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Impact of firm characteristics on capital structure: Dutch SMEs

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Abstract

This study investigates which firm-level determinants influences the capital structure of Dutch SMEs. The sample contains 11.583 firm-year observations in the period from 2010 till 2017. Using the fixed effect model, the firm-level determinants of two theories are investigated: the pecking order theory and agency cost theory. The results indicate that profitability, growth opportunities, tangibility and age are important firm-level determinants that influence the capital structure of Dutch SMEs. The relevance of past growth and size are not robust in this study. Overall, Dutch SMEs follow the pecking order theory. Robustness tests reveal that one industry follow the agency costs theory. In the other industries is the pecking order theory dominant.

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1 Introduction

Capital structure is one of the most important topics in the corporate finance theories, which is reflected in the Modigliani and Miller theorem (1958). The theory states that under certain assumptions the market value of the firm is independent of its capital structure composition. Thus, it does not matter how a company finances its operational activities. However, all the conditions do not hold in reality. Therefore, numerous scholars introduced several capital structure theories to explain its composition across firms.

Now almost sixty years later there are several acknowledged theoretical models of capital structure. One of the theories which descended from the Modigliani and Miller theory is the trade-off theory in which a decision maker assesses the costs and benefits of different financing options. This theory argues that a firm decides between financing options by setting off the potential tax benefits of debt against the potential bankruptcy costs (DeAngelo & Masulis, 1980). Another theory, the pecking order theory, is based on the statement of information asymmetry. According to Myers (1984), firms prefer financing with a low degree of asymmetric information over financing with a high degree of asymmetric information because of the costs of financing increase when capital is obtained from outside creditors who do not have complete borrower information. The agency costs theory completes the row of most important capital structure theories. This theory is about agency costs which have their effect on the capital structure choices firms make (Jensen & Meckling, 1976). Agency costs result from conflicts of interest between shareholders and managers and between shareholders and creditors. Other theories about the capital structure of firms are the signalling theory, market timing theory, and the life cycle theory.

The capital structure of firms can be determined by firm-specific, industry-specific, country-specific and owner-manager-specific determinants. Several studies have been done to determine which level is best able to describe the capital structure of companies. For example, Psillaki & Daskalakis (2009) concluded that the capital structure of SMEs is best explained by firm-specific determinants. Kayo & Kimura (2011) investigates the firm-specific and industy-specific determinants and they concluded firm-specific determinants are the most relevant for the composition of capital stucture. Gungoraydinoglu & Öztekin (2011) concludes county-level determinants covariates drive one-third of the variation in capital structure across countries. Borgia and Newman (2012) established that leverage is also influenced by owner-manager-specific determinants. However, most of the previous studies reveal that firm-level determintants are the most influenced determinants of capital structure. Therefore, this study will focus on the firm-level determinants of capital structure.

Small and medium sized enterprises (SMEs) are very important for the economy. The European Commission report that more than 99.8% are produced by SMEs and they provide more than two-third of the private sector employments. Moreover, SMEs contribute to more than half of the total added value created by business in the European Union. In other words, SMEs are the main sources of employment and they play a critical role in the economic growth. Most of the previous studies that investigated the determinants of capital structure is done by listed firms (e.g. de Jong, Kabir, & Nguyen, 2008; Frank & Goyal, 2008; Titman & Wessels, 1988). However, the literature of capital structure determinants of SMEs is still unclear. Therefore, this study focused on small and medium sized enterprises.

Most of the studies focus on the capital structure of SMEs in a single country (Bhaird & Lucey, 2010; Cassar & Holmes, 2003; Degryse, de Goeij, & Kappert, 2012; Lopez-gracia & Mestre-barberá, 2015; Michaelas, Chittenden, & Poutziouris, 1999; Sogorb-Mira, 2005) and others in multiple countries (Hall, Hutchinson, & Michaelas, 2004; Hall, Hutchinson, & Michaelas, 2000; Psillaki & Daskalakis, 2009). Degryse et al., (2012) investigated capital structure determinants of SMEs in the Netherlands. However, they used data before the financial crisis. There are also several studies

conducted on the Netherlands that focused on listed firms (Chen, Lensink, & Sterken, 1998; De Bie & De Haan, 2007; de Haan & Hinloopen, 2003; de Jong, 2002; de Jong et al., 2008; De Jong & Van Dijk, 2007; Jong & Veld, 2001). However, the evidence of the capital structure determinants after the financial crisis is limited in the Netherlands. Additionally, the Dutch banking sector in is the most concentrated in the world. Compared to the UK and USA, Dutch SMEs have less access to financial markets (Cetorelli & Gambera, 2001). Therefore, this study investigated the capital structure determinants of Dutch SMEs after the financial crisis.

Because of the focus on firm-specific determinants and on Dutch SMEs, the research question for this study is: **Which firm-specific determinants influence the capital structure of Dutch small and medium-sized enterprises?** As I mentioned above, previous research indicate that firm-level determinants are the most influenced determinants of capital structure. Furthermore, the majority of the previous studies used industry as an control variable. Activities and assets vary from industry to industry and requires different finances. Therefore, the researchers argue that industry-determinants have an indirect impact on capital structure (Hall et al., 2000). The owner-manager-specific determinants are difficult to measure for Dutch SMEs, since the data not available in the Orbis database. Searching on LinkedIn pages and surveying are time-consuming regarding the big sample size. Furthermore, it is not mandatory to have an LinkedIn account for the owner-managers or to participate in the survey. For the owner-manager-specific determinants, there will be an high probability of missing observations.

This study contributes to the existing literature by giving an answer to the capital structure composition on firm-specific determinants of Dutch SMEs by making use of data after the financial crisis. The results can be compared with studies before the financial crisis and with listed firms. Due the concentrated banking sector, these results can be compared with studies done in other countries. Also, the practical relevance of this study will help Dutch entrepreneurs of SMEs in understanding the principles of their capital structure. Therefore, they can make better decisions about their own capital structure.

This study focus on the pecking order theory and agency theory in explaining capital structure composition of Dutch SMEs. Shyam-Sunder and Myers (1999) stated that to empirically explain capital structure is better to do an in-depth study of two theories rather than try to study all available theories. The pecking order theory and agency theory are based on information asymmetry. The Netherlands has an high concentration rate of the banking sector and Dutch SMEs are not mandatory to provide detailed accounting information. Therefore, it is likely that there exits problems like high adverse section costs or moral hazard. The trade-off theory is not relevant for Dutch SMEs since several empirical studies of SMEs do not support these theory and the corporate tax is low in the Netherlands (Chen et al., 1998). Jordan et al,. (1998) suggests that SMEs operate in niche markets and that reduces the impact of the indirect industry influence on capital structure. Therefore, I do not take product market competition in consideration. Moreover, market timing theory, signaling theory and life cycle theory will not be examined due data limitation. Most of the SMEs are privately held and not mandatory to provide detailed accounting information.

The remainder of this research is organized as follows. Section 2 gives a literature review where the trade-off theory, pecking order theory and agency theory are reviewed, the empirical evidence is given and the hypotheses are formulated. In section 3 the research model are explained, variables and data are described. Section 4 give the empirical results. Lastly, the conclusion, limitations and recommendations are in described in section 5.

2 Literature review

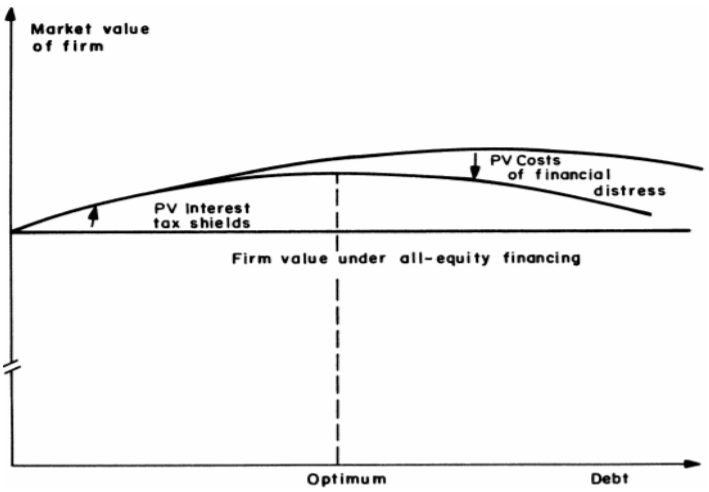
The modern theory of capital structure starts with the work of Modigliani and Miller (1958). Before their paper was published, there was no theory of capital structure generally accepted. Modigliani and Miller (1958) stated that the value of the firm does not depend on its capital structure. They assume that there is a perfect capital market. This means that there a no taxes, no transaction costs, no bankruptcy costs, no agency costs, and no information asymmetries. These assumptions do not hold in the real world. Therefore, Modigliani and Miller (1963) reviewed their work and recognized the relevance of corporate taxes. In their paper, they argue that interest expenses are tax deductible and add an interest tax shield in their theory. According to this theory, every euro of debt leads to a lower tax payment. Therefore, the value of a levered firm increases. Back to the real world, there is not a firm who finance their operations with debt only. Hence, several researchers have developed theories to explain the capital structure of firms. The main theories are the trade-off theory, pecking order theory, and the agency theory.

2.1 Trade-off theory

The original trade-off theory grew out of the debate over the Modigliani-Miller theorem. When the corporate income tax was added to the original irrelevance proposition Modigliani and Miller (1963), it created a tax benefit for debt. Since there is no offsetting cost of debt, this implied full debt financing (Frank & Goyal, 2008).

This extreme prediction does not hold in the real world. Kraus and Litzenberger (1973) provide a classical statement that an optimal capital structure can be found by weighting the tax advantage of debt between the costs of a financial distress. A firm benefits from the interest paid on debt because it is tax deductible. This means that it lowers the taxable income and therefore increases the firm's value. The cost of financial distress is a disadvantage of debt. The risk of financial distress increases when the level of debt rises. The presence of a higher debt level the firm has to pay out cash flow as interest and repayments. The bondholders will declare the firm bankrupt if the firm cannot pay the interest or fails to repay the debt (de Jong, 2002). The costs of financial distress can be divided into direct costs, like legal fees and restructuring costs, and indirect costs, like declined customer confidence and impaired vendor relationships (Baker & Martin, 2011). According to Myers (1984), a firm that follows the trade-off theory sets a target debt-to-value ratio and then gradually moves toward the target. The target is determined by balancing tax benefits and costs of financial distress. Myers (1984) illustrated this process and can be seen below.

Figure 1: Trade-off theory (Myers, 1984, p. 577).



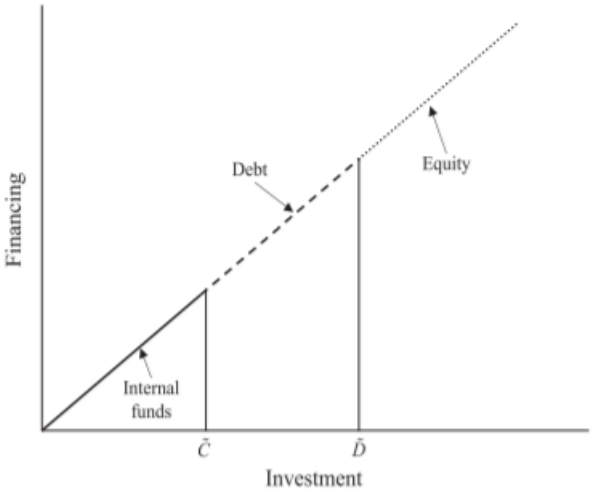
Frank and Goyal (2008) break the trade-off theory into two parts: The static trade off theory and the dynamic trade off theory. The difference lies in the ability to adjust the target debt-to-value ratio. The static trade off theory has a target debt-to-value ratio which is not allow to move. It is restricted to a single period. It do not take the time related issues into consideration. Therefore, the dynamic trade off theory came with the solution for this problem. The theory state that the target debt-to-value ratio is allowed to move during multiple financing periods.

However, empirical evidence of the trade-off theory in the SME literature does not find evidence to support this theory (Degryse et al., 2012; Michaelas et al., 1999; Sogorb-Mira, 2005). This may be due to lower levels of profitability, compared with large firms (Pettit & Singer, 1985). Firms with lower levels of profitability have fewer benefits of the tax advantages. Small firms are also at a greater risk of financial distress and young firms are more failure prone than older ones (Cressy, 2006). The tax advantages are thus less valuable for SMEs. Therefore, I take the static trade-off theory not into consideration for SMEs.

2.2 Pecking order theory

Myers (1984) and Myers and Majluf (1984) introduced the pecking order theory. They postulate that the capital structure can be explained by a hierarchy of financing sources. According to Myers (1984, p. 576), "the firm prefers internal to external financing, and debt to equity if it issues securities". Figure 2 summarizes the pecking order theory. In contrast to the trade-off theory, firms do not have a target debt-to-value ratio. The key assumption of the pecking order theory is asymmetric information between the managers of the firm and external investors. This means that the inside managers know the true value of the existing assets and growth opportunities, while external investors monitor management actions on the capital market at these can obtain information on the true value of the firm (Baker & Martin, 2011). SMEs can be particularly affected by typical asymmetric information problems like adverse selection and moral hazard. Therefore, their financial behavior can be naturally described by the pecking order theory (Frank & Goyal, 2003).

Figure 2: The pecking order theory (Leary & Roberts, 2010, p. 334)



According to Leary and Roberts (2010), companies follow the pecking order theory in an effort to minimize adverse selection cost. Adverse selection is a situation where investors have less information than managers of a company. In practice, equity have the highest adverse selection costs, debt has a low adverse selection cost and retained earnings has no adverse selection cost (Frank & Goyal, 2003). The problems of adverse selection are more severe to SMEs since the majority

of them are not listed on a stock exchange, resulting in a greater degree of uncertainty, concerning the information publicly available about those firms (McMahon et al., 1993). These problems create severe financial restrictions in credit markets and therefore SMEs can mainly attract short-term debt. The owners of SMEs also may decide not to seek external equity financing because that can limit their ability to act. A common phenomenon for SMEs is the desire of firm owners to retain control of the firm and maintain managerial independence (Chittenden, Hall, & Hutchinson, 1996; Jordan et al., 1998). Therefore, they will attract debt once internal resources have run out (López-Gracia & Sogorb-Mira, 2008). Furthermore, the transaction costs of external sources of financing, especially equity, tend to be considerably higher for this group of firms as they have less organizational and management power in credit market (López-Gracia & Sogorb-Mira, 2008).

The pecking order theory is supported in several empirical studies in explaining capital structure decisions of SMEs (Bhaird & Lucey, 2010; Degryse et al., 2012; López-Gracia & Sogorb-Mira, 2008; Michaelas et al., 1999; Sogorb-Mira, 2005). These studies suggest that SMEs on internal sources of finance first, then rely on external borrowing to finance and last on rely on external equity of finance. Holmes and Kent (1991) and Howorth (2001) report that firms operate under a constrained pecking order, and do not even consider raising external equity. Therefore, all the reason together make SMEs perfect candidates for the pecking order theory.

2.3 Agency theory

Jensen and Meckling (1976) outlined a number of potentially costly principal-agent relationships in publicy quoted firms that may arise because the agent does not always conduct business in a way that is consistent with the best interest of the principals. The firm's security debt- and stockholders are seen as principals and the firm's management, which manages the principals' assets, as the agent. Whilst a number of these relationships are relevant for SMEs, the primary agency conflict in SMEs is generally not between owners and managers, but between inside and outside contributors of capital (Hand, Lloyd, & Rogow, 1982). Potential agency problems in SMEs are exacerbated by information asymmetries resulting from lack of publicly available detailed accounting information (McMahon et al., 1993). The primary concern for outside contributors of capital arises from moral hazard, or the possibility of the SME owner changing his behaviour after credit had been granted (Bhaird & Lucey, 2010). This is because the firm owner has an incentive to alter his behaviour to riskier projects with higher returns. Three forms of agency problems have received particular attraction: the underinvestment problem, asset substitution and the free cash flow hypothesis (Drobetz & Fix, 2005). These are described below

2.3.1 Underinvestment problem

According to Myers (1977), this problem occurs when firms that obtain financing through debt relinquish profitable investment projects. This is due to shareholders bearing all the risk of the investment, but only benefiting from some gains that are generated, the rest being channeled to creditors as an increase in the value of the debt they hold. As a result, contracting debt in the present to finance current projects can cause an underinvestment problem in the future. SMEs are normally highly indebted (Lopez-gracia & Mestre-barberá, 2015), which this problem is important to them.

Brealey and Myers (2005) argue that the underinvestment problem theoretically affects all firms with leverage, but it is most pronounced for highly levered firms in financial distress. The greater the probability of default, the more bondholders gain from value increasing projects. In addition, firms whose value consists primarily of growth are most likely to suffer from the underinvestment problem.

Drobetz and Fix (2005) argue that the underinvestment problem tilts the capital structure towards equity. Mature firms with high reputation but few profitable investment opportunities, whose value comes mainly from asset-in-place, find it optimal to choose safe projects. In contrast,

young firms with many growth and little reputation may choose riskier projects. If they survive without default, they will eventually switch to the safe project. Due to their lower costs of debt, mature firms can run higher leverage rations than firms whose value is derived primarily from growth (Drobetz & Fix, 2005).

2.3.2 Asset substitution problem

According to Jensen and Meckling (1976), this problem arises when the shareholders of a firm in debt have incentives to replace low risk investment projects with other high risk ventures. This change in strategy allows shareholders to increase their wealth at the expense of creditors. Basically, small firms could take an excessive risk if they feel that creditors will bear most of the risk if the project fails (Lopez-gracia & Mestre-barberá, 2015). This can happen when the firm is highly indebted and has little to lose. Hence, small firm owners can follow a strategy that consists of making riskier investments, as they are more profitable.

Creditors will mitigate this risk through the price of the debt or by stipulating certain clauses in the debt contract. One way to solve this problem of moral hazard consists of financing by the way of short-term debt, as it is less sensitive to changes in the value of the assets it finances (Barnea, Haugen, & Senbet, 1980). In addition, financing with short-term debt forces the firm to periodically report tis performance and operating risk to lenders (Jun & Jen, 2003).

One way of mitigating this problem consists of matching the economic life of assets to debt maturity (Myers, 1977). The asset substitution problem becomes more serious in small firms whose assets have a relatively short useful life, that is, current assets. The reason is that they are more flexible, giving rise to higher monitoring costs due to there being a greater risk of a change in investment strategy. Hence, firms with a high proportion of fixed assets will obtain financing mainly through long-term debt (Fama, 1985; Stohs & Mauer, 1996).

2.3.3 Free Cash Flow problem

The free cash flow problem is indicated by Jensen (1986). Free cash flow is cash flow in excess of that required to fund all projects with positive net present values. Firms with substantial free cash flow face conflicts of interest between stockholders and managers. The problem is how to motivate managers to distribute excess funds rather than investing them below the cost of capital or wasting them on organizational inefficiencies (Drobetz & Fix, 2005).

Very small firms are frequently managed and owned by only one person. As a result, these types of firms do not face agency conflicts. As small business grows, the owner-manager entrepreneur must partially delegate decision-making responsibility to someone else in order to gain organizations advantages. This process gives rise to agency conflicts in the form of free cash flow problems (Lopez-gracia & Mestre-barberá, 2015). According to Danielson and Scott (2007), small business owners' concern regarding free cash flow problem increases as firms adopt less concentrated ownership and control structures. Likewise, Anderson, Mansi, and Reeb (2003, p. 266) state that "the presence of large shareholders can alleviate some of these conflicts because these shareholders have advantages in monitoring and disciplining control agents."

The role of ownership-management separation is a key issue for the growth of small firms. Presumably, small firms relinquish (foster) growth if the agency costs derived from the free cash flow problem are higher (lower) than the benefits gained (Lopez-gracia & Mestre-barberá, 2015). Despite being relevant for SMEs, the influence of ownership-management separation on growth and financing decisions has scarcely been studies. Two exceptions to this lack of empirical evidence are Danielson and Scott (2007), who provide a study on small north-American firms, and Ruiz-Porras and Lopez-Mateo (2011), who analyze small Mexican firms.

According to Fama and Jensen (1983), firms must invest in "decision hierarchies" after separating management and ownership in order to minimize agency costs. This includes different

techniques to monitor and control the new decision makers and obviously creates more organizational costs, depending on the extent to which the separation between management and ownership goes ahead (Ang, Cole, & Lin, 2000). In contrast, Hart and Moore (1995) state that long-term debt should prevent management from financing low-return investments by borrowing against future earnings, thus mitigating the overinvestment problem.

