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Pecking Order Theory vs. Trade-Off Theory: How do financing decisions differ with firm size?

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ABSTRACT

This paper examines the capital structure decisions in Norwegian firms. Using a database containing extensive accounting data on Norwegian firms from 2006 to 2015, we test whether or not the pecking order theory and trade-off theory of capital structure can explain financing decisions. To investigate the effect of company size, we divide our sample into three groups: (1) Small non-listed firms, (2) non-listed firms that fulfil the equity requirement to be listed in Norway, and (3) listed firms. We find that smaller and non-listed firms show a greater tendency than listed firms to adjust leverage in accordance with the pecking order theory. For listed firms, we find that the trade-off theory is suitable for explaining financing decisions as they show adjustment towards a target debt-ratio.

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1. INTRODUCTION

An extensive amount of research has been directed towards explaining the way corporations choose to finance their operating assets. Several researchers have tried to determine which factors affect a company's funding decision. This has resulted in two major theories; the trade-off theory and the pecking order theory. The trade-off theory by DeAngelo and Masaulis (1980) suggests that firms will target an optimal capital structure, which is where the advantages and disadvantages of debt converge. By contrast, the pecking order theory suggests that firms have a particular preference order for capital used to finance their businesses (Myers & Majluf, 1984). Due to information asymmetries between the firm and potential investors, the firm will prefer retained earnings over debt, short-term debt over long-term debt and debt over equity.

Nevertheless, the theories of corporate finance are not developed with small businesses in mind (Ang, 1991). According to these theories, the firm is assumed to have access to external capital markets for debt and equity, and the shareholders enjoy a limited liability position and hold diversified portfolios (Ang, 1991). These assumptions do not necessarily hold for small or non-listed companies.

The purpose of this paper is to investigate how financing decisions, more specifically capital structure, is affected by company size. We want to examine how managers of large firms differ in their financing decisions as opposed to managers of small firms in Norway. This research problem has not yet been extensively analyzed on small non-listed firms as the information is limited. Due to the access of high-quality data on Norwegian private firms obtained from the Center for Governance Research (CCGR) database, we are able to explore this area further. In total, we have investigated more than 60,000 private and listed Norwegian firms from 2006 to 2015. Following the method of Shyam-Sunder and Myers (1999), who studied 157 publicly traded American firms from 1971 to 1989, this paper aims at testing if the pecking order- and the trade-off theory can be used to explain capital structure decisions of Norwegian firms.

As mentioned, previous research mainly focuses on publicly traded firms. However, these firms represent only a fraction of the total numbers of companies. For instance, in the US there are more than 48 million private firms (Census, 2018) and less than 5,000 publicly traded firms. In 2017, the statistics for Norway showed 576,859 private firms (Statistisk Sentralbyrå, 2018) and only 208 listed firms in total (Oslo Børs, 2018). Therefore, it is interesting to gain more knowledge about the financing decisions of these private firms, and to see whether previous research on larger listed firms applies to this group or not.

1.1 Research question and objective of the thesis

In this paper we want to investigate how managers of large firms differ in their financing decisions as opposed to managers of small firms in Norway. We want to address this problem on basis of the the pecking order and the trade-off theory. In particular, our research question is:

Pecking Order Theory vs. Trade-Off Theory: How do financing decisions differ with firm size?

Firm size is assumed to influence the choice of capital structure. Literature suggests that the pecking order theory should explain more of a small firm's behavior than the trade-off theory. That is because the the pecking order suggests that the cost of asymmetric information drives financing behavior. For small businesses, asymmetry of information and agency problems between management and outside investors are more critical than for large firms, making differences in costs between internal equity, debt, and external equity consequently greater. Therefore, theoretically, the pecking-order approach should have an even greater appeal to small firms compared to large ones. This ought to apply especially for small high-growth firms as they are often thought of as firms with large information asymmetries (Frank & Goyal, 2003). Also, smaller firms might experience fewer benefits of debt due to mainly three reasons. First, because small businesses tend to be less profitable they might not be able to take full advantage of the tax shield provided by debt (McConnell & Pettit, 1984; Pettit & Singer, 1985). Second, smaller firms face a higher risk of bankruptcy as they tend to be less diversified, which again increases the cost of financial distress. And third, compared to large

firms with a high quality of financial reporting which gives increased transparency, small firms experience higher agency costs as they are more "closed". However, various researchers have investigated whether or not they can find support for the use of pecking order for small and medium sized enterprises (SMEs), but it has resulted in mixed conclusions. These varied results may be due to country-, firm- or time specific factors, but there is no widely accepted evidence that the pecking order theory can fully explain the financing decisions of these firms.

1.2 Plan of the paper

The rest of the paper is organized as follows: Section 2 provides a brief overview of the basic theoretical foundations of the pecking order- and the trade-off theory. Section 3 contains a literature review. The regression models are described in section 4. In section 5, methodology and data descriptions are provided. Finally, section 6 reports the empirical results and the robustness of our tests.

2. THEORY

2.1 The Pecking Order Theory

The pecking order theory (Myers & Majluf, 1984) states that a firm chooses capital according to a particular preference order when financing new projects or investments. External financing transactions and especially those associated with the problem of adverse selection create a dynamic environment in which firms have a preference or pecking order of preferred sources of financing. The hierarchy follows the order of using internal funds over external funds, and debt over equity if external funding is needed. If costs of financial distress are ignored, the firm will finance its investments with securities that are least affected by the cost of information and carries the least risk. This implies that there is no optimal capital structure. Instead, the leverage level is decided by the need for external funding after internal resources have been exhausted, given that profitable investment opportunities exist.

The theory is based on the notion of asymmetric information between firm insiders and outsiders. As the management have more information about the real value of

the firm than outside investors, the investors will carefully observe the company's financing decisions to gain knowledge about the firm's prospects. Issuance of debt signals the management's confidence that an investment will be profitable and that the current stock price is undervalued. Contradictory, issuance of equity signals less confidence in the project and possibly an overpriced stock. Therefore, issuance of equity would lead to a decrease in the share price and is the financing source that carries the highest cost of information. The main point is that a firm's financing decisions send essential signals to the investors about the future performance of the firm (Baker & Gerald, 2011).

2.2 The Trade-Off Theory

The trade-off theory by DeAngelo and Masaulis (1980) suggests that the optimal capital structure of a firm is where the advantages and disadvantages of debt converge.

The main advantage of debt is reduced tax costs through the tax shield, based on tax-deductible interest expenses. The value of an indebted company is equal to that of a non-leveraged company plus the present value of the tax benefits of debt (Modigliani & Miller, 1958). However, the existence of costs related to financial distress will restrain the use of debt financing. An optimal debt-equity ratio is a combination that benefits the firm after taking into account the financial distress that arises from marginal debt.

The possibility of bankruptcy has a negative effect on the value of the firm. Direct financial distress costs relate to for example fees to lawyers and accountants. Indirectly, a state of financial distress may lead to an impaired ability to conduct business and agency expenses to reduce conflicts between shareholders and debt holders (Jensen & Meckling, 1976). There are several possible agency conflicts related to financial distress. Firstly, it gives the management incentives to take large risks. Since the shareholders enjoy a limited liability position, they will in a state of financial distress only risk losing the creditor's money in a possible investment. Second and contradictory, financial distress may give incentives for the shareholders to reject investing additional capital in profitable projects as the creditors will claim the profits. Lastly, the risk of bankruptcy may lead the management to liquidate dividends or increase perquisites at the expense of the creditors, although such tactics often violate bond indentures.

However, leverage may also reduce the possible conflict between the shareholders and the management. According to agency theory, shareholders and managers have different interests. Shareholders seek to maximize company value while managers want personal advantages such as high salaries, empire building, and attractive work facilities. As leverage introduces a non-residual claim on the company's cash flow it reduces the amount of cash available for management spending (Jensen & Meckling, 1976).

2.3 Leverage factors and their relation to the Pecking Order- and the Trade-Off Theory

Previous research points to several factors that claim to influence the capital structure of firms. Frank and Goyal (2003) suggest four such factors: asset tangibility, growth opportunities, profitability, and firm size. In this section, we review the predictions that the pecking order- and the trade-off theory make about these factors.

Asset tangibility

It is often argued that tangible assets serve as collateral for lenders. If the debt is secured against existing tangible assets, it becomes less risky and thereby reduces the cost of debt. Accordingly, the trade-off theory suggests that company debt is positively related to the level of tangibility, as higher tangibility reduces the potential cost of distress (Myers, 1977; Myers & Majluf, 1984). However, Harris and Raviv (1991) argue that firms with few tangible assets suffer from greater asymmetric information problems. Under the pecking order, financing decisions are driven by asymmetric information costs implying that firms with few tangible assets will accumulate more debt over time (Frank & Goyal, 2009). Thus, the higher asset tangibility the cheaper is equity financing, making the company less indebted (Harris & Raviv, 1991).

