

Determinants of capital structure: Static trade-off theory vs. Pecking-order theory

Evidence from Dutch listed firms

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ABSTRACT

The main aim of this paper is to analyze whether the static trade-off theory or the pecking-order theory prevails in capital structure decisions made by Dutch listed firms. The analysis is done by making use of firm-specific determinants that are widely known in the field of capital structure. Evidence in line with research on Dutch firms has been found by making use of a literature review and an OLS-regression. Moreover, this paper finds that the pecking-order theory in capital structure decisions prevail while there is moderate support for the static trade-off theory.

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Keywords

Capital structure, static trade-off theory, pecking-order theory, firm-specific determinants, debt-to-capital ratio, Dutch listed firms

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1st IBA Bachelor Thesis Conference, June 27th, 2013, Enschede, The Netherlands.

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1. INTRODUCTION

Recent research revealed a lot already on specific determinants that determine a firm's capital structure. The capital structure of a firm is the relative amount of debt and equity that a firm uses for its financing. There is already an extensive theoretical basis outlining theories and determinants of capital structure. Moreover, lots of articles on determinants of capital structure are based on the irrelevance theory of Modigliani and Miller which was already constructed in 1958. In short, this irrelevance theory states that if a company's investment policy is given, then in a world of perfect markets (without taxes, transaction costs, bankruptcy costs etc.) the level of debt in a firm's capital structure will not affect the value of a firm (Chen, 2004; Modigliani & Miller, 1958).

After the introduction of this irrelevance theory, determinants and theories on capital structure have been developed. The static trade-off theory was the first of the two main theories on capital structure outlining that a firm will borrow up to the point (target debts-to-assets ratio) where the tax benefit from an extra pound or euro in debt is exactly equal to the cost that comes from the increased probability of financial distress (Hillier et al., 2011; Shyam-Sunder & Myers, 1999). This basic idea of how much debt finance and equity finance for balancing costs and benefits in the form of the static trade-off theory goes back to the hypothesis proposed by Kraus and Litzenberger. In their development of the static trade-off theory Kraus and Litzenberger propose to balance the bankruptcy costs and tax savings to be obtained from debt (Kraus & Litzenberger, 1973). Other researchers complement this definition by stating that - next to considering where the marginal costs and benefits of each additional unit of financing are optimal - also the form of financing will be determined that equates these marginal costs and benefits (Tong & Green, 2005). The second of the two main theories on capital structure is the pecking-order theory developed by Myers (1984) and this theory outlines that, due to adverse selection (i.e. hidden knowledge), firms prefer internal to external finance. When outside funds are needed, firms prefer the use of debt before equity, because there is lower information costs associated with debt and equity is therefore little used (Myers, 1984). Therefore, the pecking-order theory is based on the argument that asymmetric information creates a hierarchy of costs in the use of external financing (Tong & Green, 2005). Another theory on capital structure - agency theory - is being used in literature also, however evidence has been found that agency problems do not have large implications on capital structure choice (Brounen, De Jong, & Koedijk, 2006).

The focus of this paper will therefore be on both the static trade-off theory and the pecking-order theory. These theories will be further investigated by studying common determinants of capital structure by making use of data from Dutch listed firms. Recent literature on Dutch firms focused on both private and listed firms and emphasized that listed firms are more inclined to signal their prospects to financial markets by means of increased debt levels (Brounen et al., 2006). Moreover, rational investors are likely to infer a higher firm value from a higher debt level. This phenomenon of perception by investors is also known as 'signalling' (Hillier et al., 2011). Concerning the support for the static trade-off theory and the pecking-order theory in Dutch firms, it can be said that the pecking-order theory is assumed to prevail. The static trade-off theory faces moderate confirmation though. Further, financial flexibility was observed in Dutch firms to be important, however this is not driven by the pecking-order theory (Brounen et al., 2006). A different research conducted on capital structure of Dutch firms complements the view that the pecking-order theory is

predominant by explaining that this theory plays an important role in the financing choice of Dutch firms (Chen, Lensink, & Sterken, 1999). Other researchers provide evidence for the presence of the static trade-off theory in the Netherlands. Also for the Dutch case, factors based on corporate governance restrictions and agency costs are found to be relatively unimportant (Chen, Lensink, & Sterken, 1999).

Research conducted on capital structure of Dutch firms is very limited at the moment and conclusions made on Dutch firms are based on relatively old data. This provides therefore an opportunity for renewing the debate on capital structure of Dutch firms and whether the static trade-off or the pecking-order theory explains firms' capital structure decisions. Further, recent literature on Dutch firms mainly focused on both public and private firms, whereas this paper makes use of data from listed firms only. The research question will therefore be the following:

To what extent can capital structure decisions of Dutch listed firms be attributed to the static trade-off theory or the pecking-order theory?