There are several empirical capital structure studies that supported the agency theory for SMEs. Heyman et al,. (2008) investigated the determinants of Belgium private SMEs and concluded that agency costs are the major determinants of leverage. They find that high growth SMEs and SMEs with less tangible assets have a lower leverage ratio. Degryse et al,. (2012) examined the intra-industry effects of Dutch SMEs and indicate that SMEs display considerable heterogeneity after controlling for firm-level determinants. This suggests that the degree of agency conflicts is an important determinant of leverage. Bhaird & Lucey (2010) tested a number of agency theory hypothesis and these are consistent with previous studies. They concluded that collateral is important in alleviating information asymmetry and secure leverage. Hall et al,. (2004) concluded that variations of leverage between countries in the European Union is likely related to different agency costs levels.

2.4 Empirical evidence on determinants and effects

In this section, the empirical evidence of the previous studies will be discussed. First, I described the empirical evidence of the firm-specific, industry-specific, country-specific and owner-manager-specific determinants of capital structure. Second, the effects of capital structure on firm performance and financial distress are described.

2.4.1 Determinants

2.4.1.1 Firm-specific determinants

Previous literature has showed that there are many firm specific determinants that can have a positive or negative impact on the capital structure of SMEs. This study will incorporate the most important firm-specific determinants for testing the pecking order theory and agency costs theory. From a consideration of the previous studies of the determinants of the capital structure of SMEs, it becomes clear that profitability, growth opportunities, past growth, asset structure, size, and age are the most important firm-specific determinants of capital structure for explaining the pecking order theory and agency theory. Therefore, this study will focus on this determinants. Especially, it is interesting to have a look on size and asset tangibility. These determinants are important for theories based on information asymmetry. Tangible assets can provide collateral. The absence of a relationship suggest that information do not play an important rule. Larger firms are less severe for information asymmetry, hence the importance of information asymmetry. Furthermore, previous research of Dutch SMEs indicate that these determinants do not function differently in the Dutch economies. This chapter will give an overview of the empirical results of the firm-specific determinants done by other studies and is summarized in appendix A and B.

Profitability has been widely tested in previous research of big firms and SMEs. The results are in favor of the pecking order theory. Rajan and Zingales (1995), Chen, Lensink & Sterken (1998), Bevan and Danbolt (2002), and Chen (2004) used big firms data and find a significant negative relationship between debt and profitability. Also, studies on SMEs find the a significant negative impact of profitability on debt (Cassar & Holmes, 2003; Heyman et al., 2008; López-Gracia & Sogorb-Mira, 2008; Michaelas et al., 1999; Sogorb-Mira, 2005). However, Degryse et al,. (2012) and Hall et al,. (2004) indicate an insignificant negative relationship between debt and profitability, while Hall et al,. (2000) and Psillaki and Daskalakis (2009) find an insignificant positive relationship.

There is consistently evidence of the impact of growth opportunities on leverage. Chen, Lensink & Sterken (1998), Ozkan (2001), Bevan and Danbolt (2002), and Chen (2004) report a significant positive relationship between growth opportunities and leverage for larger or publicly listed firms. However, De Jong (2002) and Rajan and Zingales (1995) finds an insignificant positive relationship between growth opportunities and leverage. Studies on SMEs find evidence for a significant positive impact growth opportunities on leverage (Degryse et al., 2012; Michaelas et al., 1999; Sogorb-Mira, 2005).

There is contradictory evidence of the relationship between past growth and leverage. Michaelas et al,. (1999) and Degryse et al,. (2012) report a significant positive relationship between this two variables for SMEs. Other scholars, who tested capital structure determinants on SMEs, indicate an insignificant positive relationship (Cassar & Holmes, 2003; Hall et al., 2004; Hall et al., 2000). On the other hand, Heyman et al,. (2008) and Psillaki and Daskalakis (2009) find a significant negative impact of past growth on leverage. Therefore, the evidence of the impact of past growth on leverage of SMEs is mixed. There is no evidence for listed firms. The articles I studied are summarized in appendix B.

The empirical evidence of the impact of asset structure on leverage is consistent for SMEs. Several studies find a positive impact of asset structure on leverage (Cassar & Holmes, 2003; Hall et al., 2004; Hall et al., 2000; Heyman et al., 2008; Michaelas et al., 1999; Psillaki & Daskalakis, 2009; Sogorb-Mira, 2005). On the other hand, there is contradictory evidence for listed firms. Chen, Lensink & Sterken (1998), De Jong (2002) and Chen (2004) indicate a significant positive relationship. However, Bevan and Danbolt (2002) report a significant negative impact asset structure on leverage.

Size has been widely tested in previous capital structure research for listed firms and SMEs. Most of the listed firms research indicate a positive significant relationship between size and leverage (Bevan & Danbolt, 2002; Chen, 2004; de Jong, 2002; Rajan & Zingales, 1995). On the other hand, Ozkan (2001) and Chen (2004) report a significant negative impact of size on leverage. Similarity, most of the SMEs capital structure research find a significant positive impact of size on leverage (Bhaird & Lucey, 2010; Degryse et al., 2012; Hall et al., 2004; Hall et al., 2000; López-Gracia & Sogorb-Mira, 2008; Michaelas et al., 1999; Psillaki & Daskalakis, 2009; Sogorb-Mira, 2005), whereas Heyman et al,. (2008) report a significant negative relationship between size and leverage.

The results of previous studies of SMEs, who tested the impact of age on leverage, is a significant negative relationship (Bhaird & Lucey, 2010; Hall et al., 2000; Heyman et al., 2008; Michaelas et al., 1999). However, Hall et al,. (2004) report an insignificant positive relationship. For listed firms, there is no evidence for the impact of age on leverage. The listed capital structure studies are summarized in appendix B.

2.3.1.2 Industry-specific determinants

The capital structure can also be influenced by industry-specific factors. Kayo and Kimura (2011) examine whether industry-specific determinants directly influence leverage. In particular, they concluded that industry concentration, industry munificence, and industry dynamism are important industry-specific determinants of capital structure. Munificence is the ability of the environment in the industry to ensure sustainability of a firm (Kayo & Kimura, 2011). This means that an industry with high munificence has plenty of resources and low competition. This could increases the profitability of the firm. Thus, firms will consequently gain a high level of profit. Kayo and Kimura (2011) find a negative correlation between industry munificence and leverage.

Industry dynamism reflects the degree of instability or unpredictability of an industry (Kayo & Kimura, 2011). According to Ferri and Jones (1979), the concept of industry dynamism can be interpreted to a certain extent as risk where firms operating in a dynamic less predictable environment would engage with lesser debt. If the dynamism of the industry increases, the risk will

also increase and lowers the level of leverage of the firm. Kayo and Kimura (2011) find a negative relationship between industry dynamism and leverage.

The last one is the influence of industry concentration. According to MacKay and Phillips (2005), a highly concentrated industry consumes high level of leverage. They also argue that profitability, size and risk are higher in a highly concentrated industry. Kayo and Kimura (2011) find a negative relationship between concentrated industries and leverage. This means that highly concentrated industry firms reduce the employment of leverage due the higher risk of financial distress.

Degryse et al., (2012) concluded that intra-industry heterogeneity are important drivers of capital structure. This intra-industry results indicate that firms display considerable heterogeneity after controlling for firm-level determinants. They suggests that the degree of industry competition, the degree of agency conflicts and the heterogeneity in employed technology are also the important drivers of capital structure.

2.3.1.3 Country-specific determinants

Some studies have shown that country-specific determinants influences leverage. Rajan and Zingales (1995) find that continental Europe countries are more leveraged than UK. Although is it difficult to explain that differences. There can be several major country-specific determinants have an impact on the capital structure. Those country-specific determinants are legal system, macroeconomic condition, economic development of financial markets, economic growth, interest rate and inflation. These country-specific determinants will be reviewed and present how do they work on capital structure.

La Porta et al., (1998) has suggested a significant variation in the extent of legal system across countries change financing preferences. Bessler et at., (2011) find out that there are differentiations of financing choices between common law countries and civil law countries. Fan et al., (2012) suggests that common law countries have lower leverage, more outside equity and more use of long-term debt. Besides, firms in a weak legal protection for investors tend to rely on more internal financing (La Porta et al., 1998).

The study of Joeveer (2013) has stressed the importance of countries macroeconomic condition on capital structure. His study has demonstrated that both Eastern and Western small firms tend to be more dependent on macroeconomic condition and less dependent on firm-specific determinants compared to those larger firms. For instance, there are more growth opportunities available to firms in economic troughs. Furthermore, Joeveer (2013) has pointed out that the macroeconomic condition has a stronger influence on those small firms as the smaller firms seem to be more constrained by the financial market. Moreover, Stulz (1990) concluded that leverage is positively related to macroeconomic conditions in terms of future investments and growth opportunities.

There are many empirical studies that examine the economic development of financial markets that influence capital structure of the firms. For example, Demirguc-Kunt and Maksimovic (1999) have suggested that degree of stock market development has a significant impact on capital structure. Similarly, Deesomask et al., (2004) has shown that the development of capital market and leverage is found to have significantly negative relationship. Besides, the size of the government bond market also plays an important role in the markets. Moreover, the size of bond market is negatively associated with leverage (Fan et al., 2012).

Stulz (1990) argues that leverage is expected to have an inverse relationship to future economic growth. In other words, firms tend to finance with less debt in response to future economic growth. More specifically, the higher economic growth, the greater is debt capacity reversed for economic growth. Chen (2004) investigated the impact of economic development on

leverage. He shown a negative relationship in his study. However, Michaelas et al. (1999) finds a positive relationship between GDP growth and long-term debt. Frank and Goyal (2009) also have a positive relationship between GDP and leverage.

The effect of interest rate and inflation is uncertain in empirical literature. The interest rate is used to measure how a firm takes risk and borrows from external institutions. For example, Deesomask et al., (2004) show that interest rate has a positive relationship with leverage in the post-crisis period. This means that firms have more concerns about the effects of future inflation rather than the risk of default. Joeveer (2013) has demonstrated a negative relationship between inflation and leverage.

Many other empirical studies have emphasized the importance of country-specific determinants on capital structure. De Jong et al., (2008) argues that country factor does matter to the firm's capital structure decision and its effect can be either in a direct or indirect way. However, Gungoraydinoglu and Oztekin (2011) find out that firm-level determinants are able to explain two-thirds of the variation in capital structure across countries, and the county-specific determinants explain the remaining one-third.

2.3.1.4 Owner-manager-specific determinants

This section will discuss the empirical evidence of the owner-manager determinants. Characteristics of the owner-manager were found to influence the capital structure of the firm (Cassar, 2004). For instance, Irwin and Scott (2010) suggest that the personal characteristics of the SME owner-mangers (education, gender and ethnicity) influence their capability in raising business finance. Likewise, Mac an Bhaird and Lucey (2010) classifies it into owner's age, race, gender, education and experience, and preferences. Newman (2010) suggests four categories of determinants related with the owner-manager, namely managerial strategy, managerial psychology, managerial human capital and network ties.

Age of the owner-manager appears to be an important determinant of capital structure. Previous studies found that older owner-manager would be less likely to be concerned with gaining wealth. They are reluctant to invest external finances into their firm (Vos, Yeh, Carter, & Tagg, 2007). Instead, they focus more in financial independence and control (Cassar, 2004; Vos et al., 2007). This researchers report a negative relationship between leverage and the owners age. In contrast, Carter and Rosa (1998) and Wu et al., (2008) reported that the age of the owner was positively correlated with the leverage of the firm.

Hatch and Dyer (2004) define human capital as a combination of knowledge and skill possessed by the owner-managers. Knowledge and skills can be obtained through formal education or managerial experience. Education attainment and managerial experience would increase the creditworthiness of the firm to the financiers (Cassar, 2004). High-educated owner-managers were found to prefer using debt since they have better access to external financing (Cassar, 2004; Irwin & Scott, 2010). However, Cassar (2004) found limited evidence of the impact of human capital of the owner on leverage. He suggests that it is easier for high educated owner-manager to access debt, they might not do so because of their tendency to be more control and risk averse. Moreover, Irwin and Scott (2010) found no significant relationship between relationship and human capital.

Ethnicity of the owner-manager also appears to be an important determinants of capital structure of the firms. 'Ethnic minorities' is used to represent a minority population of ethnic groups in a location, region or country (Hussain & Matlay, 2007). Previous studies discovered that ethnic minority businesses encounter difficulty in accessing finance. For example, Smallbone et al., (2003) find that approximately one-third of the ethnic minority businesses relied on internal finance at start-up stage, while one-third of them obtained external finance and the remaining utilized bank finance. Likewise, Hussain and Matlay (2007) report that two-thirds of the ethnic minority owner-manager

prefer to finance internally in the start-up stage.

The relationship and networking that SMEs form have been evidenced to influence the capital structure of the firms in previous studies. For example, the wider the network between the financer with the firm, the lower the difficulties firms will experience in raising external finance (Saleh & Ndubisi, 2006). Nguyen and Ramachandran (2006) suggests that firms will utilize more debt if they have easy access to that particular finance. They found a positive relationship between network and relationship with leverage. Moreover, Irwin and Scott (2010) concludes that a good relationship between business and lender is important to avoid facing difficulties in raising external finance.

2.4.2 Effects

2.4.2.1 Effects of capital structure on firm performance

The effects of firm's capital structure and firm's performance is widely discussed in the capital structure theories. Modigliani and Miller's (1958) theory about the optimal capital structure suggests no significant association between capital structure and firm performance. The static- trade-off theory suggests a positive impact of capital structure on firm performance. Firm that follow this theory will trade-off between benefit and cost of debt until it reaches the optimal level of debt. An appropriate capital structure mix may minimize the cost of capital (Kraus & Litzenberger, 1973). This situation will maximize the returns for the firms that indirectly improve the firm performance. Lastly, The pecking order theory and agency theory suggests that there is a negative relationship between capital structure and firm performance. Highly performances firms have more retained earnings and favour internal over debt financing. Myers and Majluf's (1984) argument which stated that highly levered firms may forego positive net present value projects which may affect firm performance adversely.

Among studies that found no significant relationship between capital structure and firm performance are Kirshnan and Moyer (1996) who conducted a study for hotels in Hong Kong, Malaysia, Singapore and Korea. Second, Phillips and Sipahioglu (2004) on hotels in the UK. And lastly, Berger and Bonacccorsi (2006) concluded similar findings. In contrast, Singh and Faircloth (2005) report a significant and negative relationship between capital structure and firm performance. They report that more debt leads to lower long-term capital investments and that in turn leads to lower firm performance. Similarity, Gleason et al. (2000) indicate a significant and negative relationship between capital structure and firm performance. The inverse relationship suggests that lower performance may be due the agency issues which lead to high utilization of debt. Also, several studies indicate a positive relationship between capital structure and firm performance. Chang Aik Leng (2004) found that borrowing ratio has a negative effect on earnings performance using return on equity. Dessi and Robertson (2003) found that debt has a significant positive effect on the expected firm performance. Ebaid (2009) find that short-term debt and total debt have a negative impact on firm performance. Concluded, there are conflicting empirical results regarding the impact of capital structure on firm performance

2.4.2.2 Effects of capital structure on financial distress

Over the past decades, the world has with devasting effects witnessed numerous cases of financial distress. The entities, for example General Motors, represented the icons of corporate financial stability prior to filing for bankruptcy. Their collapse therefore came with amazement to researchers. This phenomenon motived finance scholars to examine the underlying causes of financial distress.

The review of the literature show that while studies have concluded that poor governance, severe competition and adverse economic factors are significant contributors of financial distress, the effect of capital structure has been debatable (Kapopoulos & Lazaretou, 2007; Parker, Peters, & Turetsky, 2002). Studies undertaken by Andrade and Kaplan (1998), and Chen (2004) have provided

evidence that the use of debt financing increases the financial distress. However, other studies find contradictory results. Ogbulu and Emini (2012) and Ogundipe, Idowu, and Ogundipe (2012) found that the use of leverage would mitigate the financial distress. On the other hand, studies taken by Ebaid (2009) and Modigliani and Miller (1958) concluded that the way firms are financed does not affect the failure process. Concluded, there are conflicting empirical results regarding the effects of capital structure on financial distress.

2.5 Hypothesis development

In this section, the hypothesis will be described and analyzed. As I mentioned, there is a consistency in the independent variables commonly selected. Therefore I focus on these determinants. Respectively, the hypotheses of pecking theory and agency theory will be discussed. A summary of the hypothesis can be found in table 1.

Profitability

Myers and Majluf (1984) pointed out that retained earnings are on top of the preference list to finance investments, so higher profits reduce the necessity to raise debt. When firms have more retained earnings, it will be in a better position to finance its future projects by retained earnings, instead of external debt financing. According to the pecking order theory, the impact of profitability on leverage is negative

The agency theory predicts a positive relationship between profitability and leverage. The free cash flow problem might limit managers to much in highly profitable firms. Besides the free cash flow problem, the risk shifting problem is also applicable. Managers might accept high risk positive net present value projects whose net value is not in line with the risks, the free cash flow hypothesis would then favour debt.

H1: The impact of profitability on leverage cannot be determined.

Growth opportunities

According to the pecking order theory, the impact of growth opportunities on leverage is positive. Growth opportunities is likely to put a strain on retained earnings and push the firm to borrow. If firms needs to invest in a project, first retained earnings will be used and then attract debt.

The agency theory expects a negative impact of growth opportunities on leverage. Myers' (1977) underinvestment problem suggests that growth opportunities increases the potential for conflict between insiders and outsider lenders, leading to moral hazard in the form of asset substitution. SMEs usually have a lower proportion of assets in place making them candidates to suffer this problem.

H2a: The impact of growth opportunities on leverage cannot be determined.

Past growth

Similar to growth opportunities, the pecking order theory expects a positive impact of past growth on leverage. It is likely for fast growing SMEs to have insufficient funds to finance their growth internally. Hence, these SMEs have issued debt to financed their past growth.

The agency theory expects a negative impact of past growth on leverage. Firms with more past growth than others have invested into risky projects. Therefore, debt providers were carefully by lending money to firms with huge past growth. The SME owner-manager can changing his behaviour after credit had been granted. Therefore, bondholders concern about the repay of the debt.

H3: The impact of past growth on leverage cannot be determined.

Asset structure

Asset structure is expected to be positively correlated with leverage, as it provides collateral. Collateral mitigates information asymmetry problems such that the pecking order theory predicts a positive relationship. The information asymmetry argument is particularly relevant for SMEs, as they are more opaque than large firms. Small firms often do not have to provide audited financial statements or do not issue traded securities.

Similarity, the agency theory expects a positive impact of asset structure on leverage for the similar reason. According to the asset substitution problem, the asset tangibility is a collateral for the bondholders. The bondholders will run less risk and therefore demand a lower interest rate. It is for the firm easier and cheaper to attract debt. Thus, the impact of asset tangibility on leverage is positive.

H4: The impact of tangibility on leverage is positive.

Size

Larger firms are generally more diversified and show fewer earnings volatility (Fama & French, 2002). The pecking order theory predicts a positive relationship between size and leverage because more diversification and less volatile earnings mitigate problems of asymmetric information. This decreases the costs of debt compared with other sources of finances.

The agency theory predicts also a positive impact of size on leverage. The free cash flow problem can be mitigated by debt since it has a discipline role on managers. Therefore, the hypothesis regarding size is:

H5: The impact of size on leverage is positive.

Firm Age

According to the pecking order theory, it can be stated that the age of the firm has a negative relationship with leverage. Time elapsed enables businesses to save funds and therefore avoid resorting to debt. Another reason is that order firms can relatively more easily retain profits than younger firms (Berger & Udell, 1998). Young firms are forced to finance their operations with debt because they have not retained earnings already, while older firm can accumulate retained earnings (Hall, Hutchinson, & Michaelas, 2004).

According to the agency theory, the life cycle of the firm influences the debt ratio of firms. Firms at start-up stage experience more informational asymmetry problems than older firms, and therefore are more likely to finance their project with retained earnings rather than debt. Furthermore, younger firms face difficulties with finding the creditors. As a firm becomes older and develops a trading and credit history, reputation effects mitigate the problem of moral hazard (Diamond, 1989). Therefore, the agency theory expects a negative impact of firm age on leverage.

H6: The impact of firm age on leverage is negative.