Growth opportunities

The trade-off theory suggests a negative relationship between growth opportunities and debt, since firms with investment opportunities have strong incentives to avoid under-investment and asset substitution inefficiencies due to agency problems (Jensen & Meckling, 1976; Myers, 1977). On the other hand, the pecking order

theory suggests a positive relationship as growth opportunities force the firm to search for external financing, and debt should be the preferred choice.

Profitability

Profitable companies should have more internally generated resources to use as a basis for financing new projects. For that reason, the pecking order expects a negative relationship between leverage and profitability, as internal resources are the preferred funding source (Myers, 1984). However, Frank and Goyal (2003) emphasize that the pecking order might not be the only possible reason for this negative relationship. They argue that current profitability may also serve as a signal of investment opportunities. In addition, firms may face fixed costs of adjustment. Fischer, Heinkel & Zechner (1989) investigate the effect of having recapitalization costs associated with continuously adjusting leverage. They find that even small recapitalization costs can lead to high fluctuations in a firm's debt ratio over time. Thus, the predictions on profitability are ambiguous. Contradictory, the trade-off theory assumes a positive relationship between profitability and leverage. Firstly, profitable companies will prefer debt financing to decrease their taxable profit through the tax shield. Secondly, bankruptcy costs decline as profitability increases. Lastly, leverage reduces the principal-agent problem between stockholders and the management by reducing the excess cash available to the management (Jensen & Meckling, 1976).

Size

Large firms tend to be more diversified, have a better reputation in the debt markets and face lower information costs when borrowing. Therefore, the trade-off theory predicts that large firms are more leveraged (Titman & Wessels, 1988). The pecking order theory predicts the opposite relationship; as large firms are more likely to be followed by analysts, equity is a good alternative to raise external funding (López, 2014).

3. LITERATURE REVIEW

Several papers have investigated the explanatory power of the the pecking order- and the trade-off theory in a firm's financing decisions. In this section, we revise some influential previous studies.

Fama and French (2005) show criticism towards both the pecking order- and the trade-off theory. They find that pecking order cannot explain how often and under what circumstances firms issue and repurchase equity. They point out that there may be ways to issue equity that avoids the transaction costs and asymmetric information problems purposed by the pecking order theory, which breaks down the model. Regarding the trade-off theory, it has been observed by several studies that there is a negative relationship between firms debt ratios and their profitability (e.g., Titman & Wessels, 1988; Rajan & Zingales, 1994). Fama and French (2005) claim that this relation imposes doubt about the trade-off theory's credibility to explain financing behavior, as this is a severe contradiction of the model's predictions about the tax and agency benefits of debt. Further, they refer to research suggesting that firms show a slow reversion towards leverage targets, which questions the existence of targets (Sunder & Myers, 1999).

Shyam-Sunder and Myers (1999) found evidence for the use of the pecking order theory in financing decisions for US-listed firms from 1971 to 1989. However, they doubt the suitability of pecking order for growth companies who invest heavily in intangible assets. Frank and Goyal (2003) discuss and partly reproduce Shyam-Sunder and Myers tests from 1999. They express skepticism as to whether the strong support for the pecking order prediction can be applied to a broader population of firms, referring to the use of a relatively small sample of only 157 firms. Further, the sample was restricted to firms who were reporting continuously throughout the period 1971 to 1989. Frank and Goyal argue that this specification influenced the results, as the firms reporting continuously were larger than the broader population and issuing significantly higher amounts of debt and lower amounts of equity. They find that the support for the pecking order hypothesis sharply declines when a broader population of US firms are included in the sample.

Frank and Goyal challenge the explanatory power of the financing deficit suggested by the pecking order regression against the four leverage factors; asset tangibility, growth opportunities, firm size, and profitability. Their results suggest low explanatory power for the financing deficit not in favor of the pecking order theory. In conclusion, the greatest support for the pecking order are found among large firms before the year 1980, which contradicts the main point of the theory as smaller firms are assumed to have a greater issue with information asymmetry. Across all firms, the support for the pecking order theory declines over time as the use of equity increases.

Frank and Goyal (2009) identifies six core factors that have the most importance in determining a firm's capital structure. Five of these six factors support the use of the trade-off theory in financing decisions. They find that more profitable firms tend to have lower leverage which supports the pecking order theory, although the importance of profitability as a determinant of capital structure is declining over the observed years. Contradictory, factors such as industry leverage, firm size, tangibility, and market-to-book ratios support the trade-off theory (Frank & Goyal, 2009).

Sogorb-Mira and José López-Gracia (2003) investigated determinants of capital structure decisions using panel data on 32,410 Spanish SMEs from 1994 to 1998. The results supported that both of the theoretical approaches influenced the firms' decisions. Regarding the trade-off theory, their results indicated that a firm adjusts its leverage level to reach an optimal level over the long-term. Further, they found that the effective tax rate was positively related to the debt level and that the non-debt tax shield was negatively related to the debt level. The findings indicate that small Spanish firms do not adjust their level of debt to their financial deficits, which does not support the pecking order theory (Sogorb-Mira & López-Gracia, 2003). Nevertheless, they did find that the level of debt was negatively related to the size of the generated cash flows, that company age was negatively related to the debt level, and that firms with strong growth prospects have higher debt ratios.

Bhaird and Lucey (2010) examined the capital structure in Irish SMEs. They found a positive relationship between the use of retained earnings and the age and size of the firm. This indicates that surviving firms are increasingly dependent on internal

resources as accumulated profits are reinvested. Their findings suggest a tendency towards using capital that avoid the interfering of outsiders in the decision process of the firm (Bhaird & Lucey, 2010).

As we have seen in this section, there is no clear evidence that the pecking order- and the trade-off theory can fully explain financing decisions for companies. However, the research problem has not yet been extensively tested on Norwegian firms. Therefore, we intend to fill this gap by testing both theories on private and listed firms in Norway.

4. REGRESSION MODELS

Shyam-Sunder and Myers (1999) present two simple models to assess to what extent a firm's financing behavior can be explained by the pecking order- or the trade-off theory. Also, we present a third model which includes conventional leverage factors following Frank and Goyal (2003). All variables are defined in the Data Appendix.

4.1 The Pecking Order Model

The pecking order assumes no target level of debt, rather the capital structure is a product of the firm choosing capital according to the preference order; (1) internally generated funds, (2) debt, and (3) equity. The model suggested by Shyam-Sunder and Myers (1999) states that when a firm's internal cash flows are inadequate for its real investments and dividend commitments, the firm issue debt.

To test this, we examine financing decisions made after short-term changes in profits and investments, by using the theoretical relationship between changes in the level of debt and a firm's need for funds. The theory states that the level of debt issued or retired from the company should be adjusted according to the firm's financial needs when taking all variables that form the earlier financing deficit as exogenous. By doing so, the level of debt increases or decreases depending on whether or not the requirements of the investments can be covered by the internal cash flow.

We test the pecking order hypothesis with the following model:

$$\Delta Debt = D_{i.t} - D_{i.t-1} = a + b_{POT} Def_{i.t} + e_{i.t}$$

Where D is the long-term debt to assets and $Def_{i.t}$ is the funds flow deficit . Equity issues and repurchases are not included in the financial deficit as the theory predicts that a firm will only issue or retire equity as a last resort. The pecking order hypothesis is that the financing deficit is completely covered by debt. That is, a = 0 and b_{POT} = 1. The financial deficit is being calculated as:

$$Def_{i.t} = Div_{i.t} + I_{i.t} + \Delta WC_{i.t} - CF_{i.t}$$

Where $Div_{i.t}$ is the cash dividends calculated as the change in dividends payable plus the dividend expense, $I_{i.t}$ is the capital expenditures calculated as the change in fixed assets minus depreciation, $\Delta WC_{i.t}$ is the working capital calculated as current assets minus current liabilities and $CF_{i.t}$ is the cash flow.

As described by Shyam-Sunder and Myers (1999), the sign of the deficit is irrelevant in the simple pecking order model. If a company has a surplus (the deficit being negative), and the only imperfection is information asymmetry, all managers will end up paying down debt. If there are tax or other costs of holding excess funds or paying them out as cash dividends, the managers will have a motive to repurchase shares or pay down own debt. Managers who are less optimistic than investors will pay down debt, instead of repurchasing shares at a too high price. More optimistic managers will try to repurchase own shares but will force stock prices up. As the price increases the number of optimistic managers decreases, which in turn leads to even higher stock prices. As a result, if information asymmetry is the only imperfection, the repurchase price is so high that all managers end up paying down own debt (Shyam-Sunder & Myers,1999).

