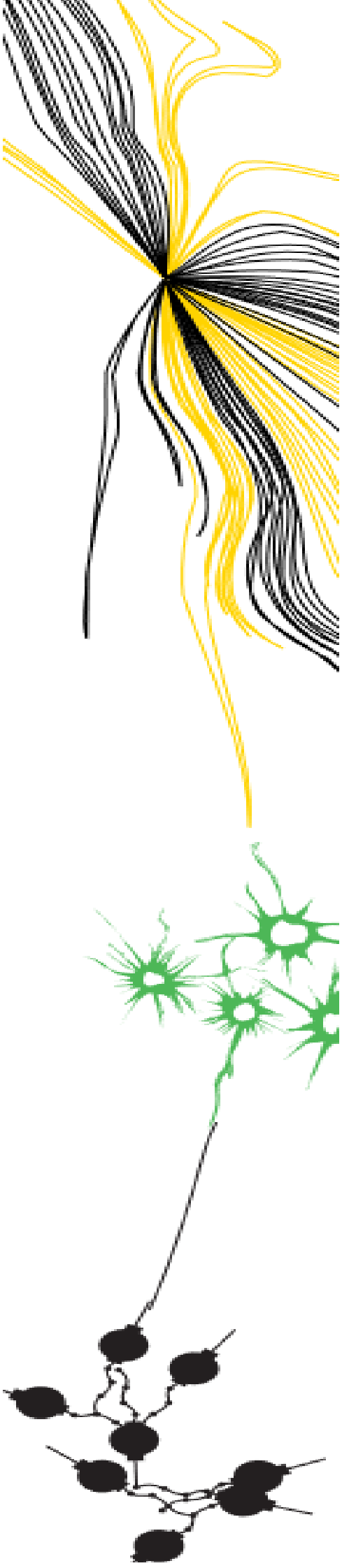

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Firm-level determinants of capital structure: Dutch listed firms

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Abstract

This research investigates whether the firm-level determinants of the tradeoff theory and the pecking order theory can explain the capital structure of Dutch listed firms. The sample contains non-financial Dutch firms from the period 2013-2017. The data is gathered from Orbis. In total there are 224 firms included in the sample. The dependent variables are the long-term debt ratio and the total debt ratio. Ordinary least squares regression is used to analyze the data. The models who test the tradeoff theory found empirical evidence that tangibility and volatility are positively related to leverage. Profitability and non-debt tax shield are negatively related to leverage. The pecking order theory hypotheses found also empirical support. Profitability and liquidity are negatively related to leverage. Further, this research does not find evidence that there exists a financial hierarchy. Also, there is no support that the pecking order theory works better for firms with higher growth opportunities.

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1. Introduction

Capital structure decisions deal with the financing of firms activities with equity or/and debt (Brounen, De Jong, & Koedijk, 2006). In corporate finance is this one of the major financial decisions a firm has to make. In the last decades, a large number of theories have been published to explain the variation in leverage across firms (Titman & Wessels, 1988). Although capital structure decisions have been a central topic for financial economics, there is no single theory that fully explains the choice of capital structure (Vo, 2017).

The paper of Modigliani & Miller (1958) was a breakthrough in the field of capital structure theories. They have created a new theory, which is nowadays known as the irrelevance theory or Miller and Modigliani theorem. This theory hypothesized that, in a perfect market, the value of a firm is not affected by the capital structure. Thus, it is not important how the operational activities are financed. The theory includes several assumptions. For example, there are no taxes, no transactions costs, no bankruptcy costs, and no information asymmetry between managers and investors. The paper of Modigliani and Miller (1958) can be seen as the beginning of the modern theory of capital structure. After publishing this paper, many financial researchers have generated a great interest in the issue of capital structure (Huang & Song, 2006). Now more than sixty years later there are mainly two worldwide theoretical models that dominate the capital structure debate (Gaud, Jani, Hoesli, & Andre, 2005). These are the tradeoff theory and the pecking order theory. The pecking order theory, modified by Myers & Majluf (1984), describes in which order a firm should finance their additional investments. The theory states that firms prefer internal financing to financing by issuing securities. When there is not enough internal fund available to finance investments, firms prefer debt financing before equity financing (Myers & Majluf, 1984). Kraus & Litzenberger (1973) developed the classical version of the static tradeoff model. In this model, a firms leverage ratio moves towards a target that involves the trade-off between financial distress cost and tax advantage (De Jong, Kabir, & Nguyen, 2008). Of course, there are more theories, such as the agency theory, the market timing theory, etc. These theories may be relevant to the capital structure of Dutch companies. This research will focus on the tradeoff theory and the pecking order theory. These theories were one of the first well-known theories after the M&M theory was published. Thus, these theories can be seen as the basis of capital structure theories. Besides, the majority of the articles focus on these theories. Also, previous Dutch research focused a lot on the tradeoff theory and pecking order theory. Which makes it easier to compare the chosen methodology and results.

In the past, many researchers found different and contradictory evidence for the pecking order theory and the tradeoff theory. For example, some authors provide in certain circumstances evidence for both models (De Jong, Verbeek & Verwijmeren, 2011; Fama & French, 2002). Other authors said that the pecking order theory has shortcomings or find no support in explaining financial decisions (Frank & Goyal, 2003; Leary & Roberts, 2010; Seifert & Gonenc, 2010). Shyam-Sunder & Myers (1999) claims that the pecking order model has much greater time-series explanatory power than the static tradeoff model. Moreover, they conclude that the statistical power of the tradeoff model in some usual tests is virtually nil. However, Chirinko & Singha (2000) questioned the validity of the new tests of Shyam-Sunder & Myers (1999). Chirinko & Singha (2000) results indicated that Shyam-Sunder & Myers (1999) empirical evidence can evaluate neither the pecking order nor static tradeoff model. Finally, Dang (2011) and López-Gracia & Sogorb-Mira (2008) found more support for the tradeoff theory. Despite a lot of research in the past, it is not clear which theory, the pecking order theory or the

tradeoff theory, has the greatest power in explaining the capital structure of firms.

The determinants of capital structure can be examined at various levels, namely: industry-level, country-level, and firm-level. In the past, only a few articles have studied which level determinants has the greatest explanatory power in the capital structure of firms. De Jong et al. (2008) concluded that country-level factors indirectly (through the impact on firm-level factors) and direct influence the capital structure of firms. However, this does not tell which determinant level the greatest explanatory power has in explaining the differences in leverage between firms. More specific, Psillaki & Daskalakis (2009) and Daskalakis & Psillaki (2008) concluded that firm-specific rather than country facts explain the differences in capital structure choices of SMEs. Gungoraydinoglu & Öztekin (2011, p. 1457) concludes the same between country-level and firm-level: "[…] firm-level covariates drive two-thirds of the variation in capital structure across countries, while the country-level covariates explain the remaining one-third". Kayo & Kimura (2011) includes also industry-level and time-level, they conclude that firm-level determinants are the most relevant for explaining the variances in leverage. Jõeveer (2013) argued that country-level factors are the main determinants in explaining the capital structure for small unlisted firms, while firm-level factors mainly explain the capital structure for listed and large unlisted firms. Most of the above studies are in favor of the firm-level determinants. Therefore, this research concentrate on firm-level determinants of the capital structure.

In the past several studies have focused on different countries on the capital structure problem. Some of them focused on multiple countries. For example in Europe (Hall, Hutchinson, & Michaelas, 2004; Psillaki & Daskalakis, 2009), the G7 (Rajan & Zingales, 1995), and in the world (De Jong et al., 2008; Kayo & Kimura, 2011). Others focus only on one single country. For example in China (Chen, 2004; Huang & Song, 2006), Vietnam (Vo, 2017), Spain (Sogorb-Mira, 2005), UK (Ozkan, 2001), and United States (Frank & Goyal, 2003; Frank & Goyal, 2009; Titman & Wessels, 1988). A lot of research has been done in the United States. But, there also several researchers that had their focus on Dutch firms (Chen, Lensink, & Sterken, 1999; De Bie & De Haan, 2007; De Haan & Hinloopen, 2003; De Jong, 2002; De Jong & Van Dijk, 2007; De Jong & Veld, 2001; De Jong et al., 2008; Degryse, Goeij, & Kappert, 2010; Hall et al., 2004). It is noticeable that almost all these studies are published more than 10 years ago. Therefore, it becomes clear that recent studies about capital structure determinants of Dutch firms are very scarce. This gives the opportunity for this research to reduce this gap. The goal of this research is to find if the tradeoff theory and/or pecking order theory can explain the firm-level determinants of the capital structure of Dutch listed firms. Therefore, the research question is: ***"Do firm-level determinants related to the tradeoff theory and pecking order theory explain the capital structure of Dutch listed firms?"***

The data of this research is gathered from Orbis. The sample includes non-financial listed Dutch firms from the period 2013-2017. Ordinary least squares are used to analyze the data. The dependent variables are the long-term debt ratio and the total debt ratio. The models that test the tradeoff theory found empirical evidence that profitability is negatively related to leverage. Volatility and non-debt tax shield are negatively related to the long-term debt ratio. Lastly, tangibility has a positive relationship with leverage. The models that test the pecking order theory found empirical evidence that liquidity and profitability have a negative relation with leverage. There is no evidence for a financial hierarchy. Besides, there is no support that the pecking order theory works better for firms with higher growth opportunities.

Research that focuses on Dutch listed firm that contains data of the last decade is very scarce. This research reduces this gap by making use of the most up to date evidence. These results can be compared with older data (e.g. before and during the financial crisis) or between countries. Also, this

research finds whether the tradeoff theory and the pecking order theory can explain the differences in the capital structure for Dutch listed firms. The practical contribution is that this research helps managers in understanding the determinants of the capital structure of Dutch listed firms. With this knowledge, they are more able to make well-considered decisions about the capital structure. Which may lead to a lower cost of capital and firm value maximization.

The structure of this study is as follows. Section 2 is a literature review. Beginning with the tradeoff theory and pecking order theory. Then the empirical evidence is mentioned. Lastly, the hypotheses and the control variables will be discussed. Section 3 describes the methodology. Where the research model, variables, and data are explained. Section 4 discussed the results. Section 5 gives the conclusion, limitations, and further research of this research.

2. Literature Review

This section focuses on the literature. First, both capital structure theories, the tradeoff theory and pecking order theory, are explained. Then the empirical evidence from earlier work is discussed. After that, the hypotheses who derived from both theories are described. Lastly, the control variables are mentioned.

2.1 Tradeoff theory

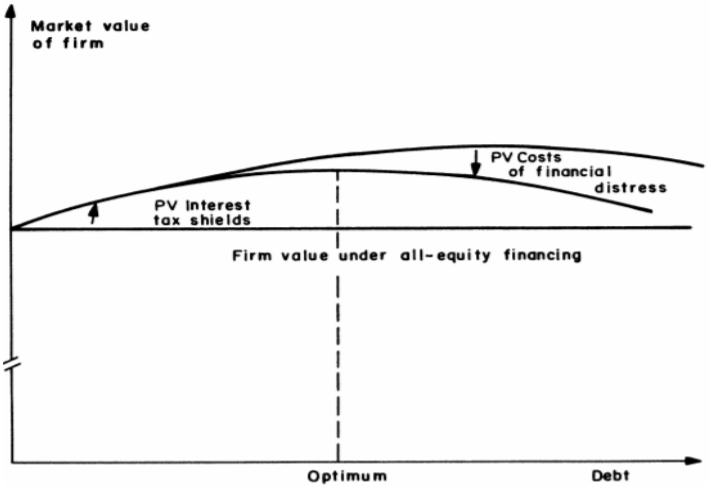
Modigliani & Miller (1958) hypothesized that in a perfect market the value of a firm is independent of the capital structure. However, in reality is the market not perfect. Therefore, in a later article tested Modigliani & Miller (1963) the effect of corporate tax. They concluded that debt creates value through the advantage of the interest tax shield. In the tradeoff theory, developed by Kraus & Litzenberger (1973), the capital structure is determined by a trade-off between the benefits of debt and the costs of debt (Frank & Goyal, 2009). The benefits are the advantage of tax benefits and the costs of debt are the cost of financial distress. This theory is known as the static tradeoff theory. There is also a dynamic version of the tradeoff theory. This theory argues that the optimum tradeoff point changes over time.

The advantage of interest-bearing debt is that the interest over debt can be subtracted from the taxable income. Thus, the interest cost is tax-deductible and firms finally have to pay fewer taxes. The opposite applies to equity. The dividends that firms paid to shareholders are not tax-deductible. The dividend is paid from the residual remaining of the profit after corporate taxation (Graham, 2003). Because of the tax shield advantage, it could be tempting to attract enough debts until a firm does not have to pay taxes anymore. By doing this, a firm can theoretically be fully financed with debt.