Table 1: Summary hypotheses and empirical evidence of the determinants

	Pecking order theory	Agency theory	Empirical evidence
Profitability	Negative	Positive	Negative
Growth opportunities	Positive	Negative	Positive
Past growth	Positive	Negative	Mixed
Asset structure	Positive	Positive	Positive
Size	Positive	Positive	Positive
Firm age	Negative	Negative	Positive

3 Methodology

The approach commonly adopted in previous studies is to test hypotheses formulated from capital structure theories by testing multivariate regression models on panal data (Bevan & Danbolt, 2002; Bhaird & Lucey, 2010; Cassar & Holmes, 2003; Chen, 2004; Chen et al., 1998; de Jong, 2002; Degryse et al., 2012; Hall et al., 2004; Hall et al., 2000; Heyman et al., 2008; López-Gracia & Sogorb-Mira, 2008; Michaelas et al., 1999; Ozkan, 2001; Psillaki & Daskalakis, 2009; Rajan & Zingales, 1995; Sogorb-Mira, 2005). Baltagi (2002) has argued that panel data have several benefits. The greatest advantage of panel data is that they allow control for individual heterogeneity. Panel data suggest that firms are heterogeneous. Because time series and cross-section studies do not control for this heterogeneity, the estimation results could be biased. The regression models adopted in previous studies will be discussed in this section.

3.1 Regression models

A regression analysis is the most common approach to examine the relationship between a dependent variable (Y) and one or several independent variables ($X_1 + X_2 + X_3$). There are three different forms of regression analysis. First, probit regression is a regression model that estimates the probability of the dependent variable to be 0 or 1, that is, the probability that some event will happen (Hair, Black, Babin, & Anderson, 2010). Second, logistic regression predicts the outcome of a categorical dependent variable. Categorical variable has usually fixed number of possible values (Hair et al., 2010). Lastly, linear regression has a metric dependent variable which can have infinite values. The linear regression is the most suitable to explain the determinants of capital structure. There are different techniques of linear regression.

3.1.1 Ordinary least squares model

Ordinary least squares (OLS) regression is widely used for capital structure studies (Bevan & Danbolt, 2002; Bhaird & Lucey, 2010; Cassar & Holmes, 2003; Chen, 2004; Chen et al., 1998; Hall et al., 2004; Hall et al., 2000; Ozkan, 2001; Psillaki & Daskalakis, 2009; Rajan & Zingales, 1995). These studies analysed data at a specific point in time, that is cross-sectional data. OLS is the simplest and most common form of linear regression. It is used to explain the relationship between a dependent variable and one or more independent variables over time, across sections or both. The goal of the OLS is to minimize the sum of squares of the residuals. In other words, the OLS determines the regression coefficients so that the regression line lies as close to the observed data as possible. The vertical difference between a data point and the line is called a residual. The OLS regression is based on several underlying assumptions. This assumptions is necessary for a valid model. The assumptions are: linearity, exogenity, homoscedasticity, nonautocorrelation, not stochastic and no multicollinearity. A big advantage of OLS is that it is easy to implement and is produce easy solutions to understand. However, Wooldridge (2012) argues OLS is not able to deliver consistent estimators due to endogeneity problem. This problem arises from measurement error, auto regression, reverse causality, simultaneous causality and omitted variables. Several scholars face this problem by lagging the independent variables with one year. Other solutions to this problem can be found in other statistical techniques. If there is homoscedasticity, meaning that that the error term is the same across all values of the independent variables, than pooled OLS provides consistent and efficient parameter estimates to use on panel data (Woolridge, 2012). If there is heterogeneity, it may influence the assumption of exogenity and nonautocorrelation. This cause biased ad inconsistent estimators. The fixed effects model and the random effect model deal with these problems (Woolridge, 2012).

3.1.2 Fixed/random effect model

The fixed effect model (FEM) is another statically form of multiple regression, which is widely used in capital structure studies (Chen, 2004; Degryse et al., 2012; Heyman et al., 2008; Michaelas et al., 1999; Sogorb-Mira, 2005). These studies analyzed panel data, which combines cross sectional and time series observations. In FEM, the parameters are fixed or non-random. This means that the variables are constant across individuals. FEM takes into account the individuality of each firm by allowing the intercept to vary across firms, while holding the slope coefficients constant across firms. FEM controls for any possible correlation among the independent variables and omitted variables by using a fixed effect. This means that the exogenity assumption will not be violated.

The random effect (REM) model is another format of FEM. REM assumes that heterogeneity is not correlated with any regressor and that the error variance estimates are specific to firms. Hence, the intercept and slope of the regressors are the same across firms, but differences are captured by individual specific errors. Furthermore, a Hausman test can be conducted to indicate whether FEM or REM is preferred.

3.1.3 Two-stage least squares model

Two-stage least squares (2SLS) regression is another statistical technique. De Jong (2002), Heyman et al,. (2008) and López-Gracia & Sogorb-Mira (2008) used 2SLS in their capital structure studies. The nature of their data had a panel character. This technique is the extension the OLS method to address the endogeneity problem. De Jong (2002) suggests OLS will yield biased and inconsistent estimates in his study. Heyman et al,. (2008) also investigate the impact on debt maturity and state the fact decisions on leverage and debt maturity are simultaneous decisions. López-Gracia & Sogorb-Mira (2008) measures adjustment speed towards target leverage ratio. 2SLS adds an instrumental variable that is correlated with the endogenous variables but uncorrelated with the error term. The instrumental variable will only have an effect on the independent variable of interest and not with other variables. Therefore, it is important to identify independent variables in the first stage that are not related to the second stage dependent variables (Woolridge, 2012). On the other hand, 2SLS have two disadvantages. First, inconsistent estimators will be generated if the correlation of the instrument variables and error terms are not easy to measure. Second, if there are weak instruments selected, the overall outcome will be of little variance (Woolridge, 2012). Therefore, previous studies provides little information in determining appropriate instrument variables to perform 2SLS.

3.1.4 General methods of moments model

The general methods of moments (GMM) model is an another statistical technique utilized in capital structure studies (López-Gracia & Sogorb-Mira, 2008; Ozkan, 2001). Both studies, with panel data, measure adjustment speed towards target leverage ratio. Ozkan (2001) argue that OLS delivers biased and inconsistent estimates. Like the 2SLS, GMM solves the endogeneity problem in the regression. However, the difference lies in the incorporation of instruments. While the 2SLS use only the lagged levels as the possible instruments, the GMM applies complete exogenous, lagged differences and lagged levels as the instruments. Nevertheless, its benefits are limited to panel data with short time series and large observations number. Additionally, previous studies provides little information in determining appropriate instrument variables.

3.1.5 Selection of Method

Due the panel character of the data, the analysis can be run by either a FEM, REM, 2SLS or GMM model. Previous studies provides little information in determining appropriate instrument variables to perform 2SLS and GMM. Therefore, FEM or REM is more suitable. To determine which of these regressions should be run, the Hausman (1978) test can be used, which examines whether the difference between estimators generated by random-effects regressions and the estimators

generated by fixed-effects regression approximates zero. Unfortunately, the statistical software package, SPSS, is not able to run a Hausman test. Therefore, the FEM/REM choice is based on a intuitive reasoning. First, in the empirical evidence section I mentioned that leverage can also influenced by owner-manager determinants. FEM could capture that factor by using an individual-specific intercept term (Degryse et al,. 2012). Second, FEM is statistically preferred in most of the previous capital structure studies with panel data (Heyman et al., 2008; Michaelas et al., 1999; Sogorb-Mira, 2005). Third, Chen (2004) compared the results of FEM and REM and she finds that FEM gives the highest explanatory power. This indicates that FEM is more suitable.

3.2 Research model

In order to test the hypothesis 1 – 6, the FEM regression is used to investigates the determinants of capital structure. To test this hypothesis, the following basic regression model is described as follows:

$$\text{Leverage}_{i,t} = \alpha_0 + \beta_1 \text{PROFITABLILTY}_{i,t} + \beta_2 \text{GROWTH OPPORTUNITIES}_{it} + \beta_3 \textit{PAST} \text{ GROWTH}_{it} + \beta_3 \text{ASSET STRUCTURE}_{it} + \beta_4 \text{SIZE}_{i,t} + \beta_5 \text{AGE}_{i,t} + \beta_6 \text{INDUSTRY}_{it} + \varepsilon_{it}$$

With i denoting firms and t denoting time. The i subscript, therefore, denotes the cross-section dimension whereas t denotes the time-series dimension. α is a scalar, β is K x 1 and X_{it} is the $_{it}$th observation of K explanatory variables. A frequently employed panel data model assumes that $\varepsilon_{it} = \alpha_i + u_{it}$, where α_i *denotes* the unobservable firm-specific effect that is time invariant, and u_{it} is the random error. As robustness, I ran a OLS regression with lagged independent variables.

3.3 Variables

In this section, the variables definitions are given. First, the dependent variables are given and then the independent variables .For some variables there are two definitions given in order to check for robustness. A summary of the definitions can be found in table 2.

3.3.1 Dependent variables

The dependent variable is leverage. I used different proxies for leverage. The most commonly used measure its total debt ratio, defined as total debt over total assets (total debt/total assets) (Bevan & Danbolt, 2002; Cassar & Holmes, 2003; Chen, 2004; Chen et al., 1998; Degryse et al., 2012; Heyman et al., 2008; López-Gracia & Sogorb-Mira, 2008; Michaelas et al., 1999; Ozkan, 2001; Psillaki & Daskalakis, 2009; Rajan & Zingales, 1995; Sogorb-Mira, 2005). However, as argued by Degryse et al,. (2012), any analysis of leverage determinants based only on total liabilities may screen the important differences between long-term and short-term debt. Consequently, in order to shed some light on this question and to get a better understanding of leverage and its determinants, I also consider the following two measures of leverage: long-term debt ratio, defined as long term debt over total assets (Bhaird & Lucey, 2010; Cassar & Holmes, 2003; Chen, 2004; de Jong, 2002; Degryse et al., 2012; Hall et al., 2004;Hall et al., 2000; Michaelas et al., 1999; Sogorb-Mira, 2005), and short-term debt ratio, defined as short-term debt over total assets (Bhaird & Lucey, 2010; Cassar & Holmes, 2003; Degryse et al., 2012; Hall et al., 2004; Hall et al., 2000; Michaelas et al., 1999; Sogorb-Mira, 2005). The debt is measured by its book value. Market values are not known for private SMEs, such that most SME managers have to base their financing decisions on book values (Degryse et al., 2012)..

3.3.2 Independent variables

Profitability is measured as a ratio of the earnings before interest and taxes (EBIT) to total assets (Cassar & Holmes, 2003; Chen et al., 1998; López-Gracia & Sogorb-Mira, 2008; Michaelas et al., 1999; Psillaki & Daskalakis, 2009; Sogorb-Mira, 2005). Another measurement for profitability what researchers use is the ratio of the EBIT to sales turnover (Hall et al., 2004; Hall et al., 2000). Therefore, I will use these two measurements of profitability.

Growth opportunities will be measured as a ratio of the intangible assets to total assets (Degryse et al., 2012; Heyman et al., 2008; Michaelas et al., 1999; Sogorb-Mira, 2005).

Past growth will be measured as a percentage increase in the total assets in the last year (Heyman et al., 2008; Michaelas et al., 1999). And the second measurement for past growth is a percentage increase of the sales turnover in the last year (Hall et al., 2004; Hall et al., 2000).

Asset structure will be measured as tangible assets ratio, which are all fixed assets except intangible assets divided by total assets (de Jong, 2002; Degryse et al., 2012; Sogorb-Mira, 2005). As opposed to real estate and equipment, inventories and short-term assets and therefore expected to be poor collateral. However, other researcher includes inventories as a measurement for asset structure (Chen, 2004; Michaelas et al., 1999; Psillaki & Daskalakis, 2009; Sogorb-Mira, 2005). Due the lack of data, it was not possible to include inventories in the variable.

The variable size is measured by the logarithm of total assets (Chen, 2004; López-Gracia & Sogorb-Mira, 2008; Sogorb-Mira, 2005) and the logarithm of total sales (Bevan & Danbolt, 2002; L. H. Chen et al., 1998; Ozkan, 2001; Psillaki & Daskalakis, 2009; Rajan & Zingales, 1995). In order to prevent a huge spread in total sales and total assets between firms, the logarithm (base 10) will be used in both measurements.

Finally, the determinant age will be measured as the age of the firm in years since the year of incorporation, thus year minus the year of incorporation (Bhaird & Lucey, 2010; Hall et al., 2004; Hall et al., 2000; López-Gracia & Sogorb-Mira, 2008; Michaelas et al., 1999).

3.3.3 Control variables

The pecking order theory suggests that industry differences were not meaningful to leverage because each firm's debt ratio reflects the cumulative requirements for external finance. Also implied is that the industry in which a firm operates does not directly determine its capital structure but may do so indirectly via the nature and composition of the firm's assets. Harris and Raviv (1991) have shown that asset risk and asset type are the most important determinants of capital structure. Therefore, Myers (1984) concludes that, if his theory is correct, then the average debt ratio would vary from industry to industry because asset risk, asset type, and requirements for external funds also varied by industries.

According to the agency theory, in industries without agency conflicts, there should be less leverage dispersion. Agency conflicts resulting from conflicting objectives between inside and outside contributors of capital could vary from industry to industry. Another reason can be that industry specific regulatory restrictions and the type of business activities can cause agency differences across industries.

Bhaird and Lucey (2010), Degryse et al., (2012) and Hall et al., (2000) concludes that leverage differs between industries. On the other hand, Balakrishnan and Fox (1993) conclude that firm-specific characteristics are more important than structural characteristic of industry and Jordan et al,. (1998) find that financial and strategy variables have greater explanatory power than industry-specific effects. The industry influence leverage directly or indirectly. Therefore, this study control for industry.

Industry dummy variables will be used to control for the impact of industries on leverage. The industry classification criteria will be taken form Standard Industrial Classification (SIC) In this research, I will use in total 5 industry groups. The first group is agriculture, forestry and mining (01-14). The second group is Construction (15-19). The third group is Manufacturing (20-39). The fourth group is Wholesale and Retail (40-59). The fifth and last group is Business services (72-89). Unfortunately, I deleted the last group to avoid a dummy variable trap. Furthermore, the industry group Finance, Insurance and Real Estate (60-67) will be excluded from the sample. These companies are restricted to regulations and/or have a different capital structure than non-financial firms. All the groups get a score of one if the firm belong to the industry group. Otherwise, it gets a score of zero.

3.4 Data

The data of the Dutch SMEs is gathered from Orbis. Orbis is a database that contains financial data of more than 200 million companies around the world. This study collected data from the period 2010 to 2017. This period is chosen because of its include all years after the financial crisis who's ended in 2009. Further, I adopted the European Commission's SME definition. According to it, SMEs are defined as enterprises that employ less than 250 persons, have an annual turnover to be less than EUR 50 million, and/or balance sheet total to be less than EUR 43 million. The dataset contains 1953 firms.

In order to test the hypothesis, SPSS was used to do the different analysis. First of all, I analyzed give the descriptive statistics and did an univariate analysis. After that, the correlation matrix is displayed and an bivariate analysis is done. The correlation of the dependent and independent variables are displayed. Third, the multivariate regression, as mentioned in previous section, is conducted to test the hypothesis.

Table 2: Variables measurements

Variables	Measurement	Abbreviation	Reference
Dependent variable			
Total debt	Total debt / Total assets	TD	See section 3.3.1
Long-term debt	Long-term debt / Total assets	LTD	See section 3.3.1
Short-term debt	(Short-term debt) / Total assets	STD	See section 3.3.1
Independent variables			
Profitability	EBIT / Sales turnover	PROF1	Cassar & Holmes, 2003; López-Gracia & Sogorb-Mira, 2008; Michaelas et al., 1999; Psillaki & Daskalakis, 2009; Sogorb-Mira, 2005
	EBIT / Total assets	PROF2	Hall et al., 2004; Hall et al., 2000
Growth opportunities	Intangible assets / Total assets	GO	Degryse et al., 2012; Heyman et al., 2008; Michaelas et al., 1999; Sogorb-Mira, 2005
Past Growth	(Sales turnovert - Sales turnovert-1) / Sales turnovert-1	GROW1	Heyman et al., 2008; Michaelas et al., 1999
	(Total assetst -Total assetst-1) / Total assetst-1	GROW2	Hall et al., 2004; Hall et al., 2000
Asset structure	(Fixed assets - intangible assets) / Total assets	TANG	De Jong, 2002; Degryse et al., 2012; Sogorb-Mira, 2005
Size	Logarithm Sales	SIZE1	Chen, 2004; López-Gracia & Sogorb-Mira, 2008; Sogorb-Mira, 2005
	Logarithm Assets	SIZE2	Bevan & Danbolt, 2002; L. H. Chen et al., 1998; Ozkan, 2001; Psillaki & Daskalakis, 2009; Rajan & Zingales, 1995
Firm age	2018 - year of incorporation	AGE	Bhaird & Lucey, 2010; Hall et al., 2004; Hall et al., 2000; López-Gracia & Sogorb-Mira, 2008; Michaelas et al., 1999
Control variables			
Agriculture, foresty and mining	Agriculture, forestty and mining = 1, otherwise = 0	DummyAGM	
Construction	Construction = 1, otherwise = 0	DummyCON	
Manufacturing	Manufacturing = 1, otherwise = 0	DummyMAN	
Wholesale and Retail	Wholesale and Retail = 1, otherwise = 0	DummyWAR	

4 Results

In this section, the empirical results are given. First, an univariate analysis is performed. The descriptive statistics are analysed and compared with previous research. Second, a bivariate analysis is performed, where the correlation matrix is analysed. Third, the main results of regressions are given. Lastly, several robustness tests were performed.

4.1 Descriptive statistics

Table 3 displays the descriptive statistics for Dutch SMEs over the time period of 2010 to 2017. To deal with distribution problems, outliers were filtered out in the following way: the ratio of total debt (TD), long-term debt (LTD) and short-term debt (STD) could not exceed 1 (Heyman et al., 2008). Furthermore, PROF2 and AGE winsorized at 1% at each tail (Bevan & Danbolt, 2002). The proxies for past growth (GROW1 and GROW2) were winsorized at 5% at each tail (Cassar & Holmes, 2003). In order to make a valid inferences from the regressions, the residuals of each regression should follow a normal distribution. This can be determined by examining a normal Predicted Probability (P-P) plot, a histogram and by comparing the mean and median. In appendix E you can see the P-P plots and histograms for each regression. I assume that the residuals of the TD and STD regression are normally distributed. The P-P plots confirm that the residuals follow the diagonal normality line indicated in the plot. For the LTD regression, there is a little bit of deviation. The residuals are a little bit skewed. This must be kept in mind. When comparing mean and median values, it becomes clear that TD, STD, SIZE1, SIZE2 and AGE have mean values that are rather close with median values. All other variables show much higher mean values compare to median values. This suggests that these variables are a little bit left-skewed. In addition, the fact that GO has a median of 0.0000 suggests that half of the sample have not intangible assets on their balance sheet, which is not surprising for SMEs. Homoscedasticity is checked by plotting the predicted values and residuals on a scatterplot. These results are displayed in appendix E. It can be seen that the residuals are more equally distributed after controlling for the outliers. If the residuals are normally distributed and homoscedastic, then the linearity assumption is also valid. The assumption for no multicollinearity is also checked, but is processed in next paragraph.

Table 3 reports the descriptive statistics of the dependent, independent and control variables. The mean and/or median are compared with those from prior SMEs capital structure studies in Europe, with one exception for Cassar & Holmes (2003). They investigated the capital structure determinants of SMEs in Australia. In order to enhance the comparability, only the proxies with same measurements were discussed. The mean and median for the total debt variable (TD) are respectively, 0.5650 and 0.5861. These are quite similar to the study of Cassar and Holmes (2003), who report a mean of 0.5704 and a median of 0.6084. The TD mean seems around 0.08 point higher compared with Degryse et al,. (2012) and Hall et al,. (2004). Degryse et al,. (2012) investigated small Dutch firms in a time period of 2002-2005 and report a TD mean of 0.4920. Hall et al,. (2004) investigated Dutch SMEs in 1995 and reports a TD mean of 0.4838. My sample shows that Dutch SMEs hold more debt or the value of the total assets is decreased. Degryse et al,. (2012) used data from the Rabobank for 2003 to 2005, which contain relatively small firms. Hall et al,. (2004) used the data were supplied by Dun and Bradstreet for 1995. I used a different dataset and my time period is more recent. The long-term debt ratio, which I found in this study has changed over time. Hall et al,. (2004) found a LTD of 0.0206 and Degryse et al,. (2012) found 0.308. Whereas my study found a LTD value of 0.0985. This indicates that Dutch SMEs increased their long-term debt from 1995 till 2005. And thereafter, they decreased their long-term debt till 0.0985. It is speculated that the financial crisis has reduced firms' LTD to a large extend. There are also similarities. Sogorb-Mira (2008) report a LTD of 0.0895. Hall et al,. (2000) report a LTD value of 0.118 and Michealas et al,. (1999) indicates a

LTD value of 0.119. The median of LTD is 0.0202. The mean and median of the short-term debt (STD) are 0.4664 and 0.4616. These results are similar to the research of Heyman et al,. (2008). They found a STD mean and median of 0.477 and 0.46. Furthermore, Hall et al,. (2004) found comparable results for Dutch SMEs in 1995. They found a STD mean of 0.4632. However, Degryse et al,. (2012) report a STD mean of 0.1840, which indicates that small Dutch firms have less STD compared with Dutch SMEs.