4.2 The Trade-Off Model

The static trade-off theory predicts that firms aim to keep a constant target debt ratio. When firms experience a deviation from the target, they respond by increasing or decreasing their capital to reach the optimum. We test the trade-off theory with the following model:

$$\Delta Debt = D_{i.t} - D_{i.t-1} = a + b_{TOT}\ (D*_{i.t-}\ D_{i.t-1}) + e_{i.t}$$

Where D is the amount of debt issued or retired and $D*_{i.t}$ is the target debt level at time t.

We test the hypothesis that $b_{TOT} = 1$, which implies that the debt level equals the target level ($D_{i.t}=D*_{i.t}$). However, it is likely that transaction costs will occur when adjusting towards the target. Therefore, it is reasonable to assume that firms will allow a certain deviation from the target level before adjusting. A b_{TOT} between zero and one indicates an adjustment towards the target while b_{TOT} above one implies an over-adjustment.

As the target debt level is unobservable for companies, $D*$ has been derived by taking the average of the historical mean debt ratio for each firm and the historical industry mean. Following Shyam-Sunder and Myers (1999) we also test using the historical mean of the debt ratio for each firm, not including the industry average.

4.3 Pecking Order Model with leverage factors

When trying to explain the level of a firm's leverage, a common approach is to test the relative importance of the factors which empirically is said to influence a firm's financing decisions.

Following Frank and Goyal (2003), we have run a regression model with the leverage factors in first differences. First differences may bias the leverage factors towards zero. However, this approach makes it appropriate to nest the financing deficit variable into the equation, to see the explanatory importance of this variable. The model contains four leverage factors which should affect the level of leverage according to the pecking order theory. Further, the financing deficit is an added

factor. We test the pecking order model with leverage factors by the following model:

$$\Delta Debt = \text{a} + b_{Prof}\Delta Prof_{i.t} + b_{Tan}\Delta Tan_{i.t} + b_{G.O}\Delta G.O_{i.t} + b_{Size}\Delta Size_{i.t} + b_{Def}Def_{i.t} + e_{i.t}$$

Where $Prof_{i.t}$ is profitability, $Tan_{i.t}$ is asset tangibility, $G.O_{i.t}$ is the growth opportunities and $Size_{i.t}$ is firm size.

5. DATA

5.1 Sample selection

To conduct this study, we need accounting information on Norwegian firms. The data is obtained from the database of the Center of Governance Research (CCGR), which contains accounting information on all private and non-private Norwegian firms. The relevant data is available from the year 2000 to 2015.

In 2006, there was a reform in the Norwegian taxation law of dividends. The reform incentivized firms to increase their leverage ratios up to the year 2005 before sharply reducing them (Alstadsæter & Fjærli, 2009). Therefore, we select 2006 as the starting year for our analysis.

Firms are included in the final sample if they have a minimum of five years of data on the relevant variables. Previous tests of the trade-off model eliminate firms without continuous data (Jalilvand & Harris, 1984; Titman & Wessels, 1988). Testing for only the pecking order theory does not require continuous data.

To reach our final sample, several filters are applied. First, financial firms are excluded as they face specific regulations regarding capital structure. Second, daughter firms are excluded as they have a capital structure decided by their parent company. Third, firms with zero revenues or zero employees are removed as we define these firms as non-operating. Further, firms with inconsistent accounting information such as negative debt, depreciation or fixed assets are excluded. In addition, negative equity firms are removed from the data as these firms may distort the results. The final sample contains 63,503 unique firms, resulting in a data panel with 412,474 observations.

In order to explore how capital structure decisions differ with firm size, the final sample is divided into three groups: (1) Small firms with less than 1 MNOK in total equity, (2) medium firms defined as firms that have more than 1 MNOK in total equity, that is, they fulfil the equity requirement in order to be listed in Oslo Axess but remain private, and (3) listed firms, which are firms listed in Oslo Axess or in Oslo Børs[1]. The separation is in accordance with López (2014). This makes it possible to explore the behavior of firms that are large enough to be listed compared to firms that are actually listed, in order to capture the effects that the transparency of being listed provides.

5.2 Firm descriptive

Table 1 summarizes descriptive statistics for the three groups of firms in our sample. All variables are defined in the Data Appendix.

The small firms are the most highly leveraged ones measured by an average total debt to assets ratio of 58 percent, while the public firms have the lowest ratio of 34 percent. However, the small firms' long-term debt to assets ratio is only 16 percent. That is, small firms show the biggest gap between the two debt ratios. In fact, only 46 percent of the small firms in our sample has made use of long-term debt in the period studied. In comparison, the share for medium- and listed firms are 66 and 78 percent respectively. This indicates that small firms rely more on short-term debt (for example trade credit) to finance their activities. Literature suggests that a combination of rapid growth and lack of access to long-term funding forces small firms to make excessive use of short-term funds (Chittenden & Hall, 1996). As firms mature and grow in size, they obtain access to other sources of funding, such as private placements of equity, venture capital, or mezzanine fund financing (López, 2014). Titman and Wessels (1988) attribute small firms' heavy use of short-term debt to the high transaction cost that they face when issuing long-term debt or equity. They also suggest that the use of short-term debt may provide some insights about possible risk factors underlying the "small-firm effect". By using more short-term funding, these firms are particularly sensitive to temporary economic

[1] There are two alternatives for listing in Norway, Oslo Axess and Oslo Børs. The equity requirement to be listed is 1 MNOK in Oslo Axess and 5 MNOK in Oslo Børs.

downsides that have less effect on larger and less leveraged firms that use longer-term financing (Titman & Wessels, 1988).

Further, private firms are more profitable than public firms, with an average return on assets of 14 percent. When measuring growth by capex to assets, the listed firms show the highest ratio of 6 percent while the small firms have the lowest ratio of 4 percent. On average, private firms appear to have a higher percentage of tangible assets, measured by PPE to assets than public firms. The medium firms have the highest tangibility ratio with an average of 28 percent. The ratio for listed firms is as low as 6 percent.

Table 1: Descriptive firm statistics

This table shows discriptive statistics of the firms in the sample. The variables are defined in the Data Appendix. All variables have been winzorised at the 2.5% level.

	All firms			Small firms			Medium firms			Listed firms		
Variable	N	Mean (Median)	SD	N	Mean (Median)	SD	N	Mean (Median)	SD	N	Mean (Median)	SD
Total Equity To Assets	411 602	0.47 (0.44)	0.27	242 948	0.42 (0.37)	0.27	168 300	0.54 (0.53)	0.26	354	0.66 (0.69)	0.24
Total Debt To Assets	411 602	0.53 (0.56)	0.27	242 948	0.58 (0.63)	0.27	168 300	0.46 (0.47)	0.26	354	0.34 (0.31)	0.24
Long Term Debt To Assets	411 602	0.17 (0.01)	0.25	242 948	0.16 (0.00)	0.25	168 300	0.20 (0.07)	0.25	354	0.17 (0.08)	0.20
Interest Bearing Debt To Assets	411 602	0.19 (0.03)	0.26	242 948	0.18 (0.00)	0.26	168 300	0.21 (0.10)	0.25	354	0.20 (0.12)	0.21
Financial Deficit To Assets	326 671	0.06 (0.05)	0.21	185 089	0.04 (0.04)	0.23	141 347	0.08 (0.06)	0.18	235	0.05 (0.07)	0.32
Target Long Term Debt To Assets	411 602	0.17 (0.13)	0.14	242 948	0.16 (0.10)	0.13	168 300	0.2 (0.16)	0.14	354	0.16 (0.13)	0.11
Target Interest Bearing Debt To Assets	411 602	0.19 (0.15)	0.14	242 948	0.18 (0.13)	0.14	168 300	0.22 (0.18)	0.14	354	0.18 (0.15)	0.11
Profitability	411 602	0.13 (0.09)	0.25	242 948	0.15 (0.09)	0.29	168 300	0.12 (0.09)	0.17	354	-0.06 (-0.02)	0.16
Tangibility	411 602	0.23 (0.07)	0.30	242 948	0.20 (0.05)	0.28	168 300	0.28 (0.12)	0.32	354	0.06 (0.00)	0.14
Growth Opportunities	361 002	0.04 (0.00)	0.13	206 207	0.04 (0.00)	0.13	154 481	0.05 (0.01)	0.13	314	0.06 (0.05)	0.21
Size	411 602	14.59 (14.49)	1.59	242 948	13.66 (13.67)	1.09	168 300	15.92 (15.70)	1.175	354	18.34 (18.47)	0.37

Across all firm groups, the leverage level declines over the sample period starting at an average long-term debt to assets ratio of 19 percent in 2006 and ending at 16 percent in 2015. Similarly, we observe a decline in the total debt to assets ratio from 60 percent in 2006 to 48 percent in 2015. That is, total debt to asset ratios for all the firms in our sample decline by 20 percent on average over the studied period, while the long-term debt to assets ratios decrease by 16 percent on average.