Despite the advantage of debt, there is also a negative side of financing a firm's activities and investments with debt. The fund gathered from debt financing must be paid off in the future. This payment normally consists of interest and principal. These payments are obligatory, whereas the dividend payments to shareholders are left to the discretion of the management (De Jong, 2002). When a firm has too much debt, it can get into financial trouble. This situation is known as financial distress cost. Financial distress costs are a wide range of cost that arises when a firm is in financial distress (Grinblatt, Hillier, & Titman, 2011). An example is that suppliers no longer want to deliver goods because they are afraid that the firm cannot pay the invoice. About the same financial setbacks can occur with customers and employees. When the financial costs reach a high level, a firm may even experience bankruptcy costs. Bankruptcy costs are the cost related to the process of selling assets or the reorganization of a bankrupt firm (Grinblatt et al., 2011). To avoid a high level of financial distress costs, it is important that a firm does not exceed its debt capacity. To profit as much as possible of the tax-deductible interest and not get into financial distress, Kraus & Litzenberger (1973) said that capital structure must be a trade-off between tax advantages and financial distress costs.

Figure 1 displays a summary of the tradeoff theory. The figure shows an inverted U-shaped curve between the market value of a firm and the debt of a firm. The begin (less debt) of the inverted U-shaped curve, the market value of a firm increases when a firm use more debt. The reason for this, as earlier said, is that the interest can be deducted from the taxable income. Beyond the optimum debt point, the interest tax shields benefit still increase after the optimum debt point. However, the cost of financial distress increased more. Therefore, the U-shape curve decline after the optimum point. A value-maximizing firm strives to equate these benefits and costs at the top of the curve in figure 1 (Shyam-Sunder & Myers, 1999). Therefore, a firm is portrayed as balancing the value of interest tax shields against the costs of financial distress (Myers, 1984).

Figure 1: The static-tradeoff theory of capital structure (Myers, 1984, p. 577)



Practically, profitability leads to a lower leverage. Because the profit after dividend payments (assuming no share repurchases) will be added to the equity and debt stay constant. This will result in a lower leverage. However, the tradeoff theory expects a positive relation between profitability$_{t-1}$ and leverage$_t$. When a firm is profitable, it has probably also to pay more taxes. Because companies want to pay as little tax as possible, it is a method for (profitable) firms to attract debt. By doing this the interest cost can be subtracted from the taxable income. Besides, profitable firms tend to have higher cash flows and suffer less from financial distress cost than low profitable firms. When the financial distress costs are low, a firm can decide to set their optimal leverage to a higher level.

Tangibility may have an impact on the financial distress cost of a firm. Examples of tangible assets are buildings, equipment, and raw materials. These assets are easier for outsiders to value and to convert to cash than intangible assets (Frank & Goyal, 2009). Therefore, tangible assets are easier to collateralized than intangible assets. When creditors use an asset as collateral, they run less risk and will demand a lower interest percentage. For firms, it is more attractive to attract debt when the interest percentage is lower. Thus, a higher level of tangibility leads to a higher leverage. Rajan & Zingales (1995) found empirical evidence for this relationship. They found that the ratio of fixed assets to total assets is positively related to the total debt ratio[1] for firms from the United States, Japan, Germany, France, United Kingdom, and Canada in the period 1995-2000.

The stability of the monthly/quarterly/yearly operating earnings of a firm is called the earnings volatility. In normal circumstances, firms with a high level of operating earnings volatility have in good(bad) times a higher(lower) percentage revenues than firms with a stable earnings volatility. For volatile firms, bad times could be very harmful. When this happens, it is possible that a firm cannot meet its obligations. This can cause financial distress cost or a firm can even go bankrupt. To avoid this, volatile firms should have a lower leverage. Iqbal & Kume (2014) found empirical evidence that supports a negative relationship. They proved that the coefficient of variation in sales is negatively related to total debt ratio for France listed firms in the period 2006-2011.

In addition to debt tax shields, non-debt tax shields could also be used to avoid taxes. Examples of non-debt tax shield are depletion allowances, depreciation/amortization, and investment tax

[1] This article assumes book values, otherwise it will be mentioned

credits. DeAngelo & Masulis (1980) concluded that non-debt tax shield is a substitute for the interest advantage of debt. Thus, non-debt tax shield is negatively related to leverage. International studies found support for this relationship. Chen (2004) and Ozkan (2001) both found a negative relationship between the ratio of depreciation to total assets and the total debt ratio.

2.2 Pecking order theory

Myers & Majluf (1984) have created a theory, which is called the pecking order theory, whereby firms have a hierarchical preference in financing sources. These financial preferences are based on the differences in information asymmetry between financial sources. By information asymmetry has the manager more or better information about the firm than the other party. When firms attract fund with information asymmetry it is possible that they first provide information to the other party to reduce the information asymmetry in an effort to lower the cost of capital or to make it possible to attract the fund. The disadvantages are that firms may reveal sensitive information to the outside world and it could cost time to get the fund. Therefore, the pecking order theory suggests that firms should attract financial sources with the least information asymmetry.

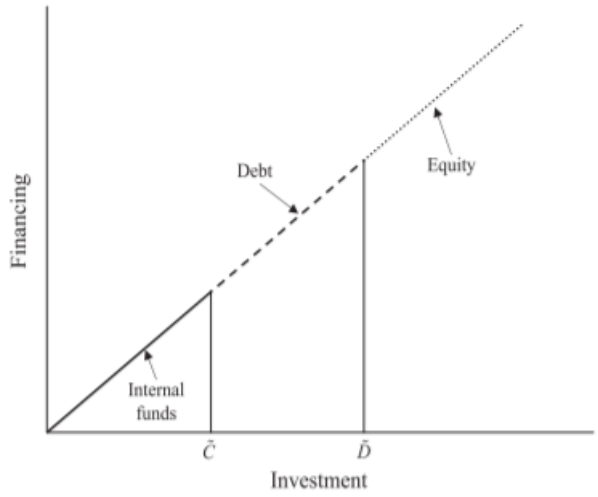
Leary & Roberts (2010) said that firms follow the pecking order theory to finance investments in an effort to minimize the cost of information asymmetry. In practice, equity is subject to a high level of information asymmetry, debt has only a minor information asymmetry and internal financing has no information asymmetry (Frank & Goyal, 2003). Internal financing is a type of financing that is already available in the firm and therefore it does not include outsiders. The advantage of this is that there does not exist information asymmetry. Debtors that lend money to a firm are outsiders that have a fixed claim in the form of interest and principal payments. They often first require information from a firm before they lend money. Although creditors do not have all the information about a firm, they often have enough information to protect themselves against high risks. That is why debt has only a minor information asymmetry problem. Outside investors have only information at their disposal that is publicly available. Luckily for them, listed firms are obliged to publish its annual results. With this information they can see the book value of the shareholders' equity. However, the market value can deviate from the book value. Also, equity consists of several components. Examples are preferred stock, common stock, capital surplus and retained earnings. Some of them are easier to value than others. The disadvantage of shares is that it could be difficult for outsiders to value the market value. They do not always know the prospects and investment opportunities of a firm. Therefore, equity is subject to high information asymmetry. Viewing from the point of an outside investor, shares have more information asymmetry than debt and is therefore riskier. Rational investors know this and will revalue the securities of the firm when it announces an equity issue (Frank & Goyal, 2009). When a firm does not share information, the result of the revaluation is that a firm equity looks to be undervalued (Frank & Goyal, 2009). In other words, when a firm announces to issue equity and does not share information, the value of a company will probably decrease.

Looking from the perspective of a manager, Myers (1984) said that when a manager thinks that the firm is overvalued, the firm could issue equity, even if the only investment opportunity is to put the earnings on a zero percent bank account. However, when a manager thinks that the firm is undervalued, the firm may pass up a positive net present value investment rather than issue undervalued shares (Myers, 1984). Thus, it can be concluded that managers prefer to raise equity when a firm is overvalued and do not prefer when a firm is undervalued. Equity holders and investors know this. As a result, when a firm is overvalued and it announces to issue shares, the value of a share will probably fall down (Myers & Majluf, 1984). This can be avoided when the firm finance their

investments with funds that are not so severely undervalued by the market through information asymmetry (Harris & Raviv, 1991). For example, retained earnings and riskless debt do not (or less) involve undervaluation (Harris & Raviv, 1991). Which means, that a firm first use retained earnings which are free of underpricing, second low-risk debt, then high-risk debt, and lastly equity (Ang & Jung, 1993).

The pecking order theory is summarized in figure 2. A firm will first finance their investments with internal resources up to the cash threshold Č, which represents the total internal fund that is available for investments (Leary & Roberts, 2010). In the figure is this part represented by the continuous black line (internal funds). When the total amount of investments exceeds the internal funds, the firm will also use external financing. Leary & Roberts (2010, p. 334) said that "debt finance is applied first and used up to the point Ď, where (Ď – Č) represents the amount of debt that a firm can issue without producing excessive leverage (i.e., without becoming financially distressed)". When this is still not enough (beyond Ď), firms need to issue equity to (fully) finance their investments. This section is indicated by the dotted line (equity).

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



Issuing shares is sometimes the only option to finance investments. In this situation is the financing deficit higher than the internal fund plus the debt that can be attracted without getting into financial difficulties. Because of information asymmetry, a firm can decide to underprice the new stocks to attract more new investors. This underpricing may be so severe that new investors capture more than the total net present value of the investment, which results in a net loss to the existing shareholders (Harris & Raviv, 1991). Despite the net present value of the investment is positive, the existing shareholders could conceivably reject the investment (Ang & Jung, 1993). Managers who act in the interest of these existing shareholders will not issue new shares. The consequence is that firms finally pass up the positive investment opportunity because they do not have enough fund available. To avoid this problem, it is important that firms have enough financial slack and invest in positive investment opportunities when they arise. According to Myers & Majluf (1984) firms could build a financial slack through multiple ways. First, issue stock in periods when the information asymmetry between managers and investors is small. Second, firms should not pay dividends to shareholders if they must earn back the money by selling stocks. Third, restrict dividends when investment requirements are modest. The last two mentioned ways to build a financial slack are both related to dividends policies. When firms pay dividend to shareholders, the amount of internal fund decrease and the need for

external financing increase (Mazur, 2007). With the result that the leverage will increase, assuming that the firm does not have financial difficulties.

Flannery & Rangan (2006) said that leverage reflects primarily a firm's historical profitability and investment opportunities. When a firm is profitable, the firm has also additional internal fund available (assuming revenues/cost and income/expenses are equal) to finance their investments. As a result, a firm need less debt financing and has a lower leverage. However, when a firm is not profitable, it would have less internal financing and the company will have a higher financing deficit. To still finance the investment, firms will attract external financing and the leverage will probably be higher. Titman & Wessels (1988) found empirical evidence that profitability indeed leads to a lower leverage. They concluded that there exists a negative relationship between EBIT to total assets and long-term debt divided by market capitalization for firms from the United States in the period 1974 - 1982. When there are limited investment opportunities, a firm does not need a lot of financing to fund its investments. As a result, the firm probably does not have a high financing deficit and does not need much external financing. Therefore, Shyam-Sunder & Myers (1999, p.221) concluded that: "Highly profitable firms with limited investment opportunities work down to low debt ratios". In this research investment opportunities is considered as growth opportunities. According to Komera & Lukose (2015) face firms with higher growth opportunities more information asymmetry costs. Therefore, it is expected that the pecking order theory performs better among firms with high growth opportunities compared to their counterparts with fewer growth opportunities (Komera & Lukose, 2015). The same as profitability can be concluded for liquidity. When firms have plenty of cash or/and other liquid assets available, it will serve as an internal source of fund and will be used first instead of debt (De Jong et al., 2008). Therefore, more liquid firms will use less debt. Deesomsak, Paudyal, & Pescetto (2004) found empirical evidence that the ratio of current assets to current liabilities is negatively related to total debt divided by the market value of total assets in the period 1993-2001 for four firms in the Asia Pacific region. Also, the asset structure can influence leverage. The advantage of tangible assets is that it has less information asymmetry (Frank & Goyal, 2009). Besides, tangible assets are easier to liquidate. Therefore, tangible assets are a better collateral than intangible assets. When lenders use a tangible asset as collateral, they have less risk and will demand a lower return. The cost of debt will increase when firms already have relatively many debts and could not provide an asset as collateral. In such situations, the interest percentage could be too high and a firm could decide to issue equity instead of attracting debt. Thus, tangibility will result in a higher leverage in the pecking order theory.

Strictly speaking, the pecking order theory does not tell us what the level of the leverage should be, the theory is actually meant to explain in which order the financing resources based on management preferences would be attracted to finance investments. In the tradeoff theory, a firm strives to achieve a target leverage ratio that is determined by various determinants. In the pecking order theory, changes in the leverage are explained by the financial hierarchy. In this view, the determinants are not important in explaining the differences in leverage. However, the different determinants may be able to influence the financial hierarchy and thus the capital structure. Frank & Goyal (2003) said that the conventional regressions of leverage are intended to explain the level of leverage. Thus, these regressions are more suitable for the tradeoff theory. To avoid this problem, many researchers use first differences in their regression (Frank & Goyal, 2003; Huang & Ritter, 2009; Komera & Lukose, 2015; Ozkan, 2001).