The results of PROF1 are comparable to the research of Hall et al,. (2004). They indicated a mean of 0.04, whereas my research found a mean of 0.0538. Hall et al,. (2000) also used this proxy for profitability for UK SMEs in 1995 and reported a mean of 0.079. Furthermore, I found a median of 0.0404. Other authors do not report a median of PROF1. For the other measurement for profitability (PROF2) I found a mean and median of 0.0829 and 0.0671. Whereas Heyman et al,. (2008) found a mean and median of 0.127 and 0.03 respectively. The small difference can be explained by the different economic situation or lower total assets. López-Gracia and Sororb-Mira (2008) found a quite similar mean of 0.0873. Sogorb-Mira (2005) reports a little higher mean of 0.0962. Contradictory, Michaelas et al,. (1999) found a little lower mean of 0.069. Overall, the two proxies for profitability are in line with previous research. When measuring growth opportunities, Degryse et al,. (2012) show a mean of 0.017 while the result of my study is 0.0257. This suggests that Dutch SMEs invested more in intangible assets. Sogorb-Mira (2005) found a little higher mean of 0.0347. This means that Spanish SMEs invested more in intangible assets than Dutch SMEs. Furthermore, I found a median of 0.0000 which means that most of the SMEs did not have intangible assets on their balance sheets. For GROW1, I found a mean and median of 0.033 and 0.0039. Hall et al,. (2004) found a mean of 0.125 for Dutch SMEs in 1995. The difference can be explained by the different economic situation. In my dataset, the SMEs are recovering from a financial crisis. Cassar and Holmes (2003) found a mean and median of 0.0878 and 0.0621, which are very similar to mine. For the other proxy of past growth (GROW2) is found a mean and median of 0.0796 and 0.0292. These results are close to the results of Heyman et al,. (2008). They investigated Belgium SMEs from 1996 to 2000 and found a mean and median of 0.058 and 0.038. Degryse et al,. (2012) used the same measurement for past growth and found a mean of 0.133, which is a little bit higher compared with the mean I found. Degryse et al,. (2012) used a dataset which contains small firms only. That can explain the difference. The mean and median of tangibility (TANG) in this study is 0.2694 and 0.1657, which are lower than the means of 0.487, 0.461, 0.4404, 0.301, 0.463, 0.343 and 0.353 that are reported by Degryse et al,. (2012), Heyman et al,. (2008), Sogorb-Mira (2005), Hall et al,. (2004), Cassar and Holmes (2003), Hall et al,. (2000) and Michaelas et al,. (1999) respectively. This could suggest that Dutch SMEs are holding less collateral assets nowadays. Banks can be doubtful to lent a mortgage to SMEs since the subprime crisis. Size is measured with total sales turnover (SIZE1) and total assets (SIZE2). For SIZE1, Psillaki & Daskalakis (2009) used similar measurement for size. They studies the capital structure determinants in France in from 1998 to 2002. They found a mean of 41.6869. In this study, the mean value of SIZE1 is 25.8761. They used a different dataset, which contains bigger firms. The mean value of SIZE2 is 16.6839. Compared to Australian SMEs, this study found a higher mean value. Cassar and Holmes (2003) found a mean value of 19.6883. The last independent variable is AGE. I found a mean and median of 27.93 and 20 respectively. López-Gracia and Sororb-Mira (2008), Hall et al,. (2004) and Hall et al,. (2000) found a mean value of 2.6991, 23.4 and 21 respectively. The outliers explain the difference in AGE compared to previous research.

Table 4 presents the annual distribution of the firms. It can be seen that the firm-year observations are equally distributed over the years. Each year contain 1,216 – 1,609 (10%-14%) observations.

Appendix F provides the mean of the dependent variables over the sample period. During 2010 to 2017, the relative mean and median changes are stable of total debt and short-term debt. The total debt and short-term debt changed with 1%-2% each year. The mean and median of long-term debt decreased in 2012 with 5% and 13% respectively. In 2014, the mean increased with 5% and in 2016 a decline of 5%, while the median decreased with 9% and increased with 10% in the same years. However, the mean and median of long-term debt is relatively small compared to the mean of total debt and short-term debt.

Table 3: Descriptive statistics

Variable	N	Mean	STD	Min	Q1	Median	Q3	Max
Dependent variables								
TD	11583	0.5650	0.2464	0.0000	0.3965	0.5861	0.7486	1.0000
LTD	11583	0.0985	0.1651	0.0000	0.0000	0.0202	0.1202	1.0000
STD	11583	0.4664	0.2471	0.0000	0.2748	0.4616	0.6497	1.0000
Independent variables								
PROF1	7582	0.0538	0.1024	-0.5820	0.0096	0.0404	0.0877	0.5763
PROF2	10239	0.0829	0.1512	-0.5126	0.0120	0.0671	0.1474	0.6236
GO	10903	0.0257	0.0867	-0.0159	0.0000	0.0000	0.0054	0.9533
GROW1	5713	0.0330	0.2303	-0.3689	-0.1070	0.0039	0.1364	0.6173
GROW2	9634	0.0796	0.2731	-0.3248	-0.0974	0.0292	0.1924	0.8139
TANG	10898	0.2694	0.2729	0.0000	0.0448	0.1657	0.4296	1.0000
SIZE1	7825	25.8761	3.1347	1.2140	16.0583	30.4929	47.5335	43
SIZE2	11583	16.6839	3.0429	1.0886	9.6205	18.1718	30.5492	50
AGE	11583	27.93	25.295	1	10	20	36	111
Control variables								
DummyAGM	11583	0.0320	0.1761	0	0	0	0	1
DummyCON	11583	0.0801	0.2715	0	0	0	0	1
DummyMan	11583	0.2097	0.4071	0	0	0	0	1
DummyWAR	11583	0.3238	0.4679	0	0	0	1	1

This table reports the mean, standard deviation (STD), minimium (Min), quartile 1 (Q1), median, quartile 3 (Q3) and maximum (Max) which are used in the regression. Outliers are filtered out in the following way: TD, LTD and STD could not exceed 1. PROF2 and AGE are winsorized at 1% at each tail. GROW1 and GROW2 are winsorized at 5% at each tail. SIZE1 and SIZE2 are in million euro's
The definitions of the variables are given in table 2.

Table 4: Annual distribution of observations

2010	1,216	10%
2011	1,317	11%
2012	1,383	12%
2013	1,471	13%
2014	1,545	13%
2015	1,609	14%
2016	1,627	14%
2017	1,415	12%
	11,583	100%

4.2 Correlation matrix

Table 5 show the correlation matrix of all variables. In the first place, the relationship between all dependent and independent variables are examined. It can be seen that all dependent variables are significantly at 0.01 level correlated with each other. There is a positive correlation between TD and LTD (.311), and TD and STD (.776). There is a negative correlation between LTD and STD (-.338). This is in line with the expectations. All the dependent variables measures the same concept, namely leverage. All the independent variables and control variables correlates significantly at 0.01 level with TD. The LTD variable is correlated at 0.01 level with PROF1, PROF2, GO, TANG, SIZE2 and SIZE2. All these coefficients indicate that the correlation is relatively low. Exception for TANG, these variable correlates with .406 with LTD. This is in line with the pecking order theory and agency theory. AGE is -.023 significant at 0.05 level correlated with LTD. But, the coefficient is low. STD is significantly correlated at 0.01 level with each of the independent variable. Unless with GO. STD is .446 negatively correlated at 0.01 level with TANG. This indicates that short-term debt do not function as collateral.

In table 5, some independent variables correlates significantly which each other. PROF1 correlates significantly at 0.01 level with GROW1 (.121), GROW2 (.126), SIZE2 (.119) and AGE (-.148). However, these coefficients are relatively low and there are no multicollinearity concerns. PROF2 correlates significantly at 0.01 level with GO (-.054), GROW1 (.177), GROW2 (.095), TANG (-.166), SIZE1 (.197), SIZE2 (-.093) and AGE (-.054). All these coefficients are relatively low and are not a concern for multicollinearity. GO is significantly correlated with GROW1 (.042), GROW2 (.030), TANG (-.108), SIZE2 (0.070) and AGE (0.076). All of the coefficients are relatively low. Meaning that there exist not a concern for multicollinearity. GROW1 is 0.463 significantly correlated at 0.01 level with GROW2. This is in line with the predictions, since the variables measure the same concept. GROW1 is significantly correlated at 0.01 level with SIZE1 (.182), SIZE2 (.073) and AGE (-.071). GROW1 is significantly correlated with TANG (-.031) at 0.05 level. TANG, SIZE1, SIZE2 and AGE are all significantly correlated with each other at 0.01 level. Surprisingly, SIZE1 and SIZE2 are not strongly correlated. These two variables measured the same concept.

The correlation coefficients indicate that there is significant correlation between many of the independent variables. This may indicate the presence of multicollinearity between independent variables. To test for multicollinearity, I calculated the VIF value and tolerance value for each regression. The VIF values are below 5 and tolerance value is higher than 0.1, which is recommended by Hair et al,. (2010). Thus, multicollinearity is not a problem in each regression in this study. Appendix E gives the VIF values and tolerance values. The last assumption for the regression analysis is met.

Table 5: Correlation matrix

	TD	LTD	STD	PROF1	PROF2	GO	GROW1	GROW2	TANG	SIZE1	SIZE2	AGE
TD	1											
LTD	.331**	1										
STD	.776**	-.338**	1									
PROF1	-.184**	-.042**	-.155**	1								
PROF2	-.131**	-.141**	-.035**	.733**	1							
GO	.063**	.104**	-0.009	-0.007	-.054**	1						
GROW1	.082**	-0.008	.087**	.121**	.177**	.042**	1					
GROW2	.109**	-0.017	.119**	.126**	.095**	.030**	.463**	1				
TANG	-.163**	.406**	-.446**	-0.007	-.166**	-.108**	-.031*	-0.014	1			
SIZE1	.098**	-.068**	.145**	-0.017	.197**	-0.01	.182**	.029*	-.202**	1		
SIZE2	-.122**	.160**	-.228**	.119**	-.093**	.070**	.073**	.134**	.281**	.340**	1	
AGE	-.084**	-.023*	-.069**	-.048**	-.054**	-.076**	-.071**	-.107**	.026**	.076**	.069**	1

This table presents the correlations coefficients between the variables over the time period 2010 to 2017. The variables definitions are given in table 2. ** and * denote correlationsignificance at 0.01 level and 0.05 level respectively (2-tailed).

4.3 Regression analysis

This chapter aims at providing empirical findings of this study. The results of regressions for total debt, long-term debt an short-term debt are reported in tables 6,7 and 9 respectively. The results are grouped per hypothesis.

In this study, profitability shows consistent patterns across measurements. The effect of PROF1 and PROF2 is negative statistical significant on total debt, long-term debt and short-term debt at 0.01 level. Debt levels are lower if firms generates profits. This suggests that SMEs prefer internal financing first, as predicted by the pecking order theory. The most likely reason is that they want to stay in control and avoid debt as possible (Degryse et al., 2012). Considering the standard deviation of PROF1 (0.1024) and PROF2 (0.1512), it shows that one standard deviation increase in PROF1 and PROF2 will translate to approximately a 7.7% (0.1024*0.4249/0.5650) and 7.1% (0.1512*0.2673 /0.5650) increase in TD mean, thus economic significant variables. Therefore, these empirical results rejected hypothesis 1. My findings are consistent with Michaleas et al,. (1999), Hall et al,. (2004) Sogorb-Mira (2005), López-Gracia & Sogorb-Mira (2008) and Degryse et al,. (2012).

The influence of growth opportunities is positive on total debt and long-term debt at the level of statistical significance of 0.01 in all models. Economically, the coefficient of GO is 0.1570, which indicates that one standard deviation increase of GO translates to 2.4% (0.0867*0.1570 /0.5650) increase of total debt mean. This indicates that SMEs with more growth opportunities include more debt in their capital structure, which is supported by the pecking order hypothesis. Nevertheless, the impact growth opportunities is statistical significant negative correlated on short-term debt at 0.01 level in all models. This is supported by the agency hypothesis. This may evidence the different time nature of this type of assets and liabilities (Sogorb-Mira 2005). SMEs with a lot of intangible assets have less short-term debt and are very well able to finance their future growth with long-term debt. Due the contradictory findings, hypothesis 2 is accepted. However, it is important to note that many SMEs have no intangible assets on their balance sheet. These results are consistent with Degreyse et al,. (2012), Sogorb-Mira (2005) and Michaelas et al,. (1999).

Past growth shows a consistent pattern across measurements. The impact of GROW1 and GROW2 on total debt and short-term debt is positively statistically significant in all models. These finding support the pecking order theory. Economically, one standard deviation increase in GROW1 and GROW2 will increase the total debt mean with 3.2% (0.2303*0.0794/0.5650) and 4.8% (0.2731*0.1012/0.5650) respectively. Rapidly grown SMEs are likely to have insufficient earnings to finance all their growth internally. A common phenomenon for SMEs is the desire of firm owners to retain control of the firm and maintain managerial independence (Chittenden et al,. 1996). Therefore, fast grown SMEs are likely to issue debt. Surprisingly, the impact of GROW 1 and GROW2 on long-term debt is negative. However, GROW1 is not statistical significant in model 5 and 6. SMEs can be prone for a high past growth and high debt ratios, which making them very sensitive to the underinvestment problem. GROW2 in the long-term debt regression supports the agency theory. Overall, the evidence of past growth is mixed. Therefore, hypothesis 3 is accepted. This is consistent with the empirical evidence of other authors. Degryse et al,. (2012) and Michaelas et al,. (1999) found a significant positive correlation between past growth and total debt and short-term debt. López-Gracia & Sogorb-Mira (2008) found a significant negative correlation between past growth and long-term debt.

Tangibility is expected to have a positive effect on leverage according to the pecking order theory and agency theory. Long-term debt is statistical significant positive correlated with tangibility at 0.01 level. Economically, one standard deviation increase of tangibility will results in an increase of long-term debt mean of 81% (0.2729*0.2933/0.0985), indicating tangibility is an highly economically determinant of long-term debt. This result point out that a high fixed asset component is associated with higher long-term debt. This suggests that information asymmetries and agency problems are significant in SME sector. Banks are doubtful to lend to SMEs, particularly because of the danger of asset substitution. In order to mitigate the agency and asymmetry information problems, SMEs provide collateral as a security of the bank loans. On the other hand, tangibility is significant

negative associated with total debt and short-term debt at 0.01 level. This inverse relationship is consistent with firms matching their durations of assets and liabilities. Long-term assets are used as collateral for long-term debt and short-term assets for short-term debt. Given the larger mean and median of short-term debt over long-term debt most likely explains why the estimate of tangibility negative. The empirical results do not support hypothesis 4. The results of long-term debt in in line with Degreyse et al,. (2012), Sogorb-Mira (2008), Hall et al,. (2004), Cassar & Holmes (2003), Hall et al,. (2000) and Michaelas et al,. (1998). The results of short-term debt is in line with Sogorb-Mira (2005), Hall et al,. (2004), Cassar and Holmes (2003), Hall et al,. (2000).

Size shows inconsistent patterns across measurements. The impact of SIZE1 is positive significant on total debt, long-term debt and short-term debt. Economically, one standard deviation increase of SIZE1 results in 4,7% (0.4962*0.0567/0.5650) increase in total debt mean. Larger firms are more aware of better financing methods, since they employ more financial and administrative staff and they have stronger bargaining position towards debt providers (Degryse et al,. 2012). SIZE1 supports the pecking order theory and agency theory. This is consistent with previous research (Degryse et al,. 2012; Sogorb-Mira 2005; Hall et al,. 2004; Cassar & Holmes 2003; Michaelas et al 1999). SIZE2 influences total debt and short-term debt negative at a 0.01 significance level, while the impact of SIZE2 is positive on long-term debt at a 0.01 significance level. Economically, one standard deviation increase of SIZE2 results in an increase of 7,6% (0.4833*0.0893/0.5650) in total debt mean These opposite relationships could be because larger firms use more long-term debt due they have better access to it. These results are not in line with the pecking order theory and agency theory. The positive relationship between SIZE2 and long-term debt is in line with previous research and the negative relationship between total debt and short-term debt with SIZE2 is inconsistent with previous research (Degryse et al,. 2012; Sogorb-Mira, 2005; Hall et al,. 2004; Cassar & Holmes, 2003; Michaelas et al,. 1999). Overall, the empirical evidence of size is mixed in this study. Therefore, hypothesis 5 is rejected.

The impact of age is statistically significant negative on total debt, long-term debt and short-term debt at 0.01 level. The results supports the pecking order theory and the agency theory, which leads to an accepted hypothesis 6. Young firms are more externally financed to older firms that generates more profits and using accumulated internal sources. These finding is in line with previous research (Bhaird & Lucey, 2010; López-Gracia & Sogorb-Mira, 2008; Hall et al,. 2000; Michaelas et al,. 1999).

The explanation power is very low in this study. The adjusted R^2 is 9% in the total debt regressions, 20% in the long-term debt regressions and 23% in the short-term debt regressions. Heyman et al,. (2008) report an explanation power of 3% of their total debt regression. Sogorb-Mira (2005) gives a explanation power of 8% for the total debt regression. And Cassar and Holmes (2003) reveal an explanation power of 7%. Hall et al,. (2000) reports 25% and 30% for the long-term debt and short-term debt regressions respectively. Whereas Degryse et al,. (2012) give an explanation power of 42% for the long-term debt regression and 16% for the short-term debt regression.