The listed firms have the most volatile debt development. This is possibly because this group contains relatively few but large firms (97 different firms compared to several thousand private firms). As a consequence, major leverage movements in some of these firms have a substantial impact on the average. Graphs are presented in figure 1 and 2.

Figure 1: Long-term debt to assets development

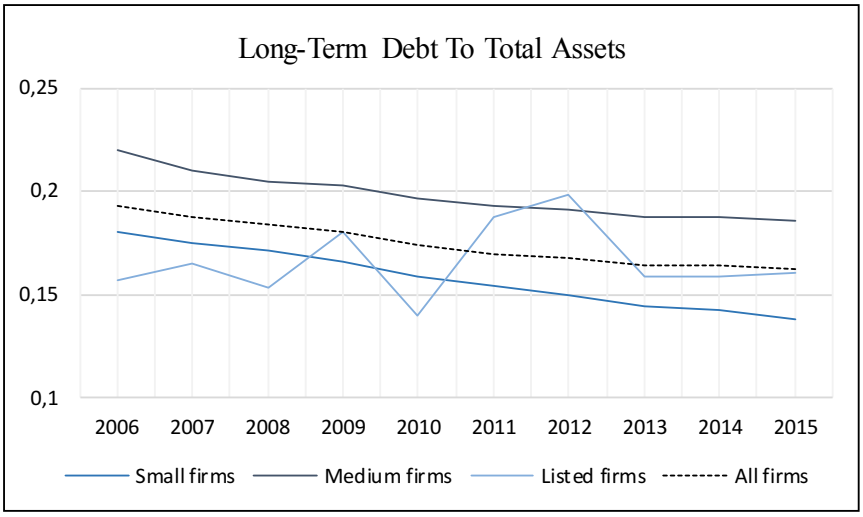
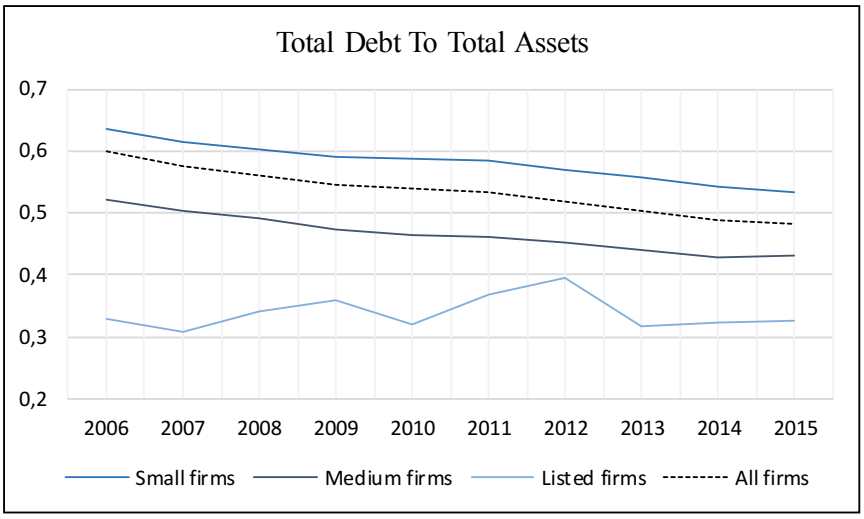


Figure 2: Total debt to assets development



The Data Appendix gives the Pearson matrix of correlations among the different variables divided into the three firm groups; small firms, medium firms, and listed firms.

5.3 Industry descriptive

Descriptive statistics for the industries are presented in table 2. The industry classification is adopted from the Statistisk Sentralbyrå classification. We observe that Wholesale and Retail trade (7) is the largest sector of the sample, representing 20 percent of the observations.

Capital-intensive sectors such as Electricity (4) and Real estate activities (11) have the highest long-term debt ratios and the highest tangibility. At the other end, the

more labor-intensive sectors like Information & Communication (10), Scientific & Technology services (12), and Service activities (18) have the lowest long-term debt and tangibility ratios.

In general, there are bigger deviations in the long-term debt ratios than in the total debt ratios. That is, industries differ in their choice between long-term debt and short-term debt, and high tangibility is linked with increased long-term debt.

In table 3 the industry distribution separated by firm group is presented. The two groups of private firms are relatively equally distributed across industries. Naturally, the listed firms are concentrated in fewer sectors.

Table 2: Descriptive industry statistics

This table presents the descriptive statistics of the industries in the sample. TDA equals total debt to total assets, LTDA is long-term debt to total assets, Prof. is profability, G.O is growth opportunities and Tan. is tangibilities. The variables are defines in the Data Appendix. All variables have been winsorized at the 2.5 % level.

Sector	N	TDA	LTDA	Prof.	G.O.	Tan.
1. Agriculture, forestry and fishing	10 678	0.57	0.28	0.12	0.06	0.37
2. Mining and quarrying	1 715	0.54	0.22	0.13	0.07	0.24
3. Manufacturing	23 565	0.56	0.17	0.1	0.04	0.22
4. Electricity, gas, steam and air conditioning supply	2 172	0.65	0.49	0.07	0.05	0.67
5. Water supply; sewerage, waste management	1 701	0.53	0.28	0.1	0.07	0.46
6. Construction	47 653	0.59	0.16	0.12	0.06	0.23
7. Wholesale and retail trade; repair of motor vehicles	80 276	0.59	0.14	0.09	0.03	0.12
8. Transportation and storage	19 260	0.59	0.25	0.15	0.07	0.36
9. Accommodation and food service activities	10 331	0.61	0.24	0.13	0.05	0.39
10. Information and communication	14 264	0.47	0.07	0.09	0.04	0.09
11. Real estate activities	44 565	0.56	0.39	0.08	0.03	0.52
12. Professional, scientific and technical activities	54 985	0.43	0.065	0.27	0.03	0.1
13. Administrative and support service activities	32 643	0.5	0.098	0.22	0.04	0.14
14. Public administration and defence	284	0.51	0.18	0.06	0.03	0.11
15. Education	6 932	0.5	0.15	0.1	0.05	0.26
16. Human health and social work activities	19 189	0.52	0.2	0.13	0.04	0.29
17. Arts, entertainment and recreation	13 370	0.45	0.15	0.1	0.05	0.32
18. Other service activities	11 731	0.44	0.1	0.08	0.03	0.19
Weighted mean		0.54	0.17	0.14	0.04	0.23

Table 3: Firm distribution between industries

This table presents the industry distribution between the firm groups in our sample.

	Small firms		Medium firms		Listed firms		Total
Sector	N	Share	N	Share	N	Share	Share
1. Agriculture, forestry and fishing	5 270	0.02	5 400	0.03	8	0.03	0.03
2. Mining and quarrying	653	0.00	1 029	0.01	33	0.11	0.00
3. Manufacturing	13 170	0.06	10 332	0.06	63	0.21	0.06
4. Electricity, gas, steam and air conditioning supply	899	0.00	1 269	0.01	4	0.01	0.01
5. Water supply; sewerage, waste management	467	0.00	1 234	0.01	-	0.00	0.00
6. Construction	29 240	0.13	18 410	0.11	3	0.01	0.12
7. Wholesale and retail trade; repair of motor vehicles	49 194	0.21	31 084	0.19	1	0.00	0.2
8. Transportation and storage	10 058	0.04	9 163	0.06	39	0.13	0.05
9. Accommodation and food service activities	6 997	0.03	3 334	0.02	-	0.00	0.03
10. Information and communication	8 636	0.04	5 604	0.03	24	0.08	0.04
11. Real estate activities	18 644	0.08	25 920	0.16	2	0.01	0.11
12. Professional, scientific and technical activities	38 194	0.16	16 698	0.10	94	0.31	0.14
13. Administrative and support service activities	22 985	0.10	9 624	0.06	34	0.11	0.08
14. Public administration and defence	52	0.00	232	0.00	-	0.00	0.00
15. Education	4 088	0.02	2 844	0.02	-	0.00	0.02
16. Human health and social work activities	10 616	0.05	8 573	0.05	-	0.00	0.05
17. Arts, entertainment and recreation	7 826	0.03	5 544	0.03	-	0.00	0.03
18. Other service activities	7 665	0.03	4 066	0.03	-	0.00	0.03
Sum	234 654		160 360		305		

6. EMPIRICAL RESULTS

6.1 Introduction

Using panel data, we run ordinary least squares (OLS) regressions with the long-term debt to assets ratio as our dependent variable. We use a Z-test to examine whether or not there is a statistical difference between two independent sample groups. As both the pecking order- and the trade-off model predicts the regression coefficient to equal 1, we use a Wald-test to check for significant differences between the estimated coefficient and 1.

