THE DETERMINANTS OF CAPITAL STRUCTURE – EVIDENCE FROM DUTCH LISTED FIRMS.

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Abstract

This study investigates the capital structure determinants of Dutch listed firms with fixed effects model. The sample contains 71 non-financial firms over year 2004-2012. As expected, the results are explained by a mixture of pecking order theory and trade-off theory. Size, free cash flow and uniqueness increases with leverage while business risk, non-debt tax shield, liquidity, profitability and tangibility decrease as leverage declines. The relevance of tax rate and growth opportunities are not significant. It is speculated that the differences of capital structure determinants compared to previous evidence reflects the recent institution development.

Key words: capital structure, panel data, fixed effects model, the Netherlands, trade-off theory, agency cost theory, pecking order theory, information asymmetry theory

Preface

"Where there is will, there is a way"

-An old English proverb

Here I am today, standing in front of the finishing line of the master study. When I look back I see myself wrestle with absorbing and applying new knowledge, being excited about new discoveries during the research and being confused and upset when nothing went right. It is during this period that I have learned the darkest is nearest the dawn and the only salvation is unshakable conviction. Luckily I have got companions along this arduous path. First of all, I would like to thank my supervisors, they are both excellent researchers with great attention to detail. Prof. Kabir, thanks to his mind of incisive and agile, I was able to organize the thesis structure more logically and generate well-illustrated arguments; Dr Huang, thanks to her sharpness I was able to improve the quality of the raw data set and research methods. Without their guidance, the thesis would have never achieved as I expected. Secondly, the contribution of my Dear Richard in terms of tabulation should also be credited. His selfless help and rich knowledge with regard to Office software have impressed me. Most importantly, he encouraged me not to give up when I was down. That means a lot to me.

Is it the end? In some way yes, since I am about to finish my study and a certificate will be awarded. Nevertheless, I would rather take it as a milestone, thereafter, I shall keep equipping myself with more in-depth knowledge. This intensive year with University of Twente is remarkable, thanks to all people that I worked with and all the lectures that I had, I have gained more that I could have ever imagined.

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1. INTRODUCTION

I. Problem definition

The capital structure, namely the way firms choose to finance its overall operation and growth with external sources, has remained an arcane puzzle to contemporary Corporates Finance for decades. Its importance for financial managers lies in the conveyance of information to investors which will in turn affect firms' long term stock returns. Modigliani and Miller (1958) have opened a new era by proposing that, under the condition of a perfect capital market without taxes and transaction costs, the financing decisions are irrelevant to firm values. Building on this unprecedented proposition, many researchers have attempted to unearth the motives of financing choices and among which, two streams of arguments prevail. One group proposes that the key determinants hinge on the static trade-off between various costs and benefits associated equity and debt issuance (e.g. Modigliani and Miller (1963), Jensen and Meckling (1976), Myers (1977)); while another group which is represented by pecking order theory (Myers and Majluf, 1984), argues that the financing decisions follow a pecking order where internal funds are always preferred over debt while equity is the last resort at all times. However, as Harris and Raviv(1991) have summarized in a survey of capital structure theories, in spite of a great deal of potential determinants are modeled by theories, the empirical evidence has not shown which of them are reliable and to what extent their generalizability holds in versatile contexts.

Institutional settings are one of the most prevalent explanations for empirical evidence disparity. Although the prominent capital structure studies aim to explain financing behaviors of US firms, the onset of internationalization has popularized cross-country comparison. Particularly, Rajan and Zingales (1995) utilize models which have been developed in US context and apply them to firms in G-7 countries. They find that the majority of the capital structure determinants that are significant in US context also apply in G-7countries. To the contrary, Fan, Titman and Twite (2012) collect international evidence which contains both developed and developing countries and find that there is no convergence effect of financing behavior across countries due to different institutional characteristics such as strength of legal system and level of corruption. Therefore they conclude that country-level determinants explain significant portion of firms' financing behavior.

As a small and highly industrialized country, the Netherlands has not received timely evidence which is able to add concurrent capital structure understanding that is embedded in institutional characteristics. Previous Dutch evidences have reached consensus in terms of 2 distinguished institutional characteristics: the strong position of bank and weak shareholder rights. They concluded that due to active participation of banks as board members of firms as well as entrenched managers, agency conflicts are not significant in the Netherlands (De Jong, 2002; De Jong and van Dijk, 2007). However, the recent evidence suggests that financial crisis has made Dutch firms actively looking for diversified funding source, plus the new Basel III requirements have endangered the incentives for banks to give long term loans, the conventionally dominant impact of bank credit on non-financial firms have been weakened. Instead, public market debt is developing rapidly and becoming the most popular alternative for bank loans (Michon and Richinel, 2013). Therefore, considering the important role of institutional settings in terms of

shaping firms financing behavior, it is expected that new evidence from this study would provide different capital structure determinants compared with previous evidences.

II. Purpose

The main purpose of this study is to unearth the answers to 4 questions.

1) Whether or not and to what extent the main capital structure theories explain the financing choice of Dutch listed firms?

2) *To what extent capital structure determinants holds or vary across different leverage measurements and firm situations*?

3) *Are there any differences compared to previous evidences in terms of capital structure determinants?*

If yes,

4) Can they be explained by the recent institutional development?

III. Contribution

Cconsidering the previous Dutch evidences contain no sampling period that is later 1997. This study adds on to the limited evidence regarding Dutch capital structure determinants by providing the most up to date evidence.

IV. Structure

The rest of this paper is structured as following: chapter 2 gives an overview of capital structure theories, findings from previous studies as well as a description of recent development in the Netherlands which could impact capital structure decisions; chapter 3 illustrates available methodologies techniques, justification of method used as well as sampling technique and variable measurements; chapter 4 presents the empirical results and robustness tests; chapter 5 provides conclusions of empirical research as well as discussions over research quality and further research direction.

2. LITERATURE REVIEW

This chapter is organized to achieve several targets. Frist of all, it illustrates the most important capital structure theories and hypothesized capital structure determinants. Secondly, it gives the overview of field evidence. Thirdly, a comparison of past and current evidence in terms of Dutch institutional settings is presented.

I. Capital structure theories

The problem of capital structure lies in how firms should choose its debt-equity ratio so that the firm value will be maximized (Hillier, Ross, Westerfield, Jaffe and Jordan, 2010). This section illustrates the most prevalent capital structure theories which explain the motives for choosing debt or equity.

A. Trade-off theory

Trade-off theory claims that there is an optimal debt-equity level where firm value is maximized. This can be achieved by identifying a balance between various costs and benefits of issuing equity and debt. One benefit that is lower issuance costs: compared to cost of equity which is varied with stock performance, cost of debt is usually fixed and tend to significantly lower than cost of equity. The second benefit lies in the tax shield. Interests that paid out can be deducted against taxable income. That is to say, the more interest payment the smaller the tax base. As a result, less taxes have to be paid. The costs that are associated with leverage are more complex in nature, the following sections gives an overview of various costs in detail.

Bankruptcy costs

Bankruptcy costs, namely the costs associated with bankruptcy. The direct costs include legal and administrative costs of liquidation or reorganization, and the indirect costs could be the loss of sales due to fear and doubt from customers and suppliers (Hillier, Ross, Westerfield, Jaffe and Jordan, 2010). When leverage level rises, the risk of going bankrupt also increases. The static trade-off theory illustrates that the benefits of leverage will be exhausted at the point where bankruptcy costs equal to tax benefits. Utilizing Altman's bankruptcy prediction model as the proxy for financial distress costs while depreciation as the proxy for non-debt tax shied, Chkir and Cosset (2001) find that both of them have significant and negative relationship with leverage. In terms of Dutch evidence, De Jong (2002), De Jong and van Dijk (2007) do not show that distress costs are significantly correlated with leverage.

In a frictionless world, firms would have kept adjusting leverage to optimal level thereby achieving firm value maximization. However, more often than not, firms find it is not optimal to instantly revert to this desired level due to there are more costs that needs to be taking income consideration (Myers, 1984).[1]

[1] The adjustment costs including agency costs and adverse selection cost that will be discussed later.

Agency cost

In addition to financial distress cost, it is suggested that agency costs also belong to trade-off decision making. There are two kinds of internal agency conflicts which incur costs: manager-shareholder and bondholder-shareholder. It is assumed that major agents have incentives to overinvest or underinvest and as a result, the agency costs that will increase the cost of debt.

- Manager-shareholder conflicts

Notwithstanding the objective of managers is to maximum shareholders' value, in pursuit of prestige and personal benefits, managers incline to invest blindly in projects with negative NPV (overinvestment). Additionally, Mauer and Sarkar (2005) indicate that overinvestment will causes damages in the way that firm value and optimal leverage will be decreased while credit spread of debt will be increased. There are several ways that debt can alleviate manger-shareholder conflicts: Jensen and Meckling (1976) proposes that debt can increase the ownership of managers by decreasing total share equity. In this way, managers will be more motivated to create shareholder value. Contrarily, Wang (2011) argue that management entrenchment does not mitigate agency problem since mangers' decisions to milk property can be driven by personal perks. The recent evidence from Lugo (2014) indicates that there is a U shape relationship between insider ownership and cost of borrowings. He suggest that larger managerial ownership is not always beneficial because more incentives are given to managers to act at expenses of creditors. Another discipline role of debt is proposed by the free cash flow hypothesis: increased debt is attached with interest obligation which will diminish the free cash flow that managers can utilize as private benefits (Jensen, 1986). The filed evidence of free cash flow hypothesis show disparity as well: While Park and Jang (2013) have positively confirmed the discipline role of debt and its associated wealth effect (firm performance) within US firms, De Jong (2002) uncover an absent discipline role of debt for Dutch firms.

- Shareholder-bondholder conflicts

One of the known conflict between shareholders and bondholders is called assets substitution. According to Myers (1977), along with the increasing debt, shareholders are attached with more incentives to invest in risky projects on account of they benefit from the higher return from highly risky projects. Nevertheless, this behavior is detrimental to bondholders in the way that they bear the costs of excessive bankruptcy risk while the extra profits are just the rewards for shareholders (due to bondholder get fixed payments). Being aware of that, bondholders will take precautions such as increasing cost of debt and/or drafting restricted debt covenants to protect their benefits. Consequently, in case of increased financing cost, firms should reduce debt to alleviate shareholder-bondholder conflict. Stemming from this concept, Titman and Tsyplakov (2007) utilize the firm value between value-maximizing firms and equity-maximizing firms as the proxy for agency costs between shareholder and bondholder[2]. What is more, they find that agency costs are substantially higher in over-levered firms. This is because firms who aims at value-maximizing will reduce leverage so that bankruptcy cost is lower while firms who wants to maximize market value of equity would not do. They also find that equity-maximizing firms tend to underinvest by distributing

larger portion of profit as dividend. Additionally, Green and Talmor (1986) shows that more debt does aggravate shareholders' incentives to take risks among US firms. However, Mauer and Sarkar (2005) cast doubt on economic significance of overinvestment by reporting that for Polish listed firms, the magnitude of overinvestment is negligible (only 1%) on achieving optimal leverage ratio. In terms of Dutch evidence, by regressing leverage on four different agency problems(overinvestment, underinvestment, assets substitution and wealth transfer) , De Jong and van Dijk (2007) are not able to detect any significant relationships between any agency problem and leverage. They attribute it to the specific institution settings where the role of bank is strong while the shareholder protection is weak.

- Stakeholder co-investment

Additionally, based on the bankruptcy cost point of view, Titman (1984) proposed a stakeholder co-investment perspective of agency conflicts. He asserts that where non-financial stakeholders are required to invest significantly in firm-specific assets, the roles of those stakeholders in financing mix decisions are non-trivial. This is because liquidation imposes costs on customers who are in particular need of a product (uniqueness) as well as employees and suppliers who have strong bargaining power. That is to say, compared to the small amount of direct bankruptcy cost, they suffer more from the disruption of normal operation due to increased debt. The field evidence for this agency view is mixed: The US evidence of Frank and Goyal (2009) do not reckon uniqueness as a reliable leverage determinant while Mazur (2007) find significant relationship between product uniqueness and leverage in Poland; in term of Dutch evidence, De Jong (2002) reports insignificance of product uniqueness and quality while De Bie and De Haan (2007) shows uniqueness contribute significantly to debt issuing possibility.

Transaction cost

Ozkan (2001) suggests that firms have long-term target leverage ratios and they adjust to the target ratio relatively fast. This study focus on first method to test trade-off theory.

Building on this, Altinkiliç and Hansen (2000) further indicate that the cost of external finance consist of two parts--the fixed component which is associated with administrative and legal fees and the variable components which increase with the size of issuance. They show that the latter accounts for 85% of the bid-ask spread. On the other hand, some literatures denote the insignificance of transaction costs as well: e.g. Graham and Harvey (2001) suggest that transaction costs in US are not on the managers' lists of most-important factors. Gilson (1997) find that transaction costs exert greater influence on financial distressed companies due to that fact that barriers of reducing debt in a reorganization is too high(e.g. forced to sell assets under fair value, taxed income for debt forgiveness, costs associated with signaling effect of reduced debt).

B. Pecking order theory

Contrary to trade-off theory, pecking order theory (Myers and Majluf, 1984) posits that there is no optimal debt ratio. Instead, firms will not utilize debt when there is still sufficient internal financing. This behavior is explained by information asymmetry theory which argues that firm insiders possess more information than outsiders and they will take advantage of it by timing the equity and debt issuance. By which it means insiders will issue equity when they perceive stocks are overvalued while debt becomes a better choice under the condition of undervaluation. However, investors are

aware of it and they reckon firms' financing behaviors as the quality signal, as a result, debt issuance is associated with positive effects while equity incurs detrimental stock performance (Ross, 1977). In order to minimize the adverse selection effects of information asymmetry between investors and insiders, firms always following a pecking order when financing. The internal fund is the most preferred due to it transmits the least information. When internal funds are not available, debt will be considered subsequently, then equity comes in the end. Miglo (2007) shows that the singling effect of debt-equity choice depends on its nature-- only on the condition that insiders have both information on timing and amount of future earnings, the pecking order theory can be explained by information asymmetry. By using different proxies for adverse selection effect, Bharath, Pasquariello and Wu (2009) show that firm-level adverse selection effects(size, tangibility) contribute to capital structure changes more significantly, compared to market microstructural level effects(bid-ask spread, trading volume, possibility of insider trading). Additionally, Andres, Cumming, Karabiber and Schweizer (2014) report that in line with signalling theory, the increases in leverage has a negative impact on information symmetry index. Dutch evidences have mixed results regarding information asymmetry: while Chen, Lensink and Sterken (1999) argue that driven by information asymmetry, pecking order theory is the most prominent theory which explains Dutch capitals structure, De Jong and Veld (2001), Chen and Jiang (2001) find that although liquidity is negatively related with leverage, there is no positive stock returns that follow bond issuance. Therefore they reject the information asymmetry as the reasoning of pecking order theory.

Besides information asymmetry, another explanation of pecking order is related with transaction costs consideration: due to internal funds are easy to access and free of charge, therefore it deserves coming first; equity is the last resort due to its large amount of issuance costs and its consequence of falling stock price. Altinkiliç and Hansen (2000) have supported this transaction cost view of pecking order theory and show that the cost of equity issuance is five times higher than that of debt. In terms of Dutch evidence, De Haan and Hinloopen (2003) utilize the ordered-profit model to test the financing hierarchy of Dutch firms and conclude that followed by bank loans and equity, internal financing is the most preferred funding source. Investigating the effects of stock return on security issuance, De Bie and De Haan (2007) find that not only marketing timing but also pecking order theory is supported for Dutch listed firms. This finding is in line with the US evidence from Hovakimian, Hovakimian and Tehranian (2004).

C. Market timing and inertia theory

Although these two theories will be not explored with empirical evidences of this study due to data limitation, they will be illustrated anyhow because their roles in capital structure determinants are non-trivial. The market timing theory is firstly proposed by Baker and Wurgler (2002). They find that firms' current capital structure is the cumulative outcome of past attempts to time the equity market and the effect is highly persistent. This indicates that there is no firm-specific factor which affect capital structure. Instead, firms time the market by issuing new shares when they perceive they are overvalued and that firms repurchase own shares when they consider these to be undervalued. Following this study, when testing traditional capital structure theories against market timing theory, Hovakimian, Hovakimian and Tehranian (2004) find that both market timing and pecking order theory are significant. Kayhan and Titman (2007) also show that the historical stock price does increase the probability of equity issuance. However, contrary to Baker and Wurler (2002), they found out that this effects are not persistent. The only market timing literature in the Netherlands (De Bie and De Haan, 2007) uncovers similar pattern as Kayhan and Titman (2007).

Sharing the same principle with market timing theory, inertia theory also denotes the importance of stock return. The essence of market timing is about mangers time the market by taking advantage of mispriced stock while inertia theory argues that a firm's capital structure tends to have an inertia behaviour where managers do not adjust capital structures on a constant basis (Welch, 2004). Instead, debt to equity ratios only fluctuates with stock returns: when stock prices are high, firms tend to have low leverage ratio and vice versa. Welch(2004) also claims that stock return is the first order determinants of capital structure, the impact of traditional determinants (e.g. size, profitability, tangibility etc.) are just because of their correlations with stock return. Gygax, Wanzenried and Wu (2013) support this view by showing that larger firms do have more inert behaviours than small firms.

II. Predictions

This section presents a list variables that are derived from aforementioned capital structure theories (except for marketing timing and inertia theory).

A. Business risk

Many researchers include business risk as a proxy for financial distress costs (e.g. Titman and Wessel, 1988; Harris and Raviv, 1990; Frank and Goyal, 2009). It is argued that firms with more leverage are facing larger bankruptcy costs because of the volatility that leverage brings to net profit. Therefore, those high-levered firms will strive to decrease bankruptcy risk by reducing debt. Empirical studies are generally in line with this predictions (e.g. Rajan and Zingales, 1995; Frank and Goyal, 2009) while the Dutch evidences differ slightly from each other: De Jong and van Dijk (2007), De Haan and Hinloopen (2003) document negative relationship with leverage while Chen and Jiang (2001), De Jong and van Dijk (2007) and De Jong (2002) do not find business risk significant in explaining leverage. Non-debt tax shield

Based on the proposition of Modigliani and Miller (1958), without tax duty, firms have incentives to maximize firm value by injecting debt unlimitedly due to the tax shield benefits. However, the advantageous impacts on firm value are acclaimed with the general recognition of some, unavoidable drawback stem from the rising possibility of bankruptcy. Therefore, it is wise for firms not to utilize debt tax shield to the largest extent on the condition that other non-debt related taxes shield exists (DeAngelo and Masulis, 1980). In other words, the substitution effect of non-debt tax shield denotes a negative relationship with leverage. The tax shield can be measured in various ways: using depreciation expenses over total assets as the non-debt tax shield, Titman and Wessel (1988), Frank and Goyal (2009) do not find its significance; Shivdasani and Stefanescu (2009) utilize pension assets and liabilities as proxy for tax shield and find that firm's leverage ratio is about 35% higher if pension assets and liabilities are included in capital structure; Kolay, Schallheim and Wells (2011) measure non-debt tax shield as the difference between accounting value of tax expenses and actual tax paid, and they find a negative and significant relationship with leverage. The Dutch evidences show mixed results: when measured as depreciation over total assets, De Jong (2002) and De Bie and De Haan (2003) support the non-debt tax shield as significant determinants while De Jong and van Dijk (2007) conclude otherwise. It is worth noting that Chen and Jiang (2001) have made a novel proposal which argues that provision liabilities for bad debt and pension are better proxy for non-debt tax shield in Dutch cases. This is because Dutch tax law requires that provisions for bad debt and pension liability can either be 100% tax deductible against income with

remain portion adding back to liability side of balance sheet or subtracted directly from account receivables. Therefore, the decisions whether provisions are treated as liability or not has direct impact on leverage for Dutch firms. Due to the purpose of creating provision liability is to smooth tax instead of financing, Chen and Jiang (2001) argue that the most relevant and significant income shelter for Dutch firms is provisions for bad debt and pension liabilities. Besides, there are other measures which are suggested in the literature, such as investment credits, net operating loss tax carry forward (e.g. Frank and Goyal, 2009). However, due to data availability, depreciation and amortization expenses as well as provision over total assets are utilized in this study.

B. Tax rate

Trade-off theory indicates that the magnitude of corporate tax rate determines the tax benefits of leverage. The empirical evidence of effects of tax rate is mixed: The survey of Graham and Harvey (2001) reports that US CFOs do not rank tax shield to be the most important considerations for debt policy while Gordon and Lee (2001) find that cutting off 10% corporate tax rate is associated with 3.5% less assets which are financed by debt financing. In terms of Dutch evidence, the survey of Brounen, De Jong and Koedijk (2006) reports that 37.5% of the Dutch CFOs mention the tax advantage of debt as an important determinant of leverage; similarly, De Jong and van Dijk (2007) find that marginal tax rate is significant capital structure determinant.

C. Free cash flow

As noted earlier, free cash flow posits that instead of distributing profit to shareholders, mangers have incentives to invest excessively so that their personal utility are maximized[3]. The misalignment of shareholder-manager goal results in decreased firm value. To mitigate the overinvestment problem, Jensen (1986) and Stulz (1990) propose that issuing debt can discipline mangers in the way that extra cash will be paid out to meet interest obligations. The discipline role of debt has received support: Gul and Tsui (1997) show that among Hong Kong listed firms, extra free cash flow induces agency costs in form of auditor fees, and this relationship shows weaker sign in the firms with high level of debt; Coincidentally, D'Mello and Miranda (2010) find that the significant decline of overinvestment (excessive capital expenditure) of US listed firms is caused by introduction of debt. In contrast, free cash flow hypothesis receives no support in the Netherlands. Consistent with the US evidence from Bates (2005) and Richardson (2006), De Jong and van Dijk (2007) find that free cash flow leads to overinvestments of Dutch listed firms. However, there is no evidence supports that leverage is related to this agency problem. Looking from the institutional settings, they conclude that it is because of the weak shareholder rights and strong position of banks.

D. Liquidity

Prior to illustrating liquidity and leverage interaction, it is of vital importance to clarify the differences between liquidity and free cash flow. Liquidity refers to cash, liquid assets and unused borrowing power (Myers and Majluf, 1984) while free cash flow is the available cash flow after investing in projects with positive NPV(Jensen,1986). The negative relationship between liquidity and leverage is argued by information asymmetry theory: for firms with higher level of information opacity, there exists larger opportunities of mispricing. On the condition that undervaluation costs are larger than profits from profitable projects, those projects will be forgone. Consequently, in

[3] The underlying assumption is that mangers' private benefits increase with firm size

order to counteract this underinvestment problem, firms tend to maintain liquidity to ensure available funds for profitable projects. After internal funds, debt is preferred over equity. This is known as pecking order theory as well. On the other hand, trade-off theory articulates a positive relationship between liquidity and leverage: due to more liquidity is associated with better ability to meet interest obligations, better liquidity position is associated with more debt. Decomposing leverage into secured and unsecured types, Sibilkov (2009) reports that assets liquidity is positively associated with secured debt while the relationship with unsecured debt is curvilinear; consistent with pecking order theory, Anderson and Carverhill (2012) find that corporate cash holding can be explained by pecking order theory. On the other hand, they also propose a conditional corporate liquidity policy which states that firms only maintain liquidity for projects with great growth opportunities. Similarly, the Dutch evidences show strong consistency—a negative relationship between liquidity and leverage (De Jong and van Dijk, 2007; De Jong and Veld, 2001; De Haan and Hinloopen 2003).