Shyam-Sunder & Myers (1999) has tested if there exists a financial hierarchy by making use of the following equation: $\Delta\ debt_{it} = \alpha + \beta * DEF_{it} + \varepsilon$. Where DEF is the financing deficit and Δ debt is the change in long-term debt. They expected an α of 0 and a β of 1. If this is the case, they argue that the

financing deficit would fully finance with debt and this would confirm the pecking order theory. Shyam-Sunder & Myers (1999) sample (U.S. listed firms, period 1971 – 1989) show a coefficient between 0.75 and 0.85. They interpret this empirical evidence as follows: "The pecking order is an excellent first-order descriptor of corporate financing behavior, at least for our sample of mature corporations" (Shyam-Sunder & Myers, 1999, p. 242). Chirinko & Singha (2000) questioned the validity of Shyam-Sunder & Myers (1999). They said that for firms who face debt constraints the relation between the financing deficit and change in debt is concave. To avoid this problem, Lemmon & Zender (2010) include an additional independent variable, which is the square of the financing deficit. They said that when firms follow the pecking order theory but their debt is constraint, then the square financing deficit is significant negative, there is an increase in the financing deficit, and an increase in the R-square. These firms use debt to fill small financing deficits (which do not violate the firm's debt capacity constraint), but for larger financing deficits these firms will turn to equity financing (Lemmon & Zender, 2010). Komera & Lukose (2015) found indeed an improvement in the coefficient after firms' debt capacity concerns are considered. However, including this variable, the coefficient of the financial deficit in the different models vary between 0.43 and 0.57. This is a lot lower than the suggested coefficient of 1.

2.3 Empirical evidence from the Netherlands

In this section the earlier empirical results of the variables profitability, tangibility, volatility, non-debt tax shields, and liquidity are discussed. Because much research has been done on the determinants of the capital structure in the past, only the empirical results that include Dutch firms will be discussed. Table 1 gives a summary of the studies that focuses on firm-level determinants of the capital structure and included Dutch firms.

A lot of research has been done on the effect of profitability on the capital structure. Degryse et al. (2010) hypothesized and proved that there exists a negative relationship between profitability and the total debt ratio for Dutch SMEs in the period 2003-2005. They used EBITDA divided by total assets as the measurement for profitability. De Haan & Hinloopen (2003) found empirical evidence that net income divided by total assets is positively related to internal financing[2] and negatively related to the probability of equity issue for Dutch listed firms in 1984-1997. De Bie & De Haan (2007) used profitability as a control variable. They found empirical evidence that EBIT divided by total assets is negatively related to the total debt ratio and the ratio of total debt to market value total assets in the period 1983-1997. Chen et al. (1999), De Jong & Veld (2001), and De Jong et al. (2008) used all the same measurement for profitability as De Bie & De Haan (2007). Chen et al. (1999) proved with empirical evidence that profitability is negatively related to the total debt ratio in the period 1984 - 1995. De Jong et al. (2008) found also empirical evidence that profitability is negatively related to long-term debt divided by the market value of total assets in the period 1997-2001. In the period 1977-1996, De Jong & Veld (2001) found empirical evidence that profitability leads to the issuance of debt. Lastly, Hall et al. (2004) found empirical evidence that the ratio of profit to sales turnover is positively related to the short-term debt ratio in the year 1995.

Most Dutch empirical research found a positive relationship between tangibility and leverage. De Jong (2002) found empirical support that the long-term debt ratio in the period 1992-1997 is positively related to tangible assets divided by total assets. De Jong et al. (2008) found empirical evidence that non-current tangible assets divided by total assets is positively related to long-term debt

[2] Internal finance definition: if retention of current earnings > 5% total assets and/or net depletion of cash holdings > 5% of total assets (de Haan & Hinloopen, 2003).

divided by the market value of total assets. Degryse et al. (2010) used the same definition for tangibility and hypothesized for their sample that tangibility has a positive effect on total debt ratio and that tangibility has a stronger positive effect on the long-term debt ratio than on the short-term debt ratio. They proved these hypotheses by showing that tangibility is positively related to the total debt ratio and the long-term debt ratio. The short-term debt ratio shows a significantly negative sign with tangibility.

There is not much evidence available about the relationship between earnings volatility and leverage. Most researchers did not find significant results or had different results between different measures. De Jong et al. (2008) concluded with empirical evidence that earnings volatility is negatively related to the ratio of long-term debt divided by the market value of total assets. They measured volatility in the following manner: standard deviation of operating income / total assets. De Jong (2002) found empirical evidence that the coefficient of variation in operating income is negatively related to the long-term debt ratio. However, when they include the variable size in their model, the relationship is insignificant. They argue that the impact of business risk is encompassed by the size effect.

De Haan & Hinloopen (2003) concluded based on empirical evidence that non-debt tax shields, measured as depreciation to total assets, is negatively related to bank loans and is positively related to internal financing and shares issue. All these conclusions will result in a lower percentage leverage. De Jong (2002) also found a negative relationship between long-term debt ratio and non-debt tax shields. They measured non-debt tax shield using the following formula: (operating income - minus interest payments - tax payments) * corporate tax rate / total assets. De Jong & Van Dijk (2007), De Jong & Veld (2001), Jong et al. (2008), and Hall et al. (2004) all did not find significant results.

Dutch empirical evidence about the relationship between liquidity and leverage are mixed. De Jong et al. (2008) found that liquidity is negatively related to long-term debt divided by the market value of total assets. De Haan & Hinloopen (2003) found that liquidity is positively related to internal finance while they are negatively related to the probability of attracting any type of external finance. De Jong et al. (2008) used the current ratio and De Haan & Hinloopen (2003) liquid assets divided by total assets as the measurement of liquidity. Degryse et al. (2010) found empirical evidence that debtors minus creditors to total assets is positively related to the total debt ratio.

Table 1: Empirical evidence Dutch firms

Author	Theory	Period	Method	Dependent variable	Independent variables	Results
Chen, Lensink & Sterken (1999)	* Pecking order theory * Agency theory	* 1984-1995 (listed firms)	* OLS regression	* Total Debt to equity * Total Debt to market value equity	* Tangibility * Growth opportunities * Size * Earnings volatility * Profitability * MTB	+ o + o + - o - - - + -
De Haan & Hinloopen (2003)	*Tradeoff theory * Pecking order theory	* 1984-1997 (listed firms)	* Multinomial logit model * Ordered probit models	* Internal financing * Bank borrowing * Bond issue * Share issue	* Liquidity * Previous financing * Size * Profitability * Depreciations * Interest payments * Deviations from target * Stock price run-up	+ - o - o o o o o - + + + o o - + - o + + - o o - + o + o - o +
De Bie & De Haan (2007)	* Market timing theory	* 1983-1997 (listed firms)	* OLS regression	* Total debt to total assets * Total debt to market value total assets	* External-finance-weighted average market-to-book ratio	- -
Degryse, Goeij, & Kappert (2010)	* Pecking order theory * Agency theory	* 2003-2005 (SMEs)	* OLS regression	* Total debt to total assets * Long-term debt to total assets * Short-term debt to total assets	* Size * Tangibility * Net debtors * Profitability * Growth opportunities * Tax rate * Depreciation	+ + + + + - + o + - o - + + o - - + o - +
De Jong & Van Dijk (2007)	* Tradeoff theory * Agency theory	* 1996-1998 (listed firms)	* Structural-equations modeling	*Long-term debt to total assets	* Marginal tax rate * Non-debt tax shields * Collateral value * Firm-specific risk * Uniqueness * Importance of quality * Overinvestment	+ o + o o o o
De Jong (2002)	* Tradeoff theory * Agency theory	* 1992-1997 (listed firms)	* Two-stage least squares	* Long-term debt to total assets	* Non-debt tax shields * Tangibility * Business risk * Tobin's Q * Size * Free cash flow * Governance mechanisms	- + - + - o o
De Jong & Veld (2001)	* Tradeoff theory * Pecking order theory * Agency theory	* 1977-1996 (listed firms)	* Logit regression	* Equity issue * Debt issue	* Profitability * Slack * Stock price run-up * Growth opportunities * Free cash flow * Issue size * Deviation from the target	+ + - o o - -
De Jong, Kabir, & Nguyen (2008)	* Tradeoff theory * Pecking order theory * Agency theory	* 1997-2001 (listed firms)	* OLS regression	*Long-term debt to market value total assets	* Tangibility * Business risk * Size * Tax rate * Growth opportunities * Profitability * Liquidity	+ - + o o - -
Hall, Hutchinson, & Michaelas (2004)	* Pecking order theory	* 1995 (SMEs)	* OLS regression	* Long-term debt to total assets * Short-term debt to total assets	* Profitability * Growth opportunities * Tangibility * Size * Age	o + o o + - + - o o

Table 1 reports the previous Dutch research. +, -, and o denotes a significant positive relationship, a significant negative relationship, and no significant results, respectively.

2.4 Hypotheses

Chen (2004) said that many empirical studies have attempted to test the explanatory power of capital structures models in developed countries. He concluded that the main tested determinants include profitability, tangibility, earnings volatility, tax shields effects, size, and growth opportunities. Articles in Appendix 1 (Dutch studies) used profitability, tangibility, non-debt tax shields, volatility, size, and growth opportunities most frequently for the tradeoff theory and profitability, tangibility, liquidity, and size most frequently for the pecking order theory in explaining the differences in the capital structure. Thus, it becomes clear that the same determinants are used for Dutch studies in comparison with the main tested determinants according to Chen (2004).

This research will test the effect of profitability, tangibility, volatility, and non-debt tax shields for the tradeoff theory and profitability, tangibility, and liquidity for the pecking order theory. Size, growth opportunities, and industry are control variables. However, some authors used size as an independent variable, this research use size as a control variable. Many researchers used growth opportunities as an independent variable (Chen et al., 1999; Degryse et al.,2010; De Jong & Veld, 2001; De Jong et al., 2008). Growth opportunities in this research a control variable. The reason for this is that many researchers use growth opportunities as an explanatory variable for the agency theory (Chen et al., 1999; De Jong, 2002; De Jong & Veld, 2001). Lastly, the variable industry is included as a control variable. In the next section, all hypotheses will be discussed. A summary of these hypotheses can be found in table 2.

Profitability

The tradeoff theory predicts for mainly two reasons that highly profitable firms have a higher leverage. First, when firms make more profit, it also has to pay more taxes. Because interest is tax-deductible, it is more likely that profitable firms borrow (more) money to reduce their taxes. Second, profitable firms face lower expected costs of financial distress (Frank & Goyal, 2009). Since the tradeoff theory is a trade-off between the financial distress costs and tax benefits, firms that face little to zero financial distress cost will set their target leverage ratio to a higher point to benefits more from the tax benefit. Therefore, a positive relationship is expected between profitability and leverage.

The pecking order theory suggests a negative relation between profitability and leverage. Myers & Majluf (1984) pointed out that in the pecking order theory firms prefer first internal financing and then outside financing to fund investments. When firms are more profitable, they probably have more retained earnings. Firms which generate more retained earnings will use less debt when all other things are being equal. Therefore, a negative relationship is expected between profitability and leverage.

Tangibility

The tradeoff theory predicts a positive relationship between tangibility and leverage. In normal circumstances, lenders will provide a loan at a lower interest rate when they can use an asset as collateral. The advantage of tangible assets is that it is easier to value for outsiders than intangible assets, such as goodwill and acquisition (Frank & Goyal 2009). Therefore, tangible assets can be easier to collateralize than intangible assets. As a result, creditors will run less risk and require a lower interest rate. In the view of a firm, it is therefore attractive to have more debts when a company has relative more tangible assets. Thus, a positive relationship is expected between tangibility and leverage.

The pecking order theory expects a positive relationship between tangibility and leverage. Tangible assets have less information asymmetry than intangible assets. Besides, they are easier to

liquidate. Therefore, tangible assets can be better used as collateral than intangible assets. The advantage of this is that the cost of debt will be relatively lower. When a firm could not provide a tangible asset as collateral, the cost of debt could become too high and a firm could decide to attract equity instead of debt. Therefore, tangibility is positively related to leverage.

Volatility

The tradeoff theory predicts a negative relationship between volatility and leverage. Higher volatility of earnings indicates a higher probability of bankruptcy in bad times (De Jong et al., 2008). Firms with a high volatility are more likely to be unable to meet their payments when a downturn occurs. To survive these bad times, the tradeoff theory expects that firms hold a lower leverage. Therefore, firms with a high level of volatility should use less debt to avoid financial distress or bankruptcy costs.