To control for average differences across firms in any observable or unobservable variable that may influence leverage and to include time series analysis, we run the fixed effects model. The Hausman test indicates that fixed effects are suitable for all our regression models. To control for potential systematic variation in leverage across sectors, industry-specific effects are applied.

6.2 Results

6.2.1 Pecking Order Model

As shown in table 4, the coefficients are significantly less than the pecking order prediction of 1 as shown by the Wald-test. However, the coefficient for listed firms, which is close to zero, is significantly lower than for the two groups of private firms, indicating that listed firms does not adjust leverage according to the pecking order theory. Contradictory to the hypothesis, the coefficients for the small firms are relatively low compared to the medium firms, indicating that these firms raise less debt to meet their financing needs. Nevertheless, breaking down the results for the small firms we observe a clear split between the smallest 50 percent and the biggest 50 percent, measuring size by total assets. The results are presented in table 5. For the smallest firms within the group the b_{POT} is close to zero while the top 50 percentile has a b_{POT} coefficient of 0.44, indicating that the absolute smallest firms are not driven by pecking order. One reason for this could be the lack of access to long-term debt funding for very small firms. Ignoring the absolute smallest firms, the results are in line with our hypothesis: That the pecking order theory is more important in a SME context. The results are consistent when using time fixed effects only, and when using time fixed as well as cross-sectional fixed effects.

Table 4: Pecking Order Model results

This table presents the relationship between the actual change in debt and the deficit term. The dependent variable is defined as the change in long-term debt. The independet variable is the financing deficit given by the difference between investment requirements and the cash flow generated by the company. All variables are scaled by total assets. We control for time specific and cross-sectional firm specific effects. Standard errors in parantheses. By using a Z-test we exploit whether there is a significant difference between the sample coefficients. The Wald-test indicates whether or not the coefficients are different from 1, on a 1% significance level.

$\Delta Debt = D_{i.t}$ - $D_{i.t-1}$ = a + $b_{POT} DEF_{i.t} + e_{i.t}$

	Small firms		**Medium firms**		**Listed firms**	
Constant	-0.0110***	-0.0036	-0.0334***	-0.0481***	0.0105***	-0.0432
	(0.0000)	(0.0099)	(0.0003)	(0.0087)	(0.0012)	(0.0323)
POT coefficient, b_{POT}	0.1987***	0.2004***	0.3642***	0.3639***	0.0692***	0.0373**
	(0.0021)	(0.0021)	(0.0032)	(0.0033)	(0.0257)	(0.0185)
Wald-test	YES	YES	YES	YES	YES	YES
Z-test						
Small firms			43.24***	41.80***	5.03***	8.76***
Medium firms	43.24***	41.80***			11.40***	17.38***
Listed firms	5.03***	8.76***	11.40***	17.38***		
Cross-sectional fixed effects	NO	YES	NO	YES	NO	YES
Time-fixed effects	YES	YES	YES	YES	YES	YES
No. Of observations	185 089	181 732	141 347	135 581	235	205
Periods included	10	10	10	10	10	10
R^2	0.23	0.23	0.37	0.37	0.11	0.07

***,** and * indicate significance at the 1%, 5% and 10 % respectively.

Table 5: Peking Order Model results for small firms divided in two groups

This table presents the relationship between the actual change in debt and the deficit term. The dependent variable is defined as the change in long-term debt. The independet variable is the financing deficit given by the difference between investment requirements and the cash flow generated by the company. All variables are scaled by total assets. We control for time specific and cross-sectional firm specific effects. Standard errors in parantheses. By using a Z-test we exploit whether there is a significant difference between the sample coefficients. The Wald-test indicates whether or not the coefficients are different from 1, on a 1% significance level.

$\Delta Debt = D_{i.t}$ - $D_{i.t-1}$ = a + $b_{POT} DEF_{i.t} + e_{i.t}$

	50 % smallest		**50 % biggest**	
Constant	-0.0114***	-0.0109	-0.0250***	-0.0206*
	(0.0000)	(0.0152)	(0.0002)	(0.0121)
POT coefficient, b_{POT}	0.0861***	0.0874***	0.4408***	0.4406***
	(0.0018)	(0.0019)	(0.0034)	(0.0034)
Wald- test	YES	YES	YES	YES
Z-test				
Medium firms	75.74***	72.61***	16.41***	16.19***
Listed firms	0.66	2.69***	14.35***	21.44***
Cross-sectional fixed effects	NO	YES	NO	YES
Time-fixed effects	YES	YES	YES	YES
No. Of observations	89 222	87 134	95 770	94 501
Periods included	10	10	10	10
R^2	0.10	0.09	0.49	0.49

***, ** and * indicates significance at the 1%, 5% and 10 % level respectively

6.2.2 Trade-Off Model

As presented in table 6, the b_{TOT} is significantly higher for listed firms than for small and medium firms. This may imply that listed firms tend to follow the trade-off theory to a larger extent compared to private firms. According to the Wald-test, the b_{TOT} for listed firms is not significantly different from 1, which is in line with the trade-off theory hypothesis.

Interestingly, the private firms also yield relatively high b_{TOT} coefficients. By using a Monte Carlo-simulation, Shyam-Sunder and Myers (1999) demonstrated that the

target-adjustment model can generate highly statistical significant results even when it is false, while the pecking order model always is correctly rejected when it is false. This is because the firm's capital expenditures are positively serial-correlated and the operating earnings are cyclical. Since dividends are not used as short-run offset to net funds requirements, the companies often have several periods with financial deficits, followed by several periods of surplus. When the target debt ratio is measured as the historical mean, the pecking order debt ratios also show mean-reversion, which causes the target model to generate a misleading good fit.

The coefficient for listed firms in the pecking order model is close to zero, which implies that the high coefficient for listed firms in the trade-off model is not falsely driven by pecking order behavior. For private firms there is a bigger chance that the high b_{TOT}-coefficients are actually a result of mean-reverting pecking order debt ratios as the b_{POT}-coefficients are higher.

The results are consistent when using time fixed effects only, and time fixed as well as cross-sectional fixed effects.

Table 6: Trade-Off Model results

This table presents the relationship between the actual change in debt and the change in debt suggested by the debt target. The dependent variable is defined as the change in long-term debt. The independet variable is the deviation of the current debt ratio from the target. The debt target is calculated as the average of the sector mean debt and the historical mean debt for each firm. All variables are scaled by total assets. We control for time specific and cross-sectional firm specific effects. Standard errors in parantheses. By using a Z-test we exploit whether there is a significant difference between the sample coefficients. The Wald-test indicates whether or not the coefficients are different from 1, on a 1% significance level.

$\Delta Debt = D_{i.t}$ - $D_{i.t-1}$ = a + b_{TOT} ($D*_{i.t-}$ $D_{i.t-1}$)+ $e_{i.t}$

	Small firms		**Medium firms**		**Listed firms**	
Constant	-0.0034***	-0.0239**	-0.0031***	-0.0027	0.0001	-0.0381**
	(0.0000)	(0.0112)	(0.0000)	(0.0107)	(0.0010)	(0.0183)
TOT coefficient, b_{TOT}	0.4576***	0.4608***	0.4608***	0.4675***	0.8775***	0.8331***
	(0.0028)	(0.0029)	(0.0036)	(0.0038)	(0.0901)	(0.1075)
Wald-test	YES	YES	YES	YES	NO	NO
Z-test						
Small firms			0.70	1.40	4.66***	3.46***
Medium firms	0.70	1.40			4.62***	3.40***
Listed firms	4.66***	3.46***	4.62***	3.40***		
Cross-sectional fixed effects	NO	YES	NO	YES	NO	YES
Time-fixed effects	YES	YES	YES	YES	YES	YES
No. Of observations	196 483	193 209	134 360	128 407	278	234
Periods included	10	10	10	10	10	10
R^2	0.39	0.39	0.37	0.37	0.58	0.52

***, ** and * indicates significance at the 1%, 5% and 10 % level respectively.

6.2.3 Pecking Order Model with leverage factors

Table 7 presents the results for the model with leverage factors included, as described in section 4.3. The leverage factors are run in first differences to achieve a suitable structure in order to add the financing deficit into the model. However, as explained in section 4.3, first differences could bias the conventional variables towards zero. In columns (2), (4) and (6) the leverage regression is estimated with the financing deficit as an additional explanatory variable.