This research question will be further investigated by making use of a sample of Dutch listed firms. The period where data will be used from starts in 2008 and lasts till 2011. The data source that will be used for this research comes from the database ORBIS. Out of this data statistical tests will be performed by means of an ordinary least square regression (OLS-regression) which is used by many researchers conducting research on capital structure also.

Concerning the scientific relevance of this paper, this paper attempts to add to the existing literature on capital structure. This will be done by conducting a detailed literature review on the determinants of capital structure that explain the static trade-off theory and the pecking-order theory. Further, literature on capital structure of Dutch listed firms is relatively limited and therefore this paper attempts to provide more insight in capital structure decisions made by means of assumptions from both the static trade-off theory and the pecking-order theory.

In terms of the practical relevance, it is generally recognized that capital structure decisions might have important implications for the value of the firm and its cost of capital. Therefore it becomes interesting to see how firms go about their capital structure decisions.

This paper will proceed with a literature review on the static trade-off theory and the pecking-order theory. The determinants of capital structure that will be used for investigating these theories will be discussed herein also. After the literature review, the methodology will be discussed. This paper ends with a results and conclusion section.

2. LITERATURE REVIEW

As mentioned, the static trade-off theory explains that a firm's decision for getting to their optimal capital structure is related to the trade-off between the tax advantage of debt and several leverage-related costs (Bradley, Jarrell, & Kim, 1984; Hillier et al., 2011). Financial distress forms an integral part of these leverage-related costs. The assumption from the static trade-off theory herein is that firms with a greater risk of experiencing financial distress tend to borrow less than firms having lower financial distress risk. Further, financial distress costs are not the same for each firm, since these costs depend primarily on a firm's assets. These financial distress costs will be determined by how easily ownership of the firm's assets can be transferred. Also, the static trade-off theory assumes that next to costs, benefits from debt can be obtained. Advantages of using debt

are that the problem of having free cash flow is reduced and also interest payments might be deductible from tax (López-Gracia & Sogorb-Mira, 2008). Therefore a tax benefit from debt can be obtained. Moreover, the higher the tax rate, the greater the incentive to borrow (Hillier et al., 2011; Shyam-Sunder & Myers, 1999). This static trade-off theory has dominated thinking about capital structure for a long time, however it has some shortcomings. Perhaps the main shortcoming is that many large, financially sophisticated and highly profitable firms make little use of debt in their financing. This is in contrast with the static-trade-off theory which assumes that these firms use relatively most debt. The thinking behind it from the static trade-off theory is that these firms face little risk of going bankrupt and there are high tax advantages from the tax shield to be obtained (Bowen, Daley, & Huber, 1982). The possible presence of the static trade-off theory in capital structure decisions of Dutch listed firms will be further investigated by making use of often used firm specific determinants and these will be linked to a measure of leverage: debt-to-capital ratio. For analysing the possible presence of the static trade-off theory the determinants 'Non-debt tax shields' and 'Business risk' will be used. For the determinant 'Non-debt tax shield' literature on the static trade-off theory assumes a negative relationship with debt. The reasoning behind the negative relationship between the non-debt tax shield and debt-to-capital ratio is that tax deductions on for example depreciation and tax credits are assumed to be substitutes for the tax benefits to be gained from debt financing (Titman & Wessels, 1988). Therefore, firms having large non-debt tax shields compared to their expected cash flows make less use of debt in their capital structure. Especially the determinant non-debt tax shield is assumed to play a big role in capital structure decisions made by Dutch firms. This holds for both short-term and long-term leverage (Chen & Jiang, 2001). The other determinant specifically focussing on the static trade-off theory that will be researched is 'Business risk'. This determinant is also known as cost of financial distress. As mentioned, firms experiencing a greater risk of financial distress tend to borrow less than firms with a lower risk of financial distress. The static trade-off theory implies that firms should balance tax advantages to be gained from debt with the costs of financial distress (earnings volatility, bankruptcy costs) (Hillier et al., 2011).

Due to the static trade-off theory's shortcoming Myers (1984) decided to develop a renewed pecking-order theory that is designed 'as a one-on-one competitor' of the trade-off theory. This pecking-order theory is assumed to explain much more of the time-series variance in actual debt ratio's as compared to a target adjustment model being used in the static trade-off theory. Further, researchers attempted to describe this pecking-order theory and the role that information asymmetry plays in firm's financing and investment decisions. Out of these attempts, two main results have been found (Shyam-Sunder & Myers, 1999). First, in his paper on the pecking-order theory, Myers (1984) suggests that firms tend to use internal finance above external finance. When firms still need external finance, the 'safest security' is issued first. According to Myers (1984), debt is – after internal finance – a safer security as compared to equity, since future values change less when manager's inside information is revealed to the market (Myers, 1984). Thus, 'safe' in this context of financing decisions means not affected by revelation of managers' inside information (Shyam-Sunder & Myers, 1999). The pecking-order theory states that when there is still financing needed after debt, possibly hybrid structures such as convertible bonds follow and equity will be used as a last resort (De Jong, Kabir, & Nguyen, 2008). Second, another important result flowing from the pecking-order theory

is the so-called 'financial slack'. This financial slack is also called reserve borrowing power or liquid assets and is considered to be valuable (Myers, 1984). The role of financial distress costs is important herein, since a firm probably considers issuing equity to finance real investments or pay down debt when financial distress is high. This issue may be forgone if manager's information is sufficiently favourable and the issue price is too low. Resulting from this might be that the debt ratio might remain high or real investments will be restricted (Shyam-Sunder & Myers, 1999).