E. Growth opportunities

One of the plausible reasons for the negative relationship between growth opportunities and leverage is explained by shareholder-bondholder conflicts. When firms are highly levered, it would become extremely difficult to raise new funds to support the profitable projects. Therefore debt overhang hinders growth options from exercising on account of shareholders refuse to finance growth opportunities with equity (Myers, 1977). Building on this debt overhang hypothesis, Billett, King and Mauer (2007) has captured a negative relationship between leverage and growth opportunity. In addition, they also discovered that covenant protections and short term debt mitigate this relationship on account of they are substitutes of controlling mechanism of agency conflicts. Alternatively, the negative growth-leverage relationship can also be explained by information asymmetry theory: it is presumed that a high-growth firm has less access to capital market on account of its low information opacity and abundant intangible assets. On the other hand, pecking order theory argues that providing fixed profitability, firms that invest more should hold more debt than equity due to debt is less information-sensitive.[4] Thus in this sense, growth is positively related with leverage. The Dutch evidences have mixed results: Chen, Lensink and Sterken (1999) and De Bie and De Haan (2007) both uncover that coefficient of MB ratio have mixed sign for book leverage and market leverage, they attribute it to a spurious relationship caused by market leverage and MB ratio; De Jong and van Dijk (2007) find growth is positively related to leverage; Chen, Lensink and Sterken(1999), De Jong and Veld (2001)and De Jong(2002) do not find significance of growth opportunities.

F. Uniqueness

As it is stated in the co-investment perspective of Titman (1984), firms that produce specialized products and are perceived by customer as unique, tend to be less levered. This is because the cost of liquidation outweigh the benefits. Titman and Wessel (1998) measure this variable as R&D and selling expenses over total sales. Because it is expected that firms who invest more in R&D are more innovative, and their products should be more unique compare to others. The rationale of selling expenses lies in firms with unique product are expected to invest more in advertising.

[4] The underlying assumption is that firms with more investment have more growth opportunities.

When investigating the relationship between firms' financing choices and characteristics of suppliers and customers, Kale and Shahrur (2007) argue that firms utilize lower debt level to induce relationship-specific investment; Coincidentally, Banerjee, Dasgupta and Kim (2008) show that customer leverage ratios are lower when they are depending on their suppliers to a larger extent. To the contrary, De Jong and van Dijk (2001) indicate that there is no significant relationship between product uniqueness and leverage for Dutch listed firms. They conclude that there exists no agency problem with external stakeholders for Dutch listed firms.

G. Size

Despite size has contradicting effects on to leverage, the positive relationship is predominantly cited by mainstream literatures (e.g. Timan and Wessel, 1988; Rajan and Zingales, 1995). The rational lie in 1) larger firms borrow more because they tend to be more diversified thus have more debt capacity than smaller firms(Harris and Raviv, 1991); 2. Larger firms have more debt because they have greater access to debt market. However, in a capital structure study of G-7 countries, Rajan and Zingales (1995) also identify negative relationship between size and leverage in Germany. They assume that it is because large firms suffer less from the impact of information asymmetry, thus the cost of capital is lower. As a result, they are more capable of issuing informational sensitive securities like equity. Kremp, Stöss and Gerdesmeier confirm the finding of Rajan and Zingales (1995) with German evidence, nevertheless they attribute strong creditor protection instead of information asymmetry as the casual factor. Alternatively, the negative relationship can be explained by transaction-costs economies theory (Williamson, 1979) as well: due to small firms are facing much higher transaction costs when issuing equity, they intend to borrow more than relying on equity financing. The previous Dutch evidences all denote a positive impact of size on leverage (e.g. Chen, Lensink and Sterken, 1999; De Jong 2002, De Haan and Hinloopen, 2003).

H. Profitability

Similar with size, there exists theoretical controversies in terms of relationship between profitability and leverage: Pecking order theory indicates that profitability is negatively related with debt because all else being equal, more profit firms are attached with less debt. However trade-off theory suggests otherwise by arguing that profitable firms have less default risks thus they are able to rely more on external financing-debt. Consistent with pecking order theory, profitability is found to have negative impact on leverage in the mainstream US literatures (e.g. Harris and Raviv, 1991; Rajan and Zingales 1995; Frank and Goyal, 2009). However, the Dutch evidences are in disparity: De Jong and Veld (2001) cast doubt on signaling effect of debt by showing that financial slack has insignificant influence on issuance probability of equity and bond; On the contrary, De Haan and Hinloopen (2003) find that Dutch firms indeed follow a sequential financing order which is in line with pecking order theory. However the inconsistency occurs where issuing share is preferred over bond. They attribute it to the underdevelopment of public debt market.

I. Tangibility

Many literatures argue that the structure of the company owned assets have mixed impacts on borrowing decisions, among which the arguments for positive relationship between leverage and tangibility prevail (e.g. Frank and Goyal, 2009; Titman and Wessel,1988). The rationale lies in agency costs: as it is noted earlier, high leverage has a disciplinary role in consumption of managerial

perquisite on account of increased bankruptcy costs and bondholder monitoring costs.[5] This view is supported by Grossman and Hart (1982) who report that due to the monitoring costs of firms with less collateral assets are indeed higher. As a result, those firms try to issue more debt to discipline managers. Scott (1977) further supports this view by showing that firms have incentives to issue secured debt to induce higher equity value when current creditors are not guaranteed with collaterals. Alternatively, consistent with trade-off theory which articulates that large collateral assets are associated with more debt due to reduced bankruptcy and transaction costs, Myers and Majluf (1984) find that firms that are highly tangible tend to borrow more to take advantage of lower issuance costs.

On the other hand, information asymmetry theory suggests a negative tangibility-leverage relationship. Harris and Raviv (1991) articulate that firms with little tangibles are more sensitive to information asymmetry. In order to avoid the signalling effect, they prefer to issue debt over equity when external financing is required. Additionally, contrary to aforementioned discipline role of debt, bondholder-shareholder conflicts also suggest a negative tangibility-leverage relationship. The assets substitution hypothesis argues that shareholders have incentives to do risky investment so that the wealth will be transferred from bondholders to shareholders. Nevertheless, the presence of large fixed assets makes it more difficult to exchange low-risk assets to high-risk assets. In other words, highly tangible firms tend to have less shareholder-bondholder conflicts. As a result, less leverage is utilized.

The Dutch evidences show a high consistency with trade-off theory--namely tangibility is positively correlated with leverage (e.g. Chen and Jiang, 2001; De Haan and Hinloopen, 2003; De Jong and van Dijk, 2007).

J. Non-linearity behavior

The non-linearity behaviours of capital structure determinants are originated from the studies which shows highly leveraged firm are embraced with much more borrowing costs (DeAngelo and Masulis 1980; Gilson, 1997). The rationale lies in the fact that greater bankruptcy risks induce strengthened investor protection where bondholders require higher costs of borrowing and stricter debt covenants. These extra borrowing costs are more expensive for firms with higher leverage. For such reasons, firm-level leverage determinants can exert different impacts on capital structure choice at different leverage levels. Utilizing quintile regression technique, the UK evidence from Fattouh, Harris and Scaramozzino (2008) shows that size only shows positive sign until 75th quintile of debt to capital distribution. Slightly different from their results, Australian evidence from Bahng and Jeong (2012) also indicates that size has conspicuous non-linearity behaviors. It is worth noting that no Dutch evidence has examined the non-linearity behavior of capital structure determinants so far, motivated by which, the squared terms size is introduced in this study.

K. Financial constraints

According to Myers (2003), theories cannot be generalized and more often or not, they are conditional. That is to say, a single model cannot fit firms with different conditions. The impact of financial constraints on firms financing choice has been studied in recent studies: Campello, Graham and Harvey(2010) show that financially constrained firms are facing greater difficulties

[5] Monitoring costs refers to bondholder protection mechanism such as higher cost of debt.

accessing capital market during crisis period; Loncan and Caldeira (2014) also report that financially constrained firms tend to hold more cash to counteract short of supply. Follow Mazur (2007) and Frank and Goyal (2009), the firms will be divided into different classes to test the robustness of empirical results.

Table 1. Hypothesized constructs and predicted signs

This table gives an overview of predicted signs of each independent variables based on theories as well as the findings of previous Dutch evidences. + denotes positive relationship with on leverage, - denotes nagative relationship with leverage.

Variables	Predicted signs from theories	Dutch empirical findings
Business risk	-(trade-off)	-(De Haan and Hinloopen,2003; De Jong and van Dijk, 2007)
Non-debt tax shield	-(trade-off)	+(Chen and Jiang, 2001; De Jong, 2002; De Haan and Hinloopen, 2003)
Tax rate	+(trade-off)	+(De Jong and van Dijk,2007)
Growth opportunities	+(pecking order)	+(Chen, Lensink and Sterken,1999; De Bie and De Haan, 2007)
	-(agency costs, information asymmetry)	-(De Bie and De Haan, 2007)
Free cash flow	+(agency cost)	-(De Jong and van Dijk, 2007)
Liquidity	+ (trade-off)	/
	+ (agency costs/pecking order)	-(Chen and Jiang, 2001; De Jong and van Dijk, 2001; De Jong and Veld, 2001; De Haan and Hinloopen, 2003)
Uniqueness	-(agency cost)	-(De Haan and Hinloopen,2003)
Size	+(trade-off)	+(Chen, Lensink and Sterken, 1999; De Jong and Veld, 2001; De Jong, 2002; De Bie and De Haan, 2007)
	-(pecking order)	/
Profitability	+(trade-off)	/
	- (pecking order)	-(Chen , Lensink and Sterken,1999; De Jong and Veld, 2001; De Haan and Hinloopen, 2003)
Tangibility	+(trade-off)	+(Chen and Jiang,2001; De Haan and Hinloopen, 2003; De Jong and van Dijk, 2007)
	-(information aysmmetry)	/

L. Concluding remarks

Although extensive studies have explored pecking order theory and static trade-off theory, it is not crystal clear if one has superiority over the other. the literature review has generated three implications: First of all, the motives of financing choice cannot be reduced to a single capital structure theory such as pecking order or trade-off, the role of corporate governance and institutional characteristics play indispensable roles as well; Secondly, it is not uncommon that same capital structure determinants shows reverse signs in various studies. The probable reason could be the influence exerted by institutional characteristics and non-linearity nature of the constructs. Consequently, it is expected that the results of this study will differ from previous evidence in the light of recent development in capital market.

III. Dutch institutional settings pertaining capital structure choices

Prior to investigating the capital structure determinants in the Netherlands, it is of vital importance to give an overview of its institutional settings. The motive for doing so is threefold: first of all, institutional settings play important roles in shaping firms financing decisions. Rajan and Zingales (1995) find that while G7 countries have similar level of leverage, bank-based countries are more levered than market-based countries; Similarly, De Jong, Kabir and Nguyen (2008) have studied the impacts of firm-level and country-level determinants with a large sample which includes firms in 42 countries, and they report that there is no equality in terms of cross-country firm-level determinants. As a result, they conclude that it is the diverse institutional settings, which influence firm-level determinants, has caused the heterogeneity indirectly; consistently, relatively new international evidence of 37 countries also stresses the importance of institutional settings and show that firm-level determinants explain 2/3 of cross-country capital structure variation while country level accounts for another 1/3 (Gungoraydinoglu and Öztekin, 2011).

The second motive concerns the scope and timeliness of the extant Dutch evidences. It is argued that the firm-level characteristics form a picture only of demand-side story while the supply-side factors has been ignored. Started at the 4th quarter of 2008, the rise of financial crisis has caused a short of supply in terms of available funds.[6] It is argued that the crisis has altered the supply side factors that affect capital structure choices, especially for the firms who are financially constrained (Campello, Graham and Harvey, 2010). When looking into the timeline of Dutch evidence, the latest ones date back to 7 years ago (2007) when no one has considered the impacts of crisis on Dutch firms' financing patterns. Following the pattern of Dutch literatures, this study tend to compare the capital structure determinants differences with prior evidences and attempt to seek linkage with development of institutional characteristics.[7] This section aims at summarizing the institutional characteristics from the past evidence while presenting the recent development.

A. Past evidence

The previous Dutch evidence regarding institutional settings focus on the role of corporate governance and investor protection. The Netherlands institutional settings are characterized by bank-based market, weak shareholder protection and undeveloped bond market.

Shareholder right

According to La Porta, Lopez-de-Silanes, Shleifer and Vishny (1998), the Netherlands belongs to the French-civil-law countries with the least investor protection rights. To compensate, French-civil-law countries normally have highly concentrated ownership. The previous Dutch evidence support this argument. De Jong and van Dijk (2007) show that equity ownership concentration ratio is very high and on average 41.5% of the equity is owned by three largest shareholders in the Netherlands. In spite of this, there are also evidence which shows that shareholder rights is restricted. The survey of Cools (1993) with 50 Dutch CFO reports that 38% of them rank

[6] Source: http://globaledge.msu.edu/countries/netherlands/economy. It is worth noting that differing from US whose recession started at 2007, the Netherlands entered the crisis a year later

[7] De Jong(2002) and De Jong and van Dijk(2007) focus on agency cost theory, De Bie and De Haan (2007) emphasize on market timing theory. De Haan and Hinloopen (2003) test pecking order theory.

shareholders as the most unimportant stakeholders. Additionally, the weak shareholder rights are worsened by entrenched mangers. Kabir, Cantrijn and Jeunink (1997) indicate that hostile takeover is rare in the Netherlands due to there exist strong anti-takeover defences against foreign influences and power of common shareholders. As a result, the discipline role of external market is diminishing and mangers tends to be more entrenched. Consolidating this argument, De Jong (2002), De Jong and van Dijk (2007)find that internal corporate control mechanism is more relevant in reducing agency costs and Dutch managers are entrenched in the way that they have a great deal of discretion over free cash flow.

Bank position

Except for shareholders, another prominent concentrated group in the Netherlands is banks. Chen and Jiang (2001) report that in 1995, the bank concentration ratio in the Netherlands was as high as 73.8% and 73% of the total share loans comes from bank. Originally, higher bank concentration functions as the substitute to investor protection mechanism and assets tangibility so that agency cost will be reduced (González and González, 2008). However, there are evidence which shows that the strong position of banks in the Netherlands has diminished the role of capital market. De Bie and De Haan (2007) find that firms tend to issue shares rather than bond in public capital market. This is inconsistent with strong pecking order that Dutch firms are following when making financing decisions. They attribute it to the underdevelopment of capital market.

B. Current evidence

This section aims to show the recent developments in terms of shareholder rights and bank position as well as the predicted impacts on Dutch financing choices.

Shareholder rights

The past evidences indicate that the Netherlands has weak shareholder protection. Table 2 depicts a recent rank with respect to investor protection index of countries that appear frequently in international studies. It can be seen that compared to other developed economies, the Netherlands still have a relatively weak shareholder rights, followed by Germany and France.

Table 2. Strength of shareholder protection

This table describe the rank of investor protection of 8 developed countries. The research was done by the organization *Doing Business Project*, who provides objective measures of business regulations and their enforcement across 189 economies and selected cities at the subnational and regional level. The most recent data was collected at June of 2013. This rank measures the strength of minority shareholder protections against directors' misuse of corporate assets for personal gain. The indicators distinguish 3 dimensions of investor protections: transparency of related-party transactions (extent of disclosure index), liability for self-dealing (extent of director liability index) and shareholders' ability to sue officers and directors for misconduct (ease of shareholder suits index). The data come from a questionnaire administered to corporate and securities lawyers and are based on securities regulations, company laws, civil procedure codes and court rules of evidence. The ranking on the strength of investor protection index is the simple average of the percentile rankings on its component indicators.

Country	Rank	Extent of disclosure index (0-10)	Extent of director liability index (0-10)	Ease of shareholder suits index (0-10)	Strength of investor protection index (0-10)
Belgium	16	8	6	7	7
France	80	10	1	5	5.3
Germany	98	5	5	5	5
Italy	52	7	4	7	6
Japan	16	7	6	8	7
Netherlands	115	4	4	6	4.7
United Kingdom	10	10	7	7	8
United States	6	7	9	9	8.3

Source: http://www.doingbusiness.org/data/exploretopics/protecting-investors

Bank position

On the other hand, a recent survey of Michon and Richinel (2013), the consultants of Orchard Finance--a Dutch consultancy company, has reported a fundamental change in debt market landscape.[8] According to their statistics, non-financial Dutch listed firms have significantly decreased their bank loan. Furthermore, they show that for the firms with credit ratings, capital market debt accounts for 75% of total debt while for the ones without credit ratings, the number is as low as 11% on account of the difficulty to access public debt market. With respect to the rationale behind this development, several reasons are presented. First of all, they lay out that since the onset of 2008 crisis, the emphasis of funding policy has shifted from optimizing financing costs to availability of funding. This is because Dutch firms target at avoiding liquidity problem by possessing sufficient funding for good investment opportunities. Additionally, the vast majority of the survey respondents report that the diversification of funding source and reducing reliance on bank debt serve as the major motives to raise capital market debt. This is because of the recently published Basel III requirements which states that banks need to maintain additional buffers and reduce risky activities.[9] It has become firms' concerns that the new liquidity regulation reduces the

[8] The survey was conducted in November 2011. It consists of answers from 40 Dutch CFO or group treasurer regarding the choices between bank debt versus non-bank debt

[9] A International framework for liquidity risk measurement, standards and monitoring, aims at promoting resilient banking and banking system

incentives for banks to offer long-term debt. When looking out for other funding source, the capital market debt becomes a popular alternative. Another reason for issuing public debt is that capital market providing debt instruments with longer maturity, which help them to reduce refinancing risk.

The publication of Kakebeeke (2014) on the Dutch financial newspaper *Het Financiële Dagblad* reports consistent findings. He indicates that since the bankruptcy of Lehman Brothers in the fall of 2008, the Dutch firms has changed their debt financing mix. As it is shown in Figure 1, by the end of 2013, the total amount of interest-bearing debt in the Netherlands is around € 86.5 billion, which is 7% less than same period in 2012. The proportion of bank loans (out of total interest-bearing debt) has experienced a sharp decrease from 34.4% in 2008 to 14.8% in 2013. What is more, it is also reported that the total interests-bearing debt accounts for around 28% of the balance sheet total while debt from bank has decreased to 15%.[10] Different from Michon and Richinel (2013), Kakebeeke (2014) argue that the most prominent reason for the sharply decreased Dutch debt position is that the Netherlands has stepped out of the crisis gradually and a substantial corporate profit (5.4%) has been made in 2013(it was 3.4% in 2012). Except for paying bank loans with internally generated fund, the debt replacement is not uncommon: in 2013 Dutch firms repaid more than €7.5 billion old loans where €2.9 billion is refinanced.

Another reason for the booming of Dutch corporate bond market can be attributed to lower interest rate. As it shows in Figure 2, ever since 2009, the corporate bond has had lower interest rate than bank loans.

In a nutshell, while shareholder rights remain weak for the Netherlands, the public bond market has experienced a drastic increase since onset of crisis period. However, due to the rise of bond market is expected to impose extra control on managers, it is expected that managers are less entranced as the past evidences suggest. In addition, the fact that Dutch firms prefer utilizing internal generated funds to pay off bank loan are in line with pecking order financing behaviour.

[10] The previous level is not known, the newspaper only indicates a decline

Figure 1. Landscape of interest-bearing debt of the Netherlands (in €Billion)

The table above give a numerical overview of the amount for each financing type while the figure beneath shows the percentages of bank loans in total intersect-bearing debt. Red stands for bank loans, blues stand for capital market debt and other interesting-bearing debt.

Financing type		2007	2008	2009	2010	2011	2012	2013
Interest-bearing debt	Bank loan	16.7	28.8	21.2	19.6	21.7	18.4	12.8
	Capital market debt and rest	48.4	55	57.6	60.2	64.1	74.7	73.7
Total interest-bearing debt		65.1	83.8	78.8	79.8	85.8	93.1	86.5
non-interest-bearing debt		93.7	103.9	100.7	108.3	114.8	119.8	117.4
Equity financing		96.8	77.4	84	100.4	101.2	105.1	106

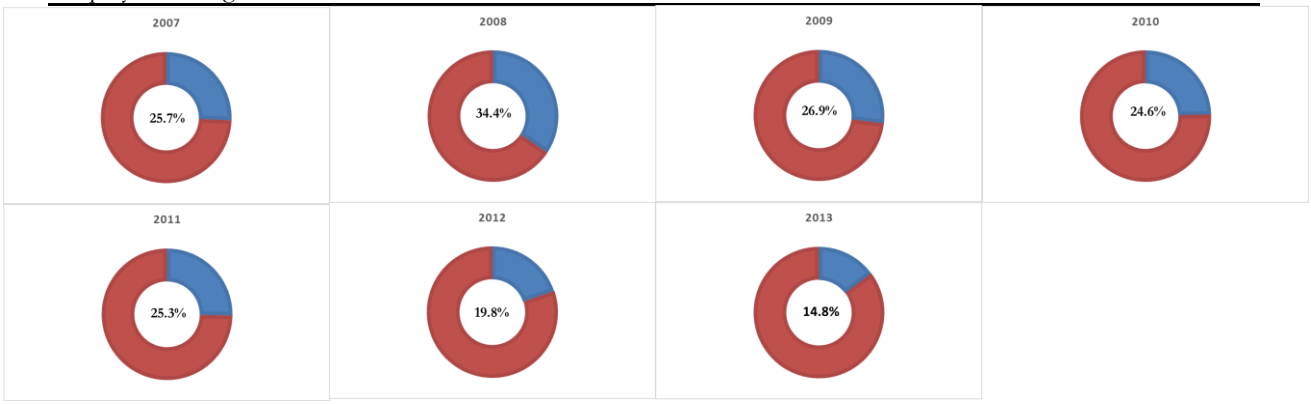
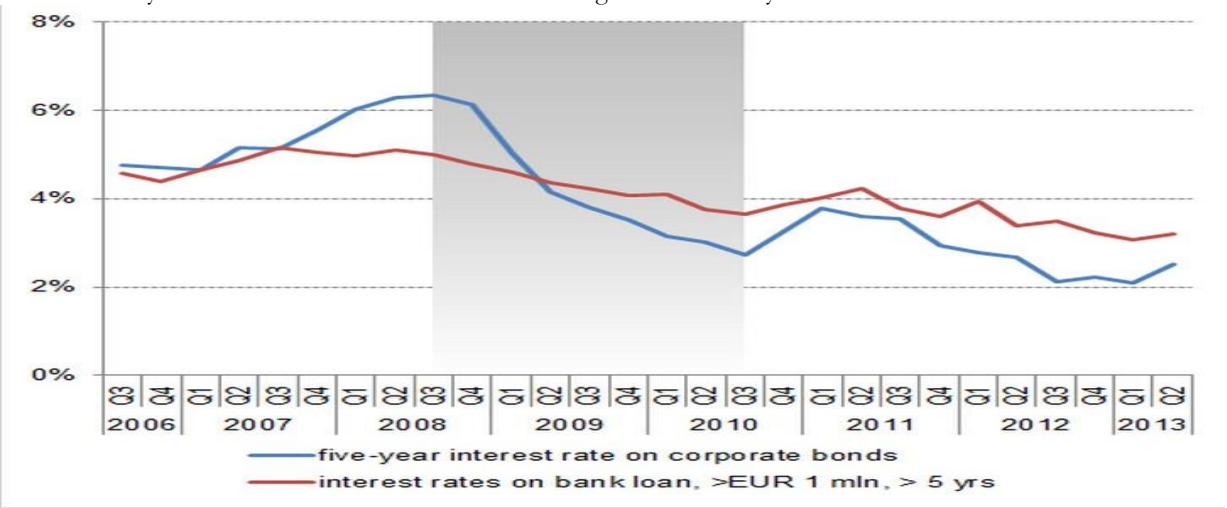


Figure 2. Five-year interests rate on corporate bonds and bank loans to non-financial corporations

This figure describes the trend of entreats rate of bank loan and 5 year interests rate on cooperate bond over 2006 to 2013. The 5-year bond rate is calculated based on the largest issuer— Royal KPN N.V.