Non-debt tax shields

Non-debt tax shields and leverage has a negative relationship in the tradeoff theory. DeAngelo & Masulis (1980) presented a model, that includes non-debt tax shields, to find the optimal capital structure. They concluded that non-debt tax shields are a substitute for debt financing. Thus, firms with a high non-debt tax shield should have less debt financing to reduce taxes. Therefore, a negative relationship is expected between non-debt tax shield and leverage.

Liquidity

Liquidity and leverage are negatively related to each other in the pecking order theory. Firms prefer first internal financing and then external financing. A higher liquidity results in a higher amount of internal financing. When firms have plenty of cash or/and other liquid assets available, it will serve as an internal source of fund and will be used first instead of debt (De Jong et al., 2008). Therefore, a negative relationship is expected between liquidity and leverage.

Table 2: Summary hypotheses

Variable	Tradeoff theory	Pecking order theory
Profitability	Positive	Negative
Tangibility	Positive	Positive
Volatility	Negative	
Non-debt tax shields	Negative	
Liquidity		Negative

2.5 Control variables

Size

The variable size is a control variable in this research. The tradeoff theory expects a positive relationship between size and leverage. The reason for this is the lower costs of debt and a smaller risk of bankruptcy. Chen (2004) argue that large firms may be able to reduce transaction cost associated with long-term debt issuance. Also, large firms may have more bargaining power over creditors (Huang & Song, 2006). Both arguments will result in cheaper debt. Besides, large firms are more diversified and therefore they are less exposed to the risk of bankruptcy (Chen, 2004). All these arguments have a preference for debts over equity financing in the tradeoff theory.

Size is negatively related to leverage in the pecking order theory. For large firms is the information asymmetries between a firm and the capital markets lower than for small firms (Rajan &

Zingales, 1995). When there is less information asymmetry, investors know more about the firm and they run less risk when they buy equity. Because of the less risk, investors will demand a lower return. Therefore, larger firms should tend to have more equity and thus have a lower leverage than small firms (Huang & Song, 2006).

Dutch empirical evidence confirms the tradeoff theory. De Haan & Hinloopen (2003) found evidence that size is negatively related to bank loans and positive related to shares and bonds. Degryse et al. (2010) concluded that size is positively related to short-term debt, long-term debt, and total debt. De Jong (2002) showed that size is positively related to long-term debt. All the above-mentioned authors used the logarithm of total assets as the measurement of size. De Bie & De Haan (2007) found evidence that size, the logarithm of sales, and all their measurements of leverage are positively related to each other.

Growth opportunities

The second control variable is growth opportunities. Growth opportunities and leverage are negatively related to each other in the tradeoff theory. The reason for this is that growth opportunities cannot be collateralized in opposite to tangible assets. In addition, growth opportunities increase the cost of financial distress (Frank & Goyal, 2009). Firms with financial distress costs prefer to choose equity over debt.

According to the pecking order theory are growth opportunities and leverage positive related to each other. The reason for this is that when firms have good investments opportunities but have a lack of retained earnings, they could turn to debt financing to fund their investments (Kayo & Kimura, 2011).

Dutch empirical evidence supports the pecking order theory. Degryse et al. (2010) showed that growth opportunities are positively related to long-term debt. Chen et al. (1999) found the same result. They said that growth opportunities have a positive effect on leverage. They used respectively growth in assets and change in sales as the measurement of growth opportunities.

Industry

Each industry experiences its own set of economic conditions and is subject to different challenges within regulations, technology, and environmental (Talberg, Winge, Frydenberg, & Westgaard, 2008). Therefore, it is plausible that some industries have on average a higher leverage than other industries. Kayo & Kimura (2011) studied the direct influence of industry on firm leverage. They concluded that industry characteristics are responsible for 12% of the variation in leverage. Degryse et al. (2010) found evidence that there is an inter-industry variation in the capital structure of Dutch SMEs. This means that there is a difference in capital structure between industries. However, these studies used the industry as an independent variable of the capital structure, many authors often employ dummy variables to control for the effect of industry on leverage (Kayo & Kimura, 2011). Examples are De Jong et al. (2008), Deesomsak et al. (2004), and Frank & Goyal (2009). The reason behind this is that most authors do believe that the variable industry cannot influence the capital structure directly, but only indirectly. For the same reason, this research also used the industry as a control variable.

3. Methodology

This section discusses the method to test the hypotheses. First, the research model will be discussed. After that, all the measurements of the variables will be explained. Lastly, the data collection and sample period will be mentioned.

3.1 Research model

Earlier Dutch research used different methods to test their hypothesis. De Haan & Hinloopen (2003) used the multinomial logit model. This method works well to predict a dependent variable with a categorical scale. In their study, the dependent variable contains four different financing types. Namely: internal finance, bank loans, bond issues, and share issues. With this model, they could test which one of the financing types suits best with the data. As argumentation to use this model, De Haan & Hinloopen (2003) said that this method is a quite standard model in the recent literature. A disadvantage of this model is that it cannot be used properly to predict continuous outcomes. De Jong & Veld (2001) used also the multinomial logit model. In their research was the dependent variable equity or debt. De Jong & Van Dijk (2007) research method differs from mainstream finance studies. They used structural-equations modeling as method and collected data through questionnaires. De Jong & Van Dijk (2007, p. 556) said: "This method combines the advantages of the survey and regression methods: inside information on firm characteristics and objective measurement of relations between characteristics" (De Jong & Van Dijk, p. 556). The strength of surveys is that the knowledge of a CFO about their firm allows researchers to obtain information and opinions that are not available in a public database (De Jong & Van Dijk). Despite the advantage, there are also disadvantages associated with this method. First, a CFO can misinterpret the questions and provide biased answers. Second, not all CFOs will complete the survey. This will reduce the number of observations. Lastly, collecting data with surveys takes more time than gathering data from a database. De Jong (2002) used as method the two-stage least squares regression. Alternatively, De Jong (2002) could use ordinary least squares (OLS) as regression method. However, they included two equations in their model that cannot be estimated separately to obtain unbiased consistent estimates. Although De Jong (2002) does not use OLS, it is a widely used method in the literature to test the determinants of the capital structure. Chen et al. (1999), De Bie & De Haan (2007), De Jong et al. (2008), Degryse et al. (2010), and De Jong et al. (2008) all used this method to analyze the capital structure of Dutch firms. This method is also often used for international studies. Examples are Chen (2004), Deesomsak et al. (2004), and Frank & Goyal (2003).

This research will use OLS regression to give an answer to the hypotheses. This method is chosen because previous Dutch and international studies often used this method and the data in the OLS regression is easy to analyze and to interpret. A characteristic of OLS is that the regression line is straight. OLS contains the following variables: intercept, residual, dependent variable, independent variables and control variables. The dependent variable in this research is leverage. The independent variables are profitability, tangibility, volatility, non-debt tax shields, liquidity, and financing deficit. Lastly, the control variables are size, growth opportunities, and industry. To test the hypotheses there will be different OLS regression used for the tradeoff theory and pecking order theory.

Tradeoff theory

The equation (1) of the tradeoff theory is as follows:

$$\text{Leverage}_{i,t} = \alpha + \beta_1 * \text{profitability}_{i,t-1} + \beta_2 * \text{tangibility}_{i,t-1} + \beta_3 * \text{volatility}_{i,t-1} + \beta_4 * \text{non-debt tax shield}_{i,t-1} + \beta_5 * \text{size}_{i,t-1} + \beta_6 * \text{growth opportunities}_{i,t-1} + \beta_7 * \text{industry}_i + \varepsilon_{i,t}$$

Where α is the constant, β_1 to β_4 are the regression coefficients of the independent variables, β_5 to β_7 are the regression coefficients of the control variables. ε is the standard error, i denotes a firm, and t is the time. T-1 means a lag of one year, this is done to avoid the potential of reverse causality between the dependent variable and independent variables (Deesomsak et al., 2004). In the first model, only control variables are included. In the second model, all variables are included.

Pecking order theory

The equation of the tradeoff theory is intended to explain the level, while the pecking order theory is intended to explain the change rather than the level (Frank & Goyal, 2003). To avoid this problem, just as Chen et al. (1999), Frank & Goyal (2003), and Ozkan (2001) the equation will be in first differences. First, there will be checked if there exists a financial hierarchy. This will be done using the equation (2) who is built on Lemmon & Zender (2010):

$$\Delta \text{ Leverage}_{i,t} = \alpha + \beta_1 * \text{financing deficit}_{i,t-1} + \beta_2 * \text{financing deficit}^2_{i,t-1} + \varepsilon_{i,t}$$

Where Δ Leverage is the change in leverage, α is the constant, β_1 and β_2 are the regression coefficients of the independent variables, ε is the standard error, i denotes a firm, and t is the time. In the first model, only the variable financing deficit is included. When this variable is significant and close to 1, the pecking order theory is confirmed. In the second model are both variables are included. When the financing deficit^2 is significant negative, there is an increase in the financing deficit, and there is an increase in the R-square then firms follow the pecking order theory but is the debt capacity constrained.

After that, an OLS regression will be executed to check which determinants have an impact on leverage. The equation (3) is built on the model of Frank & Goyal (2003) and is as follows:

$$\Delta \text{ Leverage}_{i,t} = \alpha + \beta_1 * \Delta \text{ profitability}_{i,t-1} + \beta_2 * \Delta \text{ tangibility}_{i,t-1} + \beta_3 * \Delta \text{ liquidity}_{i,t-1} + \beta_4 * \Delta \text{ size}_{i,t-1} + \beta_5 * \Delta \text{ growth opportunities}_{i,t-1} + \beta_6 * \text{industry}_{i,t} + \varepsilon_{i,t}$$

Where α is the constant, β_1 and β_3 are the regression coefficients of the independent variables, β_4 to β_6 are the regression coefficients of the control variables, ε is the standard error, i denotes a firm, t is the time, and Δ denotes the first differences between years. In the first model, only the control variables are included. In the second model, all variables are included.

Lastly, there will be checked if the pecking order theory works better for firms with high growth opportunities. The definition of low and high growth opportunities can be found in paragraph 3.2. In all the models is the control variable industry missing. The industry transportation and storage have not enough data points when only low growth opportunities are included in the model. Therefore, the control variable is removed from the equation. Equation (4):

$$\Delta \text{ Leverage}_{i,t} = \alpha + \beta_1 * \Delta \text{ profitability}_{i,t-1} + \beta_2 * \Delta \text{ tangibility}_{i,t-1} + \beta_3 * \Delta \text{ liquidity}_{i,t-1} + \beta_4 * \Delta \text{ size}_{i,t-1} + \beta_5 * \Delta \text{ growth opportunities}_{i,t-1} + \varepsilon_{i,t}$$

Where Δ Leverage is the change in leverage, α is the constant, β_1 and β_3 are the regression coefficients of the independent variables, β_4 to β_5 are the regression coefficients of the control variables, ε is the standard error, i denotes a firm, t is the time, and Δ denotes the first differences between years. In the first model, only the control variables are included. In the second model, all variables are included.

To perform the OLS regression, it is important to check all the assumptions. The assumptions of the OLS regression are linearity between the independent and dependent variable, normality of residuals, independence of residuals, no influential outliers, no heteroscedasticity, and no

multicollinearity. The multicollinearity will be checked with the variance inflation factor (VIF). A VIF of higher than 4 indicates multicollinearity. To check the linearity assumption, scatterplots will be created. With a trend line drawn in each scatterplot is it easier to check if there exists a linear relationship. Each scatterplot line will show fluctuations up and down. However, when all plots have roughly a linear relationship close to zero and no patterns or clusters can be seen, it can be concluded that the linearity assumption is met. The normality of residuals does not have to be checked. The sample size (N>30) is sufficiently large that the Central Limit Theorem ensures that residuals are normally distributed. To test the independence of the residuals, the Durbin Watson test will be used. Values of the Durbin Watson are theoretically between 0 and 4. Where values between 1,5 and 2,5 are acceptable. To check for homoscedasticity a scatter plot for each model will be used (Appendix 1). When roughly a rectangle can be drawn around the points, it can be assumed there exist no heteroscedasticity. If it is not clear if this is the case, the Koenker test will be performed. A significance level of more than 0.05 will not reject the null hypothesis and it is concluded that no heteroscedasticity is present. When the p-value is lower than 0.05, the heteroscedasticity-consistent standard error estimators (HCSE) will be used. "With this approach, the regression model is estimated using OLS, but an alternative method of estimating the standard errors is employed that does not assume homoscedasticity" (Hayes & Cai, 2007, p.711). The last assumption is that there are no influential outliers. This will be tested with the Cooks' distance. Cook's distance is a diagnostic tool for detecting influential individual or subsets of observations in linear regression (Zhu, Ibrahim, & Cho, 2012). Values with a Cook's distance of more than 1 will be excluded from the model. If no remark is mentioned in the regression results, it is assumed that all assumptions are met.