Table 6: Regressions estimating the determinants of capital structure of total debt

TD	Hypothesis	Model 1	Model2	Model3	Model 4	Model 5	Model 6	Model 7	Model 8
Intercept		0.1405**	1.1015***	0.0722	1.0613***	0.1239*	1.1128***	0.2178***	1.2769***
		(0.0680)	(0.0584)	(0.0688)	(0.0591)	(0.0700)	(0.0596)	(0.0690)	(0.0494)
PROF1	+/-	-0.4031***						-0.4249***	
		(0.0300)						(0.0302)	
PROF2	+/-		-0.2778***						-0.2673***
			(0.0219)						(0.0172)
GO	+/-			0.1656***	0.2088***			0.1546***	0.1570***
				(0.0368)	(0.0371)			(0.0361)	(0.0306)
GROW1	+/-					0.0559***		0.0794***	
						(0.0141)		(0.0139)	
GROW2	+/-						0.0985***		0.1012***
							(0.0127)		(0.0100)
TANG	+	-0.0661***	-0.0793***	-0.0597***	-0.0481***	-0.0666***	-0.0499***	-0.0596***	-0.0991***
		(0.0122)	(0.0126)	(0.0125)	(0.0128)	(0.0124)	(0.0127)	(0.0123)	(0.0103)
SIZE1	+	0.0686***		0.0732***		0.0671***		0.0567***	
		(0.0091)		(0.0092)		(0.0094)		(0.0092)	
SIZE2	+		-0.0622***		-0.0626***		-0.0693***		-0.0893***
			(0.0081)		(0.0083)		(0.0083)		(0.0069)
AGE	-	-0.0008***	-0.0008***	-0.0007***	-0.0007***	-0.0007***	-0.0007***	-0.0007***	-0.0005***
		(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Industry dummy		Included	Included	Included	Included	Included	Included	Included	Included
F-value		78.553***	95.805***	53.235***	79.655***	38.572***	76.371***	54.697***	81.294***
Adjusted R^2		0.079	0.072	0.053	0.055	0.052	0.062	0.091	0.090
N		11.583	11.583	11.583	11.583	11.583	11.583	11.583	11.583

This table report the fixed effects regressions. Variable definitions are given in table 2. Standard errors are in parentheses

* Significant at 10% level. ** Significant at 5% level. *** Significant at 1% level

Table 7: Regressions estimating the determinants of capital structure of long-term debt

LTD	Hypothesis	Model 1	Model2	Model3	Model 4	Model 5	Model 6	Model 7	Model 8
Intercept		-0.0597	-0.1238***	-0.0711	-0.1066***	-0.0727***	-0.1620***	-0.0618	-0.1166***
		(0.0441)	(0.0376)	(0.0433)	(0.0372)	(0.0448)	(0.0381)	(0.0443)	(0.0319)
PROF1	+/-	-0.0677***						-0.0656***	
		(0.0195)						(0.0194)	
PROF2	+/-		-0.0909***						-0.0582***
			(0.0141)						(0.0111)
GO	+/-			0.2976***	0.2883***			0.2973***	0.2697***
				(0.0232)	(0.0234)			(0.0232)	(0.0197)
GROW1	+/-					-0.0016		-0.0019	
						(0.0090)		(0.0089)	
GROW2	+/-						-0.0191**		-0.0139**
							(0.0081)		(0.0064)
TANG	+	0.2809***	0.2611***	0.2933***	0.2829***	0.2808***	0.2659***	0.2933***	0.2545***
		(0.00790	(0.0081)	(0.0079)	(0.0081)	(0.0079)	(0.0081)	(0.0079)	0.0066
SIZE1	+	0.0158***		0.0145**		0.0170***		0.0138**	
		(0.0059)		(0.0058)		(0.0060)		(0.0059)	
SIZE2	+		0.0263***		0.0202***		0.0304***		0.0228***
			(0.0052)		(0.0052)		(0.0053)		(0.0045)
AGE	-	-0.0003***	-0.0003***	-0.0002***	-0.0002***	-0.0003***	-0.0003***	-0.0003***	-0.0002***
		(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Industry dummy		Included	Included	Included	Included	Included	Included	Included	Included
F-value		242.407***	304.162***	269.285***	269.285***	170.516***	230.993***	155.483***	214.814***
Adjusted R^2		0.211	0.200	0.224	0.224	0.199	0.169	0.224	0.208
N		11.583	11.583	11.583	11.583	11.583	11.583	11.583	11.583

This table report the fixed effects regressions. Variable definitions are given in table 2. Standard errors are in parentheses

* Significant at 10% level. ** Significant at 5% level. *** Significant at 1% level

Table 9: Regressions estimating the determinants of capital structure of short-term debt

STD	Hypothesis	Model 1	Model2	Model3	Model 4	Model 5	Model 6	Model 7	Model 8
Intercept		0.2003***	1.2253***	0.1434**	1.1679***	0.1967***	1.2748***	0.2798***	1.3937***
		(0.0626)	(0.0535)	(0.06320	(0.0538)	(0.0643)	(0.0540)	(0.0635)	(0.0447)
PROF1	+/-	-0.3355***						-0.3596***	
		(0.0277)						(0.0278)	
PROF2	+/-		-0.1869***						-0.2092***
			(0.0201)						(0.0155)
GO	+/-			-0.1321***	-0.0795**			-0.1428***	-0.1129***
				(0.0338)	(0.0338)			(0.0333)	(0.0277)
GROW1	+/-					0.0575***		0.0814***	
						(0.0129)		(0.0128)	
GROW2	+/-						0.1177***		0.1151***
							(0.0115)		(0.0090)
TANG	+	-0.3470***	-0.3403***	-0.3530***	-0.3310***	-0.3475***	-0.3158***	-0.3530***	-0.3536***
		(0.0113)	(0.0116)	(0.0115)	(0.0117)	(0.0114)	(0.0115)	(0.0113)	(0.0093)
SIZE1	+	0.0528***		0.0587***		0.0502***		0.0428***	
		(0.0084)		(0.0085)		(0.0086)		(0.0085)	
SIZE2	+		-0.0885***		-0.0828***		-0.0997***		-0.1121***
			(0.0074)		(0.0075)		(0.0075)		(0.0063)
AGE	-	-0.0005***	-0.0005***	-0.0005***	-0.0005***	-0.0004***	-0.0004***	-0.0005***	-0.0003***
		(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Industry dummy		Included	Included	Included	Included	Included	Included	Included	Included
F-value		245.629***	366.251***	240.708***	400.993***	169.042***	344.978***	148.141***	268.163***
Adjusted R^2		0.213	0.231	0.205	0.227	0.198	0.233	0.216	0.247
N		11.583	11.583	11.583	11.583	11.583	11.583	11.583	11.583

This table report the fixed effects regressions. Variable definitions are given in table 2. Standard errors are in parentheses

* Significant at 10% level. ** Significant at 5% level. *** Significant at 1% level

4.4 Robustness tests

In this section, I performed some alternative robustness tests to test the robustness of this study. First, I ran an OLS regression with lagged independent variables (Heyman et al,. 2008). Second, I ran regressions with another method to deal with outliers. Instead of winsorinzing PROF2, GROW1, GROW2 and AGE. I truncated these variables at the same level (Degryse et al,. 2012). Thirdly, a subsample analysis is performed with a subsample of positive intangible assets versus subsample of zero intangible assets. A large proportion of firms have zero intangible assets, according to the descriptive statistics. Lastly, I present regression analysis of the four industries separately (Bhaird & Lucey, 2010; Degryse et al., 2012). The tables are given in appendix G.

The first robustness tests is an OLS regressions with lagged independent variables with one year. GROW2 lose the significance level and the direction change. All other variables remain in same direction and significance level. Overall, these robustness test indicate that the main results of profitability, growth opportunities, tangibility, size and firm age are robust.

The second robustness test is truncating the data instead of winsorizing. For long-term debt, SIZE1 increased the significance to a 0.01 level and GROW2 lose the significance and change of direction. All the other variables remain at the same direction and significance. Overall, these results indicate that the main results are robust, with an exception for GROW2 in the long-term debt regression.

The third robustness test is a positive/zero intangible assets subsample. First, I will discuss the results of the positive intangible assets subsample. For total debt, SIZE1 decreased the significance level to 0.05 All other variables remain in the same direction and significance level. For long-term debt, SIZE1 and GROW2 lose the level of significance. SIZE2 decreased the significance level to 0.1. All the other variables remain in the same direction and significance. For short-term debt, AGE decreased the significance to 0.1 level in model 1. In model 2, the significance level of AGE has vanished, but the estimates direction remain. All other variables remain in the same direction and same significance level.

For the zero intangible assets subsample, PROF1 decreased the significance level to 0.1 level in model with long-term debt as dependent variable. SIZE1 increased the positive significant relationship with long-term debt at 0.01 level, while SIZE2 is robust to the main result. AGE lose the significance level, but remain at the same direction. All other variables remain in same direction and significance level. Overall, these test indicate that the main results are robust, with an exception for AGE in the long-term debt regression.

In the last robustness tests, I ran regressions of the four industries separately. I am most interested in the results of profitability, growth opportunities and past growth, since the pecking order theory and agency theory have opposite predictions. Appendix G displayed the regression results of agriculture, forestry and mining. I found evidence that the impact of PROF1 on long-term debt is positive statistically significantly. Furthermore, GROW1 influences long-term debt in a significant negative way. Similar, the effect of GROW2 on total debt is negative significantly. This results indicate that the agency theory is dominant for the agriculture, forestry and mining sector.

The results of industry construction are given in appendix G. PROF1 and PROF2 influences total debt in a significant negative way. The impact of GO on total debt and long-term debt is significant positive at 0.1 level and 0.01 level respectively. Furthermore, the impact of GROW1 and GROW2 is significant positive with total debt and short-term debt. These results suggests that the pecking order theory is dominant for the construction industry. The main results are robust.

The results of the manufacturing industry are in favour of the pecking order theory. The effect of PROF1 and PROF2 is negative on total debt, long-term debt and short-term debt. GO influences total debt and long-term debt in a significant positive way in model 1. In model 2, GO influences long-term debt in a significant positive way. Furthermore, the impact of GROW1 and GROW2 is significant positive with total debt and short-term debt. These results suggest that the pecking order theory is dominant in the manufacturing industry. The main results are robust.

The last industry is wholesale and retail. PROF 1 and PROF2 influences total debt, long-term debt and short-term debt in a significant negative way. The effect of GO is significant positive on total debt and long-term debt in both models. In model 2, GO influences short-term debt in a significant negative way. Furthermore, the impact of GROW1 and GROW2 is significant positive on total debt and short-term debt. These results are robust to the main results and suggests that the pecking order theory is dominant for the wholesale and retail sector for Dutch SMEs.

5 Conclusion

In this section, the conclusion of the research is given. First, the main findings based on the results of this study are summarized. Second, the limitations are discussed and the recommendations for future research are given.

5.1 Main findings

This study test the impact of firm-level determinants on leverage of SMEs in the Netherlands in 2010 to 2017. To test the hypothesis, a fixed effect regression with industry control variables is conducted. Several tests are performed to test the robustness. The sample consist of a unbalanced dataset of 11.538 firm-year observations. According to European Commission, SMEs are defined as enterprises that employ less than 250 persons, have an annual turnover to be less than EUR 50 million, and balance sheet total to be less than EUR 43 million. The goal of this study was to find an answer on the following research question: **Which firm-specific determinants influence the capital structure of Dutch small and medium-sized enterprises?** Based on the pecking order theory and agency theory, six hypothesises were developed to answer the research question. The results are mostly in line with the pecking order theory. One industry follow the agency theory.

Hypothesis one state that the impact of profitability on leverage cannot be determined. The impact of profitability on total debt, long-term debt and short-term debt is highly significantly negative. Moreover, several robustness test reveal that these results are robust. This indicates that profitability follow the pecking order. Debt levels are lower if firms generates profits. This suggests that SMEs prefer internal financing first. Concluded, profitability influences the capital structure of Dutch SMEs.

Hypothesis two state that the impact of growth opportunities on leverage cannot be determined. The main results and robustness tests reveal that total debt and long-term debt is positive significant correlated with growth opportunities. This result follow the pecking order theory. However, intangible assets have negative significant impact on short-term debt in all the regressions. This may evidence the maturity-matching principle. This result follow the agency theory. The robustness tests reveal the same results. Concluded, growth opportunities influence the capital structure of Dutch SMEs

Hypothesis three state that the impact of past growth on leverage cannot be determined. The main result of this hypothesis is mixed. Moreover, the robustness test reveal several deviations. The results are mixed and not robust. Due the mixed results, the impact of past growth on leverage cannot be determined.

Hypothesis four state that the impact of tangibility on leverage is positive. The main results and robustness tests reveal a positive significant sign with long-term debt. This supports the pecking order theory and agency theory. On the other hand, tangibility has a negative sign with total debt and short-term debt. This inverse relationship is consistent with firms matching their durations of assets and liabilities. Given the larger mean and median of short-term debt over long-term debt most likely explains why the estimate of tangibility on total-term debt is not significant. Overall, tangibility is an important determinant of the capital structure of Dutch SMEs.

Hypothesis five state that the impact of size on leverage is positive. The main results reveal that size has a mixed impact leverage. The two variables give contradictory directions and lose the significance in several robustness test. Therefore, the impact of size on leverage cannot be determined.

Hypothesis six state that the impact of age on leverage is negative. The main results and robustness tests reveal that this hypothesis is true. This results support both the pecking order theory and agency theory. Therefore, firm age is an important determinant which has influence on the capital structure of Dutch SMEs.

5.2 Limitations and suggestions for future research

This research has some limitations. First, this research focus on the pecking order theory and agency theory. However, there are other available theories, like static and dynamic trade-off theory. Shyam-Sunder and Myers (1999) stated that to empirically explain capital structure is better to do an in-depth study of two theories rather than try to study all available theories. Future research can test the other available theories and dynamic models for Dutch SMEs.

Second, The Orbis database is not specialized for Dutch SMEs. The solution can be found by collecting the data from Reach. Reach contains detailed information about 430.000 Dutch firms which are specialized in small and medium sized firms. Since the researcher has no access to Reach, the Orbis database was used. For future research of Dutch SMEs, it is more appreciate to use the dataset of Reach.

Third, it was computationally not feasible to perform a Hausman model specification test to compare the use of the fixed effects model over the random effects model. Therefore, there is no statistical evidence for the use of the fixed effect model in this research. Moreover, other solutions can be found in other statistical techniques, like 2SLS and GMM. But previous research provides little information about these models. Different models could be tested to access the consistency of the results.

Fourth, this study focus on the firm-level determinants of capital structure of Dutch SMEs. It would be more meaningful to include more determinants at industry-level, country-level and owner-manager level for different countries in the research. Moreover, it interesting to investigate which determinants has an influence on the effects of capital structure. A more detailed investigation of this is left for future research.

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Appendix A

Article	Country	Theory	Time period	Method	Dependent variables	Independent variables	Results
Michaelas, Chittenden & Poutziouris (1998)	UK	TOT, POT and agency theory	1986-1995	FEM	Total debt ratio	Effective tax rate	-
					Long-term debt ratio	Non-debt taks shields	-**
					Short-term debt ratio	Size	+***
						Profitabilty	-***
						Past growth	+***
						Growth oppurtunities	+***
						Age	-***
						Asset structure	+***
						Risk	+*
						Liquidity	+***
Hall, Hutchinson & Michaelas (2000)	UK	POT and agency theory	1995	OLS	Long-term debt ratio	Size	+***
					Short-term debt ratio	Profitabilty	+
						Past Growth	+
						Asset Structure	+***
						Age	-***
Cassar & Holmes (2003)	Australia	TOT and POT	1995-1998	OLS	Total debt ratio	Size	+***
					Long-term debt ratio	Asset Structure	+***
					Short-term debt ratio	Profitabliity	-***
					Outside financing ratio	Risk	-
					Bank finanancing ratio	Past Growth	+
Hall, Hutchinson & Michaelas (2004)	Belgium, Italy, Germany, Spain, Ireland, Netherlands, Portugal and UK	TOT and POT	1995	OLS	Long-term debt ratio	Profitability	-
					Short-term debt ratio	Past Growth	+
						Asset structure	+***
						Size	+***
						Age	+
Sogorb-Mira (2005)	Spain	TOT and POT	1994-1998	FEM	Total debt ratio	Effective tax rate	-***
					Long-term debt ratio	Non-debt taxs shield	-***
					Short-term debt ratio	Size	+***
						Profitability	-***
						Growth opportunities	+***
						Asset structure	+***

Heyman et al., (2008)	Belgium	TOT, POT and agency costs	1996-2000	FEM (and as robustness: OLS and 2SLS)	Total debt ratio	Asset structure	+***
						Past growth	-***
						Profitability	-***
						Size	-***
López-Gracia & Sogorb-Mira (2008)	Spain	TOT and POT	1995-2004	2SLS and GMM	Total debt ratio	Effective tax rate	+
						Non-debt taxs shield	-**
						Risk	-
						Past growth	-***
						Profitability	-***
						Size	+***
						Cashflow	-***
						Age	-***
Psillaki and Daskalakis (2009)	Greece, France, Italy and Portugal	TOT, POT and agency costs	1998-2002	OLS	Total debt ratio	Asset structure	-***
						Size	+***
						Past Growth	-***
						Profitability	+
						Risk	+**
Bhaird & Lucey (2010)	Ireland	POT and agency costs	Survey data	OLS	Long-term debt	Age	-*
					Short-term debt	Size	+*
					Personal savings and F-connections	Growth opportunities	-
					Retained profits	Ownership	-
					External equity	Internal colleteral	+
						Owner's colleteral	+***
Degryse et al,. (2012)	Netherlands	TOT and POT	2003-2005	FEM	Total debt ratio	Effective tax rate	-***
					Long-term debt ratio	Non-debt tax shields	-***
					Short-term debt ratio	Size	+***
						Profitabilty	-
						Asset structure	+***
						Past growth	+**
						Growth opportunities	+**
						Liquidity	+*
Note1: In the results section, only the signs of coefficients are shown. *, ** and *** indicate statistical significance at 10%, 5% and 1% respectively							
Note2: The given results are based on the long-term debt variable. With the exeption for Heyman et al,. (2008), López-Gracia & Sogorb-Mira (2008) Psillaki and Daskalakis (2009), because they used only the total debt ratio							

Appendix B

Article	Country	Theory	Time period	Method	Dependent variables	Independent variables	Results
Rajan and Zingales (1995)	G7	TOT, POT and agency	1987-1991	Tobit and OLS	Book leverage ratio	Asset structure	+***
					Market leverage rato	Growth opportunities	-***
						Size	+***
						Profitability	-**
Chen, Lensink & Sterken (1998)	The Netherlands	POT and agency costs	1984-1995	OLS	Book value leverage	Asset structure	+***
					Market value leverage	Growth opportunities	+***
						Size	+*
						Risk	+
						Profitability	-***
Ozkan (2001)	UK	TOT and POT	1984-1996	OLS and GMM	Total debt ratio	Size	-***
						Liquidity	+***
						Non-debt taxs shield	-
						Profitability	+**
						Growth opportunities	+**
De Jong (2002)	The Netherlands	TOT and agency costs	1992-1997	OLS and 2SLS	Long-term debt ratio	Non-debt tax shields	-***
						Asset structure	+***
						Risk	-
						Size	+**
						Free cash flow	-
						Growth opportunies	+
Bevan & Danbolt (2002)	UK	TOT and POT	1991	OLS	Non-equity liabilities ratio	Growth opportunies	+***
					Total debt ratio	Size	+***
					Debt to capital ratio	Profitability	-***
					Adjusted debt to adjusted capital ratio	Asset structure	-***
Chen (2004)	China	TOT and POT	1995-2002	FEM, REM and pooled OLS	Total debt ratio	Profitability	-**
					Long-term debt ratio	Size	-**
						Growth opportunities	+**
						Asset structure	+***
						Risk	+
						Non-debt taxs shields	-
Note1: In the results section, only the signs of coefficients are shown. *, ** and *** indicate statistical significance at 10%, 5% and 1% respectively							
Note2: The given results are based on the total debt variable.							