Source: De Nederlandsche Bank statistics on MFI loans and their own calculations. The 5-year bond rate is calculated based on the largest issuer— Royal KPN N.V.

3. METHDOLOGY

The section 1 of this chapter critically reviews of available regression techniques in terms of capital structure study and provides justification of methodological choices of this study. The section 2 describes the data selection and sampling technique. In addition, the measurements of variables will also be discussed. The section 3 aims at giving an overview of sample data where the distribution, time series development, as well as correlations between all variables are analysed.

I. Research methods

The main empirical strategy of this study to explore capital structure determinants with panel data regression as the mainstream capital structure literatures (e.g. Rajan and Zingales, 1995; De Jong, Kabir and Nguyen, 2008). Panel data refers to data sets consisting of multiple observations on each sampling unit (Baltagi and Giles, 1998). According to Hasio (1986), panel data has several benefits and drawbacks. One advantages lies in it enables controlling for individual heterogeneity among sample firms (e.g. company culture) as well as time-series development of a single firm. In addition to that, cross-sectional and longitudinal data can be combined so that the effects that can never be shown by simply using one type of data can be seen. One limitations of panel data lies in data collection. For example the results will be biased when sample has incomplete accounts or the non-response rate is high. Another drawback which can cause distortion is the measurement error which happens when indicator variable does not represent latent variable or unclear questions during the interview.

Panel regression can be categorized into static panel model and dynamic panel model. Although this study utilize static panel model, each of them will be discussed.

A. Static panel model

In capital structure study, it is not uncommon that several static panel models are utilized jointly or separately to determine the factors that affect leverage level. Ordinary Least Squares (OLS) is the most prevalent and basic model that has been used for capital structure studies (e.g. Rajan and Zingales, 1995; Huang and Song, 2006). However, Wooldridge (2009) argues OLS is not able to deliver consistent estimators due to endogeneity problem. This problem arises when error terms are correlated with predictor variables and it poses threat to inference quality due to it leads to a looping causal relationship between predictors and responds variables. There are three causes of endogeneity problem: 1. Measurement error; 2. Auto-correlation and heteroscedasticity; 3. Omitted key explanatory variables. In order to mitigate those methodological concerns, some other static panel data models are also available.

The first problem arises when the nature of unobserved latent variables are not captured by proxies. Structural Equation Modeling (SEM) is one of the prevalent solution for this problem (Maddala and Nimalendran, 1996). There are two parts which are jointly determined in this model: a measurement model where observed proxies are expressed as a linear function of one or multiple attributes random measurement error, and a structural model where the relation between various leverage ratios and unobservable attributes are specified. The mechanism of this model lies in

minimizing the discrepancy of population covariance matrix and model-generated covariance matrix. Therefore, prior to interpreting the results, it is of vital importance to test the model's goodness-of-fit to the sample data in case misleading conclusions are generated.[11] Compared to conventional regression analysis, the advantages of SEM lie in 1. It is able to deal with more than one independent variables; 2.it solves the error-in-variable problem by confirmatory factor analysis, which tests how well hypothesized constructs fit the model. With identified model, SEM can estimate parameters with full information maximum likelihood that provides consistent and asymptotically efficient estimates. Nevertheless the problem arises when too many latent variables are introduced: using proxies as instrumental variables results in poor instruments (Maddala and Nimalendran, 1996).Titman and Wessel (1988) construct 8 latent variables with 15 indicator variables and they only find 4 significant ones due to selected proxies do not fully reflect the latent variables.[12] Additionally, it is worth noting that De Jong and van Dijk (2007) conduct a novel research where questionnaire data are quantitated with SEM. By doing so the major threats of survey technique--validity and reliability, are mitigated. Building on the study of Titman and Wessel (1988), Chang and Lee (2009) attempt to improve the model efficiency by using a reduced form of SEM--Multiple Indicators and Multiple Causes, as suggested by Maddala and Nimalendran (1996). Although they manage to acquire more significant results[13], the measurement problem that no unique representation of latent variables still exists. Realizing the unfruitful performance of SEM, Frank and Goyal (2009) alternate the reliability test by using Bayesian Information Criterion (BIC) to select reliable factors.[14] When fitting models, the over-fitting problem occurs when likelihood can be increased simply by adding more parameters. BIC solves the problem by introducing penalty terms for the number of parameters in the model. Following Frank and Goyal (2009), Chang, Chen, and Liao (2014) is also able to identify four core leverage determinants for Chinese listed firms with BIC.[15] The result differs from Frank and Goyal (2009) due to institutional settings.

The second cause of endogeneity is not as threatening as the first one due to the availability of mathematical tools. Autocorrelation occurs when variables are correlated with itself in the previous period. It violates the regression analysis assumption in the way that it leads to correlated error terms. According to Wooldridge (2009), autocorrelation only causes severe problem to macro panel data with over 20 or 30 years of observation, therefore it is not a significant issue for this study which has a micro panel data of 9 years. Another assumption of OLS is homoscedasticity—constantly distributed standard error of disturbance. Wooldridge (2009) argues that the existence of heteroscedasticity makes OLS not the optimal model due to it gives all observations equal weight. As a result, it produce biased standard errors thus biased confidence interval and test statistics. The impact can be mitigated by reporting heteroscedasticity-consistentent standard errors.

The third cause of endogeneity--omitted explanatory variables, has two prevailing remedies: 1) Two-stage Least Squares (2SLS); 2) Fixed Effects Model (FEM) or Random Effects Model (REM).

[11] There are many available goodness-of-fit indices (such as Non-Normed Fit Index, Root Mean Square of Error Approximation, Comparative Fit Index)which will not be discussed at length here due to irrelevancy

[12] The significant factors are uniqueness, size, profitability and industry classification, while non-debt tax shield, volatility, collateral value and growth are not significant

[13] They utilize the same set of variables as Titman and Wessel (1988) and find 7 significant factors, which are growth, profitability, collateral value, volatility, non-debt tax shields, uniqueness, and industry.

[14] Core factors in Frank and Goyal(2009): industry median leverage, tangibility, MB ratio, profitability, log of assets, and expected inflation

[15] Core factors in Chang, Chen, and Liao (2014): Profitability, growth opportunities, tangibility and size

2SLS remedies the problems of omitted explanatory variables and/or measurement error in the way that it replaces endogenous variables with instrument variables which are correlated with but exempt from correlation with error terms (Wooldridge, 2009). On the other hand, it is also subject to some drawbacks: first of all, due to the correlation of instruments variables and error terms cannot be measured readily, on the condition that they correlated, inconsistent estimators will be generated; secondly, when weak instruments are selected, the overall outcome will be of little variance.

FEM deals with the problem where there exist individual fixed effects that are correlated with error terms. In other words, if FEM is assumed, it is imposed that error terms contain time-invariant factors (mostly firm- or year-specific) that are correlated with explanatory variables. Therefore, by including dummy variables, FEM is able to enhance explanatory power of panel regression. Random Effects Model (REM) is a special format of FEM. It differs from FEM in the way that it requires error term cannot be correlated with predictor variables which allow fixed effects factors to become explanatory variables. What is more, another important assumption which cannot be violated is no autocorrelation. The efficiency of FEM are well documented in capital structure studies: by comparing pooled OLS and FEM, Bevan and Danbolt (2004) find that the results of pooled OLS are overturned by results of FEM, this suggests that failing to control firm specific effects introduces bias in analysing corporate capital structure; similarly, Chen (2004) also compares the results of FEM, REM as well as pooled OLS and she find that FEM gives higher explanatory power. With respect to Dutch studies, Chen, Lensink and Sterken (1999) utilize FEM as well to counteract the problems of heteroscedasticity and autocorrelation. On the other hand, Serrasqueiro and Nunes (2008) also document that the results of FEM do not have substantial differences with OLS.

B. Dynamic panel model

On the other hands, some scholars also place emphasis on the incremental capital structure choices with dynamic panel data models. Incremental capital structure choice is beyond the objective of this study, only a brief overview is provided here. The static panel models differ from dynamic models in terms of exclusion of temporal dependence of dependent variable (lags) as explanatory variable. The problem of correlation between error terms and firm fixed effects is solved by first differencing method (FD) which has a similar function as FEM/REM—to control for time-invariant effects(Wooldridge, 2009). FD eliminates those effects by regressing changes in dependent variable on changes in independent variables. However, the problem arises where first difference of error term is correlated with first difference of lagged dependent variables. In order to solve the problem, Arellano and Bond (1991) propose a difference General Methods of Movement model (GMM) which obtains estimators that are generated by moment conditions of all lagged dependent variables(as instruments) and differenced error term. However, when fixed effects are explanatory variables, difference GMM model is by no means the most appropriate model. To solve the problem, Blundell and Bond (1998) propose a system GMM model where first difference of lagged dependent variable serves as instrument of lagged dependent variable. In light of capital structure studies, GMM is mostly utilized as the model to measure adjustment speed towards target leverage ratio and its superiority has been confirmed (e.g. Ozkan, 2001; Getzmann, Lang and Spremann, 2010). Nevertheless, its benefits are limited to panel data with short time series and large observation number. Additionally, due to GMM utilizes instrument variables, the

methodological concerns arise when error term is serially correlated and/or the validity of instrument variables are low.

Another popular technique for incremental capital structure choices is logistic regression (See De Jong and Veld, 2001). It is suitable to model the relationship between binary dependent variables and some independent variables. In other words, it describes the conditional probability of the outcomes as functions of various independent variables. For example, De Jong and Veld (2001) utilize logistic regression to model probabilities of issuing debt/equity. Unlike common linear regressions, logistic model do not require linear relationship between dependent variables and independent variables. However, similar as GMM, logistic regression model requires a large sample size to ensure estimation efficiency.

C. Model justification

Following Chen, Lensink and Sterken (1999), Chen (2004), Bevan and Danbolt (2004), Delcoure (2007), this study will adopt FEM/REM. The reasoning is three-folded: 1) the assumption of OLS which is homogeneity is violated. Each regression is checked with Breusch-Pagan / Cook-Weisberg test for heteroskedasticity whose null hypothesis is equal error variances. The results are all significant at 1% level. This means that null hypothesis is rejected and heteroskedasticity does exist and OLS is not the optimal choice in this case; 2) Failing to control for unobserved firm-specific fixed effects will generate biased study results; 3) when looking at the results of the F test, all regression have significant result(at 1% level). This indicates that the fixed effects intercept is significant thus FEM is more suitable.

II. Data

Prior to discussing variable measurements, it is worth noting that these variables have been interpreted intuitively by different researchers, therefore discrepancy exists in terms of determining indicator variables. However, the extent to which indicator variables represent hypothesized constructs is not the major concern of this study, thus it is assumed that the selected proxies are exempt from measurement errors.

A. Sample

The studying sample contains Dutch listed firms that have active status.[16] All data are collected from the database *Orbis*. The financial and utility firms are excluded because their capital structures tend to be different than other industries.[17] The sample period covers the years from 2004 to 2012, and it is required that sample firms need to have available accounts during the entire sample period.[18] Furthermore, due to independent variables are scaled by total assets or sales, firms with negative or missing value of these two accounts are excluded as well. Therefore, out of 185 Dutch listed firms, the number of the final sample is 71. Additionally, on account of firms with incomplete data set are not excluded,[19] this study has an unequal yearly observations (unbalanced panel data).

[16] Active status indicates firms that are not in default of payment or dissolved due to liquidation, bankruptcy, mergers and take-over.

[17] Firms primary activities are defined in accordance with US SIC where Utility firms are coded as 4900-4999 and Financial firms as 6000-6999

[18] The reason why 2004 is chosen is because firms' accounts is available from 2004; due to the inclusion of 2013 accounts largely reduces sample size, the ending year is set to be 2012.

[19] Some specific items that are needed to calculate independent variables are not reported in *Orbis*

Last but not least, for the purpose of retaining statistical power, a winsorization of 1% at both tailed is conducted for each variable.

B. Measurements of capital structure

While total and long term leverage are the main focus in capital structure studies, it is common practice to include short leverage to inspect differences (e.g. Rajan and Zingales, 1995; Frank and Goyal, 2009). The reason why short term leverage is different in nature is because it consists predominantly of trade credits which may contain complete different determinants than long term leverage (De Jong, Kabir and Nguyen, 2008). Previous Dutch evidences place focus mainly on long term leverage (Chen, Lensink and Sterken, 1999; De Jong, 2002; De Jong and van Dijk, 2007) while the role of short term leverage remains overlooked. Due to this study incorporates the crisis period which is claimed to have detrimental impacts on access to long term leverage while the usage of short term leverage is encouraged (Custódio, Ferreira and Laureano, 2013). Consequently, in addition to long term leverage, the determinants of short term leverage and total leverage will also be investigated in this study.

Another measurement debate lies in whether to use book or market leverage. On one hand, a plenty of debates have taken place over if market value or book value should been utilized. Myers (1977) support the book value due to debt is backed by assets in place rather than growth opportunities. Another concern of market value lies in sometimes it fluctuates to a large extent and its reliability should be questioned. On the other hand, the scholars who are in favor of market value argue that book value is meaningless and merely a number on balance sheet which enables credit and debit accounts in balance. In contrast, the market is more often than not forward looking. Frank and Goyal (2009) pinpoint this view by showing that when testing market value against book value, market leverage shows higher consistency and explanatory power. Titman and Wessel (1988) are the first ones who propose that market leverage causes spurious relationship with proxy of growth opportunities (MB ratio).

Conventionally, the Dutch evidences are more in favor of book value. De Bie and De Haan (2007) argue that market value causes spurious relationship with MB ratio. Similarly, Chen, Lensink and Sterken (1999) report that compared to book leverage, market leverage is more volatile across time and firms. Alternatively, the importance of book leverage has received support with survey evidence: concluding from the interviews with 50 Dutch CFOs, Cools (1993) finds that market value is difficult to apprehend thus barely being used in capital structure measurements. Nonetheless, it is worth noting that there is no sign which shows the superiority of one of these two measures in terms of consistency in this study. Therefore both empirical results of market and book leverage are reported.

C. Measurements of independent variables

Following De Jong and van Dijk (2007), business risk is measured by standard deviation of changes in sales (EVS) and operating income (EVO) over 3 years in this study. In fact, De Jong and van Dijk (2007) use 5 years. An improvisation has been made here due to the number of observations would be decreased drastically with 5-year measurements; Tax rate (TAX) is measured as effective tax rate instead of marginal tax rate. This is because De Jong, Kabir and Nguyen (2008) argue that marginal tax rate capture the effect of incremental debt level changes while effective tax rate concerns about debt level itself; Following Jensen (1986), free cash flow (FCF) is measured as operating income minus taxes, interests and dividend, divided by total assets; Following De Jong

and van Dijk (2007), liquidity is measured as cash and equivalent over total assets; Following Rajan and Zingales (1995), the market to book ratio(MBR), which is measured as market value over book value of stock, is utilized as a proxy for growth opportunities; Titman and Wessel (1988) measures uniqueness as R&D expenses and other operating costs over total sales, due to advertising cost is not reported in the *Orbis,* other operating expense is utilized in this study;. Following Chen and Jiang (2001), Frank and Goyal (2009), Size is measured as logarithm of total employee number (SIZE_1) and total assets (SIZE_2); Following Chen. Lensink and Sterken (1999), profitability is measured as EBITDA over total assets; Following De Jong(2002), this study uses the ratio of inventory plus fixed tangible assets over total assets as the indicator of tangibility(TAN).

III. Empirical model

For the purpose of alleviating the potential reverse causality, the independent variables are lagged by one year. It is worth noting that many studies have adopted a smoothed series method where independent variables are measured as average value of several years (e.g. Titman and Wessel 1988; Rajan and Zingales, 1995). However, due to the number of observations will be reduced to a great extent by smoothing data, it is determined independent variables will be lagged only by one year in this study. Following Chen (2004) who has compared the results of three panel regression techniques (OLS, FEM and REM), the basic regression model is described as follows:

$$y_{i,t-1} = \alpha + \beta X_{it} + u_{it} \qquad i=1,\ldots\ldots,71;\ t=2,\ldots\ldots,9 \qquad (1)$$

Where *I* denotes cross-sectional dimension while *t* denotes time dimension. *y* refers to leverage ratios. α refers to constant. X_{it} refers to $K\times1$ vector of observations on *K* explanatory variables for the *i*th firm in the *t*th period, β *is* $K\times1$ vector of parameters, u_{it} is error terms and is defined as:

$$u_{it} = \mu_i + \mu_t + \varepsilon_{it} \qquad (2)$$

Where μ_i and μ_t denote time-invariant firm-specific effects and firm-invariant time-specific effects respectively. ε_{it} refers to represents the reminder error terms. Unobserved firm-specific effects that have significant impact on leverage are captured by μ_i, this varies with firms but for each firm is constant. Examples are managerial risk appetite and motivation; time-specific effects are captured by μ_t where at a given point of time the effects are same for all sample firms but it varies with time. The examples are macroeconomics factors such as inflation rate and term spread.

To determine between FEM and REM, the Hausman test whose null hypothesis is uncorrelated repressors and unobservable fixed effects is utilized. Significant results refers to rejected null hypothesis thus FEM is more suitable, otherwise REM will be used. On the condition that REM is chosen, Breusch-Pagan Lagrange multiplier test whose null hypothesis is 0 variances across entities is utilized to choose between OLS and REM. The significant result refers to there exists significant difference between firms, thus REM is more suitable in this case. In addition, F test is also reported to show if all coefficients in the model are different from 0.

Besides, several methods will be adopted to mitigate methodological concerns of the sample data:1) captured time-specific effects; 2) the reported standard error will be heteroscedasticity- and

autocorrelation-consistent; 3) reverse causality will be dealt with by using lagged dependent variables; 4) level of multicollinearity will be tested with Variance Inflation Factor (VIF).

4. DESCRIPTIVE STATISTICS

This chapter firstly give an overview of descriptive statistics of all variables. Then it visualizes the time-series trend of dependent variables. Subsequently, the comparisons before and after entering crisis period will be made. In the end, a correlation matrix will be presented to analyse inter-relationships between all variables.

Table 3 depicts the descriptive statistics for sample firms over the time period 2004 to 2012. The results will be compared to previous Dutch evidences, and the comparison of mean and (or) median value is subject to evidence availability. What is more, in order to enhance the comparability, only the proxies that are of same measurements are to be discussed. In terms of debt structure, it can be seen that long term debt accounts for larger proportion of total debt. This is consistent with pervious Dutch evidences (e.g. De Jong and van Dijk, 2007). Conventionally, Dutch evidences place emphasis on long term book leverage (LBL). In this study, the mean value of LBL is 0.1384. This number is slightly higher than 0.132 and 0.1289 which are reported by De Jong (2002) and De Jong and van Dijk (2007) respectively. The market value of long term debt can be found in international studies. The mean and median of long term market value are 0.102 and 0.091 in this study, this shows slight increase compared to the international evidences of De Jong, Kabir and Nguyen (2008) , Cheng and Shiu (2007) who report 0.091 vs 0.073 , 0.093 vs 0.065 for Dutch firms. In terms of short term debt, the only comparable results lies in De Jong and van Dijk (2007) who report that the mean debt maturity (short term book leverage over long term book leverage) is 0.435. Due to debt maturity is not included in the study as an independent variable, its descriptive statistics are not reported. Nevertheless, in order to be able to compare the results, the mean debt maturity is calculated as 0.5260(0.0728/0.5260), which bears out significantly higher than previous evidences. To conclude, compared to previous evidences, although both long term and short term debt see increases, the magnitude is larger for short term debt.

With respect to independent variables, some development can be detected compared to previous evidences. When measuring business risk, De Jong and van Dijk (2007) show that mean of the standard deviation of changes in sales (EVS) are 0.208 while the result of this study is 0.2523. This suggests that sales performance tend to get more volatile. However, the other measurement, standard deviation of changes in operating income(EVO), shows high level of abnormality due to some sample firms have experienced tremendous changes with respect to operating income. Compared to 0.035 and 0.026 which are reported by De Jong (2002), the mean and median value of EVO in this study are 2.2692 and 0.8086. The mean value suggests a severally left-skewed distribution while the median value suggests that business risk has increased significantly when measured with EVO. The results for two proxies of business risk shows that despite some sample firms have steady sales, their operating income is very volatile. And this is probably because of fluctuated operating expenses. Similarly, as one of the proxies for non-debt tax shield, mean value of depreciation over total assets (NDTS_1) in this study is 0.0584, which is higher than results (0.053) of De Jong and van Dijk (2007); in contrast, this study shows the mean value of the second proxy—provision over total assets, is lower than Chen and Jiang (2001) reported (0.0392 vs 0.121). Furthermore, it can be seen that the mean value of effective tax rate (TAX) is 0.1370. Nevertheless, due to there exists extreme negative value (e.g. -2.833), the median value of 0.2260 is more suitable to describe the sample average level. It is worth noting that this extreme value suggests that some

sample firms have made enormous operating losses, which is consistent with the behaviour of EVO. In terms of empirical evidence, De Jong, Kabir and Nguyen (2008) have reported that the mean and median value of TAX for Dutch firms are 0.2431 and 0.2901, which tend to be higher than this study. The mean and median value of free cash flow (FCF) are -0.0271 and 0.0100 in this study while De Jong (2002) report 0.030 and 0.032 respectively. It is speculated that recession has reduced firms' free cash flow to a large extent. And this assumption is verified with analysis from Table 4. Contrarily, the mean value of LIQ (measured as cash and equivalents over total assets) is 0.1141, which is slightly higher than what De Jong and van Dijk (2007) have reported (0.099). The mean and median value Market to book ratio (MBR) in this study are 2.2751 and 1.728, which are slightly higher than De Jong, Kabir and Nguyen (2008)'s finding(2.388 vs 1.459). Uniqueness which is measured by other operating expenses over sales(UNIO) are does not have coincide evidences, however, the large standard deviation shows that it is the partial cause of greatly fluctuation operating income. When uniqueness is measured with R&D expenses over total sales (UNIR), the mean and median value are 0.2990 and 0 in this study, while De Jong and van Dijk (2007) reported mean value as 0.053. The existence of extremes value (e.g. 22.9290) makes mean value a bad measurement of sample average level, therefore it concludes that this study shows relatively lower average UNIR compared to previous evidence. Size are measured with natural logarithm of total employee number (SIZE_1) and total assets (SIZE_2). In order to make meaningful comparison, the actual value instead of logarithm value is reported. In this study, the mean and median value to total assets are 33,378 €million and 3,333 €million while De Jong (2002) report 3,299 €million and 444 €million. Apparently nowadays Dutch firms tend to possess significantly more assets. The same goes with employee number: this study reports mean and median value of employee number of 10,776 and 2,483 while Chen, Lensink and Sterken (1999) report mean value as 1,858. Due to there exists firms with extreme large employee number, the median value is more appropriate to describe sample average level. The result suggests that Dutch firms tend to have more employees compared to previous evidences. The mean and median value of profitability (PROF) in this study is 0.1014 and 0.1105, which are slightly lower than De Jong, Kabir and Nguyen (2008) who reported 0.101 and 0.135 for Dutch firms. The mean and median of tangibility (TAN) are 0.3408 and 0.3402 in this study, which are lower than the value 0.6362 vs 0.6583 and 0.556 vs 0.586 that are reported by Chen, Lensink and Sterken (1999) and De Jong (2002) respectively. This could suggest that Dutch firms are holding less collateral assets nowadays. To conclude, compared with previous evidence, the values of variables EVO, EVS, NDTS_1, SIZE_1, SIZE_2 and MBR are higher while the values of NDTS_2, TAX, FCF, LIQ, UNIR, PROF and TAN.