The following steps will be conducted to test the hypotheses. First, a univariate analysis will be performed. Univariate analysis is one of the easiest forms of statistical analysis because just one variable will be analyzed. In the analysis will the minimum, maximum, average, and median be displayed for the dependent variable, independent variables, and control variables. Then, there will be a bivariate analysis conducted. In a bivariate test will be the relationship between the independent variable and the dependent variable analyzed. Lastly, the OLS regression will be conducted to test the hypotheses. SPSS will be used to conduct univariate analysis, bivariate analysis, and the OLS regressions.

3.2 Variables

In paragraph 3.2 are the definitions of the variables described. To measure the variables, there is in most cases more than one definition given to check for robustness. Table 3 summarizes the variable definitions.

Dependent variable tradeoff theory

The dependent variable is leverage and will be measured in two different ways. The first measurement is as follows: long-term debt divided by the total assets (Chen, 2004; De Jong, 2002; De Jong & Van Dijk, 2007; Degryse et al., 2010; Hall et al., 2004). The advantage of long-term debt in comparison with short-term debt is that it does not include trade-credit. A large part of short-term debt consists of trade-credit which is under the influence of completely different determinants (De Jong et al., 2008). Besides, trade-credit does not carry an explicit interest rate (Degryse et al., 2010). The second measurement of leverage is the total debt ratio. The total debt ratio is a measurement that is widely used in the literature and can be defined in different ways. Some of them use the formula total liabilities divided by total assets (Frank & Goyal, 2009; Huang & Song, 2006). Others calculated it by the total debt divided by total assets (Chen, 2004; De Bie & De Haan, 2007; Degryse et al., 2010). This

research follows earlier literature and uses the following formula: total long-term debt plus current liabilities divided by the total assets (Frank & Goyal, 2009; Huang & Song, 2006).

Dependent variables pecking order theory

The dependent variables for the pecking order theory use different definitions than the tradeoff theory. The main difference is that both equations use the Δ, which means the differences between years. The dependent variable of equation 2 will be measured as follows: (long-term debt $_{t}$ – long term-debt $_{t-1}$) / total assets $_{t-1}$. This method is based on Huang & Ritter (2009), Komera & Lukose (2015), and Frank & Goyal (2003). Equation 3 test the determinants of capital structure for the pecking order theory. The first measurement is the same as equation 2. The second measurement of the third equation is the Δ (long-term debt plus current liabilities divided by the shareholders' equity). This method is based on Frank & Goyal (2003). The only difference is that Frank & Goyal (2003) use market capitalization instead of shareholders' equity.

Independent variables

The first measurement of profitability is calculated as follows: earnings before interest and tax (EBIT) divided by total assets (Chen, 1999; De Bie & De Haan, De Jong et al., 2008). Another measurement of profitability that researchers often use includes also depreciation or/and amortization (Degryse et al., 2010). Therefore, the second measurement of profitability is earnings before interest, depreciation, and amortization divided by the total assets.

Tangibility is calculated by the non-current tangible assets divided by the total assets (De Jong et al., 2008; Deesomsak et al., 2004). The advantage of net fixed assets is that it excludes intangible assets and short-term assets. These assets are expected to be a poor collateral (Degryse et al., 2010). The second way to measure the asset structure is to divide tangible assets (non-current tangible assets plus inventory) by the total assets (Chen, 1999; De Bie & De Haan, 2007; De Jong, 2002).

Volatility is calculated by the standard deviation of EBIT divided by the average of EBIT. The second measurement is calculated as follows: standard deviation of sales divided by the average of sales (Iqbal & Kume, 2014). These measurements are known as the coefficient of variation. The sample period for both variables is from t-1 up to and including t-4.

Non-debt tax shields will be calculated by the total depreciation over the total assets (Degryse et al., 2010).

Liquidity will be first calculated as the total liquid assets divided by total current liabilities (De Haan & Hinloopen, 2003). Liquid assets are in this research cash & cash equivalents. The second measurement of liquidity is the total current assets divided by total current liabilities (De Jong et al., 2008). The second measurement is also known as the current ratio.

The last independent variable is financing deficit. Financing deficit is calculated based on the method of Huang & Ritter (2009) and Komera & Lukose (2015). This is the change in assets minus the change in retained earnings as a percentage of beginning-of-year assets.

Table 3: Variables measurements

Variables	Measurement	Abbreviation
Dependent variables		
Leverage$_{i, t}$	Long term debt$_{i, t}$ / total assets$_{i, t}$	LLEV
	(Long-term debt$_{i, t}$ + current liabilities$_{i, t}$) / total assets$_{i, t}$	TLEV
Δ Leverage$_{i, t}$	(Long-term debt$_{i, t}$ – long term-debt$_{i, t-1}$) / total assets$_{i, t-1}$	ΔLTD
	(Long-term debt$_{i, t}$ + current liabilities$_{i, t}$) / shareholders' equity$_{i, t}$ - (long-term debt$_{i,t-1}$ + current liabilities$_{i,t-1}$) / shareholders' equity$_{i, t-1}$	ΔBTD
Independent variables		
Profitability$_{i, t-1}$	EBIT$_{i, t-1}$ / total assets$_{i, t-1}$	PROF1
	EBITDA$_{i, t-1}$ / total assets$_{i, t-1}$	PROF2
Tangibility$_{i, t-1}$	non-current tangible assets$_{i, t-1}$ / total assets$_{i, t-1}$	TANG1
	(non-current tangible assets$_{i, t-1}$ + inventory$_{i, t-1}$) / total assets$_{i, t-1}$	TANG2
Volatility$_{i, t-1}$	Standard deviation of EBIT$_{i, t-1 to t-4}$ / average of EBIT$_{i, t-1 to t-4}$	VOLA1
	Standard deviation of sales$_{i, t-1 to t-4}$ / average of sales$_{i, t-1 to t-4}$	VOLA2
Non-debt tax shields$_{i, t-1}$	Depreciation$_{i, t-1}$ / total assets$_{i, t-1}$	NDTS
Liquidity$_{i, t-1}$	(Cash & cash equivalent$_{i, t-1}$) / total assets$_{i, t-1}$	LIQ1
	Total current asstss$_{i, t-1}$ / total current liabilities$_{i, t-1}$	LIQ2
Financial deficit$_{t-1}$	((Total assets$_{i, t-1}$ - total assets$_{i, t-2}$) - (retained earnings$_{i, t-1}$ - retained earnings$_{i, t-2}$)) / total assets$_{i, t-2}$	ΔDEF
Control variables		
Size$_{i, t-1}$	Logarithm sales$_{i, t-1}$ (sales in thousands)	SIZE1
	Logarithm total assets$_{i, t-1}$ (total assets in thousands)	SIZE2
Growth opportunities$_{i, t-1}$	(Total assets$_{i, t-1}$ - total shareholders' equity$_{i, t-1}$ + market capatilization of equity$_{i, t-1}$) / total assets$_{i, t-1}$	GROW
D Agriculture and mining	Agriculture and mining = 1, otherwise = 0	D AGMI
D Manufacturing	Manufacturing firms = 1, otherwise = 0	D MANU
D Construction, wholesale and retail trade	Construction, wholesale and retail trade = 1, otherwise = 0	D CWRT
D Transportation and storage	Transportation and storage = 1, otherwise = 0	D TRANSTO
D Other industries	Other = 1, otherwise = 0	D OTHER

Control variable

The size of a firm will be measured by the logarithm of total sales (Chen, 1999; De Bie & De Haan, 2007) and the logarithm of total assets (Degryse et al., 2010). The logarithm (base 10) is used to prevent for a marginal effect in the variables.

Growth opportunities will be measured by the book value of total assets less the shareholders' equity plus market capitalization divided by the book value of total assets (De Jong et al., 2008). When the value is higher than 1, the firm will be considered as a firm with high growth opportunities. When the value is 1 or lower, it will be considered as a firm with low growth opportunities.

Several dummy variables will be used to check if there exists a variance between industries. Industries are classified into different industry groups. These groups are based on the NACE-codes. The NACE-codes are used by the European Union to distinguish different economic activities. In this research, there are in total five industry groups. The first group is agriculture and mining (01-09). The second group is manufacturing (10-33). The third group is construction, wholesale and retail trade (41-

47). The fourth group is transportation and storage (48-53). The fifth and last group are the remaining classifications and is called “other” (remaining codes).

3.3 Data

The database Orbis is used to collect all the data. Orbis is a global database that has financial information on over more than 275 million firms, both publicly quoted and privately held, around the world. The sample period of this research is the period 2013 to 2017. Not all Dutch firms will be included. First, the categories utilities (35-39) and financial and insurance activities (64-66) are excluded from the sample. These firms have different accounting regulations compared to non-financial firms. Second, the firm must be listed on the stock exchange or is a formerly publicly listed firm. Formerly publicly listed companies are also included because these companies may have been listed on the stock exchange during the first years of the sample period. Table 4 shows how many firms are included in the sample. The step result shows how many firms meet the selected criteria. The firms in the sample show how many firms meet the criteria in all previously data reduction step(s). In total there are 224 different firms in the sample. However, due to missing data there will in practice be fewer firms in the sample. The sample period contains five years. As mentioned earlier, the independent variables are lagged 1 year. Besides, some variables are calculated by using data from (more than) a year ago. Therefore, the data of the independent variables and dependent variable varies respectively between the period 2011-2016 and 2013-2017.

Table 4: Total listed firms

Data reduction step	Step result	Firms in the sample
All firms	1,878,560	1,878.560
Dutch firms	52,705	35,872
Publicly listed firms and formerly publicly listed firms	101,232	314
Selected Industries	1,770,846	224

4. Results

In this chapter, the results will be discussed. First, the descriptive statistics will be described. Then the correlation between variables will be analyzed. Lastly, the OLS regression will be executed.

4.1 Descriptive statistics

Table 5 presents the descriptive statistics of all variables. This unbalanced data reports the mean, median, standard deviation, minimum, maximum and the number of observations. To reduce the chance of outliers, many researchers winsorize their data at 0.5%, 1%, 2.5% or 5% on both sides. This research deviates from these standard values. With a winsorizing of 0.5% and 1%, it turned out that there were still relatively many outliers in both theories. A winsorizing of 2.5% considerably reduced this number. A disadvantage of winsorizing at 5% is that there are relatively many data points are adjusted, which is not necessary. Thus, 2.5% seemed to be the best option. However, TLEV still had a very high maximum in the tradeoff theory after winsorizing. Adding a half percent reduces this maximum considerably. A winsorizing value of 3% is also suitable for the pecking order theory. Therefore, this study deviates from the standard values and it has been decided to winsorize the data both sides at 3%. In the next section, the descriptive statistics will be discussed and compared with previous Dutch research.

Table 5: Descriptive statistics

Panel A: Descriptive statistics						
Variable	Mean	Median	Std. Deviation	Minimum	Maximum	N
LLEV	0.194	0.145	0.191	0	0.711	815
TLEV	0.533	0.506	0.261	0.069	1.252	815
ΔLTD	0.022	0.000	0.122	-0.224	0.438	771
ΔBTD	0.124	-0.006	3.310	-10.334	12.272	771
PROF1	0.005	0.047	0.182	-0.719	0.244	731
PROF2	0.057	0.086	0.169	-0.568	0.304	702
ΔPROF1	0.004	-0.001	0.109	-0.259	0.395	670
ΔPROF2	0.003	-0.001	0.096	-0.227	0.353	641
TANG1	0.195	0.127	0.206	0	0.798	850
TANG2	0.293	0.258	0.245	0	0.835	846
ΔTANG1	-0.002	0.000	0.041	-0.126	0.111	792
ΔTANG2	-0.003	0.000	0.052	-0.153	0.135	787
VOLA1	0.154	0.257	1.802	-5.341	4.772	515
VOLA2	0.177	0.115	0.175	0.022	0.786	600
NDTS	0.027	0.022	0.025	0	0.098	641
LIQ1	0.155	0.078	0.218	0.001	0.928	850
LIQ2	2.304	1.307	3.325	0.157	16.828	876
ΔLIQ1	0.003	0.000	0.073	-0.194	0.202	784
ΔLIQ2	0.123	0.005	1.685	-4.723	6.645	816
ΔDEF	0.155	0.032	0.522	-0.544	2.258	528
ΔDEF^2	0.370	0.007	1.226	0.000	5.836	528
SIZE1	5.582	5.569	0.990	3.469	7.381	749
SIZE2	5.548	5.642	1.094	2.994	7.556	881
ΔSIZE1	0.020	0.012	0.097	-0.221	0.285	685
ΔSIZE2	0.013	0.008	0.117	-0.325	0.342	821
GROW	1.852	1.404	1.409	0.753	7.572	510
ΔGROW	0.092	0.033	0.575	-1.237	2.261	463

Table 5 reports the mean, median, standard deviation, minimum, maximum, and the number of observations of the dependent variables, independent variables, and control variables. Definitions of the variables can be found in table 3. Variables are winsorized at 3%.

