liq	= total current assets / total current liabilities
Growth Opportunities	Growth	= market value of assets / book value of assets (i.e. market-to-book-ratio)
Non-debt tax shield	NDTS1	= depreciation / book value total assets
Indus_0	Indus_0	= 1 if SIC code 0000-0999, otherwise = 0
Indus_1	Indus_1	= 1 if SIC code 1000-1999, otherwise = 0
Indus_2	Indus_2	= 1 if SIC code 2000-2999, otherwise = 0
Indus_3	Indus_3	= 1 if SIC code 3000-3999, otherwise = 0
Indus_4	Indus_4	= 1 if SIC code 4000-4899, otherwise = 0
Indus_5	Indus_5	= 1 if SIC code 5000-5999, otherwise = 0
Indus_7	Indus_7	= 1 if SIC code 7000-7999, otherwise = 0
Indus_8	Indus_8	= 1 if SIC code 8000-8999, otherwise = 0