As it is mentioned above, besides average level, the distribution of the sample deserves attention as well. Since the sample size of this study is quite small, in order to keep up the statistical power, winsorization is conducted at 1% only. Apparently this is not able to eliminate all extreme values. Except for TAX, SIZE_1, PROF and TAN whose mean values are rather close with median values, all other variables show much higher mean values compared to median values. This suggests that there exist extremely large numbers (left-skewed): EVO has 0.1250 at 10^{th} percentile while at 90^{th} percentile the value increases up to 5.2894. Similar pattern can be found for MBR. In addition, the fact that 50^{th} percentile of UNIR is 0 suggests that half of the sample firms do not invest in R&D.

Table 3 Descriptive data of Dutch listed firms 2004-2012

This table is displayed after a 1% winsorization at both tails. STD stands for standard deviation and N stands for number of observations. The unit of measurement of EN (employee number) is person and for TA (total assets) is €million. In addition, financial, utility firms and those with negative values of total assets and sales are excluded, see Appendix I for definitions of variables.

Variable	N	Mean	STD	Min	Max	Distribution		
						10th	50th	90th
Dependent variables								
LML	535	0.1020	0.0951	0.0000	0.4380	0.0000	0.0910	0.2246
LBL	624	0.1384	0.1375	0.0000	0.7680	0.0000	0.1185	0.2925
SML	540	0.0663	0.0883	0.0000	0.4630	0.0000	0.0360	0.1736
SBL	635	0.0728	0.0899	0.0000	0.4300	0.0000	0.0440	0.1890
TML	533	0.1682	0.1280	0.0000	0.5650	0.0064	0.1530	0.3212
TBL	621	0.2120	0.1642	0.0000	0.8518	0.0060	0.1960	0.4080
Independent varaibles								
EVS	426	0.2523	0.4452	0.0120	3.0580	0.0364	0.1245	0.4990
EVO	426	2.2692	4.2933	0.0440	31.4830	0.1250	0.8060	5.2894
NDTS_1	614	0.0584	0.0688	0.0030	0.4740	0.0150	0.0410	0.1095
NDTS_2	535	0.0392	0.0401	0.0000	0.2400	0.0030	0.0280	0.0842
TAX	637	0.1370	0.4869	-2.8330	1.7210	-0.0996	0.2260	0.3650
FCF	550	-0.0271	0.2276	-1.9090	0.2490	-0.1039	0.0100	0.0670
LIQ	637	0.1141	0.1183	0.0000	0.5880	0.0070	0.0760	0.2710
MBR	544	2.2751	2.5021	-0.1770	20.3160	0.6375	1.7280	3.8695
UNIO	639	0.8559	2.8801	0.0530	27.7670	0.1490	0.4130	0.9610
UNIR	583	0.2990	2.3888	0.0000	22.9290	0.0000	0.0000	0.0720
SIZE_1	617	3.3075	0.8830	1.6020	5.0920	2.0680	3.3950	4.4264
EN	617	10,776	22,748	40	123,428	117	2483	26651
SIZE_2	639	5.5243	0.9688	3.6700	7.8700	4.2720	5.5010	6.8580
TA	639	33,378	100,875	46	741,284	187	3170	72181
PROF	584	0.1014	0.1270	-0.6080	0.4410	0.0090	0.1150	0.2065
TAN	639	0.3408	0.2394	0.0090	0.8290	0.0340	0.3420	0.6640

Figure 3 shows a time series trend of 6 leverage measures. It can be seen that from 2004 to 2007, long term leverage and total leverage show strong resemblance where a general trend of decrease is revealed from 2004 to 2006 and an upward trend is seen from 2006 to 2007. During the same period, short term leverage differ from long term and total leverage in 2006-2007 in the way that an apparent downward trend is captured. From 2007 to 2008, a general trend of fast increase for each leverage measure can be seen (especially for market leverage). Reaching peaking at 2008, from 2008 to 2009, total leverage and long leverage show a sharp decrease trend while short term leverage flatten out. In 2009-2010, all leverage measures show a steady decreasing trend. In 2010-2012, total leverage and short term leverage show a strong resemblance in the way that they both increase from 2010 to 2011 while decrease slightly from 2011 to 2012. During the same period, long term leverage are stabilized.

Three conclusions are derived from this trend analysis. First of all, consistent with aforementioned analysis, credit crisis which commences at 2008 has discouraged the usage of long term debt to a large extent. Simultaneously, the usage of short term debt has been popularized. Secondly, as it is argued by De Jong, Kabir and Nguyen (2008) -- short term leverage is different in nature compared to long term leverage, this study discovers that there is a great deal of resemblance between the trends of long term and total leverage. However, it may not be appropriate to utilize long term leverage as the only dependent variables due to the role of short term leverage is non-trivial as well. In other word, in this study, total leverage depict a more comprehensive picture of corporate borrowing variations.

Figure 3. Longitudinal trend of leverage ratio for Dutch listed firms

This Figure shows a time-series trend for 6 leverage measures for the sample Dutch listed firms from 2004 to 2012. The definitions of leverage can be found in Appendix I. Financial, utility firms and those with negative values of total assets and sales are omitted. A 1% winsorization is conducted at both tails.

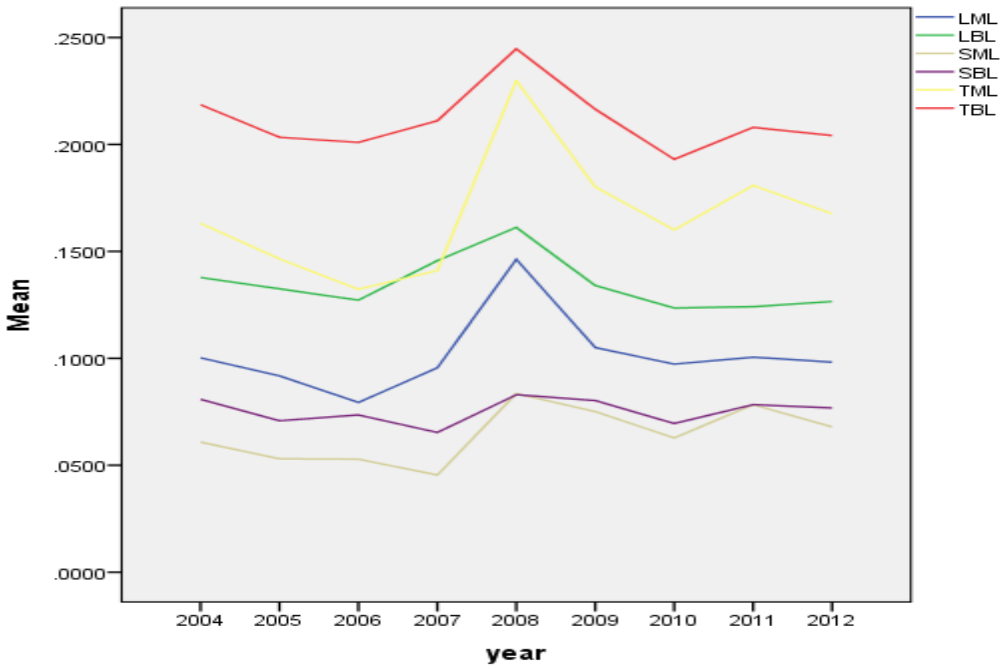


Table 4 aims at inspecting the mean differences of each variable during non-crisis period and crisis period. The rational is fairly straightforward-- since the onset of the crisis period, Dutch firms have had shifted the financing focus from bank loans to public debt market[20]. Therefore, it would be of great value to check the development in terms of various debt structures (e.g. public debt vs private debt, bank loans vs public market debt etc.) and their determinants before and during crisis period. Unfortunately, the lack of data eliminates the possibility to decompose debt into more detailed structure other than long term and short term debt. Nevertheless, the mean differences of all valuables in this study can be examined.

In terms of dependent variables, it can be seen that among 6 leverage ratios, all market leverage show increases compared to non-crisis period, during which only the increase of SML and TML are statistically significant. That is to say, the increase of total debt is predominantly caused by short term debt. This phenomena is consistent with the US evidence of Custódio, Ferreira and Laureano (2013) who argue that financial crisis has made firms adopt more short term debt due to crisis has created shocks on supply of long term debt.

In terms of independent variables, it is worthy of attention that two proxies of non-debt tax shield show different development-- NDTS_1 experiences a highly significant increase while NDTS_2 has a relatively less significant decrease. This result is consistent with the development compared with previous Dutch evidences (see analysis for Table 3). On the other hand, not surprisingly, FCF, LIQ, PROF and MBR see significant decline during crisis period. It is because when the worsening earning performance has reduced the free cash that firms holds, as a result, the growth opportunities decreases accordingly when less investments are made due to lack of fund. This is consistent with argument of Campello, Graham and Harvey (2010) who states that firms tend to cut expenditures to counteract the earning crisis during recession period. The decreased investment of Dutch firms can also be pinpointed by the insignificant decline of UNIR and TAN. What is more, despite the detrimental impacts of crisis period, two measures of size (SIZE_1, SIZE_2) both show insignificant increases.

[20] Here refers to the sub-section c*urrent evidence* of section **Dutch institutional settings pertaining capital structure choices** in chapter 2

Table 4 Descriptive statistics for crisis and non-crisis period

This table reports the descriptive statistics of sample firms in two sub-periods: crisis period and non-crisis period. 2008 is excluded to due to it is a mixture of both periods. EVO and EVS have relatively less observations in non-crisis period is because they are calculated over a three year period, therefore, due to data availability, the values of year 2004 and 2005 are missing. Financial, utility firms and those with negative values of total assets and sales are excluded. The sample is winsorized at 1% at both tails. Difference denotes the changes between mean values of variables of crisis and non-crisis period, test of the significance is based on t-test for two samples. *, ** and *** denote significance level at 10%, 5% and 1%.

	2004-2007			2009-2012			Difference
Variable	N	Mean	Median	N	Mean	Median	
Dependent variables							
LML	216	0.0915	0.0790	256.	0.1000	0.0915	0.0085
LBL	274	0.1360	0.1180	280	0.1346	0.1135	-0.0014
SML	218	0.0532	0.0280	259	0.0731	0.0380	0.0200***
SBL	283	0.0712	0.0440	282	0.0728	0.0415	0.0016
TML	215	0.1452	0.1280	255	0.1723	0.1580	0.0271**
TBL	273	0.2063	0.1940	278	0.2099	0.1890	0.0036
Independent varaibles							
EVS	71	0.2601	0.0990	284	0.2398	0.1315	-0.0203
EVO	71	1.9672	0.4670	284	2.3138	0.9555	0.3466
NDTS_1	275	0.0499	0.0360	270	0.0655	0.0420	0.0156***
NDTS_2	242	0.0433	0.0340	236	0.0363	0.0260	-0.0071*
TAX	282	0.1290	0.2530	284	0.1324	0.1895	0.0034
FCF	236	0.0067	0.0190	251	-0.0570	0.0010	-0.0637***
LIQ	282	0.1293	0.0910	284	0.1023	0.0720	-0.0270***
MBR	220	2.7671	2.2700	260	2.0381	1.3765	-0.7290***
UNIO	284	0.8259	0.4080	284	0.8698	0.4225	0.0439
UNIR	259	0.3111	0.0000	259	0.2691	0.0000	-0.0420
SIZE_1	270	3.2566	3.3175	279	3.3351	3.4650	0.0785
SIZE_2	284	5.4546	5.4345	284	5.5832	5.5665	0.1286
PROF	260	0.1224	0.1300	259	0.0809	0.0970	-0.0414***
TAN	284	0.3525	0.3645	284	0.3314	0.3405	-0.0211

Table 5 shows a correlation matrix for all variables. In the first place, the relationship between all leverage measurements and independent variables are examined. It can be seen that long term leverage are and significantly correlated with short term and total leverage while short term leverage are only significantly correlated with total leverage. This is consistent with the descriptive analysis of leverage measurement so far. Furthermore, as the proxy for business risk, EVS shows a negative correlation with each leverage ratio, however, the only significant relationship is found to be with total market leverage. EVO shows mixed and insignificant sign. Similarly, the proxies for tax benefits--NDTS_1, NDTS_2 and TAX, show insignificant and mixed correlation with each leverage measurement as well. Additionally, as expected from pecking order theory, LIQ has highly significant and negative correlation with each leverage measurement while FCF is positively correlated with long term and total book leverage. Consistent with argument which states MB ratio

causes spurious relationship with market leverage (Titman and Wessel, 1988), MBR shows mixed sign with market and book leverage. In contrary to trade-off theory, UNIO and UNIR are positively correlated with long term and total leverage. This could suggest that uniqueness is a highly significant capital structure determinant, but it has a reverse impact on leverage as predicted by agency theory. Size and their squared terms are positively correlated with long term leverage and total book leverage while the correlations. This signals size have reverse impacts on short term and long term leverage. In addition, the correlation signs of size and their squared terms are not reverse, the assumption of non-linearity might be not significant. As expected by pecking order theory, PROF is negatively correlated with both short term leverage and total market leverage. However, its correlation with long term book leverage is positive. TAN is positively correlated with all leverage measurements as trade-off theory.

In terms of relationship between each independent variable, there are also some interesting discoveries. It is worth noting that only statistically significant results will be discussed here. First of all, the relationship between variables that have alternative measurements are reported. Consistent with analysis from descriptive statistics, the correlations between EVO and EVS is fairly low and insignificant. In order to rule out the impact from extreme value, the correlation has been retested when data is winsorized at 5% at each tail. The result is not altered either with each leverage measurement or EVS. Similarly, the correlation between NDTS_1 and NDTS_2 has no economic significance (0.095, significant at 5%). On the other hand, UNIO and UNIR, SIZE_1 and SIZE_2 are found to be statistically and significantly correlated (0.969 and 9.906, both significant at 1% level). This suggests that they are ideal alternative measurements.

Secondly, the intra-relationship with each independent variable shall be analyzed to detect multicollinearity, whose impact lies in altering variable significance and coefficient sign. It is noticed that FCF and PROF (0.771, significant at 1% level), UNIO and PROF (-0.514, significant at 1% level), NDTS_1 and FCF (-0.584, significant at 1% level) those three pairs show high correlation. This may pose threat to efficiency of estimation results. In order to rule out the impact multicollinearity, the regression analysis will take out PROF and Size squared terms to compare the results.

Table 5. Correlation matrix

This table presents correlation coefficients between lavage measures and their determinants over the time period 2004 to 2012. The variables are defined in Appendix I. Leverage ratios are measured as lagged value of 1 year. ** and * denote correlation significance at 0.01 level and 0.05 level respectively(2-tailed).

	LML	LBL	SML	SBL	TML	TBL	EVS	EVO	NDTS_1	NDTS_2	TAX	FCF	LIQ	MBR	UNIO	UNIR	SIZE_1	SIZE_1²	SIZE_2	SIZE_2²	PROF	TAN
LML	1																					
LBL	.862**	1																				
SML	-.035	-.117*	1																			
SBL	-.036	-.053	.923**	1																		
TML	.735**	.578**	.649**	.594**	1																	
TBL	.675**	.825**	.480**	.511**	.842**	1																
EVS	-.099	-.065	-.044	-.009	-.124*	-.069	1															
EVO	.020	-.045	.041	-.018	.043	-.049	.029	1														
NDTS_1	-.060	-.023	.032	.032	-.020	.005	.127*	.122*	1													
NDTS_2	.009	.003	-.049	-.027	-.024	-.006	-.092	.146**	.095*	1												
TAX	.006	-.022	-.012	.017	-.012	-.016	-.108*	-.165**	-.082*	-.037	1											
FCF	.008	.042	-.090	-.117**	-.052	-.027	-.286**	-.113*	-.584**	.002	.091*	1										
LIQ	-.202**	-.183**	-.312**	-.365**	-.363**	-.357**	.293**	-.024	.050	-.134**	-.110**	-.140**	1									
MBR	-.064	.208**	-.101*	-.005	-.102*	.201**	-.050	-.015	.077	.037	.027	-.015	.062	1								
UNIO	.038	.012	.133**	.116**	.126**	.097*	.429**	-.030	.130**	.001	-.051	-.369**	.271**	.149**	1							
UNIR	.063	.039	.105*	.098*	.117*	.096*	.403**	-.047	.063	.020	-.030	-.312**	.280**	.090*	.969**	1						
SIZE_1	.268**	.245**	-.287**	-.172**	.008	.111*	-.257**	-.177**	-.178**	.166**	.125**	.231**	-.096*	.014	-.231**	-.188**	1					
SIZE_1²	.251**	.230**	-.283**	-.175**	-.002	.098*	-.246**	-.161**	-.160**	.192**	.114**	.207**	-.081*	.017	-.201**	-.159**	.991**	1				
SIZE_2	.327**	.208**	-.240**	-.139**	.087	.099*	-.215**	-.168**	-.171**	.186**	.100*	.201**	-.080*	.005	-.138**	-.093*	.906**	.914**	1			
SIZE_2²	.316**	.211**	-.241**	-.148**	.077	.097*	-.216**	-.152**	-.152**	.207**	.091*	.190**	-.074	.005	-.135**	-.092*	.899**	.919**	.995**	1		
PROF	-.031	.129**	-.189**	-.126**	-.156**	.020	-.384**	-.161**	-.226**	.061	.131**	.771**	-.153**	.171**	-.514**	-.431**	.244**	.209**	.160**	.148**	1	
TAN	.131**	.104*	.324**	.375**	.308**	.286**	-.089	-.074	-.040	.090*	.049	.068	-.466**	-.156**	-.070	-.020	-.004	-.012	.059	.047	.117**	1

5. EMPIRICAL RESULTS

This chapter aims at providing empirical findings of this study. The results are grouped per variable. Section1 analyses the results from Table 6 and Table 7: Panel A of Table 6 reports the FEM/REM of the first set of variables and Panel B reports results the alternative set of variables.[21] The results of OLS is also available in Appendix II. The difference between Table 6 and Table 7 is that in order to rule out the possibility of multicollinearity, size squared terms and profitability are taken out. In section 2, in order to inspect the impact of each alternative measurement on model efficiency, regressions are conducted 4 more times for each model in Table 7.[22] Although not the results are reported, the differences will be discussed. Section 3 presents the last robustness test which divides firms into financially constrained and unconstrained ones.

II. Results[23]

A. Business risk

In 6A and 7A, EVS has negative and significant relationships with SML, SBL, TML and TBL while in 6B and 7B EVO shows no significance.[24] When replacing EVS with EVO in 7A, the significance of business is gone. These results shows that 1) EVO is not a good measurements of business risk; 2) when measured with EVS, business risk is a significant determinant as predicted by trade-off theory. This result is inconsistent with De Jong (2002), De Jong and van Dijk (2007) who claims that business risk is an insignificant determinant.

B. Non-debt tax shield

In Table 6 and Table 7, both measurements of non-debt tax shield report negative and significant relationships with LML and LBL (significant at 1% level). This results is consistent with De Jong (2002) while it stands in contrast with Chen and Jiang (2001) who report that NDTS_1 has no significance. Instead, they claim that NDTS_2 is a significant determinant for both in LBL and SBL. This study shows that both NDTS_1 and NDTS_2 have consistent impact on long term leverage, as predicted by trade-off theory. However this stands in contrast to Chen and Jiang (2001) who argued that NTDS_1 is not significant.

C. Tax rate

TAX reveals neither economically nor statistically significant relationship across different models and leverage measurements although trade-off theory suggests that due to tax benefits of leverage hinge on the magnitude of tax rate, it is expected to be positively correlated with leverage. This result is in contrary to De Jong and van Dijk (2007) who report marginal tax rate is significant

[21] Set 1 and set 2 differs in terms of four variables: while the rest of the independent variables being equal, set 1 has EVS, NDTS_1, UNIO and SIZE_1, set 2 has EVO, NDTS_2, UNIR and SIZE_2. See Appendix 1 for variables definitions.

[22] e.g. Besides what is reported in Panel A in Table 7, each dependent variable is regressed 4 more times by different independent variable combinations, and each time only one variable is replaced. The different combinations are EVS, NDTS_1, TAX, FCF, LIQ, MBR, UNIO, SIZE_1, TAN/ EVS, NDTS_2, TAX, FCF, LIQ, MBR, UNIO, SIZE_1, TAN/ EVS, NDTS_1, TAX, FCF, LIQ, MBR, UNIR, SIZE_1, TAN/ EVS, NDTS_1, TAX, FCF, LIQ, MBR, UNIO, SIZE_2, TAN.

[26] e.g. 6A Refers to Panel A in Table 6, it will be used in the same manner in the later text

determinant. The possible reason could be the different measurements: De Jong and van Dijk (2007) measure it as marginal tax rate while effective tax rate is adopted in this study. The result of this study is consistent with the international study of De Jong, Kabir and Nguyen (2008) who argue that effective tax rate is also not a significant factor.

D. Free cash flow

FCF has mixed signs in this study: in 6A, FCF is negatively correlated with LML and LBL while in 6B is it positively correlated with SML, SBL, TML and TBL. 7A shows similar results with 6A, while in 7B, FCF is found to be negatively related with LML and LBL and positively correlated with SML and SBL. These results are inconsistent with previous Dutch evidences which demonstrate that FCF is not correlated with leverage (De Jong and Veld, 2001; De Jong and van Dijk, 2007; De Jong 2002). They argue that the lack of discipline role of debt can be attributed to lack of shareholder-manager conflicts. Due to strong anti-takeover defences and limited shareholders influences on managerial decisions, plus lack of monitoring from capital market due to overwhelming amount of bank loans in the market, the Dutch mangers were entrenched thus there the shareholder-manager conflicts were missing.

Based on agency cost theory, debt has a discipline role in alleviating overinvestment behaviour of managers. Therefore, FCF is expected to be positively correlated with leverage. However, this study shows that long term leverage is negatively correlated with FCF. This could be related to the recent development of public debt market: the new regulation Basel III requirements and rising bank interest rate has made Dutch corporations shift their focus from bank loan to capital market debt. Since the onset of financial crisis, it is the availability of funds and diversification of funding source that have become the first-order financing objectives for Dutch firms. The earning shocks has forced them to maintain sufficient liquidity level so that good investment opportunities will not be forgone. According to Jensen (1986), FCF differs from LIQ in terms of FCF is the reminder after profitable projects are funded. Therefore, the negative relationship between long term leverage and FCF in this study is consistent with the aforementioned analysis (see Chapter 2, section IIIB) where shows Dutch firms prefer to pay back long term bank loans with internally generated funds.

On the other hand, the positive signs of short term and total leverage can be explained by enhanced external control. Along with the popularizing of capital market debt, the mangers are imposed with more external control thus they tend to be less entrenched. As a result, despite Dutch shareholder right is still relatively low in the Netherlands (see Chapter 2, section IIIB), the monitoring effects of capital market might have revealed the missing manager-shareholder conflicts by making mangers less entranced. As a result, leverage is needed to reduce agency conflicts.

E. Liquidity

LIQ is found to be negatively correlated with LML and LBL across all models. Besides, the negative relationship are also viable with SBL, TML and TBL in 6B and 7B. These results indicate that liquidity is the significant determinant for all leverage ratios as predicted by pecking order theory. The previous Dutch evidences have presented similar results (Chen and Jiang, 2001; De Jong and Veld, 2001; De Haan and Hinloopen, 2003; De Jong and van Dijk, 2007). This indicates that Dutch firms following a pecking order persistently when it comes to financing decisions. And it is also consistent with De Haan and Hinloopen (2003) who argues that Dutch firms has a unique and most preferred financing hierarchy where internal financing comes first.

F. Growth opportunities

The significance of MBR in this study is marginal. The positive relationship is found in 6A and 7A with TBL, in 6B and 7B with SBL. Nevertheless, it is also noticed although these coefficients statistically significant, the economic significances are quite low (all less than 0.01).Therefor, at best MBR is an insignificant capitals structure determinant for Dutch firms.[25] This is consistent with previous Dutch evidences where insignificance of growth opportunities is well documented (Chen, Lensink and Sterken, 1999; Chen and Jiang, 2001; De Jong and van Dijk, 2001; De Jong and Veld, 2001).