Table 6: Industries

Industry	Frequency	Percent
Agriculture & mining	30	3.7%
Construction, wholesale and retail trade	118	14.5%
Manufacturing	318	39.0%
Transportation and storage	16	2.0%
Other	333	40.9%
Total	**815**	**100%**

First, the descriptive statistics of the tradeoff theory will be discussed. The total observations per variable vary between 510 and 881. The first dependent variable of the tradeoff theory is LLEV. LLEV has a mean (median) of 19% (14%). In comparison with previous research that focuses on Dutch firms can be concluded that LLEV is relative high. De Jong (2002) found a mean of 13%. Degryse et al. (2010) and Hall et al. (2004) who focused on SME's found respectively a mean of 30% and 2%. These means

differ a lot of each other and the result of this research. Despite, Degryse et al. (2010) and Hall et al. (2004) both focused on SME's. Degryse et al. (2010) said that their sample contains many very small firms, which distinguishes their study further from earlier SME capital structure studies that have medium-sized firms in their data like Hall et al. (2004). A reasonable explanation for the huge difference in means could be that very small firms use fixed asset as collateral and have therefore more long-term debt than SME's. The second dependent variable is TLEV and has a mean (median) of 53% (51%). This is higher than 49% (Degryse et al., 2010) and lower than 60% (De Bie & De Haan, 2007). The dependent variable TLEV has a maximum of more than 1. It is remarkable that after winsorizing TLEV still have a maximum value of more than 1. A logical explanation for this is that some firms have a negative equity. Both independent variables PROF1 and PROF2 show a positive profitability on average. However, with 5% and 0% it is just above zero and lower than previous Dutch research. For example, Chen et al. (1999), De Bie & De Haan (2007), and De Jong et al. (2008) have with respectively 8%, 9%, and 10% all a higher PROF1. This suggests that Dutch listed firms are less profitable in this sample period. If we look more in-depth, firms with negative shareholders' equity have on average a negative profitability (not shown). These firms push the mean of profitability to a lower average. Excluding these firms results in a mean of 3% for PROF1 and a mean of 8% for PROF2 (not showed). Also, the median shows that most firms have a higher profitability than the average. Thus, the profitability looks low, but it is comparable to previous Dutch research. On average, Dutch firms have in this sample more intangible assets than earlier research. TANG2 is with a mean of 29% a lot lower than Chen et al. (1999), De Bie & De Haan (2007), and De Jong (2002). They had respectively a mean of 63%, 35%, and 56%. This suggests that Dutch listed firms in the last years have attracted more intangible assets. An explanation could be that the authors just mentioned also include cash & cash equivalents as tangible assets. This research does not include cash & cash equivalents as tangible assets because according to the IFRS is it a financial asset. TANG1 shows with a mean of 19% also a low tangibility compared with other Dutch studies. De Jong et al. (2008) show a mean of 26% and Degryse et al. (2010) a mean of 49%. The latter is probably a lot higher because small firms often use their private home or car as collateral to finance their activities. Both measurement variables of volatility show different descriptive statistics. VOLA1 has a much higher standard deviation, higher maximum, and lower minimum. Although both variables measure the volatility of companies, it can be concluded that the descriptive statistics of both variables are different. The result of this is that one variable indicates a higher degree of volatility than the other. Therefore, some caution must be taken by interpreting these results. These differences are due to the fact that EBIT fluctuates more than sales. Besides, EBIT could have negative values. For sales is this only in theory possible. Unfortunately, there is no Dutch research that uses the same definition of volatility as this research. Therefore, only VOLA2 will be compared with the descriptive statistics of Iqbal & Kume (2014). Iqbal & Kume (2014) shows a mean of 38%, 26%, and 49% for respectively the United Kingdom, France, and Germany. This is a lot higher than 18% of this research. Thus, on average are Dutch firms less volatile compared with the sample of Iqbal & Kume (2014). NTDS has a mean of 3%. This value is lower than Degryse et al. (2010) who reported a mean 18%. Thus, this study appears to have a relatively low average for NTDS1 compared with previous Dutch studies. However, the tangibility ratio is in this study also relatively lower than previous Dutch research. Therefore, it is logical that there is less depreciation and that NTDS has a relatively lower average than previous Dutch research. The control variables SIZE1 and SIZE2 have both almost the same descriptive statistics. One difference is that SIZE1 has a smaller sample size. The reason for this is that there are relatively fewer data available about the total sales of a firm than the total assets. The mean of SIZE2 corresponds with 5.5 almost to the sample of De Jong

et al. (2008) who had a mean of 5.8. But, SIZE2 differs extremely with the sample of Chen et al. (1999) and De Bie & De Haan (2007) who has both an average around the 13. It is likely that these authors use a different definition of size. In this study, the amount of sales and total assets is calculated in thousands. Probably, Chen et al. (1999) and De Bie & De Haan (2007) do not do this. Also, the authors could use a different log base. However, when authors not mentioned which logarithm base they used, it is assumed that the base is 10. The last variable of the tradeoff theory is GROW, also known as growth opportunities. When the mean of a firm is above 1, it indicates that a firm has positive growth opportunities. In this case, is the market value of equity higher than the book value of equity. The sample of this research shows a mean of 1.80. Thus, Dutch listed-firms has on average positive growth opportunities. The median is with 1.4 lower than the mean. This indicates that the distribution is right-skewed. Chen et al. (1999) had an average and median of 1.16 and 1.09. This lower mean and median suggest that Dutch listed-firms have on average higher growth opportunities in the years 2013 till 2017 than the years 1984 till 1995. Also, De Bie & De Haan (2007) found with 1.34 a lower leverage. De Jong (2002) shows an average of 1.43. However, he used the replacement value of total assets as the denominator instead of the book value of total assets.

In the pecking order theory, there are a lot fewer authors who used the same definition of the variables as this research compared to the tradeoff theory. In fact, Chen et al. (1999) is from table 1 the only one who used first differences to measure the variables of the pecking order theory. To still compare the results, research from abroad is used. Unfortunately, most authors did not show their descriptive statistics. Probably because all variables have due to the differences in time a mean close to zero.

The total observations per variable for the pecking order theory vary between 463 and 821. This is less than the tradeoff theory. This is easy to explain because the variables of the pecking order theory need more data points than the tradeoff theory. The dependent variables of the pecking order theory are ΔLTD and ΔBTD. ΔLTD is with 2.2% a slightly lower than Komera & Lukose (2015), who has a mean of 5.7%. However, because Komera & Lukose (2015) used total debt instead of long-term debt. Therefore, caution must be taken by comparing these results. Huang & Ritter (2009) descriptive statistics show an increase in debt between 2% and 10 % percent per year. However, they include also short-term debt. Better comparable are the descriptive statistics from Frank & Goyal (2003). They show for the same measurement an average between 0.5 % and 3,4%. These results are in line with this research. ΔBTD shows with 12% a high average. However, the median is with -0% close to zero. All the independent variables do not show unexpected results. All these variables have a mean or median close to zero. This is in accordance with the descriptive statistics of Ozkan (2001), This is logic because it is expected that on average no major change takes place in a year. The variable ΔDEF shows a mean of 0,16. This is in line with Komera & Lukose (2015) who showed an average between 0.08 and 0.38.

Table 6 shows the descriptive statistics of the five industries. Only the industries where data from the variable TLEV are available are included in the table. The industries are not evenly distributed. Agriculture and mining have with 30 firm-year observations a lot fewer observations than the industry “other” who have 333 firm-year observations. Further, construction, wholesale and retail trade had 118 firm-year observations. That is almost 15% of the total observations. Manufacturing and transportation & storage have respectively 39% and 2% of the total observations.

4.2 Correlation

In this section, the correlation between the variables will be tested. A common tool to test this is the Pearson’s correlation. Pearson’s correlation measures how well a relationship between two variables

can be described using a linear function (Rebekić, Lončarić, Petrović, & Marić, 2015). Table 6 describes the results of the correlation matrix. The first two columns are the most important ones. In these columns can be seen which independent variables are correlated to the dependent variables. In panel A, both variables of profitability are significant and negatively correlated to TLEV. Surprisingly, this contradicts the tradeoff theory. The theory predicts that firms that are profitable face little to zero financial distress cost and will set their target leverage ratio to a higher point to benefits more from the tax benefit. The variable TANG1 is significant and positively related to both variables of leverage. This is what the theory expects. Also, the TANG2 is positively correlated to LLEV. Volatility shows surprising results. Almost all the variables show a positive correlation. This contradicts the tradeoff theory who argue a negative correlation through financial distress costs. Only VOLA1 has a negative correlation with TLEV. However, the relationship is insignificant. Non-debt tax shield and total debt ratio have a positive correlation. The tradeoff theory predicts that non-debt tax shield is a substitute for debt financing. Thus, this correlation is the opposite of what the tradeoff theory predicts. The correlation between non-debt tax shield and the long-term debt ratio is insignificant. The variables that measuring the size of a firm are positive and significant correlated to the dependent variable LLEV. Growth opportunities is positively correlated to the long-term debt ratio and the total debt ratio. However, only the last mentioned has a significant correlation. Almost all the industry dummies have a significant relationship with leverage. Agriculture & mining are positively correlated to both variables of leverage. The industry manufacturing is negatively correlated to LLEV and TLEV. Construction, wholesale, & retail trade shows mixed correlations. It is positively correlated to the total debt ratio and negatively correlated to the long-term debt ratio. Transportation & storage is positively correlated to both the long-term debt ratio and total debt ratio. The last industry "other" is the only industry that is not significantly correlated to both variables of leverage.

Panel B shows the correlations between the variables of the pecking order theory. It is noticeable that there are fewer significant correlations in the first two columns than in the tradeoff theory. The variables with a significant correlation with the dependent variable will be discussed. ΔPROF2 is significantly and positively correlated to ΔLTD. Profitable firms usually have more retained earnings and move less quickly to debt financing. Therefore, the pecking order theory expects a negative relationship. Thus, the correlation contradicts the pecking order theory. ΔTANG has a positive correlation with ΔBTD. Tangible assets have less information asymmetry than intangible assets. Therefore, a positive relationship is expected. The last independent variable is liquidity. The second measurement of this variable is negatively correlated to ΔBTD. This is in line with the expectation of the pecking order theory. ∆DEF is expected to have a significant correlation close to one with leverage. However, panel B shows that the variable do not have a correlation close to one with leverage. Besides, the correlations are insignificant. Only ΔDEF^2 has a significant positive correlation with ΔBTD. Further, the control variables ΔSIZE shows a positive correlation with ΔBTD. Growth opportunities have a positive significant correlation with both variables op leverage. Lastly, the industry construction, wholesale & retail trade have a negative correlation with ΔBTD.

Table 6: Correlation

Variable			[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]
LLEV	[1]	Pearson	1																
		N	815																
TLEV	[2]	Pearson	**0.507****	1															
		N	**815**	815															
PROF1	[3]	Pearson	0.011	**-0.181****	1														
		N	704	**704**	731														
PROF2	[4]	Pearson	0.033	**-0.136****	0.916**	1													
		N	678	**678**	702	702													
TANG1	[5]	Pearson	**0.244****	**0.093***	0.140**	0.233**	1												
		N	**758**	**758**	713	684	850												
TANG2	[6]	Pearson	**0.086***	0.065	0.217**	0.278**	0.854**	1											
		N	**757**	757	713	684	846	846											
VOLA1	[7]	Pearson	**0.127****	-0.074	0.232**	0.152**	0.022	0.072	1										
		N	**506**	506	515	515	502	502	515										
VOLA2	[8]	Pearson	**0.099***	**0.115****	-0.390**	-0.398**	-0.054	-0.065	-0.034	1									
		N	**572**	**572**	560	541	594	594	493	600									
NDTS	[9]	Pearson	0.053	**0.086***	0.042	0.207**	0.660**	0.569**	-0.103*	-0.132**	1								
		N	631	**631**	641	641	623	623	515	493	641								
SIZE1	[10]	Pearson	**0.099****	**0.087***	0.399**	0.379**	0.114**	0.163**	0.218**	-0.236**	0.122**	1							
		N	**711**	**711**	692	663	741	740	496	596	605	749							
SIZE2	[11]	Pearson	**0.221****	-0.031	0.453**	0.409**	0.158**	0.165**	0.258**	-0.164**	0.033	0.883**	1						
		N	**774**	774	731	702	850	846	515	600	641	748	881						
GROW	[12]	Pearson	0.012	**0.231****	-0.441**	-0.407**	-0.049	-0.105*	-0.087	0.205**	-0.019	-0.147**	-0.375**	1					
		N	507	**507**	510	510	492	492	463	441	510	481	510	510					
D AGMI	[13]	Pearson	**0.084***	**0.212****	-0.059	-0.065	0.007	-0.032	-0.009	0.091*	-0.029	-0.062	-0.058	0.352**	1				
		N	**815**	**815**	731	702	850	846	515	600	641	749	881	510	1120				
D MANU	[14]	Pearson	**-0.073***	**-0.135****	0.137**	0.138**	0.096**	0.192**	0.191**	-0.023	0.099*	0.210**	0.186**	-0.099*	-0.133**	1			
		N	**815**	**815**	731	702	850	846	515	600	641	749	881	510	1120	1120			
D CWRT	[15]	Pearson	**-0.141****	**0.078***	0.103**	0.120**	0.049	0.194**	-0.112*	-0.124**	0.190**	0.106**	0.032	-0.114**	-0.075*	-0.307**	1		
		N	**815**	**815**	731	702	850	846	515	600	641	749	881	510	1120	1120	1120		
D TRANSTO	[16]	Pearson	**0.126****	**0.086***	0.084*	0.089*	0.206**	0.118**	0.001	-0.009	0.058	0.081*	0.102**	-0.009	-0.037	-0.151**	-0.085**	1	
		N	**815**	**815**	731	702	850	846	515	600	641	749	881	510	1120	1120	1120	1120	
D OTHER	[17]	Pearson	**0.105****	-0.027	-0.213**	-0.224**	-0.198**	-0.361**	-0.113*	0.092*	-0.235**	-0.294**	-0.217**	0.042	-0.156**	-0.639**	-0.360**	-0.177**	1
		N	**815**	815	731	702	850	846	515	600	641	749	881	510	1120	1120	1120	1120	1120