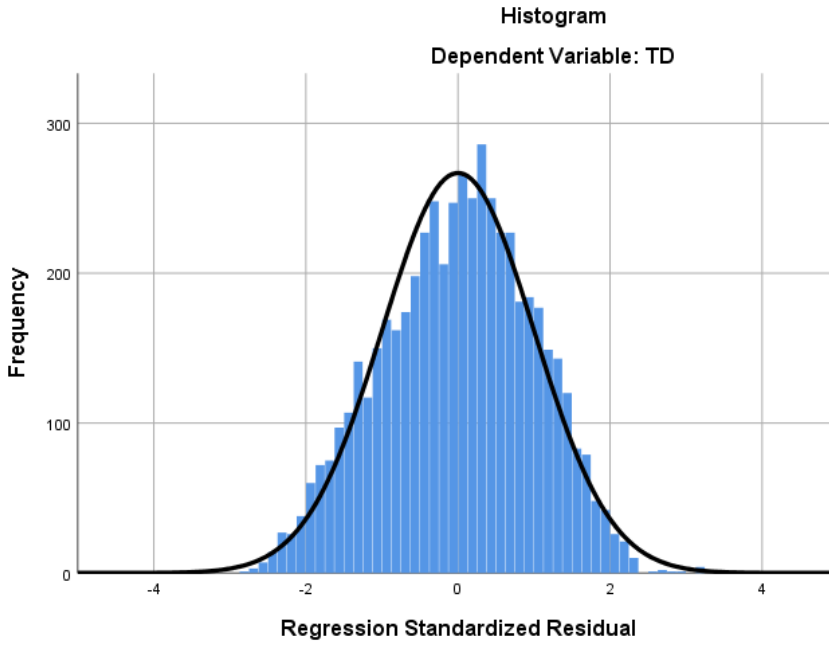
Appendix C

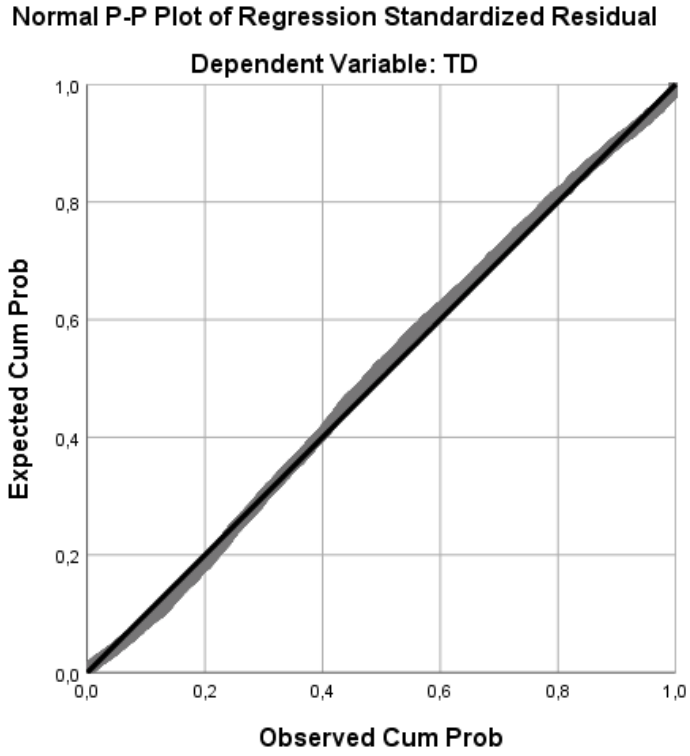
Article	Dependent variables	Independent variables	Relationship
Gleason et al,. (2000)	ROA	Total debt ratio	Negative
	Pretax profit margin		
Phillips and Sipahioglu (2004)	ROA	Total debt ratio	n.s.
	ROE	Total gearing ratio	n.s.
Dessi and Robertson (2003)	Tobin's Q	Total debt ratio	Positive
Chang Aik Leng (2004)	ROE		
	Divident payouts	Total debt ratio	Positive
Sing and Faircloth (2005)	R&D ratio	Total debt ratio	Negative
Berger and Bonaccorsi (2006)	ROE	Total equity ratio	n.s.
Ebaid (2009)	ROE	Total debt ratio	Positive
	ROA	Long-term debt ratio	
	GM ratio	Short-term debt ratio	

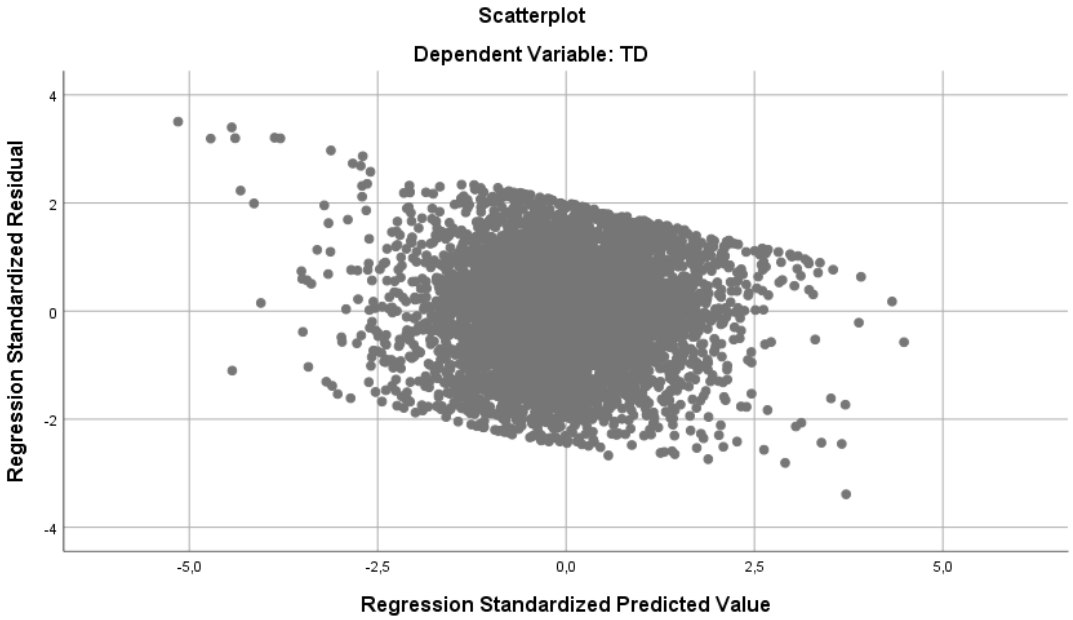
Appendix D

Article	Dependent variables	Independent variables	Relationship
Modigliani and Miller	Firm value	Total debt	n.s.
		Total equity	
Andrade and Kaplan (1998)	Total debt ratio	Operating performance	Positive
		Capital expenditure margin	
		Net cashflow margin	
Chen (2004)	Total debt ratio	Cost of financial distress	Positive
	Long-term debt ratio		
Ebaid (2009)	Total debt ratio	ROA	n.s.
	Long-term debt ratio		
	Short-term debt ratio		
Ogbulu and Emini (2012)	Firm value	Long-term debt ratio	Positive
Ogundipe, Idowu and Ogundipe (2012)	Tobins Q	Total debt ratio	negative
	ROA		
	ROI		

Appendix E



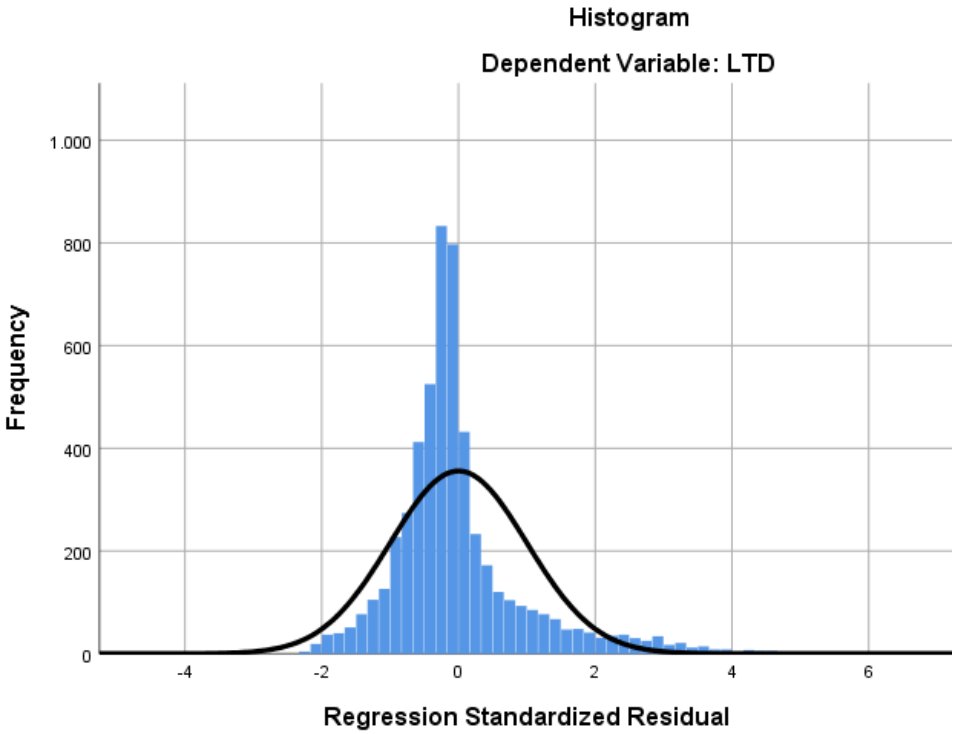


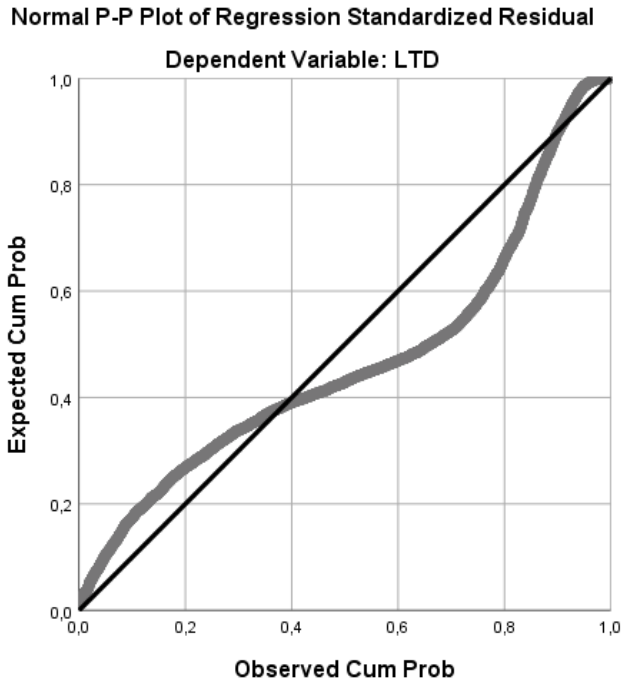


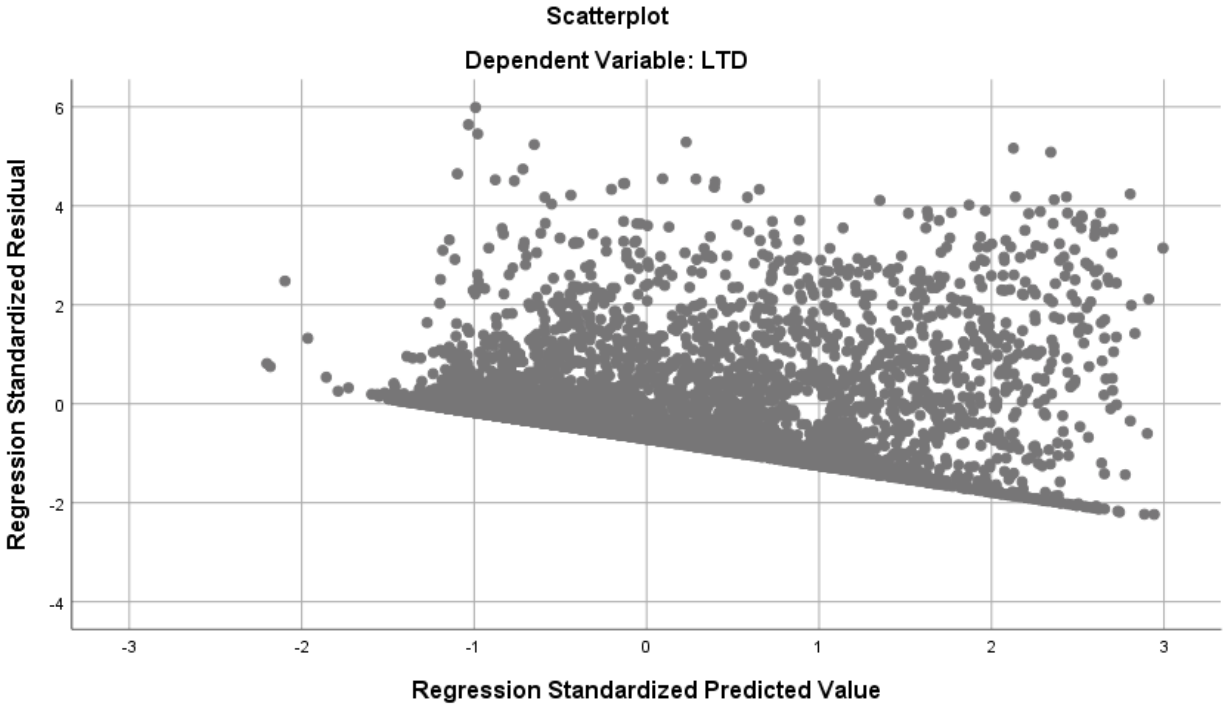
Coefficients[a]

Model		Collinearity Statistics: Tolerance	Collinearity Statistics: VIF
1	PROF1	,967	1,034
	GO	,958	1,043
	GROW1	,937	1,067
	TANG	,954	1,048
	SIZE1	,898	1,114
	AGE	,926	1,080
	DummyAGM	,924	1,082
	DummyCON	,842	1,188
	DummyMan	,685	1,460
	DummyWAR	,695	1,439

a. Dependent Variable: TD



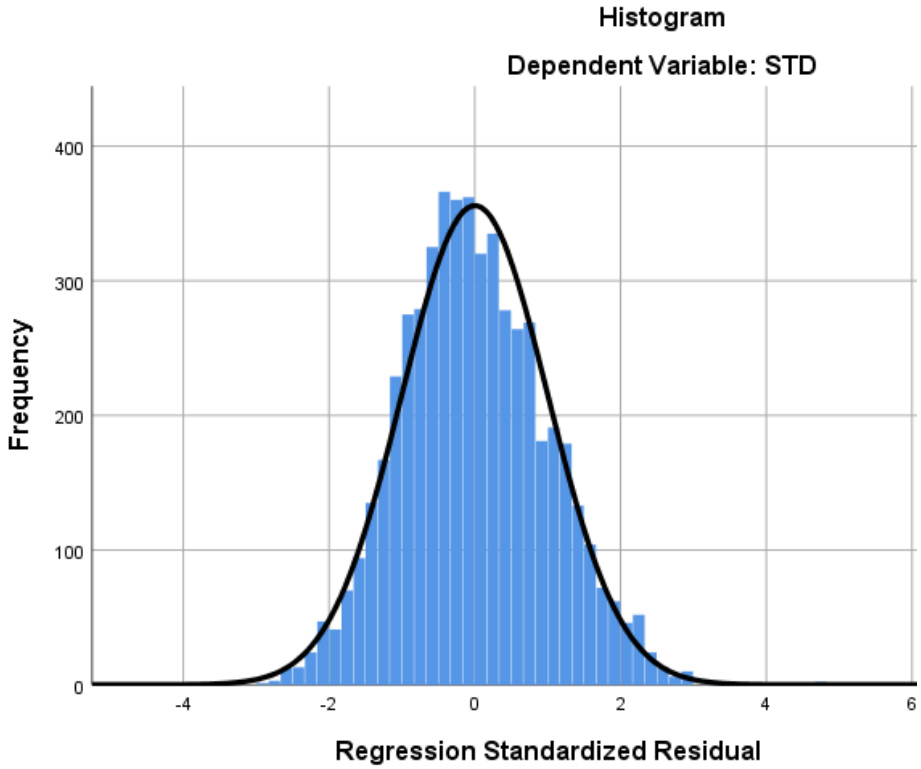


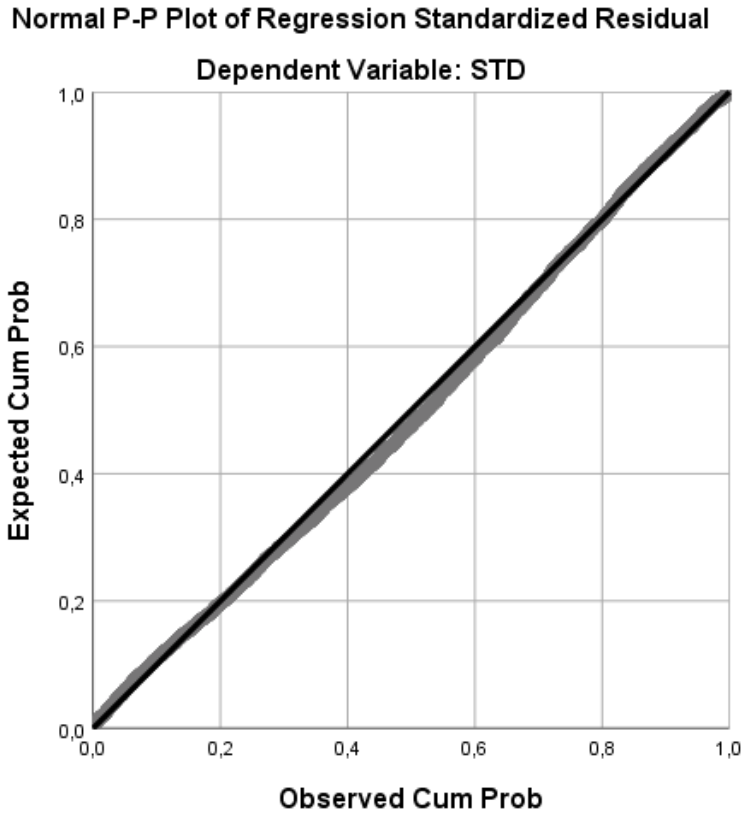


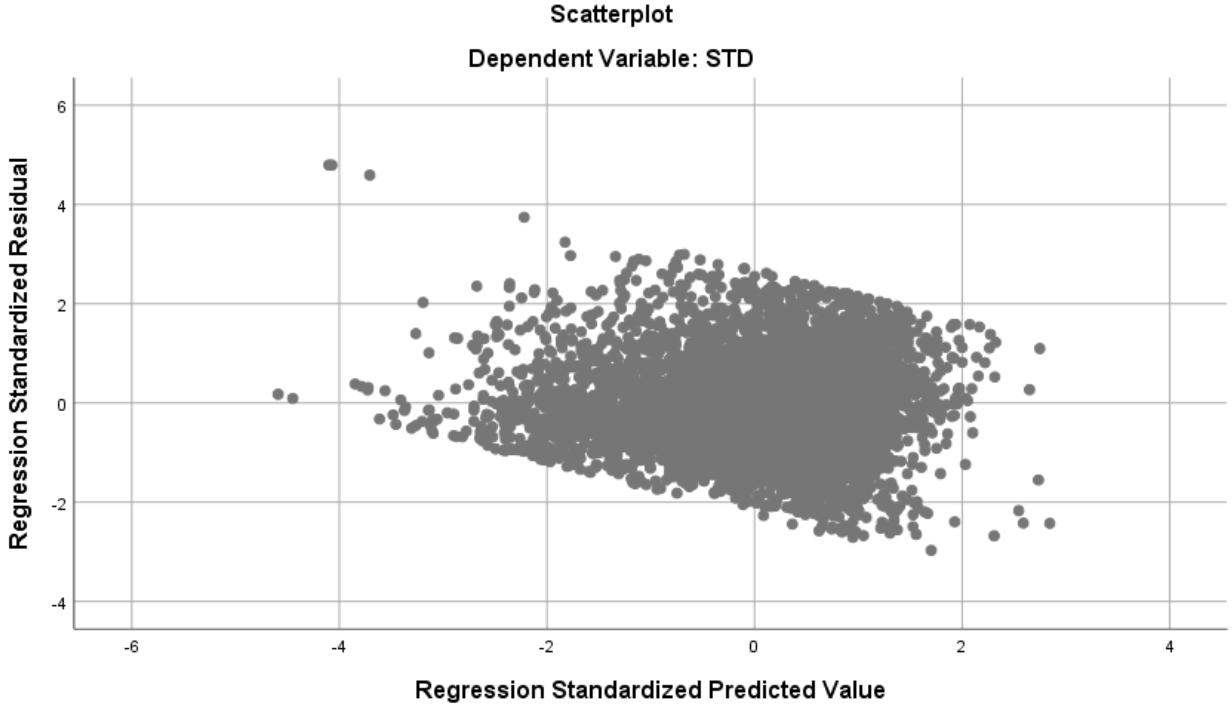
Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	PROF1	,967	1,034
	GO	,958	1,043
	GROW1	,937	1,067
	TANG	,954	1,048
	SIZE1	,898	1,114
	AGE	,926	1,080
	DummyAGM	,924	1,082
	DummyCON	,842	1,188
	DummyMan	,685	1,460
	DummyWAR	,695	1,439