G. Uniqueness

In this study, uniqueness is found to be positively and significantly correlated with all leverage ratios across different models. This is inconsistent with previous Dutch evidences which argue that uniqueness is not a significant determinant (De Jong and van Dijk, 2007). While agency cost theory suggests a negative relationship between product uniqueness and leverage, empirical evidence of this study do not support this assumption. The plausible reason behind this could be that uniqueness is explained by information asymmetry theory rather than agency costs theory: While investing in R&D and advertising expenditure represents uniqueness, it is also regarded as the investments in intangible assets. The firms with more intangible assets are more sensitive towards adverse selection problem, therefore, debt is issued more frequent than equity due to equity issuance is associated with negative wealth effects. Mazur(2007) reports similar findings for Polish firms.

H. Size

Size shows inconsistent patterns across models and measurements, as a result of the multicollinearity between size and its squared term. Therefore the results of Table 6 should be interpreted with caution. In Table 6 where both size and squared terms are included, the significant results are only identified in Panel B where SIZE_2 is negatively correlated with LBL and TBL while the relationship become positive for $SIZE\_2^2$. However, it would be unjustified to conclude that the assumption of non-linearity is supported because of result in 6B. Although technically, the marginal significance with LBL and TBL shows that the relationship between size and leverage do not remain constant as the firm size grows: below certain size level, size is negatively correlated with leverage; when firm size surpasses this level, the correlation becomes positive. When taking out squared terms (7B), size (SIZE_1 and SIZE_2) is found to have reverse coefficient sign. This suggests that multicollinearity does exert impact on this variable. Thus Table 7 probably shows a better picture of size.

In 7A, the significance of SIZE_1 reveals and it is positively correlated with LML and negatively correlated with SML. While in 7B, SIZE_2 is positively related with LML and LBL. This is consistent with all previous Dutch evidences which denote size to be positively correlated with long term leverage (Chen and Jiang 2001; De Jong and van Dijk, 2007; De Jong 2002). On the other hand, the negative relationship between short term debt and size could be because large firms use more long term debt due to they have greater access to it. In order to explore the relationship between size and various leverage measurements, the scatter plots are given in Appendix IV. It can

[25] In order to eliminate the possibility that the insignificance are caused by outliers, the regressions are rechecked with MBR being winsorised at 5% level. The results remain insignificant except for SBL and TBL.

be seen that the results coincide the conclusions from Table 7 while no non-linear relationship is detected for any of them. For both SIZE_1 and SIZE_2, the positive correlation can be found for long term leverage while negative correlation is identified with short term leverage. In addition, it can also be seen that the reason why the relationship between size and total leverage is insignificant (the line of fitted values almost have 0 slope) is because reverse effects of size on long term and short term leverage have been neutralized. While there is a lack of evidence in terms of the impact of size on short term debt in the Netherlands, the UK evidence from Bevan and Danbolt (2004) shows consistency with this study.

I. Profitability

Due to PROF is taken out for Table 7, therefore only results of Table 6 will be discussed here. In this study PROF is found to be negatively correlated with SML, SBL, TML and TBL, as predicted by pecking order theory. The coefficients with LML and LBL are also negative, however they are not statistically significant. This is consistent with all the Dutch evidences which denote that PROF has negative relationship with all leverage (Chen, Lensink and Sterken, 1999; Chen and Jiang 2001; De Haan and Hinloopen, 2003).

J. Tangibility

TAN is found to be negatively correlated with LBL and TML across all models. This results show a strong consistency with pecking order theory. However, all Dutch evidences show that tangibility has positive coefficient as a significant capital structure determinant (Chen and Jiang, 2001; De Haan and Hinloopen, 2003; De Jong and van Dijk, 2007).[26]

The strong consistency with pecking order theory can be explained by information asymmetry theory. For firms with large amount of tangible assets, they can issue more equity due to there exist less information asymmetry between investors and insiders. On the other hand, it is worth noting that TAN has no impact on short term leverage in this study. The reason could be that short term debt usually does not require so much collaterals as long term debt.

[26] Chen and Jiang (2001); De Haan and Hinloopen (2003); De Jong and van Dijk, (2007)

Table 6 FEM /REM estimation of capital structure determinants of Dutch listed firms

This table presents the FEM/REM estimation of various leverage measures and their determinants. See Appendix I for variable definitions. The sample consists of *Orbis* Dutch listed firms from 2004 to 2012. Firms belong to financial industries, utility industries as well as those with negative sales and total assets are omitted. Dependent variables are measured as lagged value of 1 year. N stands for number of observations. Year dummies are included but not reported. Robust standard errors corrected for firm-level clustering are in parentheses. ***, **, and * denote significance at 1%, 5% and 10% level respectively.

Panel A: variable set 1

	LML	LBL	SML	SBL	TML	TBL
EVS	-0.0074	-0.0013	-0.0403*	-0.0368*	-0.0514**	-0.0569**
	(0.0217)	(0.0285)	(0.0234)	(0.0192)	(0.0196)	(0.0248)
NDTS_1	-0.3195***	-0.3781***	0.1645*	0.0841	-0.1049	-0.1615
	(0.0904)	(0.1130)	(0.0902)	(0.1034)	(0.1106)	(0.1347)
TAX	0.0027	0.0106	0.0006	0.0052	0.0044	0.0198*
	(0.0096)	(0.0103)	(0.0074)	(0.0065)	(0.0073)	(0.0084)
FCF	-0.0947***	-0.1444***	0.0918*	0.0498	0.0281	-0.0075
	(0.0332)	(0.0444)	(0.0517)	(0.0589)	(0.0486)	(0.0785)
LIQ	-0.0957*	-0.0995*	-0.0243	-0.1359***	-0.1099	-0.1151
	(0.0517)	(0.0845)	(0.0475)	(0.0437)	(0.0770)	(0.1013)
MBR	-0.0005	0.0002	0.0004	0.0018	0.0010	0.0075*
	(0.0014)	(0.0047)	(0.0014)	(0.0013)	(0.0018)	(0.0043)
UNIO	0.0038***	0.0067***	0.0071**	0.0092***	0.0108***	0.0177***
	(0.0012)	(0.0015)	(0.0029)	(0.0020)	(0.0031)	(0.0048)
SIZE_1	0.0845	0.0274	0.0279	-0.0047	0.0722	0.0167
	(0.0847)	(0.1258)	(0.0621)	(0.0609)	(0.0880)	(0.1494)
SIZE_1²	-0.0103	-0.0001	-0.0083	-0.0026	-0.0125	-0.0001
	(0.0149)	(0.0210)	(0.0099)	(0.0085)	(0.0150)	(0.1259)
PROF	0.0452	0.1047	-0.0636	-0.0779	-0.0506	-0.0249
	(0.0911)	(0.1238)	(0.0696)	(0.0781)	(0.1097)	(0.1317)
TAN	-0.2578***	-0.2223**	0.0444	0.1084**	-0.2026**	0.0036
	(0.0848)	(0.1022)	(0.0821)	(0.0453)	(0.0914)	(0.1381)
Constant	0.0354	-0.1408	0.0596	0.1044	0.1687	0.1727
	(0.1027)	(0.1824)	(0.1051)	(0.1098)	(0.1270)	(0.1977)
N	341	351	341	351	341	351
Wald $X^2(16)$	/	/	/	492.67***	/	/
F test	49.95***	76.15***	15.30***	/	8.27***	11.22***
R^2	0.7266	0.6965	0.7464	0.7171	0.8272	0.8032
Adjusted R^2	0.6439	0.6080	0.6697	0.6346	0.7749	0.7459
Hausman specification test for fixed versus random effects panel estimation						
$X^2(16)$	24.23*	31.14**	25.52*	20.14	31.14**	92.02***
Breusch and Pagan Lagrangian multiplier test for random effects versus OLS panel estimation						
$X^2(1)$	/	/	/	178.75***	/	/
Model	FE	FE	FE	RE	FE	FE

Panel B: variable set 2

	LML	LBL	SML	SBL	TML	TBL
EVO	0.0003	0.0004	-0.0004	-0.0007	-0.0003	-0.0007
	(0.0016)	(0.0014)	(0.0008)	(0.0006)	(0.0010)	(0.0012)
NDTS_2	-0.4665***	-0.6808***	0.1914	0.1555	-0.2974	-0.5841***
	(0.1202)	(0.2140)	(0.2652)	(0.1896)	(0.2080)	(0.1545)
TAX	-0.0012	0.0094	0.0028	0.0040	0.0055	0.0134
	(0.0125)	(0.0135)	(0.0102)	(0.0103)	(0.0084)	(0.0106)
FCF	-0.0732*	-0.0816	0.1754***	0.1722***	0.1245***	0.1703***
	(0.0039)	(0.0615)	(0.0278)	(0.0245)	(0.0380)	(0.0507)
LIQ	-0.1580**	-0.2094*	-0.0808	-0.1514**	-0.2721***	-0.3031**
	(0.0639)	(0.1237)	(0.0503)	(0.0604)	(0.0925)	(0.1498)
MBR	-0.0008	-0.0019	0.0021	0.0023**	0.0028	0.0061
	(0.0016)	(0.0059)	(0.0014)	(0.0011)	(0.0037)	(0.0064)
UNIR	0.0046***	0.0125**	0.0253***	0.0101**	0.0328***	0.0506***
	(0.0012)	(0.0062)	(0.0076)	(0.0045)	(0.0094)	(0.0117)
SIZE_2	-0.1296	-0.6583**	-0.1195	-0.0126	-0.4059	-0.9723*
	(0.1217)	(0.3110)	(0.2685)	(0.0581)	(0.3656)	(0.5528)
SIZE_2²	0.0067	0.0677**	-0.0039	-0.0007	0.0361	0.0876*
	(0.0106)	(0.0261)	(0.0221)	(0.0049)	(0.0301)	(0.0450)
PROF	-0.0736	-0.0109	-0.2041**	-0.1824*	-0.2896**	-0.2939**
	(0.0792)	(0.1138)	(0.0832)	(0.0650)	(0.1128)	(0.1272)
TAN	-0.0461	-0.1708*	-0.0608	-0.0957*	-0.3068***	-0.1571
	(0.0385)	(0.0955)	(0.0592)	(0.0512)	(0.0807)	(0.1063)
Constant	0.3620	1.7463*	-0.6555	0.1608	1.4212	2.9706*
	(0.3408)	(0.9543)	(0.8072)	(0.1678)	(1.0939)	(1.6811)
N	290	298	290	298	290	298
Wald $X^2(16)$	1110.9***	/	/	240.69***	/	/
F test	/	483.77***	12288.93***	/	1450.95***	4116.93***
R^2	0.7743	0.7666	0.8096	0.7658	0.8485	0.8237
Adjusted R^2	0.7008	0.6933	0.7477	0.6922	0.7991	0.7683
Hausman specification test for fixed versus random effects panel estimation						
$X^2(16)$	10.14	48.98***	25.50**	23.18	43.94***	105.01***
Breusch and Pagan Lagrangian multiplier test for random effects versus OLS panel estimation						
$X^2(1)$	247.69***	/	/	167.81***	/	/
Model	RE	FE	FE	RE	FE	FE

Table 7 FEM /REM estimation of capital structure determinants of Dutch listed firms: robustness

This table presents the FEM/REM estimation of various leverage measures and their determinants. See Appendix I for variable definitions. The sample consists of *Orbis* Dutch listed firms from 2004 to 2012. Firms belong to financial industries, utility industries as well as those with negative sales and total assets are omitted. Dependent variables are measured as lagged value of 1 year. N stands for number of observations. Year dummies are included but not reported. Robust standard errors corrected for firm-level clustering are in parentheses. ***, **, and * denote significance at 1%, 5% and 10% level respectively.

Panel A: variables set 1

	LML	LBL	SML	SBL	TML	TBL
EVS	-0.0090	-0.0034	-0.0442**	-0.0466*	-0.0569***	-0.0679**
	(0.0146)	(0.0288)	(0.0219)	(0.0234)	(0.0209)	(0.0302)
NDTS_1	-0.2706***	-0.3281***	0.1703*	0.1011	-0.0817	-0.1101
	(0.0842)	(0.1073)	(0.0936)	(0.0964)	(0.1136)	(0.1452)
TAX	0.0009	0.0117	0.0005	0.0068	0.0047	0.0201**
	(0.0087)	(0.0103)	(0.0075)	(0.0063)	(0.0073)	(0.0086)
FCF	-0.0737***	-0.1072***	0.0834*	0.0477	0.0282	0.0107
	(0.0263)	(0.0249)	(0.0463)	(0.0468)	(0.0449)	(0.0709)
LIQ	-0.1152**	-0.1026*	-0.0112	-0.0498	-0.0947	-0.0918
	(0.055)	(0.0793)	(0.0577)	(0.0515)	(0.0841)	(0.1081)
MBR	-0.0003	0.0025	0.0012	0.0039**	0.0022	0.0095**
	(0.0014)	(0.0046)	(0.0017)	(0.0018)	(0.0020)	(0.0046)
UNIO	0.0056***	0.0077***	0.0072***	0.0105***	0.0110***	0.0177***
	(0.0014)	(0.0017)	(0.0025)	(0.0016)	(0.0026)	(0.0037)
SIZE_1	0.0305***	0.0296	-0.0248***	-0.0158	-0.0056	0.0144
	(0.0086)	(0.0207)	(0.0091)	(0.011)	(0.0167)	(0.024)
TAN	-0.0332	-0.2197**	0.0491	0.1441	-0.1959*	0.0031
	(0.0384)	(0.1072)	(0.0895)	(0.0907)	(0.1039)	(0.1553)
Constant	0.017	0.1431*	0.1272*	0.0764	0.2528***	0.1737
	(0.0366)	(0.0806)	(0.0643)	(0.0695)	(0.0728)	(0.1198)
N	341	351	341	351	341	351
Wald $X^2(14)$	259.77***	/	/	/	/	/
F test	/	64.84***	14.59***	49.91***	12.11***	11.45***
R^2	0.7260	0.6947	0.7429	0.7156	0.8232	0.7962
Adjusted R^2	0.6458	0.6086	0.6676	0.6353	0.7715	0.7387
Hausman test specification for fixed versus random effects panel estimation						
$X^2(14)$	18.64	42.82***	31.34***	34.61***	28.11**	86.64***
Breusch and Pagan Lagrangian multiplier test for random effects versus pooled OSL panel estimation						
$X^2(1)$	208.49***	/	/	/	/	/
Model	RE	FE	FE	FE	FE	FE

Panel B: variables set 2

	LML	LBL	SML	SBL	TML	TBL
EVO	0.0004	0.0000	-0.0002	-0.0010*	-0.0003	-0.0010
	(0.0016)	(0.0015)	(0.0007)	(0.0006)	(0.0011)	(0.0014)
NDTS_2	-0.4873***	-0.7587***	0.1839	0.0915	-0.3449	-0.6826***
	(0.1195)	(0.2065)	(0.3004)	(0.2393)	(0.2557)	(0.1874)
TAX	-0.0016	0.0085	0.0029	0.0053	0.0051	0.0121
	(0.0123)	(0.0134)	(0.0104)	(0.0109)	(0.0076)	(0.0097)
FCF	-0.0932***	-0.1083**	0.1171***	0.1044***	0.0335	0.0605
	(0.0190)	(0.0430)	(0.0235)	(0.0227)	(0.0267)	(0.0372)
LIQ	-0.1596**	-0.1825*	-0.0681	-0.0896	-0.2411**	-0.2527*
	(0.0646)	(0.1142)	(0.0542)	(0.0625)	(0.0913)	(0.142)
MBR	-0.0007	0.0004	0.0034	0.0051***	0.0052	0.0101
	(0.0015)	(0.0059)	(0.0022)	(0.0014)	(0.0048)	(0.0079)
UNIR	0.0055***	0.0097	0.0228***	0.0213***	0.0274***	0.0427***
	(0.0009)	(0.0077)	(0.0069)	(0.0054)	(0.0095)	(0.0120)
SIZE_2	0.0511***	0.1000**	-0.0667	-0.0298	0.0131	0.0248
	(0.0107)	(0.0482)	(0.0430)	(0.0367)	(0.0545)	(0.0855)
TAN	-0.0460	-0.1784*	-0.0702	-0.0213	-0.3231***	-0.1762
	(0.0356)	(0.0953)	(0.0589)	(0.0732)	(0.0766)	(0.1064)
Constant	-0.1573**	-0.3252	0.4560*	0.2499	0.2022	0.1652
	(0.0657)	(0.3050)	(0.2531)	(0.2284)	(0.3129)	(0.4954)
N	290	298	290	298	290	298
Wald $X^2(14)$	598.07***	/	/	/	/	/
F test	/	318.36***	9594.63***	10006.90***	1163.01***	3447.36***
R^2	0.7726	0.7590	0.8020	0.7599	0.8388	0.8082
Adjusted R^2	0.7013	0.6861	0.7398	0.6872	0.7882	0.7502
Hausman test specification for fixed versus random effects panel estimation						
$X^2(14)$	17.55	30.19***	26.52**	27.12**	56.86***	37.96***
Breusch and Pagan Lagrangian multiplier test for random effects versus pooled OSL panel estimation						
$X^2(1)$	254.37***	/	/	/	/	/
Model	RE	FE	FE	FE	FE	FE

III. Robustness test

When comparing adjusted R^2 for models with set 1 variables and set 2 variables, it is apparent that set 2 have higher explanatory power. However, the differences between 2 set lies in four variables (business risk, non-debt tax shield, uniqueness, size). Consequently, in order to investigate the individual effects of each alternative variable, models in 7A and 7B are rerun 4 times with changing one variable each time. Only partial results which shows great sensitivity towards variable measurements are reported. The models with minor differences will merely be discussed but not reported.

In terms of statistical power, it found out that EVS, NDTS_2, UNIR and SIZE_1 gives higher adjusted R^2 than EVO, NDTS_1, UNIO and SIZE_1 respectively. What is more, the results are insensitive when only shifting size or uniqueness towards alternative measurements. This is consistent with the correlation matrix analysis where shows UNIO and UNIR, SIZE_1 and SIZE_2 are highly correlated respectively. When changing EVS to EVO for models with set 1 variables, the only difference lies in the disappearance of significant relationship between businesses risk and all leverage ratios. This is consistent with the aforementioned analysis which shows EVO is not a good measurement of business risk.

When changing NDTS_1 to NDTS_2 for models with set 2 variables (See 8A), it is found out that TAN is negatively correlated with both TML and TBL. This suggests that TAN is a significant factor for total leverage. Liquidity is found to be negatively correlated with all leverage measurements, this suggest that this is a significant factor who has persistent impact on different leverage measurements.

8B displays the results when changing EVO to EVS for models with set 2 variables. Compared to 7B, there are 2 noted differences. One is that EVS is positively and negatively correlated with LML, LBL, TML and TBL. Considering EVS was found to be a significant factor for short term and total leverage in 7B, the findings here show that business risk is a highly significant factor for all leverage measurements in this study. Another important finding is that FCF is positively correlated with SML, SBL, TML and TBL, while negatively correlated with LML. The significant relationship is not consistent in terms of total leverage in last section, this finding reinforces the fact that FCF is a highly significant factor which has different impact on long term and short term leverage.

When changing NDTS_2 to NDTS_1 for models with set 2 variables (See 8C), TAN is found to be negatively correlated both with LML and LBL. This suggests that TAN is a significant determinant for long term leverage. Additionally, SIZE_2 is found to be positively correlated with LML and LBL, while negatively correlated with LML and LBL. This reinforces the aforementioned results where size has different impacts on long term and short term leverage.

To conclude, the utilization of alternative measurements have not significantly changing the results fundamentally (except for EVO). Instead, it consolidate the previous empirical findings in this study. The overall results of this study are presented in Table 9.

Table 8 Robustness test

This table presents the FEM/REM estimation of various leverage measures and their determinants. See Appendix I for variable definitions. The difference between Table 7 and Table 8 is that each panel in Table 8 has only 1 different variable where there are 4 different variables between 7A and 7B. The sample consists of *Orbis* Dutch listed firms from 2004 to 2012. Firms belong to financial industries, utility industries as well as those with negative sales and total assets are omitted. Dependent variables are measured as lagged value of 1 year. N stands for number of observations. Year dummies are included but not reported. Robust standard errors corrected for firm-level clustering are in parentheses. ***, **, and * denote significance at 1%, 5% and 10% level respectively.