For investigating the presence of the pecking-order theory in the Netherlands, this paper will make use of firm specific determinants. This paper will analyse the relationship between leverage and the firm-specific determinant 'Liquidity' which is assumed to give explanations on the presence of pecking-order behaviour (De Jong et al., 2008). Concerning the relationship between liquidity and debt, the pecking-order theory assumes that there exists a negative relationship because firms with high liquidity tend to borrow less. The thinking behind this negative relationship from the pecking-order theory is that more liquid firms are in possession of more internal funds. The pecking-order theory assumes that these internal funds are used first when financing is needed (Deesomsak, Paudyal, & Pescetto, 2004).

Literature also discusses some firm-specific determinants where both the static trade-off theory and the pecking-order describe assumptions on the relationship between a determinant and leverage. These determinants are 'Profitability, Firm size and Asset tangibility.' It becomes especially worthwhile to investigate the firm-specific determinants Profitability and Firm size, since different outcomes are expected when comparing the static trade-off theory and the pecking-order theory with one and another.

Again, for 'Profitability' a contradiction can be found in the relationship between this determinant and the leverage of a firm. Moreover, the static trade-off theory assumes a positive relationship between profitability and leverage whereas the pecking-order theory states that there is a negative relationship present (Chen, 2004). The positive relationship according to the static trade-off theory can be attributed to 'signalling'. Rational investors are likely to infer a higher firm value from a high debt level. Moreover, by using debt managers want to signal firm prospects to not well-informed outside investors. These investors believe these signals since it is very costly for weak firms to signal in the same way (Chen, 2004). Further, a more successful firm will probably take on more debt because the firm can reduce the taxes from its higher earnings due to the extra interest (Deesomsak et al., 2004; Hillier et al., 2011). The pecking-order theory assumes that there exists a negative relationship between profitability and leverage because when firms are more profitable, it has more internal funds in possession. These extra retained earnings will be used first as investment funds after which will be moved on to bonds and new equity when necessary (Huang & Song, 2006).

For the firm-specific determinant 'Firm size' a contradiction can be found in literature. Moreover, the static trade-off theory outlines that there exist a positive relationship between firm size and the debt-to-capital ratio whereas a negative relationship is assumed in the pecking-order theory. The static trade-off theory assumes a positive relationship since larger firms might be able to reduce the transaction costs associated with long-term debt issuance. This is the case because public corporate debt might be traded in large blocks relative to the size of an equity trade. Further, larger firms may also be better able to attract a debt analyst to provide information to the public about the issue

(Wald, 1999). In addition, large firms have lower agency costs of debt, relatively lower costs of monitoring, easier access to credit market and require more debt for being able to benefit fully from the tax shield (Deesomsak et al., 2004). In contrast, the pecking-order theory assumes a negative relationship between firm size and leverage. According to Chen (2004), information asymmetries between firm's insiders and capital markets are expected to be lower for large firms as compared to smaller firms. Therefore, large firms are assumed to be more capable of issuing informational sensitive securities like equity at the expense of debt (Chen, 2004). Other researchers complement this negative relationship by stating that small firms have to pay much more as compared to large firms when issuing new equity. Small firms therefore tend to be more leveraged (Titman & Wessels, 1988).

Concerning 'Asset tangibility', both the static trade-off theory and the pecking-order theory assume that there exist a positive relationship between asset tangibility and leverage. When firms are in possession of relative high tangible assets than the lender's risk of suffering agency costs can be diminished, since these assets can be used as collateral (Huang & Song, 2006). When looking more closely to the static trade-off theory and its relation to asset tangibility and debt issuing, it can be said that the result is consistent in terms of financial distress and bankruptcy costs. The pecking-order theory explains this positive relationship in terms of asset mispricing (Chen, 2004). Moreover, when asset tangibility increases the liquidation value of the firm does this also resulting in a decrease of the probability of mispricing in the event of bankruptcy. Firms that are unable to provide collateral will have to pay higher interest or might be forced to issue equity at the expense of debt (Deesomsak et al., 2004).