Panel B: Correlation pecking order theory

Variable			[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]
ΔLTD	[1]	Pearson	1																	
		N	771																	
ΔBTD	[2]	Pearson	**0.157****	1																
		N	**771**	771																
ΔPROF1	[3]	Pearson	0.056	-0.075	1															
		N	647	647	670															
ΔPROF2	[4]	Pearson	**0.081***	-0.012	0.809**	1														
		N	**621**	621	641	641														
ΔTANG1	[5]	Pearson	-0.024	**0.104****	-0.054	-0.041	1													
		N	704	**704**	653	624	792													
ΔTANG2	[6]	Pearson	-0.005	0.061	-0.067	-0.063	0.834**	1												
		N	702	702	653	624	787	787												
ΔLIQ1	[7]	Pearson	-0.053	**-0.075***	0.131**	0.108**	-0.266**	-0.318**	1											
		N	710	**710**	657	628	763	761	784											
ΔLIQ2	[8]	Pearson	-0.012	0.030	0.119**	0.067	-0.173**	-0.157**	0.263**	1										
		N	720	720	670	641	791	786	784	816										
ΔDEF	[9]	Pearson	0.049	-0.039	0.115**	0.078	-0.103*	-0.101*	0.134**	0.076	1									
		N	520	520	528	527	513	513	521	528	528									
ΔDEF²	[10]	Pearson	**0.151****	-0.008	0.241**	0.201**	-0.024	-0.024	0.066	0.111*	0.772**	1								
		N	**520**	520	528	527	513	513	521	528	528	528								
ΔSIZE1	[11]	Pearson	**0.081***	0.038	0.180**	0.142**	0.030	0.015	-0.039	-0.093*	0.399**	0.275**	1							
		N	**648**	648	634	605	679	677	672	683	499	499	685							
ΔSIZE2	[12]	Pearson	0.052	-0.067	0.253**	0.183**	-0.182**	-0.184**	0.050	0.121**	0.616**	0.336**	0.417**	1						
		N	720	720	670	641	792	787	784	816	528	528	683	821						
ΔGROW	[13]	Pearson	**0.154****	**0.108***	-0.039	-0.095*	0.024	0.054	0.047	0.137**	-0.239**	0.022	0.009	-0.471**	1					
		N	**461**	**461**	463	462	446	446	455	463	421	421	436	463	463					
D AGRI	[14]	Pearson	0.031	-0.024	-0.048	-0.072	0.009	0.031	-0.082*	-0.028	0.033	0.037	-0.026	-0.017	0.006	1				
		N	771	771	670	641	792	787	784	816	528	528	685	821	463	1120				
D MANU	[15]	Pearson	0.028	0.010	-0.037	-0.039	-0.010	-0.026	-0.004	0.018	-0.005	-0.090*	0.008	0.084*	-0.061	-0.133**	1			
		N	771	771	670	641	792	787	784	816	528	528	685	821	463	1120	1120			
D CWRT	[16]	Pearson	**-0.081***	-0.025	-0.059	-0.038	-0.053	-0.038	-0.030	-0.041	-0.099*	-0.085	-0.037	-0.027	-0.026	-0.075*	-0.307**	1		
		N	**771**	771	670	641	792	787	784	816	528	528	685	821	463	1120	1120	1120		
D STANSTO	[17]	Pearson	-0.054	0.019	-0.009	-0.003	0.076*	0.066	0.022	0.017	-0.039	-0.044	-0.023	-0.063	-0.009	-0.037	-0.151**	-0.085**	1	
		N	771	771	670	641	792	787	784	816	528	528	685	821	463	1120	1120	1120	1120	
D OTHER	[18]	Pearson	0.033	0.012	0.103**	0.096*	0.023	0.023	0.050	0.019	0.070	0.146**	0.036	-0.037	0.079	-0.156**	-0.639**	-0.360**	-0.177**	1
		N	771	771	670	641	792	787	784	816	528	528	685	821	463	1120	1120	1120	1120	1120

Table 6 reports the correlation matrix. * and **denotes a significant level of 5% and 1%, respectively. Definitions of the variables can be found in table 3.

4.3 OLS regression tradeoff theory

Table 7 shows the results of the OLS regression of the tradeoff theory. The first four models are only control variables included and in the last four models are all variables included. In model 1, model 2, model 5, and model 6 is the long-term debt ratio the dependent variable. In all the other models is the total debt ratio the dependent variable. Further, all even models include variables that use the first measurement of the independent variables. The odd models include variables that use the second measurement of the independent variables. The most important results will be discussed for each variable. Beginning with the independent variables.

The independent variables are included in model 5 to model 8. The first independent variable is profitability. Except of model 6, profitability is significant and negatively related to both measurements of leverage. Surprisingly, this is the opposite of what the hypothesis of the tradeoff theory expects. Thus, this outcome of profitability does not give any support for the tradeoff theory. The negative relationship corresponds with De Bie & De Haan (2007) who also found empirical evidence that profitability leads to a lower total debt ratio.

In all the models is tangibility positive and significant related to both measurements of leverage. The tradeoff theory argues that tangible assets serve as a good collateral, which makes it more accessible to attract debt. Thus, the positive relationship supports the hypothesis of the tradeoff theory. These results are in line with De Jong (2002) who also found empirical evidence for a positive relationship between tangibility and the long-term debt ratio.

Model 5 shows that the volatility of a firm has a positive impact on the long-term debt ratio. This result is not in accordance with the tradeoff theory hypothesis. The theory expects a negative relationship with leverage because volatile firms should use less debt to avoid financial distress or bankruptcy costs when a downturn happens. This result contradicts also with De Jong (2002). He found empirical evidence that the coefficient of variation in operating income is negatively related to the long-term debt ratio. All the other models do not show any significant results. That most models do show significant results is not remarkable. Most previous Dutch research did also not find significant results.

The last independent variable is non-debt tax shield. The trade-off theory hypothesizes through substitute considerations that non-debt tax shield is negatively related to leverage. In model 5 is the non-debt tax shield negatively and significantly related to the long-term debt ratio. This supports the hypothesis of the tradeoff theory. The other models only show insignificant results.

Table 7: Determinants tradeoff theory

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Variable	LLEV	LLEV	TLEV	TLEV	LLEV	LLEV	TLEV	TLEV
Constant	-0.022	-0.107*	0.303***	0.414***	-0.175***	-0.396***	0.134**	0.260***
	(-0.375)	(-1.829)	(4.083)	(5.609)	(-3.270)	(-7.397)	(2.024)	(3.167)
PROF1 (+)					-0.207*		-0.495***	
					(-2.137)		(-3.708)	
PROF2 (+)						-0.066		-0.392***
						(-0.748)		(-2.481)
TANG1 (+)					0.428***		0.331***	
					(6.277)		(3.418)	
TANG2 (+)						1.122***		0.182***
						(3.120)		(2.769)
VOLA1 (-)					0.010**		-0.037	
					(2.210)		(-0.534)	
VOLA2 (-)						0.090		0.024
						(1.564)		(0.242)
NDTS (-)					-1.473***	0.235	-1.028	0.391
					(-3.350)	(0.686)	(-1.325)	(0.622)
SIZE1	0.035***		0.026**		0.049***		0.050***	
	(3.897)		(2.210)		(5.847)		(4.836)	
SIZE2		0.046***		0.003		0.079***		0.021*
		(5.396)		(0.309)		(10.674)		(1.764)
GROW	-0.005	0.008	0.012	0.028*	0.006	0.013	0.013	0.019
	(-0.620)	(1.155)	(0.771)	(2.168)	(0.624)	(1.406)	(0.836)	(1.331)
D AGRI	0.152***	0.094*	0.334***	0.315***	0.113*	0.154***	0.318***	0.326***
	(2.643)	(1.776)	(3.337)	(3.618)	(1.830)	(3.138)	(3.705)	(3.667)
D CWRT	-0.078***	-0.075***	0.048	0.049	-0.070***	-0.053***	0.048	0.063**
	(-5.069)	(-4.620)	(1.514)	(1.492)	(-5.071)	(-3.365)	(1.638)	(2.069)
D TRANSTO	0.157***	0.139***	0.193***	0.195***	0.095*	0.138***	0.160	0.219**
	(3.838)	(3.516)	(2.668)	(2.613)	(1.938)	(3.719)	(1.606)	(2.360)
D OTHER	0.049**	0.040**	0.057**	0.026	0.092***	0.097***	0.087***	0.102***
	(2.436)	(2.122)	(2.324)	(1.137)	(5.019)	(5.314)	(3.652)	(3.866)
HCSE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.099	0.117	0.094	0.112	0.243	0.271	0.222	0.175
Adjusted R^2	0.088	0.106	0.083	0.101	0.225	0.254	0.204	0.155
N	480	507	480	507	439	434	439	434

Table 7 reports the OLS-regression results of the tradeoff theory. Model 1 to 4 includes only control variables. Model 5 to 8 includes all variables of the tradeoff theory. Definitions of the variables can be found in table 3. *, **, and *** denotes a significant level of 10%, 5%, and 1%, respectively. T-value are in parentheses.

The first control variable is the size of a firm. All models show that the variable SIZE1 is positive and significantly related to both measurements of leverage. In model 2 and model 6 is SIZE2 also positively related to the long-term debt ratio. SIZE2 does not show significant results with the total debt ratio. Thus, most models show that the size of a firm is positively related to leverage. This corresponds with earlier work of De Bie & De Haan (2007) and Degryse et al. (2010). The tradeoff theory expects also a positive relationship because profitable firms are less exposed by financial distress costs.

The second control variable is growth opportunities. Growth opportunities do not show any

significant relationships with leverage in all the models. There is one exception. In model 5 has growth opportunities a positive and significant relationship with the long-term debt ratio.

The last control variable is the industry. This variable is divided into five dummy variables. The industry manufacturing is the reference group. All the models show that the industry agriculture and mining have a significantly higher leverage than manufacturing. Construction, wholesale, and retail trade (CWRT) have in models 1, 2, 5, and 6 significantly relationships. These models concluded that CWRT has a significantly lower leverage than firms from the manufacturing industry. In model 3, model 4, and model 7 no significant results are found regarding CWRT. In model 8 has CWRT significant higher total debt ratio than firms from the manufacturing industry. The last two industries are transportation & storage and "other". Both industries have almost in every model a higher leverage than the industry manufacturing.

The number of observations in all the models varies between 434 and 507. This is not very high, but certainly not too low. More important is that all models have a significant level of lower than 1%. From model 5 to model 8 the independent variables have been added. The result is that the adjusted R^2 increase by 5% to 15%. Thus, the independent variables explain 5% to 15% of the variance in leverage. The total adjusted R^2 in model 5 to 8 vary between 16% and 25%. This is comparable with De Jong (2002) who found an adjusted R^2 of 24%. Only they include the variable free cash flow and exclude the variables profitability and industry. Further, the models of long-term debt have a higher adjusted R^2 than the models of the total debt ratio.