According to Frank and Goyal (2003), the conventional variables should decline in significance when the b_{POT} is added, if the pecking order is the key driver. Adding the financial deficit does not have a major impact on the significance. For medium

and listed firms the size variable is no longer significant when the financial deficit is added to the model. The sample of listed firms is limited, including only 148 observations, which might explain the insignificant coefficients. It is therefore hard to draw conclusions for this firm group.

In the medium firms group, the firms range widely in size, as the equity criteria in this group is 1 MNOK but there is no upper limit. Therefore, we ran a separate test with a sample consisting of the 5 percent largest firms within the group. We still observe that the size coefficient becomes insignificant when including the financing deficit. In addition, the growth variable declines in significance. The results are presented in table 8.

In very large samples, the coefficients appear to be significant even if the actual effect of the variables are practically zero. For private firms we have a large number of observations. To test whether the obtained significance also is detected when decreasing the sample size, we select a random sample from the two groups small and medium firms, containing approximately 4,000 observations. There is no change in the significance or in the signs of the coefficients. The results are presented in table 9.

Table 7: Pecking Order Model with leverage factors

This table presents the relationship between the actual change in debt and the deficit term and leverage factors. The dependent variable is defined as the change in long-term debt. The independent variables are profitability, growth, tangibility and size in first differences, and the financial deficit scaled by total assets. We control for time specific and cross-sectional firm specific effects. Standard errors in parantheses.

$$\Delta Debt = \text{a} + b_{Prof}\,\Delta Prof_{i.t} + b_{Tan}\,\Delta Tan_{i.t} + b_{G.O}\Delta G.O_{i.t} + b_{Size}\,\Delta Size_{i.t} + b_{Def}\,Def_{i.t} + e_{i.t}$$

	Small firms		**Medium firms**		**Listed firms**	
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	0.0071	-0.0046	-0.0056	-0.0376***	0.0155	0.0597
	(0.0108)	(0.0096)	(0.0112)	(0.0087)	(0.0321)	(0.0538)
ΔProfitability	-0.0188***	-0.0629***	-0.0625***	-0.1379***	-0.0579	-0.0507
	(0.0011)	(0.0016)	(0.0026)	(0.0025)	(0.0499)	(0.0566)
ΔGrowth	0.0923***	0.0733***	0.0783***	0.0378***	-0.0274**	-0.0433***
	(0.0025)	(0.0022)	(0.0027)	(0.0021)	(0.0133)	(0.0154)
ΔTangibility	0.1451***	0.1290***	0.0976***	0.0881***	-0.1534	-0.1204
	(0.0044)	(0.0038)	(0.0052)	(0.0038)	(0.1321)	(0.1159)
ΔSize	0.0669***	0.0074***	0.1138***	0.0018	0.0819**	0.0119
	(0.0012)	(0.0010)	(0.0023)	(0.0017)	(0.0376)	(0.0571)
Financial deficit		0.1950***		0.3911***		0.0804**
		(0.0029)		(0.0044)		(0.0392)
Cross-sectional fixed effects	YES	YES	YES	YES	YES	YES
Time-fixed effects	YES	YES	YES	YES	YES	YES
No. Of observations	142 101	142 101	104 826	104 826	148	148
Periods included	10	10	10	10	10	10
R^2	0.21	0.33	0.21	0.46	0.08	0.13

***, ** and * indicates significance at the 1%, 5% and 10 % level respectively.

Table 8: Pecking Order Model with leverage factors– 5 % largest medium firms

This table presents the relationship between the actual change in debt and the deficit term and leverage factors. The dependent variable is defined as the change in long-term debt. The independent variables are profitability, growth, tangibility and size in first differences, and the financial deficit scaled by total assets. We control for time specific and cross-sectional firm specific effects. Standard errors in parantheses.

$$\Delta Debt = \text{a} + b_{Prof}\,\Delta Prof_{i.t} + b_{Tan}\,\Delta Tan_{i.t} + b_{G.O}\Delta G.O_{i.t} + b_{Size}\,\Delta Size_{i.t} + b_{Def}\,Def_{i.t} + e_{i.t}$$

	Medium firms (5% largest firms)	
	(1)	(2)
Constant	-0.0654	-0.0365
	(0.0675)	(0.0404)
ΔProfitability	-0.1027***	-0.1846***
	(0.0233)	(0.0196)
ΔGrowth	0.1353***	0.0235**
	(0.0142)	(0.0108)
ΔTangibility	-0.0066	0.0338*
	(0.0304)	(0.0181)
ΔSize	0.1012***	-0.0119
	(0.0149)	(0.0096)
Financial deficit		0.4885***
		(0.0202)
Cross-sectional fixed effects	YES	YES
Time-fixed effects	YES	YES
No. Of observations	4 706	4 706
Periods included	10	10
R^2	0.14	0.51

***, ** and * indicates significance at the 1%, 5% and 10 % level respectively.

Table 9: Pecking Order Model with leverage factors – randomized sample

This table presents the relationship between the actual change in debt and the deficit term and leverage factors. The dependent variable is defined as the change in long-term debt. The independent variables are profitability, growth, tangibility and size in first differences, and the financial deficit scaled by total assets. We control for time specific and cross-sectional firm specific effects. Standard errors in parantheses.

$\Delta Debt = \text{a} + b_{Prof}\,\Delta Prof_{i.t} + b_{Tan}\,\Delta Tan_{i.t} + b_{G.O}\Delta G.O_{i.t} + b_{Size}\,\Delta Size_{i.t} + b_{Def}\,Def_{i.t} + e_{i.t}$

	Small firms		**Medium firms**	
	(1)	(2)	(3)	(4)
Constant	0.0137	-0.0199	-0.0013	-0.0158
	(0.0314)	(0.0431)	(0.0210)	(0.0087)
ΔProfitability	-0.0375***	-0.0871***	-0.0684***	-0.1434***
	(0.0080)	(0.0103)	(0.0116)	(0.0121)
ΔGrowth	0.0752***	0.0486***	0.0822***	0.0426***
	(0.0143)	(0.0119)	(0.0139)	(0.0112)
ΔTangibility	0.1330***	0.1392***	0.1324***	0.1253***
	(0.0281)	(0.0229)	(0.2490)	(0.0208)
ΔSize	0.0895***	0.0125**	0.1097***	0.0045
	(0.0080)	(0.0069)	(0.0103)	(0.0084)
Financial deficit		0.2303***		0.3374***
		(0.0178)		(0.0211)
Cross-sectional fixed effects	YES	YES	YES	YES
Time-fixed effects	YES	YES	YES	YES
No. Of observations	4 217	4 217	4 339	4 339
Periods included	10	10	10	10
R^2	0.22	0.36	0.24	0.44

***, ** and * indicates significance at the 1%, 5% and 10 % level respectively.

In general, the signs of the coefficients indicate that none of the two theories completely dominates for the private firms. Profitability and growth opportunities have the signs implied by the pecking order theory. While, the coefficients for size and tangibility implies a positive relationship to the debt level, which is contradictory to negative relationship predicted by the pecking order. For the listed firms the two significant coefficients are in line with the trade-off theory. Table 10 shows the sign of the coefficients that is hypothesized by the pecking order- and the trade-off theory.

Table 10: Expected and observed relations

This table presents the predicted relationship between the leverage factors and the debt level according to what is suggested by the pecking order- and the trad-off theory. (1) is the model with leverage factors. (2) is the model when the financial deficit is included. N.S implies that the coefficient is not significant.

Explanatory variables	**Actual relation**						**Predicted relation**	
	Small firms		Medium firms		Listed firms		Pecking Order Theory	Trade-Off Theory
	(1)	(2)	(1)	(2)	(1)	(2)		
Profitability	-	-	-	-	N.S	N.S	(-)	(+)
Growth	+	+	+	+	-	-	(+)	(-)
Tangibility	+	+	+	+	N.S	N.S	(-)	(+)
Size	+	+	+	N.S	+	N.S	(-)	(+)

6.3 Robustness

In order to investigate the consistency and robustness of our results we perform a series of tests.