After having discussed the components that form the static trade-off theory and the pecking-order theory, it becomes worthwhile pinpointing some differences between the two theories. These differences stem from target capital structures and financial slack. Again, the static trade-off theory assumes that firms strive at obtaining the optimal capital structure by balancing tax advantages and financial distress costs. Under the pecking-order theory however there is no target or optimal debt-equity ratio, since a firm's capital structure is determined by the need for external financing (Hillier et al., 2011; Shyam-Sunder & Myers, 1999). Lastly, the pecking-order theory assumes that companies want financial slack (i.e. liquid assets or reserve borrowing power). This means that companies want to keep generated cash internally to give management the ability to finance its projects and to move quickly when necessary (Hillier et al., 2011; Myers, 1984).

Taking a closer look at Dutch firms, contradictions in literature can be observed in some aspects on whether the static-trade off theory or the pecking-order theory prevails in the capital structure decisions of Dutch firms. Empirical research conducted before the twenty-first century suggests that the pecking-order theory can be moderately confirmed in the Netherlands. In a study on the microeconomic motives behind macroeconomic liquidity behaviour in a Dutch sector, it was found that 54% of Dutch firms prefer internal funds whereas 18% of the studied firms prefer debt when financing is needed (de Haan, Koedijk, & de Vrijer, 1994). The main reason why Dutch firms are assumed to prefer internal funds stem from credit rationing and also from the cost of external finance. This credit rationing and increased cost of external finance are assumed to be the result of asymmetric information (Chen, Lensink, & Sterken, 1999). Other researchers complement the view on the presence of pecking-order behaviour in Dutch

firms, however the assumption herein is that the pecking-order theory is not being driven by information differences (Brounen et al., 2006). As mentioned, the static trade-off theory is assumed to face moderate confirmation in the Netherlands by means of the presence of target-to-debt ratios but also specifically by tax effects and bankruptcy costs. Moreover, Dutch firms actively choose a certain level of leverage (de Haan et al., 1994)

Again, there is little research being conducted on the determinants of capital structure in the Netherlands. However the research that is present currently stresses the importance of macro-economic factors that play a role in capital structure decisions being made by Dutch firms. Although this paper will not investigate these macro-economic factors in depth, it becomes worthwhile mentioning the factors. Moreover, since this paper focuses on the Netherlands specifically it becomes interesting to mention external factors that affect the capital structure decisions being made by Dutch firms. However due to the time-span of this research, the focus will lie on the mentioned firm-specific determinants of capital structure.

A factor that is assumed to have an effect on capital structure in the Netherlands is the relative importance of the private market. In their research, Chen et al., (2004) stress the importance of financial intermediaries as credit providers. In the Netherlands, loans primarily come from the private market instead of the public market. This finding was observed also in many other countries and therefore not that surprising. Furthermore, the banking sector is in the Netherlands the most important credit provider and, thus, financial intermediary. The share of bank loans in total loans is however relatively low in the Netherlands as compared to many other countries. To continue the story on banks, in the Netherlands the banking system is highly concentrated as compared to other countries (Chen, Lensink, & Sterken, 1999).

3. METHODOLOGY

In the following sections the methodology will be discussed. Firstly, the research question will be outlined after which the sample will be described. The section will proceed with hypothesis. Lastly, variables and method of analysis will be discussed. As mentioned in the introduction, the research question will be as follows:

To what extent can capital structure decisions of Dutch listed firms be attributed to the static trade-off theory or the pecking-order theory?

This paper attempts to analyse the research question by making use of data extracted from 107 Dutch listed firms. This research limits itself to the period of 2008 till 2011. The data sources that will be used for this research come from ORBIS.

As mentioned in the introduction, due to the fact that a confirmation of the pecking-order theory was observed in Dutch firms, this theory is hypothesized to prevail over the static trade-off theory when both theories show conflicting effects of a particular determinant on debt. Next, the hypothesis on the firm-specific determinants will be outlined split out into the static trade-off theory and the pecking-order theory.

Determinants static trade-off theory

H1: Non-debt tax shield will have a negative effect on the debt-to-capital ratio

H2: Business Risk will have a negative effect on the debt-to-capital ratio

H3: Profitability will have a positive effect on the debt-to-capital ratio

H4: Firm size will have a positive effect on the debt-to-capital ratio

H5: Asset tangibility will have a positive effect on the debt-to-capital ratio

Determinants pecking-order theory

H6: Liquidity will have a negative effect on the debt-to-capital ratio

H7: Profitability will have a positive effect on the debt-to-capital ratio

H8: Firm size will have a negative effect on the debt-to-capital ratio

H9: Asset tangibility will have a positive effect on the debt-to-capital ratio

The mentioned firm-specific determinants will be further investigated by analysing what the effect will be on the leverage of the firm using the dependent variable debt-to-capital ratio. This dependent variable is calculated as follows:

$$\frac{\text{Total debt}}{\text{Total debt} + \text{shareholder equity}}$$

This paper will adopt the measurement from other researchers, since attempts have been made already for investigating the presence of the static trade-off theory or the pecking-order theory in certain geographical regions. As mentioned, for investigating the static trade-off theory primarily the determinants Non-debt tax shield and Business risk will be used. The determinant non-debt tax shield is calculated as follows: $\frac{\text{Depreciation}}{\text{Total assets}}$ The static trade-off theory assumes a negative outcome when linking it to the dependent variable. Moreover, firms having large non-debt tax shields compared to their expected cash flows make less use of debt in their capital structure. The other determinant that will be used is the determinant Business risk. The static trade-off theory implies that firms should balance tax advantages to be gained from debt with the costs of financial distress (earnings volatility, bankruptcy costs), therefore a negative effect on the dependent variable is assumed. The determinant business risk will be calculated by measuring the annual percentage change in Earnings Before Interest and Taxes (EBIT).

The firm-specific determinant that will be used specifically investigating the pecking-order theory is liquidity. For the determinant liquidity a negative relationship is expected from the pecking-order theory. Moreover, liquid firms are in possession of more internal funds that will be used first in their financing and investment decisions. The determinant liquidity will be measured by making use of the current ratio, which is composed out of current assets and liabilities: $\frac{\text{Current assets}}{\text{Current liabilities}}$. Afterwards the effect of this current ratio on the debt-to-capital ratio will be investigated.

Further, 3 firm-specific determinants will be used where both the static trade-off theory and the pecking-order theory assume a relationship with debt. The firm-specific determinants that will be used are 'Profitability, Firm size and Asset tangibility'. For the determinant Profitability a positive relationship with the debt-to-capital ratio is expected from the static trade-off theory. The positive relationship according to the static trade-off theory can be attributed to 'signalling'. Rational investors are likely to infer a higher firm value from a high debt level. Moreover, by using debt managers want to signal firm prospects to not well-

informed outside investors. However the pecking-order theory expects a negative relationship with the debt-to-capital ratio. Moreover, more profitable firms are in possession of more internal funds and therefore less inclined to make use of debt in their financing and investment decisions. The variable Profitability will be measured as follows: $\frac{\text{EBIT} - \text{depreciation}}{\text{Total assets}}$.

Concerning the determinant Firm size, the static trade-off theory assumes a positive relationship with firm's debt-to-capital ratio. The static trade-off theory assumes a positive relationship since for example relatively large firms might be able to reduce the transaction costs associated with long-term debt issuance. Further the pecking-order theory assumes a negative effect on the debt-to-capital ratio since small firms have to pay much more as compared to large firms when issuing new equity. Small firms therefore tend to be more leveraged. The determinant will be analysed by analysing the natural logarithm of sales and relate it to the effect that it has on the debt-to-capital ratio.

Lastly, the variable Asset tangibility will be researched. A positive outcome is expected from the static trade-off theory when linking it to the debt-to-capital ratio due to collateral. Because when firms are in possession of relative high tangible assets than the lender's risk of suffering agency costs can be diminished, since these assets can be used as collateral. The pecking-order theory also assumes a positive relationship with the debt-to-capital ratio. The pecking-order theory assumes a positive relationship due to asset mispricing. The variable Asset tangibility will be measured as follows: $\frac{\text{Total fixed assets}}{\text{Total assets}}$.

Next, a statistical test will be performed incorporating the firm-specific determinants and its effect on leverage of the firm. First, a Univariate analysis will be presented after which will be continued with a Bivariate analysis outlining the correlation between the firm-specific determinants being used and the debt-to-capital ratio. Lastly, an Ordinary Least Square Regression (OLS-regression) will be performed to analyse whether the static trade-off theory or the pecking-order theory prevails in Dutch listed firms. This paper makes use of 2 separate regressions and 1 pooled regression. The first separate regression focuses solely on the effect of the static trade-off theory on leverage whereas the second separate regression is focused on the pecking-order theory's effect on leverage. The pooled regression combines all firm-specific determinants being used in this paper as variables in explaining the effects of the researched theories on leverage. The outcomes of whether a positive or negative relationship between a determinant and the debt-to-capital ratio will be linked to the assumptions made on the static trade-off theory and pecking-order theory in the literature review. Lastly, conclusions will be drawn on whether the static trade-off theory or the pecking-order theory prevails in Dutch listed firms.

4. RESULTS

Firstly, summary statistics of the major variables will be presented. The sample consists out of 107 different Dutch listed firms. These firms are industrial firms and had a listing during the period of 2008-2011. Dutch listed firms have been chosen since research conducted on Dutch firms in general is relatively little researched (1) and it is at the moment not completely clear whether the static trade-off theory or the pecking-order theory explains the capital structure decisions of Dutch firms (2). The firm specific determinants' (Non debt tax shield, Business Risk, Liquidity Profitability, Firm size and Asset tangibility) annual data are from 2008 till 2010. These firm specific determinants are separately investigated first for both the static trade-off

theory and the pecking-order theory. Secondly, a pooled regression with all firm-specific determinants being used in this paper will be performed and linked to debt-to-capital ratio. For the dependent variable debt-to-capital ratio annual data is retrieved from 2011. The reason why the independent variables are lagged one period behind the dependent variables is done in order to isolate the analysis from potential reverse causality between independent and dependent variables. Noteworthy to mention is that on average many independent variables have increased in their value during the period 2008-2010. Especially Earnings Before Interest and Taxes (EBIT) per firm has increased a lot throughout the period 2008-2010, however this may also be attributed to the effects of the financial crisis.