a. Dependent Variable: LTD



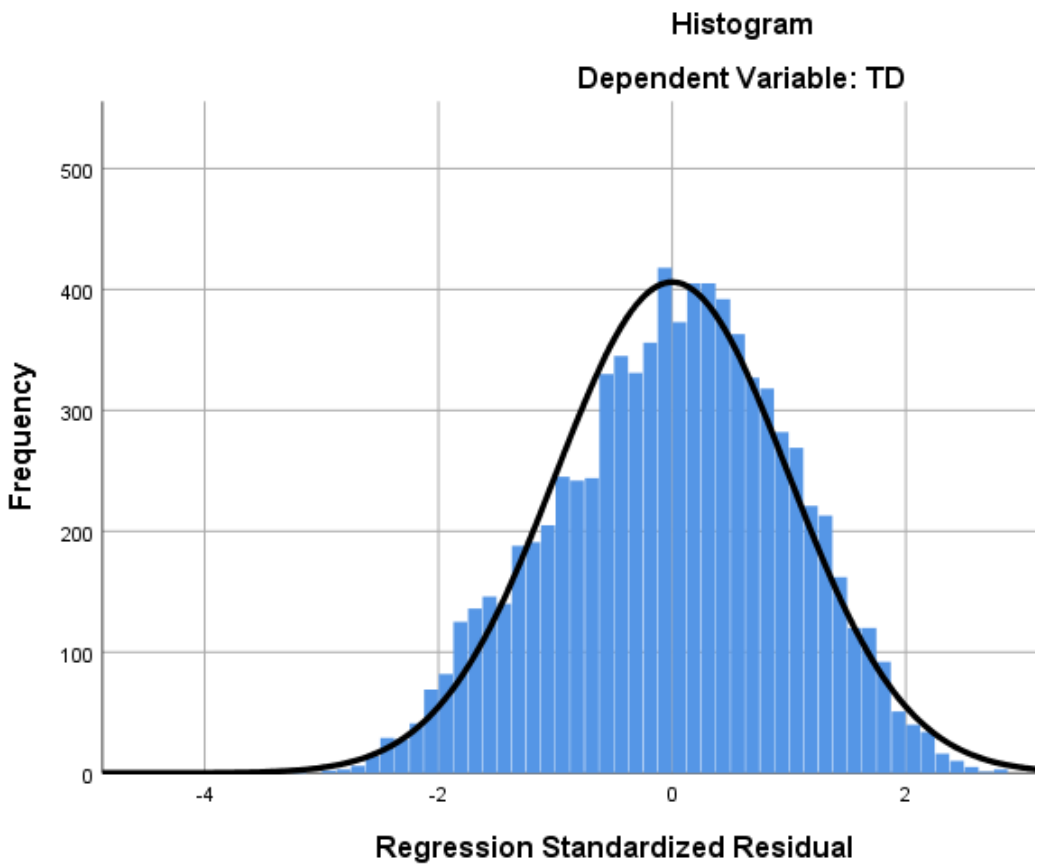


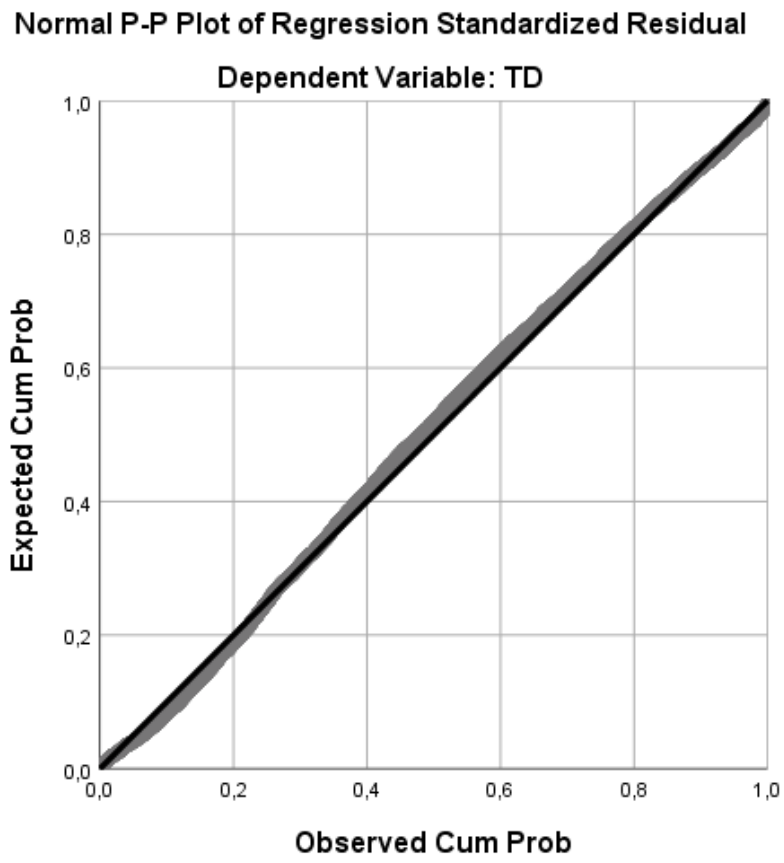


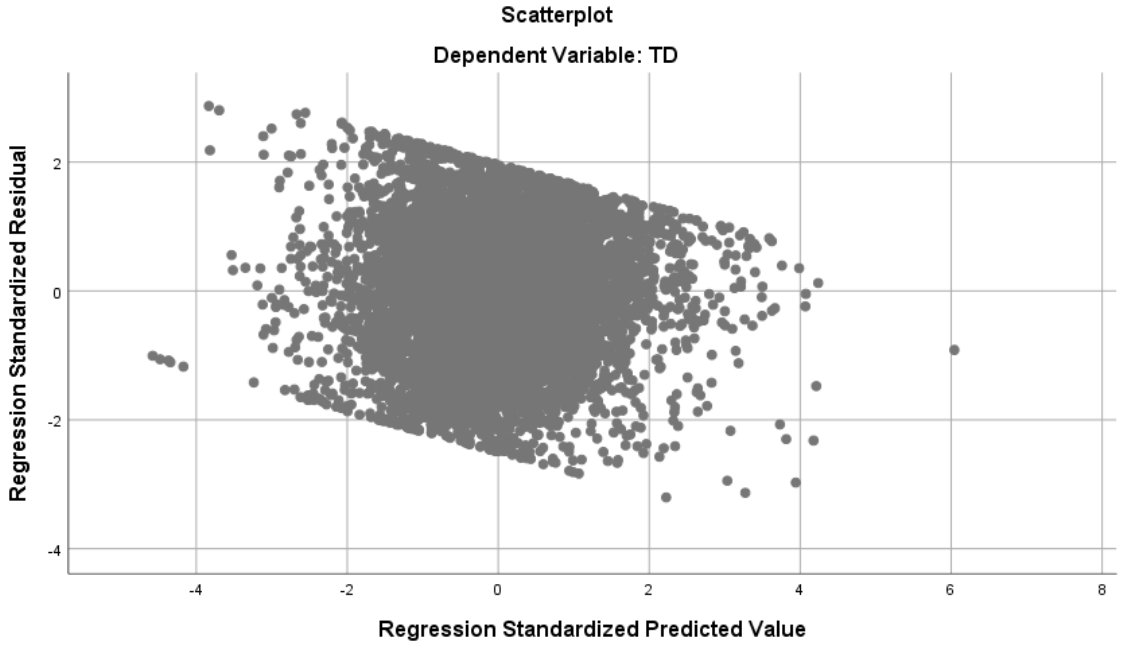
Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	PROF1	,967	1,034
	GO	,958	1,043
	GROW1	,937	1,067
	TANG	,954	1,048
	SIZE1	,898	1,114
	AGE	,926	1,080
	DummyAGM	,924	1,082
	DummyCON	,842	1,188
	DummyMan	,685	1,460
	DummyWAR	,695	1,439

a. Dependent Variable: STD



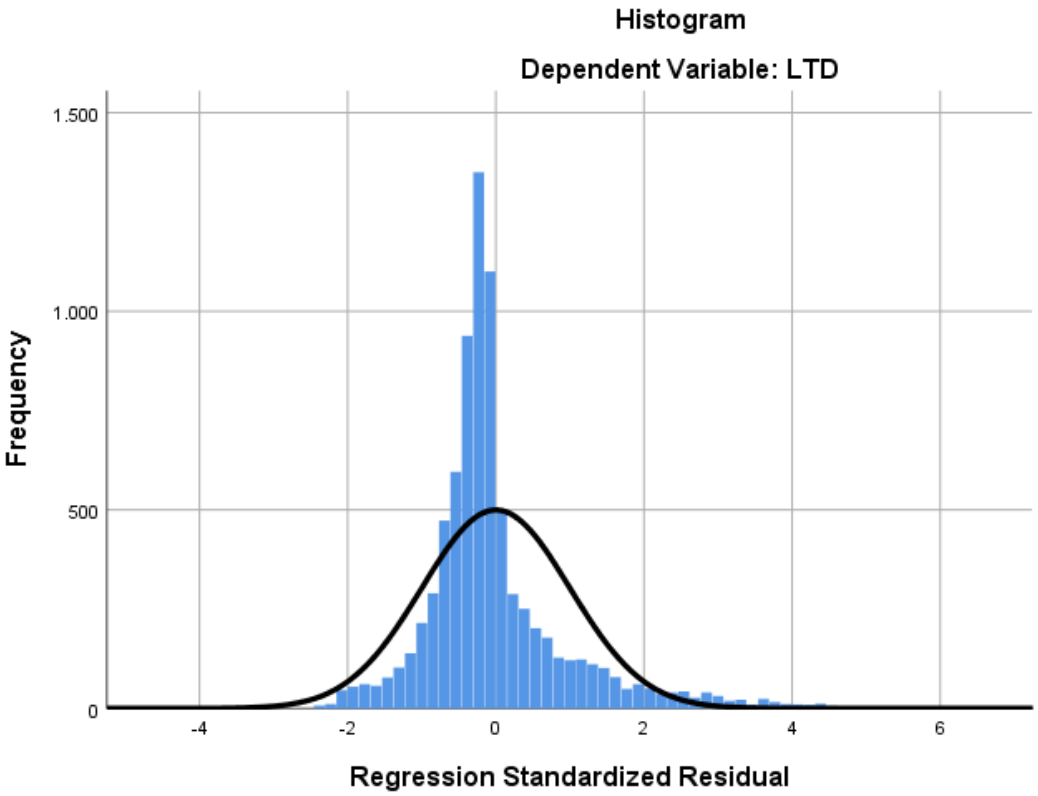


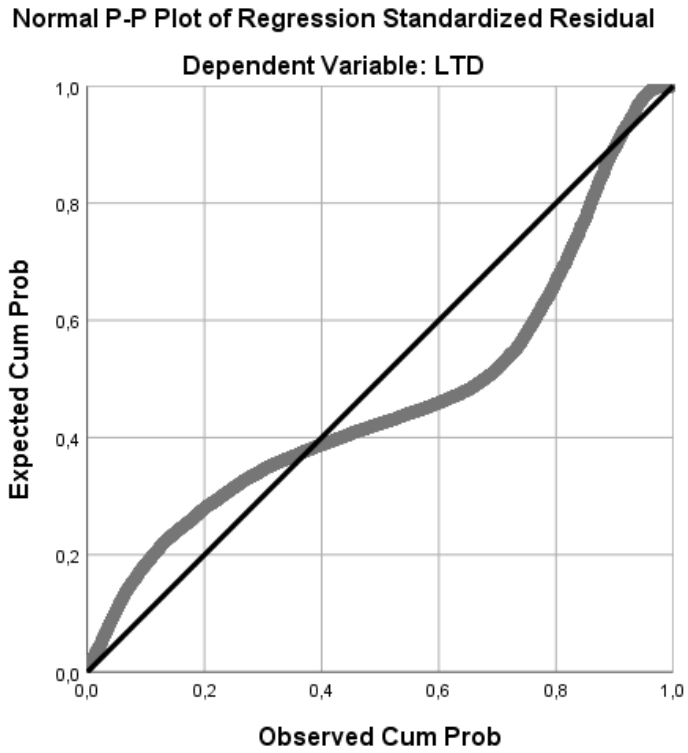


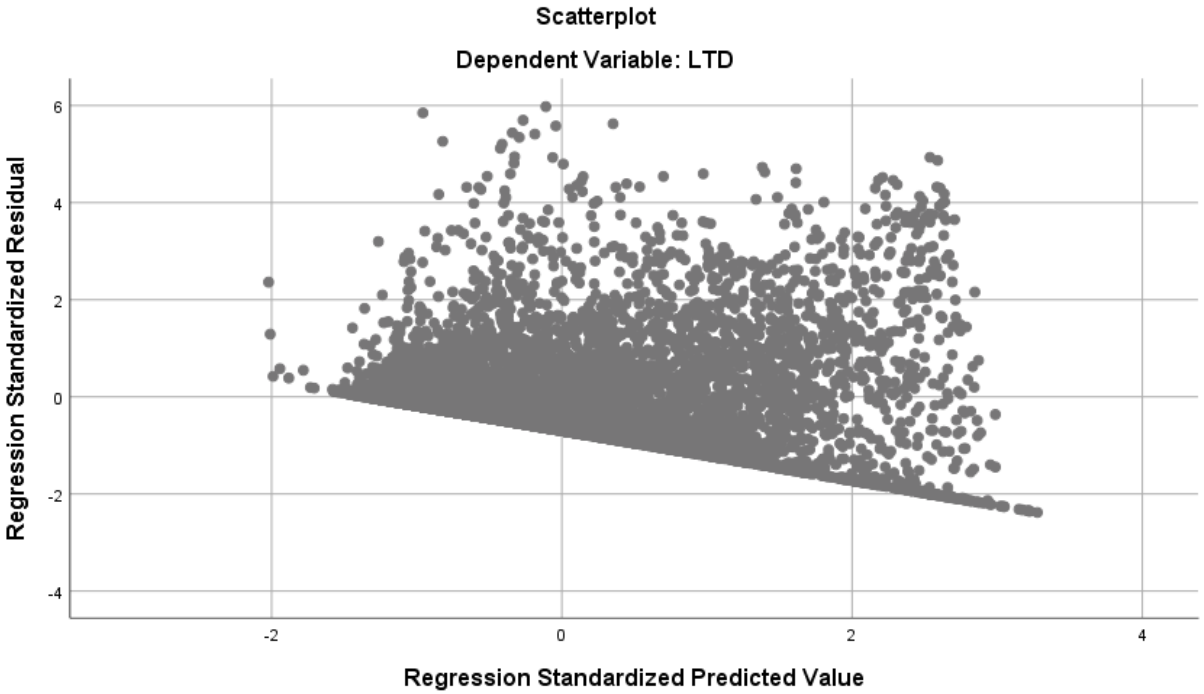
Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	PROF2	,939	1,065
	GO	,945	1,058
	GROW2	,946	1,057
	TANG	,853	1,172
	SIZE2	,831	1,203
	AGE	,919	1,088
	DummyAGM	,908	1,102
	DummyCON	,820	1,220
	DummyMan	,688	1,453
	DummyWAR	,697	1,435

a. Dependent Variable: TD



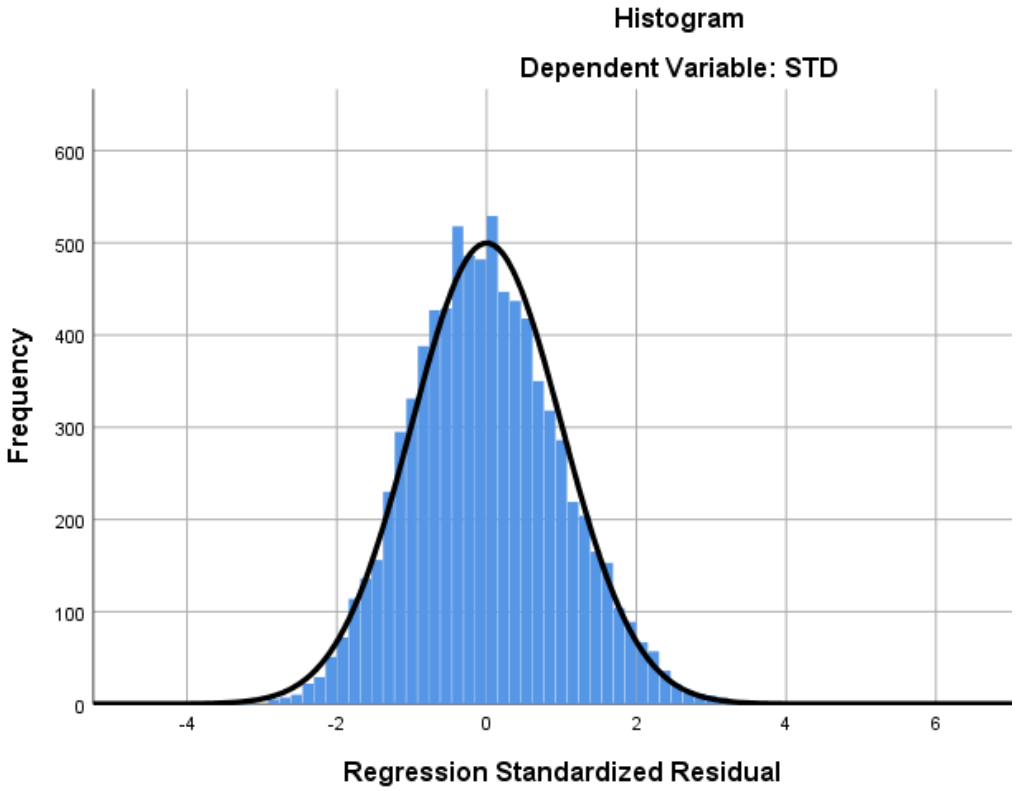


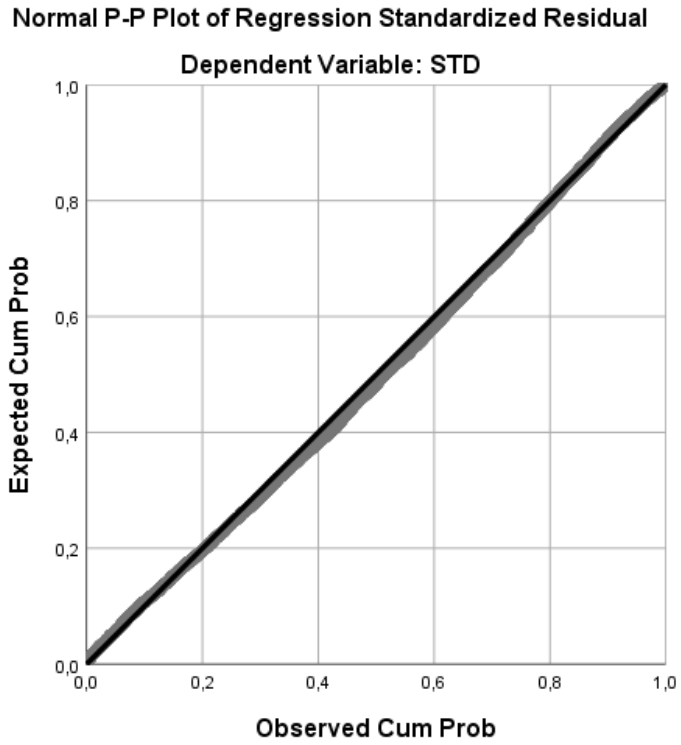


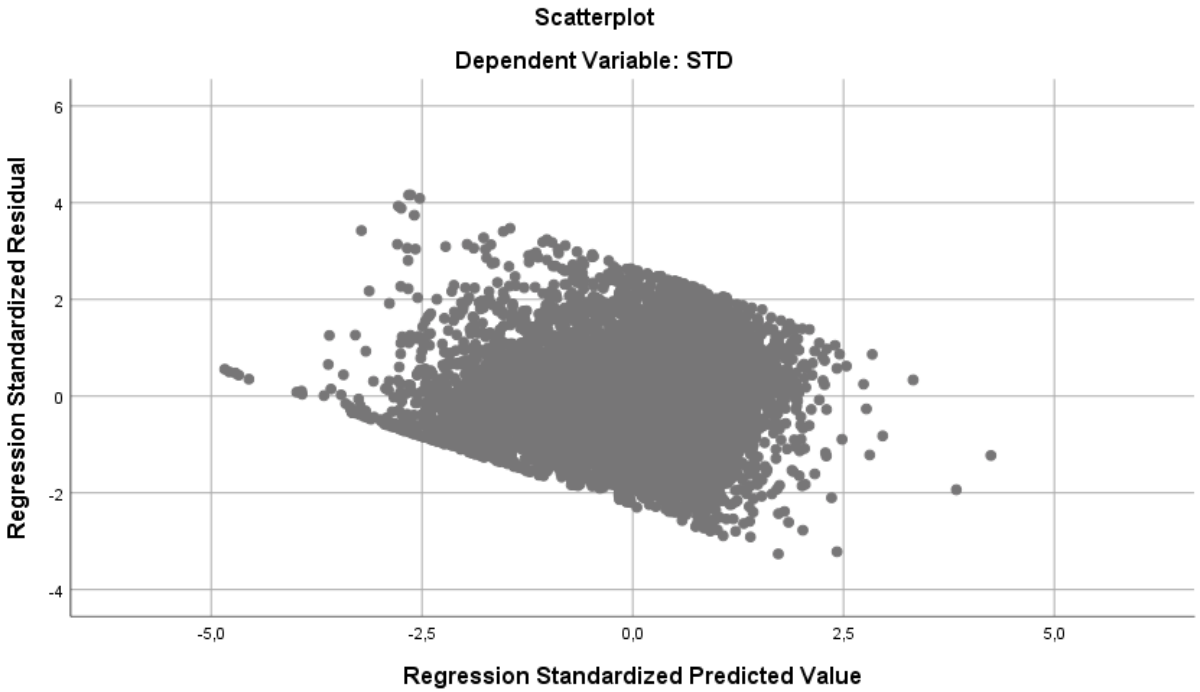
Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	PROF2	,939	1,065
	GO	,945	1,058
	GROW2	,946	1,057
	TANG	,853	1,172
	SIZE2	,831	1,203
	AGE	,919	1,088
	DummyAGM	,908	1,102
	DummyCON	,820	1,220
	DummyMan	,688	1,453
	DummyWAR	,697	1,435