First, all regressions have been run using interest-bearing debt to assets as the dependent variable, which yields almost identical results as using long-term debt to assets. This is expected as we observe only minor differences between the two leverage measures presented in the descriptive statistics in table 1. Interest-bearing debt is defined as long-term debt plus the interest-bearing portion of short-term debt. By using this measure, we are able to capture how short-term debt is used as a funding source, without including operating debt that is not a result of capital structure decisions. Results are presented in table 11.

Table 11: Robustness test 1- Interest bearing debt

This table presents the results of fitting the pecking order (POT) - and trade-off (TOT) model. The dependent variable is defined as the change in interest bearing debt. The independet variable in the pecking order model is the financing deficit given by the difference between investment requirements and the cash flow generated by the company. The independet variable in the trade-off model is the deviations of the current debt ratio from the target. All variables are scaled by total assets. We control for time specific and cross-sectional firm specific effects. Standard errors in parantheses. By using a Z-test we exploit whether there is a significant difference between the sample coefficients. The Wald-test indicates whether or not the coefficients are different from 1, on a 1% significance level.

$\Delta Debt = D_{i.t}$ - $D_{i.t-1} =$ a + $b_{POT} DEF_{i.t} + e_{i.t}$

$\Delta Debt = D_{i.t}$ - $D_{i.t-1} =$ a + b_{TOT} $(D *_{i.t-} D_{i.t-1}) + e_{i.t}$

	Small firms		**Medium firms**		**Listed firms**	
	POT	TOT	POT	TOT	POT	TOT
Constant	-0.0036	-0.0282**	-0.0269***	0.0002	-0.1202***	-0.1106***
	(0.0112)	(0.0124)	(0.0100)	(0.0114)	(0.0382)	(0.0204)
Coefficient	0.1872***	0.5362***	0.3444***	0.5362***	0.0275	1.042***
	(0.0024)	(0.0029)	(0.0039)	(0.0037)	(0.0202)	(0.0387)
Wald -test	YES	YES	YES	YES	YES	NO
Z-test						
Small firms			34.33***	0.00	7.85***	13.03***
Medium firms	34.33***	0.00			15.40***	13.01***
Listed firms	7.85***	13.03***	15.40***	13.01***		
Cross-sectional fixed effects	YES	YES	YES	YES	YES	YES
Time-fixed effects	YES	YES	YES	YES	YES	YES
No. Of observations	173 697	193 209	117 119	128 407	183	234
Periods included	10	10	10	10	10	10
R^2	0.15	0.44	0.26	0.43	0.05	0.87

***, ** and * indicates significance at the 1%, 5% and 10 % level respectively.

In addition, we run all tests scaling all variables by net assets, defined as total assets minus current liabilities. The results are presented in table 12 and 13. The size of the pecking order- and the trade-off coefficients are in line with what is observed when using total assets. For the leverage factor model, the size variable for medium firms is still significant when adding the financing deficit, which is contradictory to what is observed in the original model. Despite from this, the results are consistent.

Table 12: Robustness test 2- Net assets

This table presents the results of fitting the pecking order (POT) - and the trade-off (TOT) model. The dependent variable is defined as the change in long-term debt. The independet variable in the pecking order model is the financing deficit given by the difference between investment requirements and the cash flow generated by the company. The independent variable in the trade off-model is the deviation of the current debt ratio from the target. All variables are scaled by net assets. We control for time specific and cross-sectional firm specific effects. Standard errors in parantheses. Using a Z-test we exploit whether there is a significant difference between the sample cofficients. The Wald-test indicates whether or not the coefficients are different from 1, on a 1% significance level.

$\Delta Debt = D_{i.t}$ - $D_{i.t-1}$ = a + $b_{POT} DEF_{i.t} + e_{i.t}$

$\Delta Debt = D_{i.t}$ - $D_{i.t-1}$ = a + b_{TOT} $(D *_{i.t-} D_{i.t-1}) + e_{i.t}$

	Small firms		**Medium firms**		**Listed firms**	
	POT	TOT	POT	TOT	POT	TOT
Constant	0.0013	-0.0437***	-0.0610***	-0.0026	-0.0536	-0.059***
	0.0181	(0.0169)	(0.0126)	(0.0131)	(0.0356)	0.0199
Coefficient	0.1160***	0.6078***	0.3123***	0.5489***	0.0433**	1.1325***
	(0.0014)	(0.0027)	(0.0031)	(0.0038)	(0.0201)	(0.1210)
Wald-test	YES	YES	YES	YES	YES	NO
Z-test						
Small firms			57.71***	12.64***	3.61***	4.34***
Medium firms	57.71***	12.64***			13.23***	4.82***
Listed firms	3.61***	4.34***	13.23***	4.82***		
Cross-sectional fixed effects	YES	YES	YES	YES	YES	YES
Time-fixed effects	YES	YES	YES	YES	YES	YES
No. Of observations	181 642	192 459	135 583	128 410	205	234
Periods included	10	10	10	10	10	10
R^2	0.15	0.52	0.31	0.44	0.07	0.63

***,** and * indicate significance at the 1%, 5% and 10 % respectively.

Table 13: Robustness test 3 - Net assets

This table presents the relationship between the actual change in debt, and the deficit term and leverage factors. The dependent variable is defined as the change in long-term debt. The independent variables are profitability, growth, tangibility and size in first differences, and the financial deficit scaled by net assets. We control for time specific and cross-sectional firm specific effects. Standard errors in parantheses.

$\Delta Debt = \text{a} + b_{Prof}\,\Delta Prof_{i.t} + b_{Tan}\,\Delta Tan_{i.t} + b_{G.O}\Delta G.O_{i.t} + b_{Size}\,\Delta Size_{i.t} + b_{Def}\,Def_{i.t} + e_{i.t}$

	Small firms		**Medium firms**		**Listed firms**	
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	0.0022	-0.0016	-0.0187	-0.0570***	0.0103	0.0470
	(0.0169)	(0.0165)	(0.0144)	(0.0126)	(0.0428)	(0.0604)
ΔProfitability	-0.0303***	-0.0827***	-0.0851***	0.0184***	-0.0720	-0.0924
	(0.0019)	(0.0023)	(0.0035)	(0.0034)	(0.0778)	(0.0799)
ΔGrowth	0.1398***	0.1300***	0.1948***	0.2704***	-0.0327*	-0.0502**
	(0.0042)	(0.0039)	(0.0272)	(0.0239)	(0.0178)	(0.0199)
ΔTangibility	0.2755***	0.2524***	0.2052***	0.1657***	-0.2395	-0.2011
	(0.0077)	(0.0071)	(0.0064)	(0.0048)	(0.2436)	(0.2183)
ΔSize	0.1175***	0.0534***	0.1685***	0.0208***	0.1132**	0.0591
	(0.0021)	(0.0019)	(0.0030)	(0.0024)	(0.0556)	(0.0881)
Financial deficit		0.0976***		0.3365***		0.063
		(0.0017)		(0.0040)		(0.0517)
Cross-sectional fixed effects	YES	YES	YES	YES	YES	YES
Time-fixed effects	YES	YES	YES	YES	YES	YES
No. Of observations	142 021	142 021	117 119	117 119	148	148
Periods included	10	10	10	10	10	10
R^2	0.19	0.26	0.19	0.40	0.08	0.12

***, ** and * indicates significance at the 1%, 5% and 10 % level respectively.

The target debt level of a firm is unobservable. We have estimated this target as the mean of the average historical debt ratio for each firm and the historical industry average debt ratio. To confirm statistical power, we employ the use of a proxy containing only the average historical debt ratio for each firm. That is, the industry debt ratio is excluded. As shown in table 14, the results are consistent using both proxies for target debt level.

Table 14: Robustness test 4- Firm target

This table presents the relationship between the actual change in debt and the change in debt suggested by the debt target. The dependent variable is defined as the change in long-term debt. The independet variable is the deviation of the current debt ratio from the target. The debt target is calculated as the historical mean long-term debt for each firm. All variables are scaled by total assets. We control for time specific and cross-sectional firm specific effects. Standard errors in parantheses. By using a Z-test we exploit whether there is a significant difference between the sample coefficients. The Wald-test indicates whether or not the coefficients are different from 1, on a 1% significance level.