When comparing the means and medians of the firm-specific determinants used in this paper with other research on Dutch firms, it can be said that especially the determinants 'Firm Size and Asset tangibility' are comparable with this paper. Comparisons among the data outcomes are made between this paper and the papers of Chen et al. (1999) and de Jong et al. (2008). Although comparisons can be made, it should be mentioned that in this paper sometimes different components of variables are being used leading to different outcomes in terms of values. Looking at the other firm-specific determinants, it can be observed for the firm-specific determinant *non-debt tax shield* that no comparison can be made in terms of calculations since other types of analysis by authors have been used when looking at this firm-specific determinant specifically. Although, research on Dutch firms suggest that tax considerations play a big role in capital structure decisions being made, no specific analysis on the non-debt tax shield has been conducted so far. For the firm-specific determinant *Business risk* a negative mean has been found in this paper (-0,337). Other research conducted on Dutch firms found a positive mean though. The reason for the difference in means can be attributed to the financial situation during the sample periods. Moreover, (Chen, Lensink, & Sterken, 1999) made use of data from the period between 1983-1995 and (De Jong et al., 2008) from 1997-2001. For the determinant *Liquidity* only a comparison can be made with a paper from (De Jong et al., 2008), since the effect of liquidity on capital structure has been observed in their paper also. Again, a higher positive ratio has been found by the other researchers, which might be attributed to the favourable financial situation in the past. For the determinant *Profitability* a negative mean has been found in this paper, although it is close to a positive number. The median for profitability is however positive, which is comparable to other papers on Dutch firms. As mentioned, for the determinant *Firm size* comparable means and medians have been found. Lastly, for the firm-specific determinant *Asset tangibility* a comparable mean and median has been found when comparing the value with other papers on Dutch firms.

Table 1: Univariate analysis on independent and dependent variables

	Mean	Median	Standard Deviation	Minimum	Maximum
D-to-C ratio	0,556	0,561	0,197	0,096	1,048
NDTS	0,590	0,042	0,055	0,000	0,320
RISK	-0,337	0,026	2,394	-16,100	9,927
LIQU	1,585	1,363	1,179	0,103	8,970
PROF	-0,029	0,013	0,174	-0,908	0,306
SIZE	12,931	12,77	2,242	7,850	18,196
TANG	0,554	0,557	0,202	0,019	0,993

Debt to capital ratio is measured as debt divided by debt and shareholders' equity. NDTS (non-debt tax shield) is a ratio of depreciation to total assets. PROF (profitability) is measured as ((EBIT-depreciation)/total assets). TANG (tangibility) is the ratio of total fixed assets to total assets) LIQU (liquidity) is the current ratio of firms meaning the ratio of current assets to current liabilities). RISK (business risk) is the absolute difference between annual percentage change in EBIT and the average of this change. SIZE (firm size) is the natural logarithm of total assets. Next to mean and standard deviation, the minimum and maximum of each firm-specific determinant is presented in the table.

Further, an investigation will be made to observe whether there exists a correlation between the firm-specific determinants with the debt-to-capital ratio. These correlation coefficients are outlined in table 2. As can be observed from the coefficients, it seems that there exists low correlation between the various firm-specific determinants and the debt-to-capital ratio of firms. Especially the low correlation coefficient for non-debt tax shield with debt-to-capital ratio is surprising, since literature on Dutch firms suggested that the non-debt tax shield, next to financial flexibility, plays a big role in the capital structure in the capital structure decisions of Dutch firms. For the determinants 'Liquidity' and 'Firm size' a weak correlation with debt-to-capital ratio has been observed. The negative correlation coefficient between liquidity and debt-to-capital ratio is in line with the pecking-order theory, since more liquid firms are assumed to make relatively little use of debt due to the higher availability of internal funds. The positive correlation coefficient between firm size and debt-to-capital ratio is however in line with the static-trade off theory. Moreover, relatively large firms have been shown to be in possession of lower bankruptcy costs and risks. Further, larger firms are often able to reduce the transaction costs associated with debt.