4.4 OLS regression pecking order theory

In this paragraph will be checked if there exists a financial hierarchy and which determinants an impact has on leverage. The first will be checked with the dependent variable leverage and the independent variable financing deficit. Shyam-Sunder & Myers (1999) argue that when there is a shortage of investment fund, it will mainly use debt financing. Table 8 shows the results of the OLS regression. When in the OLS regression the coefficient of the financing deficit is close to 1, it can be concluded that there is a financial hierarchy. Model 1 of table 8 shows that the coefficient is 0.035 and significant at 5%. This is far away from the expected 1. For now, there cannot be concluded that there exists a financial hierarchy. A possible explanation for the low coefficient could be that the firms face debt capacity constraints. To test if this is the case, the variable ΔDEF^2 has been added. When the square financing deficit is significant negative, there is an increase in the financing deficit, and an increase in the R-square, it can be concluded that the firms face debt capacity constraints. In model 2 is ΔDEF^2 significant. But, all the other assumptions are not met. Therefore, this research does not find any proof that there exists a financing hierarchy. This contradicts the results of Shyam-Sunder & Myers (1999).

Table 8: Pecking order

	Model 1	Model 2
Constant	0.017***	0.014**
	(3.208)	(2.906)
ΔDEF	0.011	-0.037
	(1.111)	(-1.338)
ΔDEF^2		0.026**
		(2.047)
HCSE	No	Yes
R^2	0.025	0.047
Adjusted R^2	0.023	0.043
N	520	520

Table 8 test if there exists a pecking order. Model 1 includes the variable financial deficit. Model 2 includes the variables financial deficit and financial deficit². Definitions of the variables can be found in table 3. *, **, and *** denotes a significant level of 10%, 5%, and 1%, respectively. T-value are in parentheses.

Despite that this research does not find proof that there is a financing hierarchy, it will still check which determinants influence the capital structure of Dutch firms. Table 9 shows the results of the different OLS regressions. The first independent variable is profitability. The pecking order theory hypothesized that profitable firms generate more retained earnings and will therefore attract less debt. Thus, a negative relationship. ΔPROF2 has insignificant results. However, ΔPROF1 has a significant and negative relationship with both variables of leverage. This confirms the pecking order theory hypothesis. This relationship corresponds with Chen et al. (1999). However, they only divided the dependent variable not by total assets but by total equity.

The second independent variable is tangibility. The hypothesis expects a positive relationship with leverage. Both variables of tangibility show no significant results. Thus, this research found no empirical support that tangibility has an impact on leverage.

The last independent variable is liquidity. The pecking order theory hypothesized that firms with a high liquidity will use their cash or other liquid assets as a source of internal fund and will use this first instead of debt financing. In model 5 is liquidity significantly negative related to the long-term debt ratio. This gives empirical support for the pecking order theory hypothesis. Ozkan (2001) found the same relationship for firms from the United Kingdom. The other models of liquidity showed insignificant results.

The next variables are control variables. Most control variables have no significant relationships with leverage. Size is an example of that. The variable growth opportunities show only a significant relationship in model 2. Thus, growth opportunities will result in a higher long-term debt ratio. Surprisingly, is growth opportunities not significant in model 1. In this model, the definition of size is the only difference compared with model 2. Apparently, growth opportunities is sensitive to this change. The last control variables are the industries dummies. Agriculture & mining and the industry "other" do not show significant relationships. The industry transportation and storage show in each model of ΔLTD significant results. This indicates that the industry transportation & storage have a significantly lower leverage than the industry manufacturing.

The number of observations in all the models varies between 428 and 461. Compared to the tradeoff theory, there are much less significant relationships. It is unclear how this is possible. In the last four models, the independent variables have been added. The result is that the adjusted R^2

increase by -2% to 2%. Thus, the increase of the independent variables is very low. The adjusted R^2 becomes even smaller in one model. The total adjusted R^2 in the last four models varies between 1% and 3%. Compared the tradeoff theory is this a lot 17% to 25% lower. Therefore, the independent variables of the pecking order theory explain little in the variance of the dependent variable. Compared with earlier Dutch research, the adjusted R^2 is comparable with Chen et al. (1999). Chen et al. (1999) found an adjusted R^2 of 4%. Just as the tradeoff theory have the models of the long-term debt ratio a higher adjusted R^2 than the models of the total debt ratio.

Table 9: Determinants pecking order theory

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Variable	ΔLTD	ΔLTD	ΔBTD	ΔBTD	ΔLTD	ΔLTD	ΔBTD	ΔBTD
Constant	0.021***	0.024***	0.210	0.275	0.020***	0.022***	0.229	0.279
	2.818	(2.957)	(1.165)	(1.500)	(2.642)	(2.861)	(1.291)	(1.541)
ΔPROF1 (-)					-0.106*		-3.147*	
					(-1.917)		(-1.683)	
ΔPROF2 (-)						-0.043		-3.428
						(-0.680)		(-1.628)
ΔTANG1 (+)					-0.228		3.474	
					(-1.604)		(0.989)	
ΔTANG2 (+)						-0.060		-1.399
						(-0.535)		(-0.498)
ΔLIQ1 (-)					-0.136*		-0.549	
					(-1.703)		(-0.165)	
ΔLIQ2 (-)						-0.007		0.105
						(-1.347)		(0.853)
ΔSIZE1	0.060		-1.180		0.073		0.163	
	(1.110)		(-0.612)		(1.285)		(0.083)	
ΔSIZE2		0.032		-2.134		0.069		-1.974
		(0.472)		(-1.112)		(1.263)		(-1.043)
ΔGROW	0.005	0.033**	0.480	0.324	0.009	0.017	0.423	0.554
	(0.453)	(2.391)	(1.134)	(0.885)	(0.793)	(1.573)	(0.925)	(1.269)
D AGRI	0.017	0.006	-0.355	-0.392	0.013	0.006	-0.260	-0.519
	(0.030)	(0.192)	(-0.346)	(-0.415)	(0.453)	(0.219)	(-0.235)	(-0.500)
D CWRT	-0.012	-0.017	-0.215	-0.144	-0.014	-0.015	0.147	0.092
	(-0.801)	(-1.205)	(-0.585)	(-0.410)	(-0.917)	(-0.920)	(0.413)	(0.271)
D TRANSTO	-0.068**	-0.073**	-0.078	-0.174	-0.063*	-0.068**	-0.119	-0.167
	(-2.068)	(-2.126)	(-0.040)	(-0.089)	(-1.882)	(-2.017)	(-0.060)	(-0.085)
D OTHER	-0.017	-0.016	-0.183	-0.328	-0.016	-0.017	-0.245	-0.298
	(-1.590)	(-1.395)	(-0.684)	(-1.271)	(-1.467)	(-1.574)	(-0.934)	(-1.183)
HCSE	No	Yes	Yes	Yes	No	No	Yes	Yes
R^2	0.019	0.038	0.012	0.022	0.040	0.028	0.028	0.042
Adjusted R^2	0.005	0.032	-0.002	0.009	0.020	0.008	0.007	0.022
N	435	461	435	461	428	444	428	444

Table 9 reports the OLS-regression results of the pecking order theory. Model 1 to 4 includes only control variables. Model 5 to 8 includes all variables of the pecking order theory. Definitions of the variables can be found in table 3. *, **, and *** denotes a significant level of 10%, 5%, and 1%, respectively. T-value are in parentheses.

The pecking order theory predicts that the theory better works for firms with high growth opportunities. Table 10 examines whether this is true. When there are more significant results for firms with high growth opportunities or the adjusted R^2 increase, it can be concluded that the pecking order theory performs better for firms with greater growth opportunities. When the variable GROW has an amount of higher than 1, it is considered as high growth opportunities. Values of 1 and lower will be considered as low growth opportunities. The consequence of this definition is that low growth opportunities have a relatively small sample size. Comparing model 5 and 6, it is noticeable that the variables ΔTANG1, ΔLIQ1, and ΔSIZE1 is significant when a firm has higher growth opportunities. For low growth opportunities, no significant results are shown. Besides, profitability and liquidity have the expected sign of the pecking order theory. Also, the adjusted R^2 in model 5 is a lot higher than in model 6. Thus, these models confirm the theory that the pecking order theory works better for firms with high growth opportunities. In the last two models exact the opposite happens. Model 7 shows no significant results. Model 8 shows with profitability, liquidity, and the size of a firm many more significant results. Besides, the independent variables have both the expected sign. The adjusted R^2 is 10%. There is no table (included table 9) such high R^2 reported. Thus, this contradicts the theory. We have one case that supports the theory and one case that contradicts the theory. Because of these conflicting results, this research concludes that it cannot find empirical support that firms with higher growth opportunities are better in explaining the pecking order theory.

Table 10: Determinants pecking order theory and growth opportunities

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Variable	High	Low	High	Low	High	Low	High	Low
Constant	0.018***	-0.011	0.023***	-0.007	0.017***	-0.011	0.021***	-0.006
	2.818	(-1.111)	(3.868)	(-0.729)	(2.885)	(-1.075)	(2.932)	(-0.606)
ΔPROF1 (-)					-0.092	-0.123		
					(-1.444)	(-1.070)		
ΔPROF2 (-)							0.026	-0.370***
							(0.259)	(-2.918)
ΔTANG1 (+)					-0.293*	0.180		
					(-1.946)	(0.443)		
ΔTANG2 (+)							-0.049	-0.006
							(-0.285)	(-0.230)
ΔLIQ1 (-)					-0.152*	0.008		
					(-1.796)	(0.032)		
ΔLIQ2 (-)							-0.021	-0.022**
							(-0.149)	(-2.364)
ΔSIZE1	0.109*	-0.136			0.111*	0.088		
	(1.734)	(-1.315)			(1.653)	(0.770)		
ΔSIZE2			-0.006	0.169			0.016	0.204*
			(-0.078)	(1.397)			(0.143)	(1.701)
ΔGROW	0.002	0,001	0.026*	0.055	0.006	0.013	0.010	0.101
	(0.172)	(0.018)	(1.904)	(0.803)	(0.548)	(0.173)	(0.978)	(1.513)
HCSE	No	No	Yes	No	No	No	Yes	No
R^2	0.009	0.018	0.024	0.020	0.035	0.032	0.003	0.145
Adjusted R^2	0.003	-0.003	0.019	0.000	0.020	-0.019	-0.011	0.100
N	335	100	358	103	328	100	342	102

Table 10 reports the OLS regression results of the pecking order theory divided into low and high growth opportunities. Model 1 to 4 includes only control variables. Model 5 to 8 includes all variables of the pecking order theory. High indicates high growth opportunities. Low indicates low growth opportunities. Definitions of the variables can be found in table 3. *, **, and *** denotes a significant level of 10%, 5%, and 1%, respectively. T-value are in parentheses.

5. Conclusion

This study focuses on the capital structure of Dutch listed firms in the period 2013-2017. The main question is: "Do firm-level determinants related to the tradeoff theory and pecking order theory explain the capital structure of Dutch listed firms?". The main tested determinants of the tradeoff theory are profitability, tangibility, volatility, and non-debt tax shield. For the pecking order theory are this profitability, tangibility, and liquidity. Ordinary least squares regression is used as method of analysis. In the tradeoff theory, there is empirical support that profitability is negatively related to leverage. The determinant volatility finds empirical evidence that it is positively related to the long-term debt ratio. Both determinants contradict the tradeoff theory hypotheses. There is empirical evidence that tangibility is positively related to leverage. This is in line with the empirical results of De Jong (2002). Non-debt tax shield finds a significant and negative relationship to the long-term debt ratio. Both, tangibility and non-debt tax shield, are in line with the tradeoff theory hypotheses. Thus, for the tradeoff theory, tangibility and non-debt tax shield explain the differences in the capital structure of Dutch listed firms in the period 2013-2017.

In opposite to Shyam-Sunder & Myers (1999), this research found no empirical evidence that there exists a financial hierarchy in the pecking order theory. Also, this research finds no support that the pecking order theory works better for firms with higher growth opportunities. There is no evidence for the hypothesis that the determinant tangibility has a positive impact on leverage. The determinant liquidity finds empirical support that it is negatively related to the long-term debt ratio. This is in accordance with Ozkan (2001) who found the same relationship for firms from the United Kingdom. The determinant profitability finds empirical support that it is negatively related to leverage. The last two mentioned determinants both support the pecking order theory hypotheses. Thus, for the pecking order theory, profitability and liquidity explain the variance in the capital structure of Dutch listed firms in the period 2013-2017. Lastly, the pecking order theory finds much less significant results and has a lower adjusted R^2 than the tradeoff theory.

There are limitations to every research. In this research, it is not taken into account the dynamic character of leverage. Therefore, it is supposed that firms every year do aim at the same ideal leverage ratio. However, it is uncertain whether this also happened in reality. This research focuses only on two theories, one country, and use only book values. To have a more complete and extensive study, an additional theory, country and market values could be added. Further, the industry classifications are self-made. The disadvantage is that the observations differ greatly per industry. For further research, it is interesting to investigate whether the results differ when the industry classification is different. Lastly, almost all the models of the pecking order theory show a very small R^2 and few significant results. This raises questions. It could be that the right variables were not included in the models or/and that the definitions of the variables were inaccurate. An answer to this question is for further research.

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