Panel A: variables set 1(NDTS_1→ NDTS_2)

	LML	LBL	SML	SBL	TML	TBL
EVS	-0.0319**	-0.0620**	0.0004	0.0070	-0.0492*	-0.0658**
	(0.0143)	(0.0257)	(0.0136)	(0.0148)	(0.0261)	(0.0255)
NDTS_2	-0.4452***	-0.6750***	0.1871	0.1140	-0.3342*	-0.6484***
	(0.1083)	(0.2055)	(0.2207)	(0.2006)	(0.1957)	(0.1905)
TAX	-0.0015	0.0076	0.0045	0.0088	0.0050	0.0136
	(0.0120)	(0.0122)	(0.0099)	(0.0103)	(0.0082)	(0.0102)
FCF	-0.0818***	-0.0485	0.1007***	0.0894***	0.0412	0.0819*
	(0.0181)	(0.0499)	(0.0266)	(0.0287)	(0.0379)	(0.0493)
LIQ	-0.1430**	-0.1888*	-0.0832*	-0.0975*	-0.2512***	-0.2770**
	(0.0667)	(0.1057)	(0.0469)	(0.0566)	(0.0757)	(0.1169)
MBR	-0.0023**	-0.0057	0.0012	0.0033	0.0010	0.0016
	(0.0011)	(0.0055)	(0.0017)	(0.0028)	(0.0025)	(0.0048)
UNIO	0.0043	0.0033	0.0207***	0.0195***	0.0204***	0.0374***
	(0.0027)	(0.0071)	(0.0036)	(0.0037)	(0.0054)	(0.0055)
SIZE_1	0.0350***	0.0331	-0.0459*	-0.0117	0.0454	-0.0006
	(0.0114)	(0.0250)	(0.0243)	(0.0281)	(0.0371)	(0.0244)
TAN	-0.0494	-0.2024**	-0.0993*	-0.0327	-0.3369***	-0.2319**
	(0.0403)	(0.0992)	(0.0587)	(0.0581)	(0.0753)	(0.0917)
Constant	0.0241	0.1822*	0.3428**	0.1401	0.0328	0.3564***
	(0.0471)	(0.0997)	(0.1434)	(0.1684)	(0.2216)	(0.0956)
N	288	294	290	298	290	294
Wald $X^2(14)$	162.97***	/	/	/	/	/
F test	/	3.47***	24.7***	39.39***	16.33***	33.81***
R^2	0.7806	0.762	0.8154	0.7677	0.8567	0.8379
Adjusted R^2	0.7118	0.6901	0.7575	0.6974	0.8118	0.7889
Hausman test specification for fixed versus random effects panel estimation						
$X^2(14)$	11.5	43.31***	28.19**	28.37**	84.6***	49.37***
Breusch and Pagan Lagrangian multiplier test for random effects versus pooled OSL panel estimation						
$X^2(1)$	249.14***	/	/	/	/	/
Model	RE	FE	FE	FE	FE	FE

Panel B: variables set 2(EVO→EVS)

	LML	LBL	SML	SBL	TML	TBL
EVS	-0.0351**	-0.0700**	-0.0227**	-0.0058	-0.0701**	-0.0979***
	(0.0146)	(0.0273)	(0.009)	(0.0169)	(0.0272)	(0.0343)
NDTS_2	-0.5186***	-0.7058***	0.1815	0.1183	-0.3038	-0.5852***
	(0.1194)	(0.2039)	(0.2403)	(0.2177)	(0.2174)	(0.2012)
TAX	-0.0039	0.0053	-0.0008	0.0072	0.0028	0.0100
	(0.0115)	(0.0111)	(0.0087)	(0.0100)	(0.0083)	(0.0100)
FCF	-0.0899***	-0.0693	0.1235***	0.1106***	0.0723*	0.1181*
	(0.0177)	(0.0493)	(0.0219)	(0.0316)	(0.0434)	(0.0710)
LIQ	-0.1573**	-0.1709*	-0.1022**	-0.0831*	-0.2273***	-0.2306**
	(0.0627)	(0.1005)	(0.0481)	(0.0570)	(0.0732)	(0.1095)
MBR	-0.0012	-0.0037	0.0005	0.0046	0.0019	0.0042
	(0.0012)	(0.0065)	(0.0026)	(0.0032)	(0.003)	(0.0065)
UNIR	0.0070***	-0.0044	0.0095***	0.0196***	0.0164*	0.0223*
	(0.002)	(0.011)	(0.0031)	(0.0067)	(0.0092)	(0.0124)
SIZE_2	0.0488***	0.1352	-0.0266***	-0.0263	0.0397	0.0746
	(0.0109)	(0.0528)	(0.0078)	(0.0372)	(0.0530)	(0.0648)
TAN	-0.0538	-0.1445	0.0818	-0.0037	-0.2832***	-0.1134
	(0.0375)	(0.0932)	(0.0510)	(0.0606)	(0.0839)	(0.1008)
Constant	-0.1305*	-0.5133	0.1832***	0.2229	0.0555	-0.1098
	(0.0673)	(0.3197)	(0.0490)	(0.2190)	(0.3145)	(0.3793)
N	290	298	290	298	290	298
Wald $X^2(14)$	194.6***	/	136.84	/	/	/
F test	/	7.68***	/	21.53***	18.09***	18.05***
R^2	0.7803	0.7732	0.8037	0.7587	0.8505	0.8270
Adjusted R^2	0.7114	0.7046	0.7422	0.6857	0.8036	0.7746
Hausman test specification for fixed versus random effects panel estimation						
$X^2(14)$	14.34	38.28***	6.85	38.28***	97.23***	56.55***
Breusch and Pagan Lagrangian multiplier test for random effects versus pooled OSL panel estimation						
$X^2(1)$	255.26***	/	212.69***	/	/	/
Model	RE	FE	RE	FE	FE	FE

Panel C: variables set 2(NDTS_2→NDTS_1)

	LML	LBL	SML	SBL	TML	TBL
EVO	0.0007	0.0008	0.0002	-0.0010	0.0006	-0.0001
	(0.0010)	(0.0012)	(0.0007)	(0.0009)	(0.0011)	(0.0014)
NDTS_1	-0.2672**	-0.3003**	0.0866	0.0405	-0.1327	-0.1661
	(0.1093)	(0.1220)	(0.0924)	(0.0855)	(0.1260)	(0.1484)
TAX	0.0041	0.0130	-0.0042	0.0003	-0.0001	0.0130
	(0.0084)	(0.0098)	(0.0092)	(0.0075)	(0.0065)	(0.0081)
FCF	-0.0937***	-0.1198***	0.0456	0.0157	-0.0137	-0.0422
	(0.0256)	(0.0401)	(0.0481)	(0.0423)	(0.0423)	(0.0666)
LIQ	-0.0807	-0.0705	-0.1048*	-0.1012*	-0.1266	-0.1257
	(0.0585)	(0.0904)	(0.0560)	(0.0607)	(0.0784)	(0.1097)
MBR	0.0008	0.0043	0.0012	0.0053*	0.0051	0.0135**
	(0.0017)	(0.0045)	(0.0026)	(0.0028)	(0.0034)	(0.0062)
UNIR	0.0028	0.0051	0.0083***	0.0127***	0.0123***	0.0189***
	(0.0031)	(0.0052)	(0.0029)	(0.0045)	(0.0037)	(0.0067)
SIZE_2	0.0716***	0.0912***	-0.0306***	-0.0352*	0.0111	0.0390
	(0.0247)	(0.0324)	(0.0081)	(0.0346)	(0.0393)	(0.0539)
TAN	-0.2292***	-0.1802*	0.0830	0.1262	-0.1784*	0.0388
	(0.0786)	(0.0975)	(0.0527)	(0.0873)	(0.0933)	(0.1495)
Constant	-0.2251	-0.3022	0.2090***	0.2257	0.1488	-0.0330
	(0.1456)	(0.1986)	(0.0570)	(0.2088)	(0.2233)	(0.3169)
Wald $X^2(14)$	/	/	72.72***	/	/	/
F test	4.98***	3.32***	/	1.91***	8.53***	4.16***
R^2	0.7333	0.7019	0.7256	0.6977	0.8087	0.7817
Adjusted R^2	0.6566	0.6199	0.6467	0.6146	0.7537	0.7217
Hausman test specification for fixed versus random effects panel estimation						
$X^2(14)$	27.64***	41.56***	11.64	28.41**	33.39***	21.84***
Breusch and Pagan Lagrangian multiplier test for random effects versus pooled OSL panel estimation						
$X^2(1)$	/	/	74.05***	/	/	/
Model	FE	FE	RE	FE	FE	FE

Table 9 Results overview[27]

This tables summarize the results of this study. — denotes significant and negative relationship, + denotes significant and positive relationship, / denotes no significant relationship.

	LML	LBL	SML	SBL	TML	TBL
business risk	-	-	/	/	-	-
non-debt tax shield	-	-	/	/	/	-
Liqudity	-	-	/	/	-	-
Tax rate	/	/	/	/	/	/
Free cash flow	-	-	+	+	+	+
growth opportunities	/	/	/	/	/	/
uniqueness	+	+	+	+	+	+
size	+	+	-	-	/	/
profitbility	/	/	-	-	-	-
tangibility	-	-	/	/	-	-

IV. Model fitness

The overall results of this study suggests that FEM is better than OLS. The reasoning is three-folded: first of all, FEM/REM estimations is able to improve explanatory power of the empirical model significantly. This is can be proven by the comparison of R^2 of two models.[28] It can be seen that the adjusted R^2 in OLS are no larger than 34%. This is consistent with previous Dutch evidences with OLS (e.g. the adjusted R^2 from De Jong (2002) range from 19% to 24% while De Jong and van Dijk report 18% to 30%). However, FEM/REM in this study have recorded a range from 60% to 80%. This suggests that the role of firm-specific effects are non-trivial for Dutch firms in terms of making financing choices. On the other hand, compare to OLS, the significance and sign of some determinants have changed fundamentally in FEM/REM e.g. there is no significant relationship identified for NDTS_2 in OLS while in FEM/REM it is negatively correlated with leverage; TAN is positively correlated with leverage in OLS while the relationship reverse in FEM/REM. That is to say, failing to control for firm fixed effects may cause biased estimates.

When it comes to utilizing book measure or market measure of leverage, it is found that the there are no noted inconsistencies. What is more, the market leverage provide higher explanatory power. This suggests that the capital structure determinants in this study explains market leverage better than book leverage.

Multicollinearity is checked for each regression model with VIF value. In addition to size and size squared terms which are highly correlated, the alarming signal comes from 6A, between PROF and FCF (whose VIF are above 5). This means the results of these two factor need to be interpreted with caution.

[27] It is worth noting that all significant factors are also in consistent with the partial model where insignificant variables such as tax rate and growth opportunities are taken out. In addition, profitability are tested in the models without FCF and results are also similar. All of those models are not reported for simplicity.

[28] Here refers to Table 6 and Table 11 where the only difference is the inclusion of firm fixed effects.

V. Additional check for robustness

According to Myers (2003) who argues that capital structure theories are conditional, this study divides the sample into three subsamples to see if capital structure determinants differs with financial situation of firms (see Table10). Similar studies are conducted by Frank and Goyal (2009) and Mazur (2007). The dependent variable is TML because total leverage is a more comprehensive measurement for corporate leverage. In terms of market and book measurements, market value is chosen on account of higher adjusted R^2. Furthermore, for variables that have alternative measurements, the ones which with better explanatory power are adopted.[29]

The results generally confirm that there are some differences between full sample and sub samples, nevertheless the similarities are non-trivial as well. First of all, there are striking similarities between full sample and sample firms that are of low profitability. That is to say, the majority of the sample firms are characterized by low profitability. This could be as a result of the earning shock of has lowered the probability of Dutch firms as a whole. Surprisingly, there exists no evident similarities among small, low profit and high growth firms, this means the small firms are not necessarily to be associated with low profitability and high growth option. Secondly, the fact that adjusted R^2 fluctuates with different groups is consistent with the assumption that the impact of capital structure determinants on financing choice varies with firm classes. Particularly, R^2 of low profit firms is as high as 90% and this denotes that this set of variables explains financing behavior of small firms the best.

The findings of capital structure determinants for different firm classes are generally consistent with overall regression results in this study. And it seems that the most of significant factors are explained by pecking order theory (refer to the significances of LIQ, UNIR, and TAN). Some interesting findings for each firm class are listed as following. Firstly, it is worth noting that for small firms size is negatively correlated with TML. This could be because small firms suffers more from adverse selection costs than big firms, thus they prefer to issue more debt than equity to avoid the negative wealth effect of share issuance. What is more, it is found out that the discipline role of debt is significant for low profit firms. This is inconsistent with Jensen (1986) who proposes that for firms that are more likely to overinvest (characterized by lack of growth opportunity while rich in free cash), they tend to issue debt to take advantage of its discipline role. The reason for this contrary result could be that Dutch firms uses the discipline role of debt as a precaution instead of a cure for overinvestment.

[29] In this case EVO, NDTS_2, UNIR and SIZE_2

Table 10 Capital structure determinants for Dutch listed firms under different circumstances

This table presents the FEM/REM estimation of total market leverage (TML) and its determinants. See Appendix I for variable definitions. The sample consists of *Orbis* Dutch listed firms from 2004 to 2012. Firms belong to financial, utility industries as well as those with negative sales and total assets are omitted. The sample is broken into different classes to check the robustness. The examined classes are 1) low and high-growth firms (MBR smaller than 33rd percentile and larger than 67th percentile); 2) low and high profitability firms (profitability smaller than 33rd percentile and larger than 67th percentile); 3) small and big firms (small). Dependent variable is measured as lagged value of 1 year. To determine the model fitness between fixed effected model (FEM) and random effects model (REM), the results of Hausman specification test are presented. To further consolidate model choice between REM and OLS, Breusch and Pagan Lagrangian multiplier test are presented as well. Year dummies are included but not reported. Robust standard errors corrected for firm-level clustering are in parentheses. ***, **, and * denote significance at 1%, 5% and 10% level respectively.

	Full sample	Size		Probability		MBR	
		Small	Big	Low	High	Low	High
EVS	-0.0701**	-0.0346	-0.1202***	-0.0596***	0.0229	-0.0308	-0.1999**
	(0.0272)	(0.0266)	(0.0441)	(0.012)	(0.0192)	(0.0319)	(0.0800)
NDTS_2	-0.3038	0.6916	-0.4021	0.2389	-0.2228	0.1168	-0.3813
	(0.2174)	(0.2684)	(0.3600)	(0.2778)	(0.2399)	(0.4094)	(0.7078)
TAX	0.0028	0.0283	0.0074	-0.0042	0.0256	-0.0035	0.0061
	(0.0083)	(0.0339)	(0.0167)	(0.0097)	(0.0227)	(0.0124)	(0.0625)
FCF	0.0723*	0.0494	0.1498	0.0942***	-0.0822	0.0407	0.0944
	(0.0434)	(0.0487)	(0.1105)	(0.0219)	(0.0986)	(0.0409)	(0.1042)
LIQ	-0.2273***	-2.1701***	-0.1584*	-0.0605	-0.4028***	-0.0081	-0.1895
	(0.0732)	(0.7230)	(0.0837)	(0.0640)	(0.1388)	(0.1556)	(0.1593)
MBR	0.0019	0.0080	-0.0031	0.0043	-0.0061	-0.0708	-0.0024
	(0.003)	(0.0045)	(0.0041)	(0.0037)	(0.0039)	(0.0514)	(0.0035)
UNIR	0.0164*	-0.3486	0.0376***	0.0135***	1.0442**	0.0145	-1.0305
	(0.0092)	(0.5917)	(0.0035)	(0.0021)	(0.5146)	(0.0090)	(1.1398)
SIZE_2	0.0397	-0.3887***	0.0218	-0.0248	0.0388	-0.0032	-0.0072
	(0.0530)	(0.1049)	(0.0312)	(0.0191)	(0.0752)	(0.0202)	(0.0930)
TAN	-0.2832***	-0.9023***	-0.0773	0.0817	-0.3481**	0.0634	-0.2414
	(0.0839)	(0.2973)	(0.0676)	(0.1117)	(0.1369)	(0.1111)	(0.2954)
Constant	0.0555	2.5433***	0.1332	0.3003	0.0902	0.2468*	0.5957
	(0.3145)	(0.7065)	(0.2093)	(0.1201)	(0.4193)	(0.1441)	(0.7401)
N	290	43	137	100	86	109	80
Wald $X^2(14)$	/	/	1244.91***	3244.79***	/	91262.09***	/
F test	18.09***	99.04***	/	/	16.38***	/	3.47***
R^2	0.8505	0.9677	0.8480	0.9473	0.9438	0.9135	0.9274
Adjusted R^2	0.8036	0.8956	0.7847	0.9051	0.8889	0.8468	0.8566
Hausman test specification for fixed versus random effects panel estimation							
$X^2(14)$	97.23***	24.83**	8.02	13.67	31.84***	14.5	61.33***
Breusch and Pagan Lagrangian multiplier test for random effects versus pooled OSL panel estimation							
$X^2(1)$	/	/	89.62***	111.53***	/	130.01***	/
Model	FE	FE	RE	RE	FE	RE	FE

6. SUMMERY AND CONCLUSION

I. Conclusion

The literatures on corporate capital structure decisions have been extensively investigated by relating various capital structure determinants to corporate debt level. Controlling for firm fixed effects and time effects, this paper studies the capital structure determinants of non-financial Dutch listed firm for the period 2004-2012. Consistent with previous Dutch evidences, the results of multiple regression suggest that Dutch capital structure determinants are explained by a mixture of trade-off theory and pecking order theory: while business risk, non-debt tax shield, free cash flow, liquidity, uniqueness, size, profitability, tangibility are significant capital structure determinants, the relevance of growth opportunities and tax rate for Dutch listed firms are not are not confirmed.

Predicted by trade-off theory, firms that have more business risk and non-debt tax shield tend to issue less debt. Consistent with pecking order theory, more profitable firms and those with more liquid assets use less debt. Additionally, larger firms and firms that have more tangible assets also tend to issue less debt. This may suggest the firms with greater collateral assets suffer less from information asymmetry. The signs of uniqueness is positively correlated with all leverage measurements, this is inconsistent with agency cost theory which states the more unique the products are the less borrowing the firms issue. Probably this is because R&D and advertising costs are regarded as intangible assets. And based on information asymmetry theory, those firms who possess intangible assets are more sensitive towards adverse selection costs therefore more debt is utilized to avoid bad signals of equity. In addition, firms with more free cash flow tend to use more debt. This result supports the agency cost theory which argues that debt is an effective measure to reduce the free cash flow that managers can use for personal perks.

When decomposing leverage into long term and short term leverage, it is discovered that except for liquidity and uniqueness which show constant signs across leverage measures, there exist heterogeneity for the rest of the capital structure determinants: while business risk, non-debt tax shield and tangibility are only the significant factors for long term leverage, profitability is significant for short term leverage but not for long term leverage. With respect to signs, free cash flow is negatively correlated with long term leverage while it is positively correlated with short term leverage; size has positive impact on long term leverage while negative impact on short term leverage. Additionally, no non-linear relationship of size is discovered for size.

The empirical results of free cash flow are noteworthy because they overturn the previous Dutch evidences. Previously, De Jong and van Dijk (2007), De Jong and Veld (2001), De Jong (2002) demonstrate that entrenched managers and weak shareholder protection have disappeared the manager-shareholder conflicts. As a result, the discipline role of debt in mitigating overinvestment is also not significant. This study conclude otherwise by showing that free cash flow is indeed a significant capital structure determinant as predicted by agency cost theory. One plausible reason for the negative impact of free cash flow on long term leverage could be related to the recent institutional development. Traditionally, bank has absolute dominant position in Dutch market. However, along with unfold of financial crisis, in order to prioritize funding diversification and

availability, Dutch firms start to shift to new funding source. Simultaneously, the Basel III requirements have posed threat to incentives of banks to issue long term debt. As a result, being the most popular alternative of long term bank loans, the public debt market is developing at an unprecedented speed. When shifting their funding source to capital market, Kakebeeke (2014) mention that Dutch firms prefer using internally generated cash to repay long term bank loan. This is probably the reason why free cash flow is negatively correlated with long term leverage. The appearing of discipline role of total leverage could be related to the development of capital market which imposes external control on Dutch managers (which was absent before). Affected by which, they tend to be less entrenched than before.

Although the capital structure determinants differ for firms in different classes, it can be seen that for each class internal financing is preferred over external financing. What is more, the results of the entire sample show a high level of consistency with low profit firms. The possible reason is that sample frims have experienced earning shocks due to financial crisis. Another interesting finding is that the discipline role of debt is significant for low profit firms instead of high profit or low growth option firms who are likely to overinvest. One plausible reason is that low profit Dutch firms may utilize discipline role of debt as a precaution for overinvestment behaviour instead of a cure. This extra caution could be caused by financial crisis as well.

II. Limitations

This study is subject to 2 main drawbacks. Firstly, there is a harsh sampling criteria which requires sample firms to have consecutive accounts over the entire sampling period. Therefore for firms who started to have accounts in *Orbis* later than 2004 or those accounts are dropped during the sampling period are eliminated. Therefore this study could suffer from the survivorship bias because the reminder sample firms' could have convergence effects in terms of capital structure choices. This poses threat to the generalizability of this study. Secondly, the explanation of some capital structure determinants are inferences which are based on the recent institutional developments. These are just assumptions that are in need of further verifications.

III. Recommendations for further research

There are two recommendations that are made for further research. Firstly, the leverage measures in this study are at aggregate level due to data unavailability has constrained the further decomposition of debt instrument other than short term and long term leverage. Therefore it is recommended that further study could contribute by investigating more debt elements e.g. securitized vs unsecuritized debt, long term vs short term bank borrowings. Additionally, in order to gain a real-world understanding, survey would be a handy tool to verify the impact of institutional developments that are put forward to in this study. The fact that no survey is conducted due to time constraints may lead to a gap between theoretical arguments and genuine capital structure concerns that are embedded in business decisions. e. g. Graham and Harvey (2002) find that US managers prioritize maintaining credit rating and financial flexibility when devising debt policy; the survey results of Bancel and Mitto (2004) of 16 European countries suggest that financial flexibility and earning per share dilution is the primary concern when issuing securities.

7. BIBLIOGRAPHY

Altinkilic. O., & Hansen. R. S. (2000). Are there economies of scale in underwriting fees? Evidence of rising external financing costs. *Review of Financial Studies. 13*(1). 191-218.

Anderson, R. W., & Carverhill, A. (2012). Corporate liquidity and capital structure. *Review of Financial Studies*, *25*(3), 797-837.

Andres. C., Cumming. D., Karabiber. T., & Schweizer. D. (2014). Do markets anticipate capital structure decisions?—Feedback effects in equity liquidity. *Journal of Corporate Finance. 27*. 133-156.

Bahng. J. S., & Jeong. H. C. (2012). Nonlinear behaviors in capital structure decisions in Australian firms. *Review of Pacific Basin Financial Markets and Policies. 15*(03). 1-19

Baker. M., & Wurgler. J. (2002). Market timing and capital structure. *The Journal of Finance. 57*(1). 1-32.

Baltagi, B. H., & Giles, M. D. (1998). Panel data methods. *Statistics Textbooks and Monographs*, *155*, 291-324.

Bancel, F., & Mittoo, U. R. (2004). Cross-country determinants of capital structure choice: a survey of European firms. *Financial Management*, 103-132.

Banerjee. S., Dasgupta. S., & Kim. Y. (2008). Buyer–supplier relationships and the stakeholder theory of capital structure. *The Journal of Finance. 63*(5). 2507-2552.

Bates. T. W. (2005). Asset sales, investment opportunities and the use of proceeds. *The Journal of Finance. 60*(1). 105-135.

Bevan, A. A., & Danbolt, J. O. (2004). Testing for inconsistencies in the estimation of UK capital structure determinants. *Applied Financial Economics. 14*(1). 55-66.

Bharath. S. T., Pasquariello. P., & Wu. G. (2009). Does asymmetric information drive capital structure decisions?. *Review of Financial Studies. 22*(8). 3211-3243.

Billett, M. T., King, T. H. D., & Mauer, D. C. (2007). Growth opportunities and the choice of leverage, debt maturity, and covenants. *The Journal of Finance. 62*(2). 697-730.

Bowen. R. M., Daley. L. A., & Huber. C. C., Jr. (1982). Evidence on the existence and determinants of inter-industry differences in leverage. *Financial Management. 4*. 10–20.

Brounen, D., De Jong, A., & Koedijk, K. (2006). Capital structure policies in Europe: Survey evidence. *Journal of Banking & Finance*, *30*(5), 1409-1442.

Campello. M., Graham. J. R., & Harvey. C. R. (2010). The real effects of financial constraints: Evidence from a financial crisis. *Journal of Financial Economics. 97*(3). 470-487.

Chang. C., Lee. A. C., & Lee. C. F. (2009). Determinants of capital structure choice: A structural equation modeling approach. *The Quarterly Review of Economics and Finance. 49*(2). 197-213.

Chang. C., Chen. X., & Liao. G. (2014). What are the Reliably Important Determinants of Capital Structure in China?. *Pacific-Basin Finance Journal*. 1-55.

Chen, J. J. (2004). Determinants of capital structure of Chinese-listed companies. *Journal of Business Research*. *57*(12). 1341-1351.

Chen. L. H.. & Jiang. G. J. (2001). The determinants of Dutch capital structure choice. *Working paper University of Groningen*.

Chen. L. H.. Lensink. R.. & Sterken. E. (1999). The determinants of capital structure: Evidence from Dutch panel data. *Working paper University of Groningen*. 1-33.

Cheng. S. R., & Shiu. C. Y. (2007). Investor protection and capital structure: International evidence. *Journal of Multinational Financial Management*. *17*(1). 30-44.

Chevalier, J. A. (1995). Capital structure and product-market competition: Empirical evidence from the supermarket industry. *The American Economic Review*, 415-435.

Cools. K. (1993) Capital Structure Choice; Confronting: (Meta) Theory. Empirical Tests and Executive Opinion. *Ph.D. dissertation of Tilburg University*.

Custódio. C., Ferreira. M. A., & Laureano. L. (2013). Why are US firms using more short-term debt?. *Journal of Financial Economics*. *108*(1). 182-212.

DeAngelo. H., & Masulis. R. W. (1980). Optimal capital structure under corporate and personal taxation. *Journal of financial Economics*. *8*(1). 3-29.

De Bie. T., & De Haan. L. (2007). Market timing and capital structure: Evidence for Dutch firms. *De Economist*. *155*(2). 183-206.

De Haan. L., & Hinloopen. J. (2003). Preference hierarchies for internal finance, bank loans, bond and share issues: evidence for Dutch firms. *Journal of Empirical Finance*. *10*(5). 661-681.

D'Mello. R., & Miranda. M. (2010). Long-term debt and overinvestment agency problem. *Journal of Banking & Finance*. *34*(2). 324-335.

De Jong. A., Kabir. R., & Nguyen. T. T. (2008). Capital structure around the world: The roles of firm-and country-specific determinants. *Journal of Banking & Finance*. *32*(9). 1954-1969.