Table 2: Bivariate analysis: Pearson correlation

	D-to-C ratio	NDTS	RISK	LIQU	PROF	SIZE	TANG
D-to-C ratio	1,000						
NDTS	-0,180	1,000					
RISK	-0,132	-0,073	1,000				
LIQU	-0,396	0,020	0,122	1,000			
PROF	0,060	-0,812	0,058	0,057	1,000		
SIZE	0,436	-0,248	0,040	-0,241	0,285	1,000	
TANG	-0,021	0,162	-0,028	-0,536	-0,160	0,134	1,000

Correlation coefficients of the firm-specific determinants with the debt-to-capital ratio are presented by making use of Pearson correlation. For the definitions of the variables see table 1.

For analysing whether the static trade-off theory or the pecking-order theory prevails in Dutch listed firms, 3 separate regressions will be conducted. Moreover, firstly an investigation will be made solely containing independent variables' influence on leverage that can possibly be explained from the static trade-off theory (*non-debt tax shield* and *business risk; model 1*). Second, a regression will be conducted on an independent variable (*liquidity; model 2*) from which the pecking-order theory assumes a particular relationship with leverage. Within model 1 and 2 also the three firm-specific determinants where both the static trade-off theory and the pecking-order theory have an assumption on are included. Third, a regression containing all 6 firm-specific determinants will be performed (*model 3*). For analysing the prevalence of the static trade-off theory or the pecking-order theory in Dutch listed firms, there will be made use of p and t-values. The results of the two separate regressions and the pooled regression can be found in table 3.

Looking at the firm-specific determinant *non-debt tax shield* it can be observed in both model 1 and model 3 that a significant negative relationship with debt-to-capital ratio is in place. The negative relationship is in line with the static trade-off theory

since tax deductions for depreciation and tax credits are assumed to be substitutes for the tax benefits to be gained from debt financing. The significant relationship between non-debt tax shield and debt-to-capital is not that surprising, since non-debt tax shield is assumed by literature to have a large effect on firm's leverage in Dutch firms. However as mentioned, looking at table 2 it can be observed that there is low correlation between non-debt tax shield and debt-to-capital ratio. For the firm-specific determinant *Business risk* both model 1 and model 3 show an insignificant negative relationship with debt-to-capital ratio. This finding is again in line with the static trade-off theory since firms having relatively severe volatile earnings are assumed to make less use of debt in their financing. As mentioned, the outcomes in both model 1 and model 3 for the firm-specific determinant business risk are insignificant and thus little attribution can be made towards these findings.

Concerning the firm-specific determinant *liquidity* an insignificant negative relationship with debt-to-capital ratio is observed in model 2 whereas a significant negative relationship has been observed in model 3. Because a difference in terms of significance has been observed between model 2 and model 3 it becomes worthwhile to take a closer look at the adjusted R^2 of the two models. When comparing the models, it can be observed that a higher adjusted R^2 for model 3 is in place and therefore more attribution should be given to the significant negative relationship between liquidity and debt-to-capital ratio. The negative relationship found is in line with the pecking-order theory, since more liquid firms tend to use less debt in their financing. Moreover, liquid firms are in possession of relatively more internal funds and the pecking-order theory assumes that these internal funds are used first when financing is needed. Therefore, more liquid firms are relatively little leveraged according to the pecking-order theory.

The firm-specific determinants being used describing assumptions on both theories: *Profitability (PROF)*, *Firm size (SIZE)* and *Asset tangibility (TANG)*, show mixed results on which theory prevails in Dutch listed firms. First, for the firm-specific determinant *Profitability (PROF)* a significant negative relationship with debt-to-capital ratio has been observed. This finding is in line with the pecking-order theory since more profitable firms are assumed to make relatively little use of debt in their financing. Moreover, more profitable firms are in possession of more internal funds and the pecking-order theory assumes that these internal funds are used first when financing is needed. Second, for the determinant *Firm size (SIZE)* an insignificant positive relationship with debt-to-capital ratio has been observed. This finding is in line with the static trade-off theory since this theory assumes that larger firms make relatively more use of debt in their financing. The reasoning herein is that large firms have easier access to credit market and require more debt to benefit fully from the tax shield. Again, since an insignificant relationship has been observed little attribution can be made towards the finding. Although a significant relationship between firm size and debt-to-capital ratio in model 3 has been observed, it cannot be said that a significant relationship is in place. This because model 3 has a lower adjusted R^2 as compared to model 1 and therefore model 1 – suggesting an insignificant relationship between firm size and debt-to-capital ratio - has relatively higher explanatory power as compared to model 3. Third, for the firm-specific determinant *Asset tangibility (TANG)* an insignificant positive relationship with debt-to-capital ratio has been observed. The positive relationship between asset tangibility and debt-to-capital ratio is in line with both the static trade-off theory and the pecking-order theory. Moreover, the static trade-off theory assumes a positive relationship due to financial distress and

bankruptcy costs. The pecking-order theory assumes a positive relationship because of the event of asset mispricing. As mentioned in this section, different outcomes throughout the three models have come across. By making use of the adjusted R^2 it became possible to determine which of the models has the highest explanatory power. It can be said that in all three models a low adjusted R^2 has been found. The low adjusted R^2 is not that surprising, since other researchers conducting research on Dutch firms by means of firm-specific determinants found a low adjusted R^2 also. The adjusted R^2 is used also to compensate for the addition of independent variables in the model and to check whether the independent and dependent variables are linearly related. From the adjusted R^2 observed it can be said that the variables are very little linearly related.