a. Dependent Variable: LTD





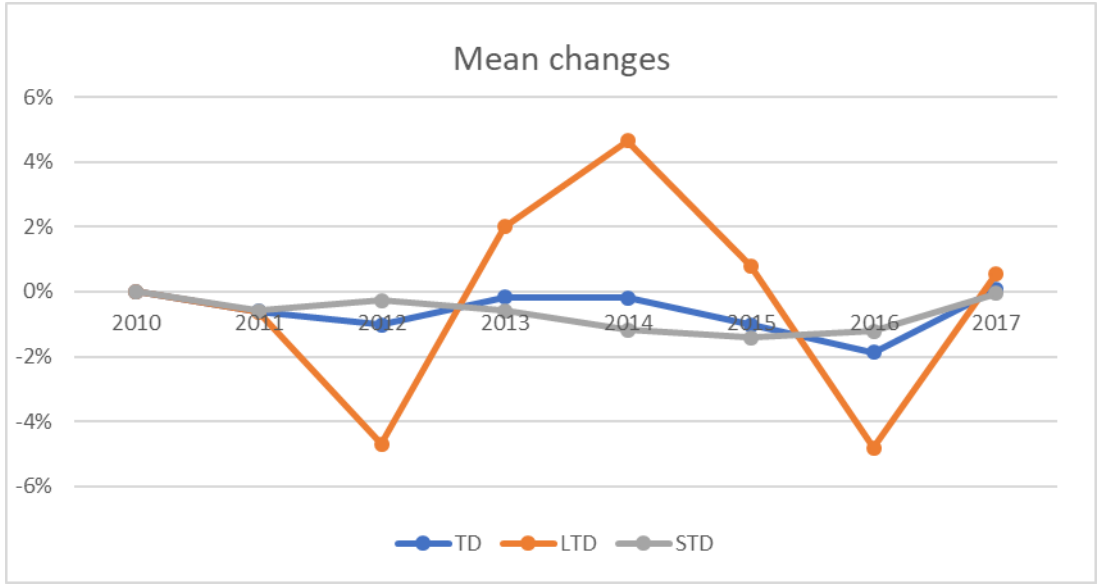


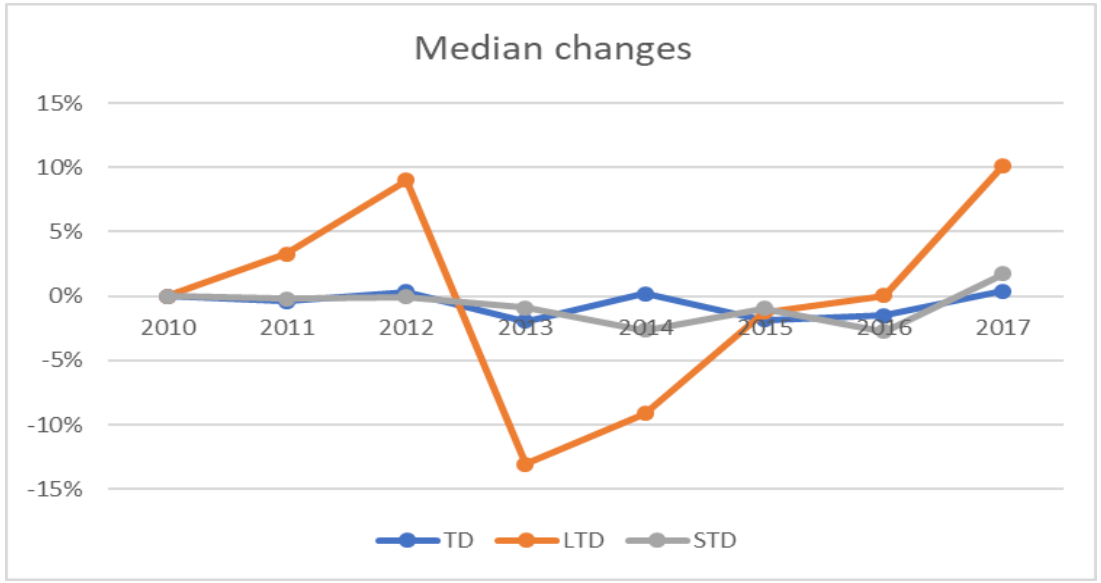
Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	PROF2	,939	1,065
	GO	,945	1,058
	GROW2	,946	1,057
	TANG	,853	1,172
	SIZE2	,831	1,203
	AGE	,919	1,088
	DummyAGM	,908	1,102
	DummyCON	,820	1,220
	DummyMan	,688	1,453
	DummyWAR	,697	1,435

a. Dependent Variable: STD

Appendix F


Mean changes
6%
4%
2%
0%
-2%
-4%
-6%
2010
2011
2012
2013
2014
2015
2016
2017
TD
LTD
STD


Median changes
15%
10%
5%
0%
-5%
-10%
-15%
2010
2011
2012
2013
2014
2015
2016
2017
TD
LTD
STD

Appendix G

	OLS		Truncated		Zero intangible assets		Postive intangible assets	
TD	Model 1	Model2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Intercept	0.0459***	1.3160***	0.1625**	1.3210***	0.1377*	1.2219***	0.3379***	1.4059***
	(0.0700)	(0.0557)	(0.0806)	(0.0542)	(0.0828)	(0.0615)	(0.1286)	(0.0836)
PROF1	-0.0937***		-0.4748***		-0.3882***		-0.4746***	
	(0.0117)		(0.0326)		(0.0385)		(0.0486)	
PROF2		-0.2596***		-0.3343***		-0.2512***		-0.2886***
		(0.0194)		(0.0213)		(0.0222)		(0.0269)
GO	0.1125***	0.1796***	0.1654***	0.1802***	0.0000	0.0000	0.1991***	0.1744***
	(0.0399)	(0.0341)	(0.0381)	(0.0320)	(0.0000)	(0.0000)	(0.0398)	(0.0331)
GROW1	0.0652***		0.0774***		0.0799***		0.0728***	
	(0.0164)		(0.0182)		(0.0172)		(0.0237)	
GROW2		0.0652***		0.1297***		0.0980***		0.1051***
		(0.0126)		(0.0129)		(0.0127)		(0.0160)
TANG	-0.0581***	-0.0902***	-0.0405***	-0.0723***	-0.0518***	-0.1039***	-0.0849***	-0.0861***
	(0.0137)	(0.0115)	(0.0127)	(0.0107)	(0.0146)	(0.0124)	(0.0232)	(0.0187)
SIZE1	0.0764***		0.0638***		0.0675***		0.0401**	
	(0.0094)		(0.0108)		(0.0111)		(0.0172)	
SIZE2		-0.0956***		-0.0957***		-0.0815***		-0.1076***
		(0.0078)		(0.0076)		(0.0086)		(0.0117)
AGE	-0.0005***	-0.0004***	-0.0007***	-0.0005***	-0.0006***	-0.0001***	-0.0009***	-0.0006***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0002)	(0.0002)
Industry dummy	Included	Included	Included	Included	Included	Included	Included	Included
F-value	32.450***	61.696***	49.747***	73.740***	34.704***	155.626***	26.457***	41.446***
Adjusted R^2	0.066	0.084	0.091	0.090	0.080	0.209	0.121	0.123
N	8.482	8.482	11.583	11.583	7.882	7.882	3.701	3.701

This table report the robustness regressions. Variable definitions are given in table 2. Standard errors are in parentheses. * Significant at 10% level. ** Significant at 5% level. *** Significant at 1% level

	OLS		Truncated		Zero intangible assets		Postive intangible assets	
LTD	Model 1	Model2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Intercept	-0.0531	-0.1051***	-0.0934*	-0.1549***	-0.1284**	0.1446***	0.0460	-0.0634
	(0.0443)	(0.0353)	(0.0520)	(0.0350)	(0.0531)	0.0396	(0.0819)	(0.0535)
PROF1	-0.0374***		-0.0870***		-0.0455*		-0.0878***	
	(0.0074)		(0.0210)		(0.0247)		(0.0309)	
PROF2		-0.0552***		-0.0656***		-0.0573***		-0.0521***
		(0.0123)		(0.0137)		0.0143		(0.0172)
GO	0.2886***	0.2758***	0.2914***	0.2922***	0.0000	0.0000	0.3355***	0.3065***
	(0.0253)	(0.0216)	(0.0245)	(0.0206)	(0.0000)	(0.0000)	(0.0253)	(0.0212)
GROW1	0.0104		0.0009		-0.0036		-0.0002	
	(0.0104)		(0.0118)		(0.0110)		(0.0151)	
GROW2		0.0084		-0.0099		0.0197**		-0.0038
		(0.0080)		(0.0083)		0.0082		(0.0103)
TANG	0.2826***	0.2460***	0.3034***	0.2628***	0.3009***	0.2520***	0.2584***	0.2488***
	(0.0087)	(0.0073)	(0.0082)	(0.0069)	(0.0094)	0.0080	(0.0148)	(0.0120)
SIZE1	0.0124**		0.0179***		0.0231***		-0.0014	
	(0.0059)		(0.0069)		(0.0071)		(0.0109)	
SIZE2		0.0209***		0.0280***		0.0276***		0.0135*
		(0.0050)		(0.0049)		0.0056		(0.0075)
AGE	-0.0003***	-0.0002***	-0.0002***	-0.0002***	-0.0001	-0.0001	-0.0006***	-0.0004***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Industry dummy	Included	Included	Included	Included	Included	Included	Included	Included
F-value	124.501***	165.302***	152.685***	215.580***	120.368***	155.626***	52.983***	83.513***
Adjusted R^2	0.217	0.199	0.237	0.225	0.235	0.209	0.219	0.223
N	8.482	8.482	11.583	11.583	7.882	7.882	3.701	3.701

This table report the robustness regressions. Variable definitions are given in table 2. Standard errors are in parentheses. * Significant at 10% level. ** Significant at 5% level. *** Significant at 1% level

	OLS		Truncated		Zero intangible assets		Postive intangible assets	
STD	Model 1	Model2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Intercept	0.0990	1.4212***	0.2560***	1.4761***	0.2662***	1.3667***	0.2920**	1.4693***
	(0.0644)	(0.0505)	(0.0744)	(0.0491)	(0.0763)	(0.0555)	(0.1184)	(0.0758)
PROF1	-0.0563***		-0.3878***		-0.3427***		-0.3867***	
	(0.0108)		(0.0301)		(0.0355)		(0.0447)	
PROF2		-0.2044***		-0.2686***		-0.1938***		-0.2366***
		0.0176		(0.0193)		(0.0201)		(0.0243)
GO	-0.1761***	-0.0962***	-0.1260***	-0.1121***	0.0000	0.0000	-0.1364***	-0.1321***
	(0.0367)	(0.0309)	(0.0351)	0.0289	(0.0000)	(0.0000)	(0.0366)	(0.0300)
GROW1	0.0548***		0.0765***		0.0835***		0.0730***	
	(0.0151)		(0.0168)		(0.0158)		(0.0218)	
GROW2		0.0568***		0.1396***		0.1177***		0.1089***
		(0.0114)		(0.0117)		(0.0115)		(0.0145)
TANG	-0.3407***	-0.3362***	-0.3439***	-0.3351***	-0.3526***	-0.3559***	-0.3434***	-0.3348***
	(0.0126)	(0.0104)	(0.0117)	(0.0097)	(0.0134)	(0.0112)	(0.0214)	(0.0170)
SIZE1	0.0640***		0.0460***		0.0443***		0.0416***	
	(0.0086)		(0.0099)		(0.0102)		(0.0158)	
SIZE2		-0.1165***		-0.1238***		-0.1092***		-0.1212***
		(0.0071)		(0.0069)		(0.0078)		(0.0106)
AGE	-0.0002***	-0.0002***	-0.0005***	-0.0003***	-0.0005***	-0.0004***	-0.0003*	-0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Industry dummy	Included	Included	Included	Included	Included	Included	Included	Included
F-value	105.412***	193.928***	129.634***	240.401***	116.367***	201.938***	43.766***	87.746***
Adjusted R^2	0.190	0.226	0.208	0.245	0.229	0.256	0.187	0.232
N	8.482	8.482	11.583	11.583	7.882	7.882	3.701	3.701

This table report the robustness regressions. Variable definitions are given in table 2. Standard errors are in parentheses. * Significant at 10% level. ** Significant at 5% level. *** Significant at 1% level

	AGM		CON		MAN		WAR	
TD	Model 1	Model2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Intercept	-0.5198	0.9032***	0.1028	0.4678***	0.2180	1.2550***	0.1771	1.4168***
	(0.4443)	(0.3472)	(0.2331)	(0.1668)	(0.1459)	(0.1094)	(0.1213)	(0.0861)
PROF1	0.0955		-0.1981**		-0.6549***		-0.3924***	
	(0.1348)		(0.0989)		(0.0607)		(0.0598)	
PROF2		0.1104		-0.2778***		-0.2902***		-0.3351***
		(0.1071)		(0.0517)		(0.0333)		(0.0344)
GO	0.1544	0.2435	0.7690	0.4317*	0.1389*	-0.0240	0.2241**	0.1798**
	(0.3306)	(0.2288)	(0.6448)	(0.2487)	(0.0812)	(0.0672)	(0.0950)	(0.0720)
GROW1	-0.0279		0.0687**		0.1224***		0.0688***	
	(0.0805)		(0.0348)		(0.0259)		(0.0261)	
GROW2		-0.1475**		0.1368***		0.1522***		0.1167***
		(0.0611)		(0.0278)		(0.0210)		(0.0180)
TANG	-0.0020	-0.1269**	-0.1071**	-0.3007***	-0.0889***	-0.1087***	-0.0731***	-0.0736***
	(0.0839)	(0.0584)	(0.0485)	(0.0334)	(0.0274)	(0.0233)	(0.0203)	(0.0175)
SIZE1	0.1411		0.0770**		0.0539***		0.0527***	
	(0.0564)		(0.0308)		(0.0192)		(0.0159)	
SIZE2		-0.0434		0.0340		-0.0893***		-0.1134***
		(0.0463)		(0.0229)		(0.0150)		(0.0119)
AGE	0.0001	-0.0001	-0.0006*	-0.0007**	-0.0015***	-0.0010***	-0.0001	-0.0001
	(0.0001)	(0.0009)	(0.0004)	(0.0003)	(0.0002)	(0.0002)	(0.0002)	(0.0002)
Industry dummy	Included	Included	Included	Included	Included	Included	Included	Included
F-value	1.336***	2.664***	5.931***	23.136***	35.384***	33.538***	15.754***	39.761***
Adjusted R^2	0.013	0.036	0.071	0.161	0.144	0.096	0.046	0.079
N	371	371	929	929	2.429	2.429	3.750	3.750

This table report the robustness regressions. Variable definitions are given in table 2. Standard errors are in parentheses. * Significant at 10% level. ** Significant at 5% level. *** Significant at 1% level

	AGM		CON		MAN		WAR	
LTD	Model 1	Model2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Intercept	-0.9231***	-0.4524*	-0.1672	-0.7847***	-0.2993***	-0.1639**	0.0010	0.0247
	(0.3215)	(0.2424)	(0.1376)	(0.1290)	(0.0959)	(0.0667)	(0.0711)	(0.0515)
PROF1	0.1974**		0.0387		-0.1567***		-0.0670*	
	(0.0975)		(0.0584)		(0.0399)		(0.0351)	
PROF2		0.2479***		-0.0476		-0.0674***		-0.0759***
		(0.0747)		(0.0400)		(0.0203)		(0.0206)
GO	0.3517	0.2170	0.1387	0.8284***	0.3418***	0.1940***	0.2200***	0.3365***
	(0.2392)	(0.1597)	(0.3806)	(0.1923)	(0.0533)	(0.0410)	(0.0557)	(0.0431)
GROW1	-0.1251**		-0.0084		-0.0151		0.0035	
	(0.0582)		(0.0205)		(0.0170)		(0.0153)	
GROW2		-0.0981**		-0.0260		-0.0101		0.0030
		(0.0427)		(0.0215)		(0.0128)		(0.0108)
TANG	0.2987***	0.1971***	0.2930***	0.1509***	0.2147***	0.1918***	0.2526***	0.2440***
	(0.0607)	(0.0408)	(0.0286)	(0.0258)	(0.01800	(0.0142)	(0.0119)	(0.0105)
SIZE1	0.1302***		0.0297		0.0480***		0.0024	
	(0.0408)		(0.0182)		(0.0126)		(0.0093)	
SIZE2		0.0682**		0.1204***		0.0304***		-0.0001
		(0.0323)		(0.0177)		(0.0091)		(0.00710
AGE	-0.0013*	-0.0006	-0.0006***	-0.0004	-0.0006***	-0.0005***	0.0001	0.0001
	(0.0007)	(0.0006)	(0.0002)	(0.0002)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Industry dummy	Included	Included	Included	Included	Included	Included	Included	Included
F-value	8.318***	7.159***	22.890***	26.045***	36.358***	50.875**	76.092***	117.078***
Adjusted R^2	0.223	0.122	0.254	0.178	0.147	0.140	0.197	0.204
N	371	371	929	929	2.429	2.429	3.750	3.750

This table report the robustness regressions. Variable definitions are given in table 2. Standard errors are in parentheses. * Significant at 10% level. ** Significant at 5% level. *** Significant at 1% level

	AGM		CON		MAN		WAR	
STD	Model 1	Model2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Intercept	0.4033	1.3555***	0.2700	1.2525***	0.5173***	1.4189***	0.1761	1.3920***
	(0.3866)	(0.2711)	(0.2458)	(0.1723)	(0.1387)	(0.0999)	(0.1126)	(0.0795)
PROF1	-0.1019		-0.2368**		-0.4982***		-0.3254***	
	(0.1173)		(0.1042)		(0.0577)		(0.0556)	
PROF2		-0.1374		-0.2302***		-0.2228***		-0.2593***
		(0.0836)		(0.0534)		(0.0304)		(0.0318)
GO	-0.1973	0.0265	0.6302	-0.3967	-0.2029***	-0.2180***	0.0041	-0.1566**
	(0.2876)	(0.1786)	(0.6798)	(0.2569)	(0.0772)	(0.0614)	(0.0883)	(0.0665)
GROW1	0.0971		0.0771**		0.1376***		0.0653***	
	(0.0700)		(0.0366)		(0.0246)		(0.0242)	
GROW2		-0.0494		0.1628***		0.1624***		0.1137***
		(0.0477)		(0.0287)		(0.0192)		(0.0166)
TANG	-0.3006***	-0.3239***	-0.4001***	-0.4517***	-0.3036***	-0.3005***	-0.3257***	-0.3176***
	(0.0730)	(0.0456)	(0.0511)	(0.0345)	(0.0261)	(0.0213)	(0.0189)	(0.0162)
SIZE1	0.0109		0.0473		0.0059	-0.1197***	0.0503	
	(0.0491)		(0.0325)		(0.0183)	(0.0137)	(0.0148)	
SIZE2		-0.1116***		-0.0865***				-0.1134***
		(0.0362)		(0.0237)				(0.0110)
AGE	0.0013	0.0005	-0.0001	-0.0002	-0.0009***	-0.0005***	-0.0001***	-0.0001
	(0.0009)	(0.0007)	(0.0004)	(0.0003)	(0.0002)	(0.0001)	(0.0002)	(0.0002)
Industry dummy	Included	Included	Included	Included	Included	Included	Included	Included
F-value	4.104***	12.920***	17.395***	47.132***	43.023***	76.178***	65.039***	120.057***
Adjusted R^2	0.109	0.211	0.204	0.285	0.170	0.197	0.171	0.208
N	371	371	929	929	2.429	2.429	3.750	3.750

This table report the robustness regressions. Variable definitions are given in table 2. Standard errors are in parentheses. * Significant at 10% level. ** Significant at 5% level. *** Significant at 1% level