De Jong. A., & Veld. C. (2001). An empirical analysis of incremental capital structure decisions under managerial entrenchment. *Journal of Banking & Finance*. *25*(10). 1857-1895.

De Jong. A., & Van Dijk. R. (2007). Determinants of leverage and agency problems: A regression approach with survey data. *The European Journal of Finance*. *13*(6). 565-593.

Delcoure, N. (2007). The determinants of capital structure in transitional economies. *International Review of Economics & Finance*, *16*(3), 400-415.

Fan. J. P., Titman. S., & Twite. G. (2012). An international comparison of capital structure and debt maturity choices. *Journal of Financial and Quantitative Analysis*. *47*(1). 23.

Fattouh. B., Harris. L., & Scaramozzino. P. (2008). Non-linearity in the determinants of capital structure: evidence from UK firms. *Empirical Economics*. *34*(3). 417-438.

Faulkender. M., Petersen. M., (2006). Does the source of capital affect capital structure? *Review of Financial Studies 19*(1). 45–79.

Frank. M. Z., & Goyal. V. K. (2009). Capital structure decisions: which factors are reliably important?. *Financial Management*. *38*(1). 1-37.

Hackbarth. D., Miao. J., & Morellec. E. (2006). Capital structure, credit risk, and macroeconomic conditions. *Journal of Financial Economics*. *82*(3). 519-550.

Hayes. A. F., & Cai. L. (2007). Using heteroskedasticity-consistent standard error estimators in OLS regression: An introduction and software implementation. *Behavior Research Methods*. *39*(4). 709-722.

Hillier, D. J., Ross, S. A., Westerfield, R. W., Jaffe, J., & Jordan, B. D. (2010). Corporate finance: 1st European edition (No. 1st Edition). McGraw-Hill. 400-425

Hovakimian. A., Hovakimian. G., & Tehranian. H. (2004). Determinants of target capital structure: The case of dual debt and equity issues. *Journal of Financial Economics*. *71*(3). 517-540.

Huang. G., & Song. F. M. (2006). The determinants of capital structure: evidence from China. *China Economic Review*. *17*(1). 14-36.

Titman. S., & Wessels. R. (1988). The determinants of capital structure choice. *The Journal of Finance*. *43*(1). 1-19.

Titman. S. (1984). The effect of capital structure on a firm's liquidation decision. *Journal of Financial Economics*. *13*(1). 137-151.

Titman. S., & Tsyplakov. S. (2007). A dynamic model of optimal capital structure. *Review of Finance*. *11*(3). 401-451.

Gaud. P., Jani. E., Hoesli. M., & Bender. A. (2005). The capital structure of Swiss companies: an empirical analysis using dynamic panel data. *European Financial Management*. *11*(1). 51-69.

Gaud, P., Hoesli, M., & Bender, A. (2007). Debt-equity choice in Europe. *International Review of Financial Analysis*, *16*(3), 201-222.

Getzmann, A., Lang, S., & Spremann, K. (2010). Determinants of the target capital structure and adjustment speed–evidence from Asian capital markets. *Working paper European Financial Management Symposium*.

Gilson. S. C. (1997). Transactions costs and capital structure choice: Evidence from financially distressed firms. *The Journal of Finance*. *52*(1). 161-196.

Gordon, R. H., & Lee, Y. (2001). Do taxes affect corporate debt policy? Evidence from US corporate tax return data. *Journal of Public Economics*, *82* (2), 195-224.

Graham. J., & Harvey. C. (2002). How do CFOs make capital budgeting and capital structure decisions? *Journal of Applied Corporate Finance. 15*(1). 8-23.

Graham. J. R., & Harvey. C. R. (2001). The theory and practice of corporate finance: evidence from the field. *Journal of Financial Economics. 60*(2). 187-243.

Green. R. C., & Talmor. E. (1986). Asset substitution and the agency costs of debt financing. *Journal of Banking & Finance. 10*(3). 391-399.

González. V. M., & González. F. (2008). Influence of bank concentration and institutions on capital structure: New international evidence. *Journal of Corporate Finance. 14*(4). 363-375.

Gul. F. A., & L Tsui. J. S. (1997). A test of the free cash flow and debt monitoring hypotheses: Evidence from audit pricing. *Journal of Accounting and Economics. 24*(2). 219-237.

Gungoraydinoglu. A., & Öztekin. Ö. (2011). Firm-and country-level determinants of corporate leverage: Some new international evidence. *Journal of Corporate Finance. 17*(5). 1457-1474.

Gygax, A. F., Wanzenried, G., & Wu, X. (2013). Capital Structure Inertia and Product Market Competition. *IFZ Working Paper*

Harris. M., & Raviv. A. (1991). The theory of capital structure. *The Journal of Finance. 46*(1). 297-355.

Hsiao, C. (1986). *Analysis of panel data* (Vol. 34). Cambridge university press.

Hovakimian. A., Opler. T., & Titman. S. (2001). The debt-equity choice. *Journal of Financial and Quantitative Analysis. 36*(01). 1-24.

Jensen. M. C., & Meckling. W. H. (1976). Theory of the firm: Managerial behaviour, agency costs and ownership structure. *Journal of Financial Economics. 3*(4). 305-360.

Jensen. M. C. (1986). Agency costs of free cash flow, corporate finance and takeovers. *The American Economic Review*. 323-329.

Kabir. R., Cantrijn. D., & Jeunink. A. (1997). Takeover defences, ownership structure and stock returns in the Netherlands: An empirical analysis. *Strategic Management Journal. 18*(2). 97-109.

Kakebeeke. P. (2014). Nederlandse bedrijven leunen minder op bankschulden. *Het Financieele Dagblad.*

Kayhan. A., & Titman. S. (2007). Firms' histories and their capital structures. *Journal of Financial Economics. 83*(1). 1-32.

Kayo. E. K., & Kimura. H. (2011). Hierarchical determinants of capital structure. *Journal of Banking & Finance. 35*(2). 358-371.

Kolay. M., Schallheim. J., & Wells. K. (2011). Do Non-Debt Tax Shields Matter for Debt Policy?. *Working paper University of Utah.*

Kovenock. D., & Phillips. G. (1995). Capital structure and product-market rivalry: how do we reconcile theory and evidence?. *The American Economic Review*. 403-408.

La Porta. R., Lopez-de-Silanes. F., Shleifer. A & Vishny., R. (1998). Law and Finance. *Journal of Political Economy. 106*(6). 1113-1155.

Leary. M. T., & Roberts. M. R. (2003). Do firms rebalance their capital structures?. *The Journal of Finance. 60*(6). 2575-2619.

Lemmon. M.L, & Zender. J.F. (2004). Debt Capacity and Tests of Capital Structure Theories. *Working paper University of Utah and University of Colorado at Boulder.*

Lemmon. M. L., Roberts. M. R., & Zender. J. F. (2008). Back to the beginning: persistence and the cross ‐ section of corporate capital structure. *The Journal of Finance. 63*(4). 1575-1608.

Loncan, T. R., & Caldeira, J. F. (2014). Capital structure, cash holdings and firm value: a study of brazilian listed firms. *Revista Contabilidade & Finanças*, *25*(64), 46-59.

Lugo. S. (2014). Insider Ownership and the Cost of Debt Capital: Evidence from Bank Loans. *Working paper Utrecht University School of Economics.*

Mauer. D. C., & Sarkar. S. (2005). Real options, agency conflicts and optimal capital structure. Journal of banking & Finance. 29(6). 1405-1428.

Mazur. K. (2007). The determinants of capital structure choice: evidence from Polish companies. *International Advances in Economic Research. 13*(4). 495-514.

Michaely. R., & Vincent. C. (2012). Do Institutional Investors Influence Capital Structure Decisions?. *Working Paper Johnson School of Management. Cornell University*.

Michon. R., & Richinel. R. (2013). Beleid beursgenoteerde ondernemingen gericht op het verhogen van de beschikbaarheid van financiering. *MCA*. (1). 15-20.

Miglo. A. (2007). Debt-equity choice as a signal of earnings profile over time. *The Quarterly Review of Economics and Finance. 47*(1). 69-93.

Myers. S. C. (2003). Financing of corporations. *Handbook of the Economics of Finance. 1*. 215-253.

Myers. S. C., & Majluf. N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics. 13*(2). 187-221.

Myers. S. C. (1977). Determinants of corporate borrowing. *Journal of Financial Economics. 5*(2). 147-175.

Ozkan. A. (2001). Determinants of capital structure and adjustment to long run target: evidence from UK company panel data. *Journal of Business Finance & Accounting. 28*(1 ‐ 2). 175-198.

Park. K., & Jang. S. S. (2013). Capital structure, free cash flow, diversification and firm performance: A holistic analysis. *International Journal of Hospitality Management. 33*. 51-63.

Psillaki. M., & Daskalakis. N. (2009). Are the determinants of capital structure country or firm specific?. *Small Business Economics. 33*(3). 319-333.

Rajan. R. G., & Zingales. L. (1995). What do we know about capital structure? Some evidence from international data. *The Journal of Finance. 50*(5). 1421-1460.

Richardson. S. (2006). Over-investment of free cash flow. *Review of Accounting Studies. 11*(2-3). 159-189.

Ross. S. A. (1977). The determination of financial structure: the incentive-signaling approach. *The Bell Journal of Economics*. 23-40.

Serrasqueiro, Z., & Nunes, P. M. (2008). Determinants of capital structure: Comparison of empirical evidence from the use of different estimators. *International Journal of Applied Economics. 5*(1). 14-29.

Shivdasani. A., & Stefanescu. I. (2009). How do pensions affect corporate capital structure decisions?. *Review of Financial Studies. 23(*3). 1287-1323.

Stulz. R. (1990). Managerial discretion and optimal financing policies. *Journal of Financial Economics. 26*(1). 3-27.

Sibilkov, V. (2009). Asset liquidity and capital structure. *Journal of Financial and Quantitative Analysis*, *44*(05), 1173-1196.

Wang. H. (2011). Managerial entrenchment, equity payout and capital structure. *Journal of Banking & Finance. 35*(1). 36-50.

White. H. (1980). A Heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity. *Econometrica. 48*. 817–838.

Williamson, O. E. (1979). Transaction-cost economics: the governance of contractual relations. *Journal of Law and Economics*, 233-261.

Wooldridge, J. (2009). *Introductory econometrics*. 1st ed. Mason, OH: South Western, Cengage Learning.

8. APPENDIX

I. Definitions of variables[30]

	Abbreviation	Definition	Reference
Dependent variables			
Long term market leverage	LML	Long term debt/total assets-shareholder funds + annual market capitalization	De Jong, Kabir and Nguyen (2008)
Long term book leverage	LBL	Long term debt/total assets	De Jong(2002); De Jong and van Dijk(2007)
Short term market leverage	SML	Short term debt/ total assets-shareholder funds + annual market capitalization	Chen and Jiang(2001); Mazur(2007)
Short term book leverage	SBL	Short term debt /total assets	Titman and Wessel(1988); Rajan and Zingales (1995)
Total market leverage	TML	Long term debt + short term debt/total assets-shareholder funds + annual market capitalization	Gungoraydinoglu and Öztekin(2011); Cheng and Shiu (2007)
Total book leverage	TBL	Long term debt + short term debt/ total assets	Frank and Goyal(2009); Cheng and Shiu(2007)
Independent variables			
Business risk	EVS	Standard deviation of percentage changes in sales over 3 years	Titman and Wessel(1988); De Jong and van Dijk(2007)[31]
	EVO	Standard deviation of percentage changes in operating income over 3 years	De Jong(2002); De Jong and Dijk(2007)
Non-debt tax shield	NDTS_1	Depreciation and amortization/total assets	Titman and Wessel(1988); De Jong (2002)
	NDTS_2	Provision/total assets	Chen and Jiang(2002);
Tax rate	TAX	Taxation/pre-tax income	De Jong, Kabir and Nguyen (2008); Gungoraydinoglu and Öztekin(2011)

[30] The definition variables are in accordance with the global standard format of accounting data from *Orbis*

[31] The measurement of business risk is improvised based on De Jong and van Dijk (2007) who utilize Standard deviation of percentage changes in operating income over 5 years. The reason lies in 5 year measurement will reduce number of observations of business risk significantly

	Abbreviation	Definition	Reference
Free cash flow	FCF	Operating income-taxation-interest paid-ordinary dividend/total assets	Jensen(1986); De Jong(2002)
Liquidity	LIQ	Cash and equivalent/total assets	De Jong(2002); De Jong and van Dijk(2007)
Market-to-book ratio	MBR	Annual market capitalization/shareholder fund	Rajan and Zingales (1995); Chen. Lensink and Sterken. (1999)
Uniqueness	UNIR	R&D expenses/total sales	Titman(1984); Titman and Wessel(1988)
	UNIO	Other operating expenses/total sales	Titman and Wessel(1988)[32]
Size	SIZE_1	Logarithm of employee number	Chen and Jiang(2001)
	NE	Number of employees	/
	SIZE_2	Logarithm of total assets	Frank and Goyal(2009)
	TA	Total assets	/
Squared size	$SIZE\_1^2$	Square of SIZE_1	Fattouh, Harris and Scaramozzino (2008); Bahng and Jeong (2012)
	$SIZE\_2^2$	Square of SIZE_2	
Profitability	PROF	EBITDA/total assets	Chen. Lensink and Sterken (1999)
Tangibility	TAN	Fixed tangible assets +inventory/total assets	Chen, Lensink and Sterken (1999); De Jong(2002)
Industry dummies			
Mining and construction	DUM_MIN	0=other industries, 1=mining and construction	Frank and Goyal (2009); Titman and Wessle (1988); Lemmon, Roberts and Zender (2008)
Trasportation and communication	DUM_TRAN	0=other industries, 1=transportation and communication	
Whole sale and retail	DUM_RET	0=other industries,1=whole sale and retail	
Business service	DUM_BS	0=other industries1=business service	

[32] Titman and Wessel (1988) utilize advertising costs instead of other operating cost. The measurements are improvised due to data limitation

II. OLS estimations

Table 11 OLS estimation of capital structure determinants of Dutch listed firms

This table presents the OLS estimation of various leverage measures and their determinants. See Appendix I for variable definitions. The sample consists of *Orbis* Dutch listed firms from 2004 to 2012. Firms belong to financial industries, utility industries as well as those with negative sales and total assets are omitted. Dependent variables are measured as lagged value of 1 year. N stands for number of observations. Year dummies are included but not reported. Robust standard errors corrected for firm-level clustering are in parentheses. ***, **, and * denote significance at 1%, 5% and 10% level respectively.

Panel A: variables set 1

	LML	LBL	SML	SBL	TML	TBL
EVS	-0.0110	0.0023	-0.0282*	-0.0211	-0.0410**	-0.0252
	(0.0147)	(0.0225)	(0.0147)	(0.0169)	(0.0200)	(0.0261)
NDTS_1	-0.1358	-0.2962**	0.1277	-0.0002	0.0329	-0.1834
	(0.1081)	(0.1337)	(0.1099)	(0.1524)	(0.1289)	(0.1731)
TAX	-0.0062	-0.0154	-0.0013	0.0007	-0.0071	-0.0141
	(0.0126)	(0.0121)	(0.0105)	(0.0086)	(0.0137)	(0.0132)
FCF	-0.0488	-0.1615**	0.1103	0.0164	0.0909	-0.0609
	(0.0446)	(0.0704)	(0.0716)	(0.0856)	(0.0694)	(0.0845)
LIQ	-0.1808**	-0.2796***	-0.181***	-0.2498***	-0.3635***	-0.5349***
	(0.0737)	(0.0959)	(0.0676)	(0.0554)	(0.1001)	(0.1234)
MBR	-0.0013	0.0104***	-0.0014	0.0008	-0.0017	0.0139***
	(0.0017)	(0.0021)	(0.0019)	(0.0016)	(0.0029)	(0.0028)
UNIO	0.0050**	0.0088***	0.0043	0.0067***	0.0095***	0.0170***
	(0.0019)	(0.0016)	(0.0028)	(0.0024)	(0.0022)	(0.0040)
SIZE_1	0.1557*	0.1472	-0.0375	-0.0575	0.1172	0.0945
	(0.0855)	(0.1006)	(0.0690)	(0.0806)	(0.1063)	(0.1212)
SIZE_1²	-0.0173	-0.0145	0.0009	0.0047	-0.0163	-0.0107
	(0.0129)	(0.0151)	(0.0096)	(0.011)	(0.0158)	(0.0179)
PROF	-0.0515	0.2191	-0.2225*	-0.0646	-0.3200*	0.0269
	(0.094)	(0.1342)	(0.1308)	(0.1362)	(0.1726)	(0.1787)
TAN	0.0048	-0.0023	0.0842	0.0910*	0.0907	0.0982*
	(0.0318)	(0.0429)	(0.0536)	(0.0498)	(0.0593)	(0.0619)
Constant	-0.1972	-0.1881	0.1985	0.2188	0.0048	-0.0228
	(0.1270)	(0.1550)	(0.1250)	(0.1425)	(0.1655)	(0.1917)
F test	8.18***	15.55***	7.66***	14.58***	6.84***	10.17***
N	341	351	341	351	341	351
R^2	0.2076	0.2672	0.3133	0.3125	0.3045	0.3696
Adjusted R^2	0.1685	0.2321	0.2794	0.2796	0.2702	0.3394

Panel B: variables set 2

	LML	LBL	SML	SBL	TML	TBL
EVO	0.0007	0.0005	0.0003	-0.0004	0.0009	-0.0001
	(0.0015)	(0.002)	(0.001)	(0.001)	(0.0014)	(0.0017)
NDTS_2	-0.1809	-0.3805	0.0083	-0.0142	-0.1817	-0.3918
	(0.2217)	(0.2571)	(0.2096)	(0.2253)	(0.3529)	(0.4024)
TAX	-0.0043	-0.0119	0.0037	0.0036	-0.0013	-0.0115
	(0.0184)	(0.0190)	(0.0129)	(0.0120)	(0.0198)	(0.0195)
FCF	-0.1157**	-0.2362***	0.1649***	0.1473***	0.0737	0.0085
	(0.0459)	(0.0628)	(0.0616)	(0.0518)	(0.0898)	(0.0827)
LIQ	-0.1952*	-0.3648***	-0.2335***	-0.3098***	-0.4276***	-0.6824***
	(0.1025)	(0.1363)	(0.0599)	(0.0692)	(0.1166)	(0.1664)
MBR	-0.0007	0.0121***	0.0001	0.0018	0.0006	0.0170***
	(0.0018)	(0.0020)	(0.0016)	(0.0013)	(0.0032)	(0.0034)
UNIR	0.0043*	0.0151***	0.0049	0.0091*	0.0086	0.0258***
	(0.0023)	(0.0023)	(0.0056)	(0.0051)	(0.0053)	(0.0071)
SIZE_2	0.1707	0.1243	-0.0367	-0.0647	0.1291	0.0469
	(0.1274)	(0.1512)	(0.0666)	(0.0647)	(0.1513)	(0.1746)
SIZE_2²	-0.0111	-0.0058	0.0014	0.0038	-0.0093	-0.0010
	(0.0112)	(0.0132)	(0.0055)	(0.0053)	(0.0134)	(0.0154)
PROF	-0.0102	0.3039**	-0.3004**	-0.2314**	-0.3588**	-0.0638
	(0.1024)	(0.1217)	(0.1177)	(0.1050)	(0.1760)	(0.1745)
TAN	0.0131	0.0237	0.1035*	0.0920	0.1204*	0.1249*
	(0.0364)	(0.0464)	(0.0578)	(0.0554)	(0.0650)	(0.0684)
Constant	-0.4898	-0.4003	0.2428	0.3439*	-0.2294	-0.0089
	(0.3480)	(0.4219)	(0.2003)	(0.1946)	(0.4075)	(0.4757)
N	290	298	290	298	290	298
F test	13.72***	16.67***	3.19***	3.31***	9.10***	5.81***
R^2	0.2301	0.3730	0.3634	0.3411	0.3242	0.3730
Adjusted R^2	0.1805	0.2766	0.3261	0.3036	0.2846	0.3373

III. Industry classification

The significant impact of industry conditions on leverage has been well documented. One stream of study argues that the industrial median leverage level serve as a bench mark and firms strive to revert to this level over long run. Hovakimian, Opler and Titman (2001) confirmed this view by showing that firms indeed adjust their leverage ratios towards industrial average. Gygax, Wanzenried and Wu (2013) also report that for each industry in their study there is a fixed leverage level that firm prefer to keep up with. On the other hand, another stream of study assert that it is a series of correlated industry-specific factors (such as level of competition, regulations, nature of assets etc.) that affect firms' financing decision. In terms of evidence, Chevalier (1995) shows that the leverage level soften the product market competition for US supermarkets. reports that there exist inertia behaviro in terms within differeiencet industries each indistru has where

Due to this study places emphasis on FEM which controls for firm fixed effects that includes industry classification, thus the industrial impact cannot be identified. Nevertheless, as an area of interest, this section will conduct OLS with industry dummies to test industry-level determinants. Due to the sample size is rather small, based on US SIC code, the industries are categorized into 4 groups as Table 12 presents. It can be seen that next to manufacturing industries, firms that belong to business services industries also accounts for a large proportion of the sample. When it comes to the variables selections, the independent variables are chosen to be same as Table 8 due to they bear out to be better measurements/ variables that give better explanatory power. Manufacturing industry is omitted as it is the reference group.

Table 12 Industrial distribution of sample firms

Industries	SIC code	Number of firms
Mining and Construction	1000-1999	6
Manufacturing	2000-3999	31
Transportation and Communication	4000-4999	4
Whole Sale and Retail Trade	5000-5999	8
Business Services	7000-8999	22

Only the results of industry dummies will be reported since those are the primary concerns. It is discovered that mining and construction as well as transportation and communication industry do not have significant impacts on any leverage ratios; retail and whole sale industry are negatively correlated with long term leverage and positively correlated with short term leverage. This means retail and whole sale firms prefer short term debt rather than long term debt. One plausible reason would be this industry is seasonal in nature thus they tend to borrow in advance to build up inventories so that after the peak season the debt can be repaid with profit earned in the same period. Business service industry is negatively correlated with both long term and total leverage. The reason could be that firms that are in business service industry tend to have less tangible assets, therefore its more difficult for them to raise long term debt due to no/little collaterals.

Table 13 OLS estimation with industry dummies

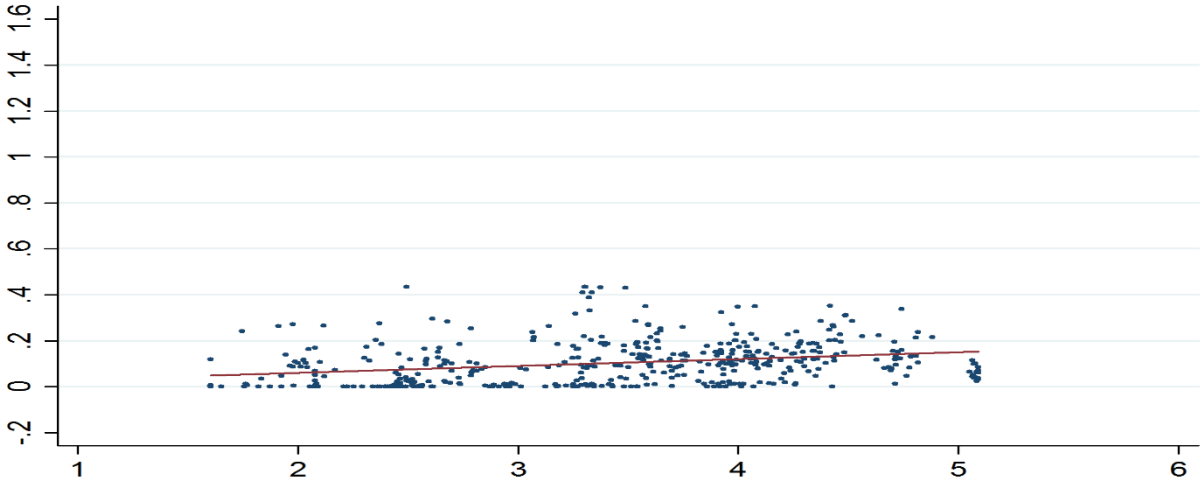
This table presents the OLS estimation of various leverage measures and their determinants. See Appendix I for variable definitions. The sample consists of *Orbis* Dutch listed firms from 2004 to 2012. Firms belong to financial industries, utility industries as well as those with negative sales and total assets are omitted. Dependent variables are measured as lagged value of 1 year. N stands for number of observations. Year dummies are included but not reported. Robust standard errors corrected for firm-level clustering are in parentheses. ***, **, and * denote significance at 1%, 5% and 10% level respectively.