Table 3: Three OLS-regressions on firm-specific determinants' effect on debt-to-capital ratio

Variable (static trade-off theory)	Expected relationship	Unstandardized coefficient	t-value	p-value
(Constant)		0,303	0,501	0,617
NDTS	-	-7,737	-2,763	0,007*
RISK	-	-0,002	-0,079	0,937
PROF	+	-2,824	-3,184	0,002*
SIZE	+	0,051	1,175	0,243
TANG	+	0,093	0,198	0,834
Adj. R^2		0,055		

Variable (pecking-order theory)	Unstandardized coefficient	t-value	p-value	
(Constant)	0,456	0,620	0,537	
LIQU	-	-0,131	-1,360	0,177
PROF	-	-0,889	-1,556	0,123
SIZE	-	0,044	0,977	0,331
TANG	+	-0,362	-0,651	0,571
Adj. R^2	0,012			

Variable (pooled)	Unstandardized coefficient	t-value	p-value	
(Constant)	0,437	3,592	0,001*	
NDTS	- (ST)	-0,924	-1,904	0,060***
RISK	- (ST)	-0,009	-1,343	0,182
LIQU	- (PO)	-0,073	-4,514	0,043**
PROF	+ (ST)	-0,318	-2,054	0,043**
	- (PO)			
SIZE	+ (ST)	0,035	4,646	0,000*
	- (PO)			
TANG	+ (ST)	-0,306	-3,320	0,001*
	- (PO)			
Adj. R^2	0,054			

Unstandardized coefficients, expected relationships from the theories (ST = static trade-off theory and PO = pecking-order theory), t-values adjusted for heteroscedasticity and p-values for analysing the prevalence of the static trade-off theory or the pecking-order theory in Dutch listed firms by using firm-specific determinants. Further, the adjusted R^2 of the 3 models are presented. The numbers of observations for each determinant are 107. Possible presence of multi-collinearity has been observed by analysing the VIF of the determinants. No problems have been observed due to low VIF-values. For the definitions of the variables see table 1.

- * Significant at 1%
- ** Significant at 5%
- *** Significant at 10%

5. CONCLUSION

Capital structure theories have been mostly constructed and analysed in single countries. Research on Dutch firms is relatively limited though and this paper attempted to complement to the existing literature on capital structure. The methods being used in this paper are a literature review and an OLS-regression on Dutch listed firms. This paper aims to describe whether the static trade-off theory or the pecking-order theory explains capital structure decisions being made by Dutch listed firms. These theories have been widely researched and are assumed to be the main theories of capital structure. Literature on capital structure in Dutch firms assumes that the pecking-order theory prevails in capital structure decisions, while there is moderate support for the static trade-off theory. This paper supports overall existing evidence on the prevalence of the pecking-order theory next to the moderate presence of the static trade-off theory. Moreover, 2 out of 6 firm-specific determinants researched significantly support the pecking-order theory whereas only 1 firm-specific determinant significantly supports the static trade-off theory. Among the 6 firm-specific determinants, 2 firm-specific determinants specifically assume a particular outcome from the static trade-off theory: *Non-debt tax shield and Business risk*. In addition, 1 firm-specific determinant is used in this paper for observing the presence of the pecking-order theory in particular: *Liquidity*. For the remaining 3 firm-specific determinants (*Profitability, Firm size and Asset tangibility*) both the static trade-off theory and the pecking-order theory assume a particular outcome:

A result found in this paper is concerned with the *Non-debt tax shield*. Moreover, this paper finds that there exists low correlation between the non-debt tax shield and its effect on a firm's capital structure. This finding is surprising since non-debt tax shield was assumed by other researchers to play a big role in firm's capital structure decisions. However that there exists a significant negative relationship between *Non-debt tax shield* and debt-to-capital ratio shows support for the presence of the static trade-off theory in capital structure decisions made by Dutch listed firms. Next, the firm-specific determinants researched, *Liquidity* and *Profitability*, show support for the existence of the pecking-order theory in capital structure decisions of Dutch listed firms. Since only firm-specific determinants have been investigated and no country-specific factors, careful assumptions must be made on the impact of the firm-specific factors on capital structure decisions being made by Dutch listed firms. Moreover, the correlation coefficients outlined in Table 2 support the remark on careful assumptions to be made on the impact of the firm-specific determinants, since weak correlations among the firm-specific determinants with the dependent variable *debt-to-capital ratio* have been observed.

6. REFERENCES

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