	LML	LBL	SML	SBL	TML	TBL
EVS	-0.0290*	-0.0263	0.0025	0.0175	-0.0270	-0.0084
	(0.0159)	(0.0169)	(0.0107)	(0.0119)	(0.0211)	(0.0244)
NDTS_2	-0.4537***	-0.5136***	0.0937	0.0971	-0.3827	-0.4394
	(0.1312)	(0.1749)	(0.1794)	(0.1850)	(0.2379)	(0.3080)
TAX	-0.0087	-0.0151	0.0023	0.0055	-0.0068	-0.0117
	(0.0154)	(0.0153)	(0.0156)	(0.0154)	(0.0204)	(0.0215)
FCF	-0.1141***	-0.1136***	0.0187	0.0243	-0.0889	-0.0717
	(0.0372)	(0.0364)	(0.0360)	(0.0331)	(0.0635)	(0.0505)
LIQ	-0.2002***	-0.3556***	-0.2113***	-0.2970***	-0.4160***	-0.6775***
	(0.0676)	(0.1199)	(0.0587)	(0.0709)	(0.0979)	(0.1714)
MBR	-0.0028	0.0342***	-0.0086*	0.0007	-0.0104	0.0377***
	(0.0046)	(0.0070)	(0.0046)	(0.0046)	(0.0069)	(0.0087)
UNIR	-0.1120	0.0511	0.0103	0.1078	-0.1138	0.2007
	(0.2123)	(0.2620)	(0.2044)	(0.2075)	(0.2969)	(0.4113)
SIZE_2	0.0341***	0.0412***	-0.0197***	-0.0195***	0.0135*	0.0183*
	(0.0055)	(0.0072)	(0.005)	(0.0052)	(0.0077)	(0.0094)
TAN	-0.0298	0.0193	0.0294	0.0369	-0.0039	0.0500
	(0.0327)	(0.0376)	(0.0266)	(0.0267)	(0.0385)	(0.0456)
DUM_MIN	-0.0173	0.0140	-0.0168	-0.0142	-0.0370	-0.0044
	(0.0179)	(0.0266)	(0.0135)	(0.0140)	(0.0232)	(0.0304)
DUM_TRAN	0.0100	0.0369	-0.0179	-0.0218	-0.0116	0.0079
	(0.0192)	(0.0245)	(0.0166)	(0.0158)	(0.0259)	(0.0314)
DUM_RET	-0.0465**	-0.0465**	0.0760***	0.0692**	0.0279	0.0189
	(0.0192)	(0.0208)	(0.0280)	(0.0269)	(0.0295)	(0.0289)
DUM_BS	-0.0585***	-0.0456**	-0.0184	-0.0146	-0.0812***	-0.0682**
	(0.0164)	(0.0200)	(0.0179)	(0.0165)	(0.0250)	(0.0300)
Constant	-0.0231	-0.1081	0.1959***	0.1964***	0.1805***	0.1092
	(0.0476)	(0.0545)	(0.0383)	(0.0384)	(0.0613)	(0.0696)
F test	7.63***	10.28***	5.76***	5.06***	8.96***	7.05***
N	290	298	290	298	290	298
R^2	0.2734	0.3275	0.3642	0.3255	0.3157	0.3024
Adjusted R^2	0.2252	0.2842	0.3220	0.2820	0.2703	0.2574

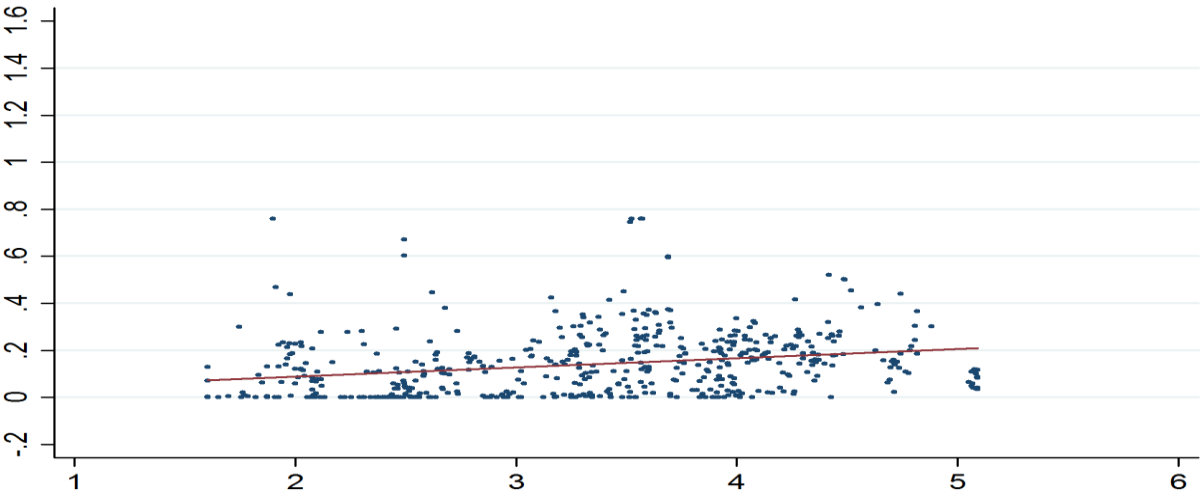
IV. Variation of leverage ratios with size

Figure 4 Scatter plot of size and leverage

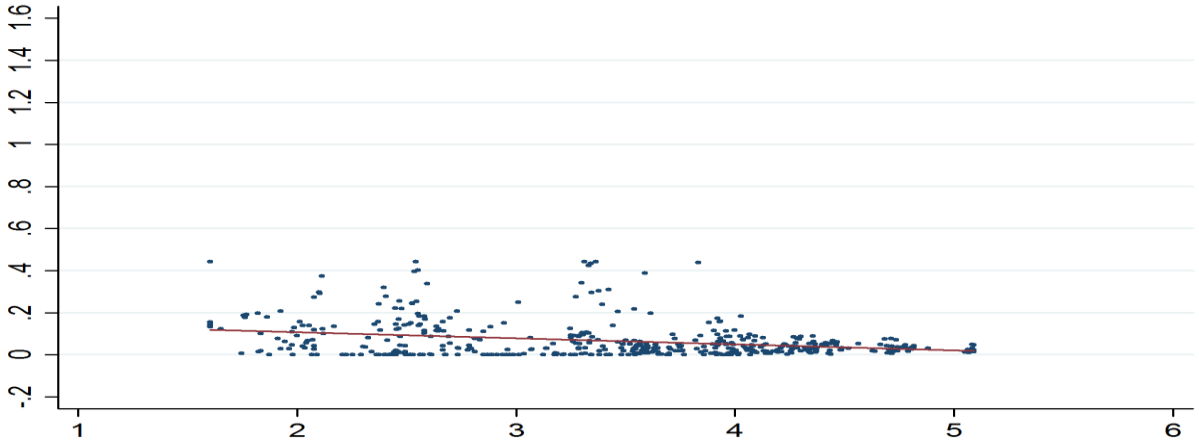
a: LML vs SIZE_1



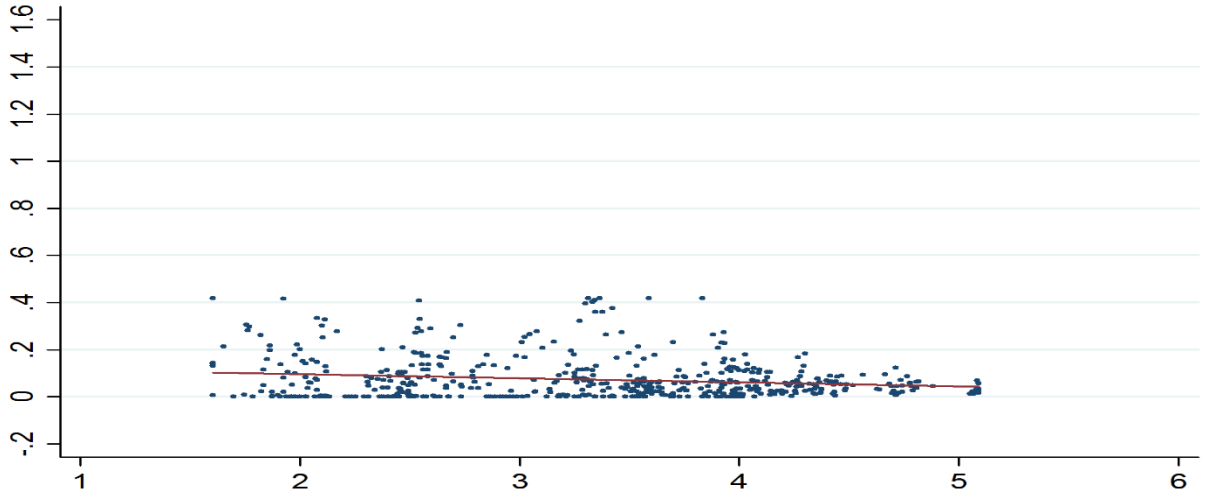
b: LBL vs SIZE_1



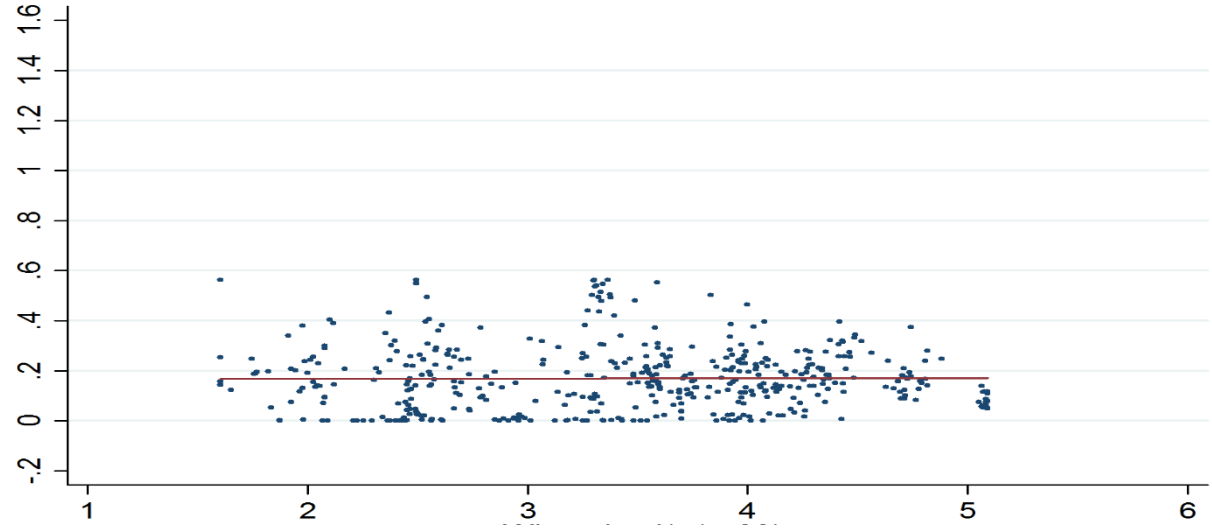
c: SML vs SIZE_1



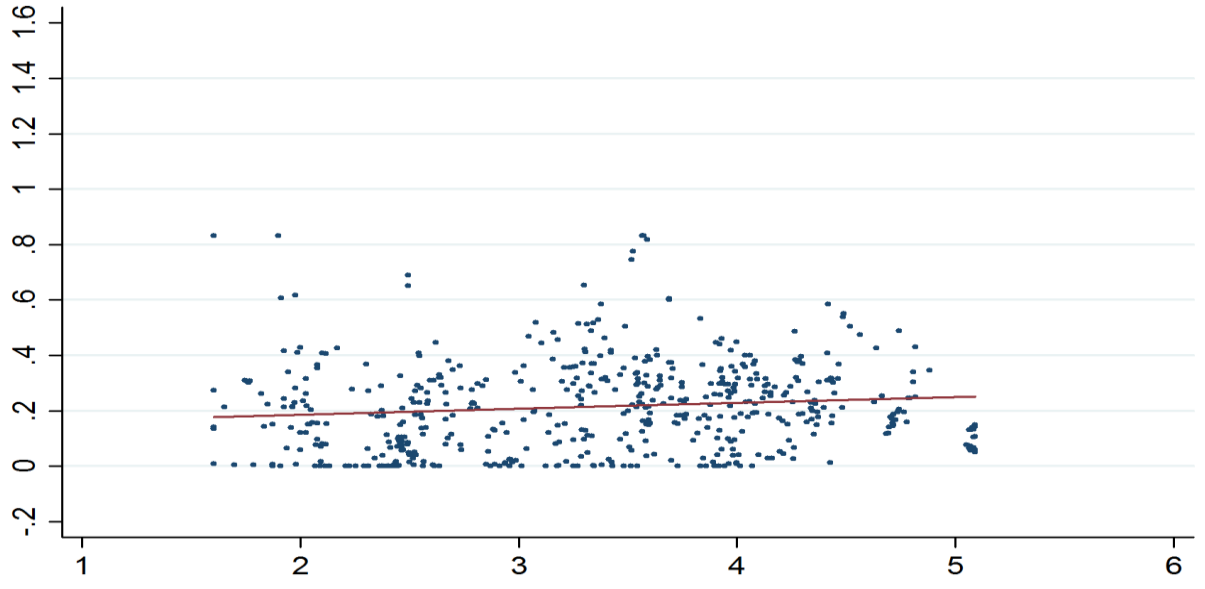
d: SBL vs SIZE_1



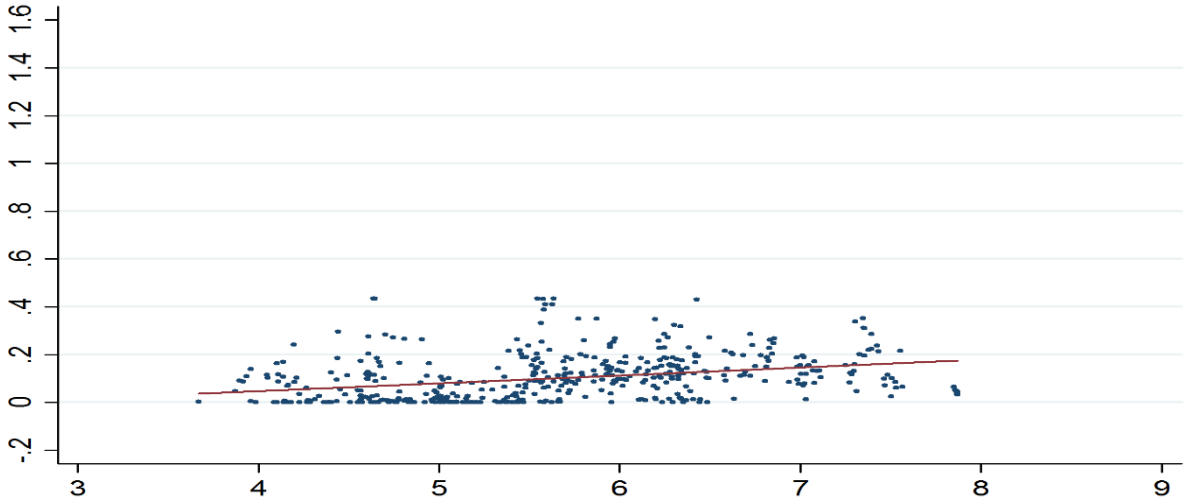
e: TML vs SIZE_1



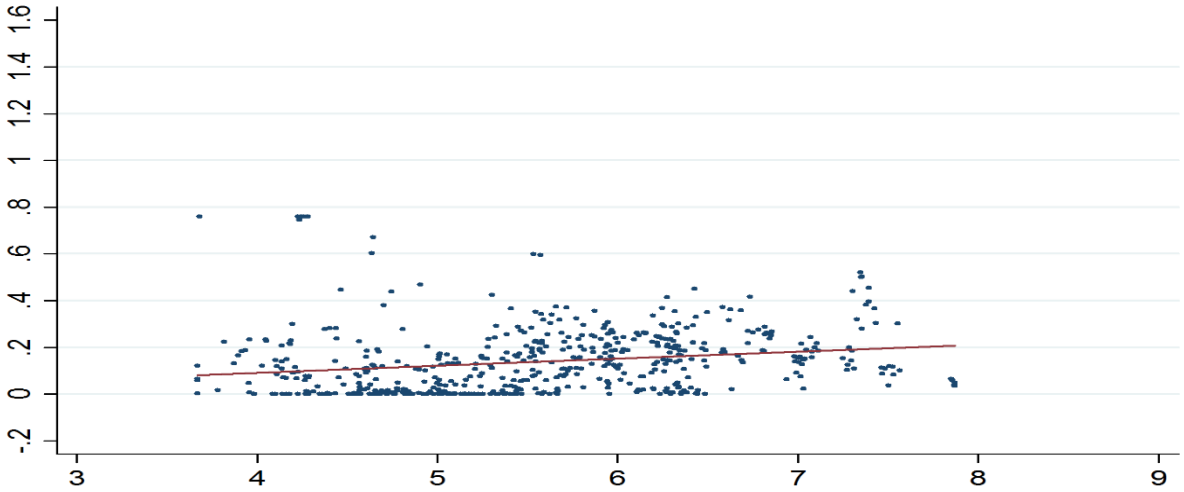
f: TBL vs SIZE_1



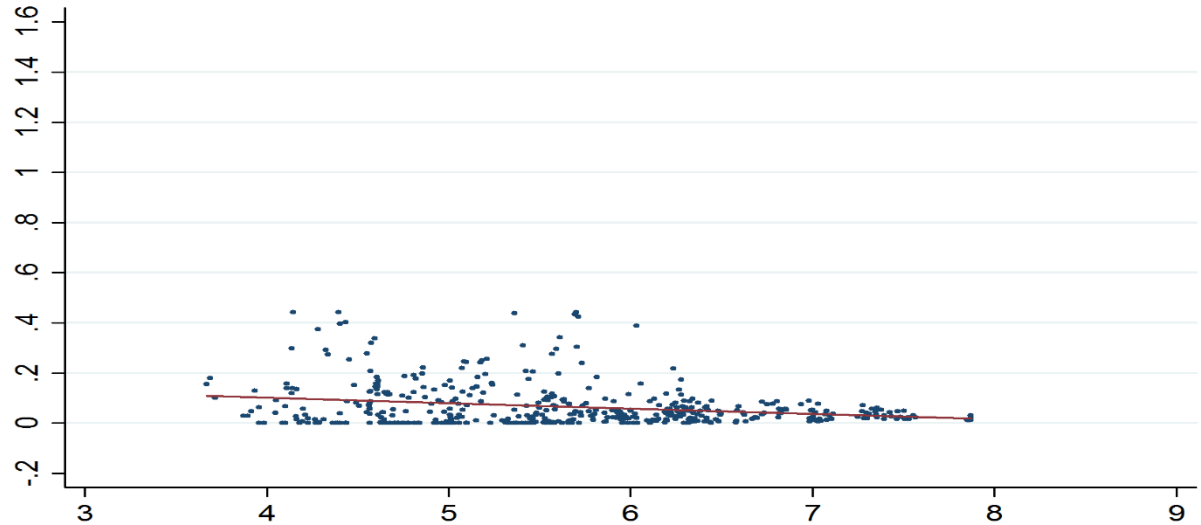
g: LML vs SIZE_2



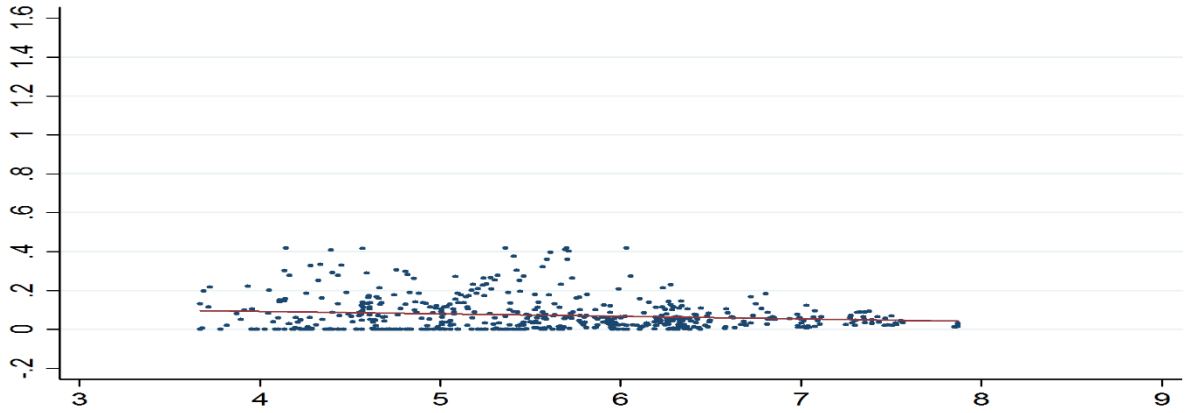
h: LBL vs SIZE_2



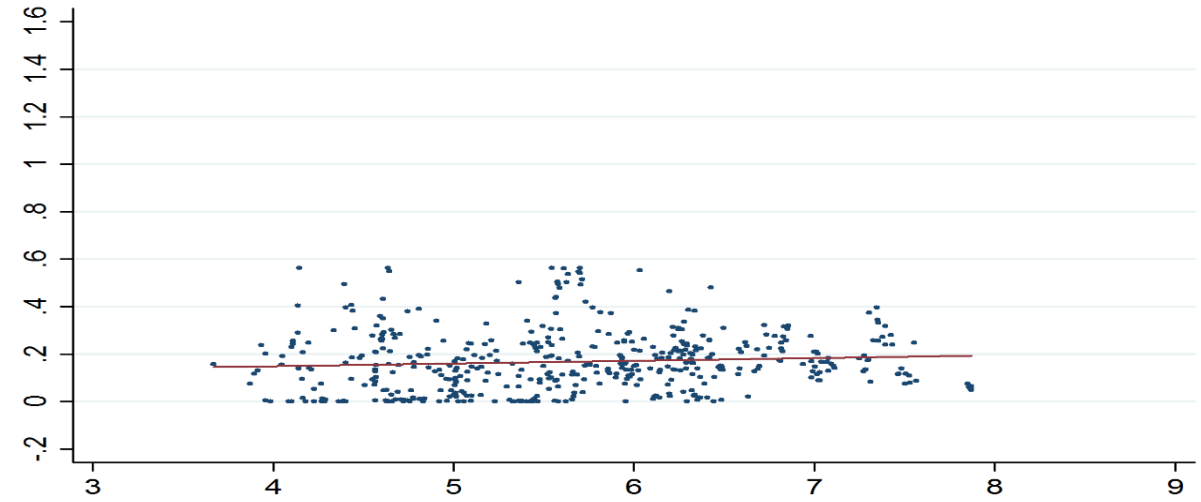
i: SML vs SIZE_2



j: SBL vs SIZE_2



k:TML vs SIZE_



l: TBL vs SIZE_2