$\Delta Debt = D_{i.t}$ - $D_{i.t-1}$ = a + b_{TOT} $(D *_{i.t-} D_{i.t-1})$+ $e_{i.t}$

	Small firms		**Medium firms**		**Listed firms**	
Constant	-0.0029***	0.0012	-0.0031***	0.0215**	0.0010	-0.0331*
	(0.0000)	(0.0112)	(0.0000)	(0.0107)	(0.0011)	(0.0181)
TOT coefficient b_{TOT}	0.4599***	0.4609***	0.4643***	0.4675***	0.8896***	0.8331***
	(0.0029)	(0.0029)	(0.0036)	(0.0038)	(0.0933)	(0.1075)
Wald-test	YES	YES	YES	YES	NO	NO
Z-test						
Small firms			0.96	1.38	4.60***	3.46***
Medium firms	0.96	1.38			4.55***	3.40***
Listed firms	4.60***	3.46***	4.55***	3.40***		
Cross-sectional fixed effects	NO	YES	NO	YES	NO	YES
Time-fixed effects	YES	YES	YES	YES	YES	YES
No. Of observations	196 483	193 209	134 360	128 407	278	234
Periods included	10	10	10	10	10	10
R^2	0.39	0.39	0.37	0.37	0.59	0.52

***, ** and * indicates significance at the 1%, 5% and 10 % level respectively.

7. CONCLUSION

In this paper, the pecking order theory and the trade-off theory are tested on a large sample of Norwegian firms. From the CCGR database, we retrieved extensive accounting information for the period 2006 to 2015. To explore how company size affects capital structure decisions, firms were divided into three groups: (1) small firms, (2) medium firms, and (3) listed firms.

We find that private firms tend to follow the pecking order theory to a greater extent than listed firms. Although for the absolute smallest firms (27 percent of the total sample) we do not find support for the theory, which may be due to restrained access to long-term debt funding for very small firms. When nesting the four leverage factors profitability, size, tangibility, and growth opportunities into the pecking order model the leverage factor coefficients mostly remain significant for the private firms, which questions the relative importance of the financing deficit. According to Frank and Goyal (2003), this is not in favor of the pecking order. As large samples may bias the results, we ran the same test with a randomized sample consisting of about 4,000 observations for both small and medium firms. The results are robust.

The trade-off theory suggests an adjustment parameter equal to 1, implying a debt level equal to the target level. For listed firms, our tests show that the adjustment parameter is not significantly different from 1, confirming the trade-off predictions. Private firms also show a tendency of adjustment towards the target, but this can be influenced by mean-reverting pecking order debt ratios. The pecking order is always correctly rejected when it is false. In contrast, the target-adjustment model is biased towards acceptance even when firms follow strict pecking order rules, as the pecking order debt ratios also show mean-reversion (Shyam-Sunder & Myers, 1999).

Regarding the signs of the leverage coefficients, they are not consistent with one of the two theories for private firms. We find that for private firms profitability and growth opportunities have signs in agreement with the pecking order theory, while tangibility and size have a positive sign supporting the trade-off theory. For listed firms both of the significant coefficients, growth and size are in line with the trade-off theory.

In conclusion, we observe differences in financing behavior between the three firm groups and especially between listed and private firms. Our tests suggest a tendency for small and medium firms to adjust leverage in accordance with the pecking order theory, while the trade-off theory seems to make a better fit for the listed firms.

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DATA APPENDIX

A. Correlation matrices

This table presents the Pearson correlations between pairs of variables used in the analysis for firms that have less than kr 1,000,000 in total equity (small firms). The variables are defined in the Data Appendix. TDA is Total Debt to Total Assets, LTDA is Long-Term Debt to Total Assets, Prof. is Profability, G.O is Growth Opportunities and Tan. is Tangibility. All variables have been winsorized at the 2.5 % level. The sample period is 2006 to 2015.

Variables	EquityToA	TDA	LTDA	IBDToA	DefToA	D*/A	D* (IBD) /A	Prof.	Tan.	G.O	Size
Total Equity To Assets	1.00										
Total Debt To Assets	-0.999	1.00									
Long Term Debt To Assets	-0.518	0.518	1.00								
Interest Bearing Debt To Assets	-0.558	0.558	0.959	1.00							
Financial Deficit To Assets	0.029	-0.031	0.112	0.090	1.00						
Target Long Term Debt To Assets	-0.456	0.456	0.870	0.842	0.044	1.00					
Target Interest Bearing Debt To Assets	-0.490	0.490	0.851	0.870	0.038	0.977	1.00				
Profitability	0.198	-0.197	-0.081	-0.085	0.350	-0.111	-0.113	1.00			
Tangibility	-0.293	0.293	0.639	0.614	0.096	0.657	0.634	-0.017	1.00		
Growth Opportunities	-0.125	0.124	0.156	0.153	0.348	0.096	0.002	-0.002	0.267	1.00	
Size	-0.572	0.571	0.530	0.548	0.146	0.524	0.546	-0.112	0.365	0.136	1.00

This table presents the Pearson correlations between pairs of variables used in the analysis for firms that have kr 1,000,000 or more in total equity but are not listed (medium firms). The variables are defined in the Data Appendix. TDA is Total Debt to Total Assets, LTDA is Long-Term Debt to Total Assets, Prof is Profability, G.O is Growth Opportunities and Tan. is Tangibility. All variables have been winsorized at the 2.5 % level. The sample period is 2006 to 2015.

Variables	EquityToA	TDA	LTDA	IBDToA	DefToA	D*/A	D* (IBD) /A	Prof.	Tan.	G.O	Size
Total Equity To Assets	1.00										
Total Debt To Assets	-1.000	1.00									
Long Term Debt To Assets	-0.644	0.644	1.00								
Interest Bearing Debt To Assets	-0.684	0.684	0.967	1.00							
Financial Deficit To Assets	0.004	-0.005	0.038	0.017	1.00						
Target Long Term Debt To Assets	-0.515	0.520	0.868	0.847	-0.053	1.00					
Target Interest Bearing Debt To Assets	-0.554	0.554	0.855	0.870	-0.060	0.983	1.00				
Profitability	0.061	-0.061	-0.105	-0.120	0.352	-0.108	-0.116	1.00			
Tangibility	-0.293	0.293	0.624	0.597	-0.007	0.658	0.633	-0.052	1.00		
Growth Opportunities	-0.110	0.120	0.119	0.116	0.447	0.058	0.054	0.043	0.168	1.00	
Size	-0.364	0.364	0.339	0.361	-0.033	0.317	0.334	-0.170	0.186	0.059	1.00

This table presents the Pearson correlations between pairs of variables used in the analysis for firms that are listed in Oslo Axess or Oslo Børs. The variables are defined in the Data Appendix. TDA is Total Debt to Total Assets, LTDA is Long-Term Debt to Total Assets, Prof. is Profability, G.O is Growth Opportunities and Tan. is Tangibility. All variables have been winsorized at the 1 % level. The sample period is 2006 to 2015.

Variables	EquityToA	TDA	LTDA	IBDToA	DefToA	D*/A	D* (IBD) /A	Prof.	Tan.	G.O	Size
Total Equity To Assets	1.00										
Total Debt To Assets	-1.00	1.00									
Long Term Debt To Assets	-0.729	0.729	1.00								
Interest Bearing Debt To Assets	-0.790	0.790	0.936	1.00							
Financial Deficit To Assets	0.083	-0.083	0.098	0.050	1.00						
Target Long Term Debt To Assets	-0.626	0.626	0.804	0.788	0.054	1.00					
Target Interest Bearing Debt To Assets	-0.648	0.648	0.792	0.816	0.051	0.982	1.00				
Profitability	-0.043	0.043	0.180	0.137	0.290	0.153	0.136	1.00			
Tangibility	-0.479	0.497	0.326	0.380	0.014	0.368	0.419	0.092	1.00		
Growth Opportunities	0.064	-0.064	-0.036	-0.032	0.605	-0.006	-0.009	0.171	-0.003	1.00	
Size	0.020	-0.020	0.165	0.178	0.188	0.232	0.242	0.292	0.074	0.114	1.00

B. Variable definitions

Total equity to assets (EquityToA): The ratio of total equity to total assets.

Total debt to assets (TDA): The ratio of total debt (current liabilities + long- term debt) to total assets.

Long-term debt to assets (LTDA): The ratio of long-term debt to total assets.

Interest bearing debt to assets (IBDToA): The ratio of interest bearing debt (long-term debt + short term credit loans + short term convertible loans + short-term certificate loans) to total assets.

Target long-term debt to assets (D/A):* The average of historical industry mean of long-term debt to asset and the historical firm mean of long-term debt to assets.

Target interest bearing debt to assets (D(IBD)/A):* The average of historical industry mean of interest bearing debt to asset and the historical firm mean of interest bearing debt to assets.

Profitability (Prof): The ratio of operating income before depreciation to total assets.

Growth opportunities (G.O): The ratio of capital expenditures to total assets.

Size: The log of total assets of the firm.

Tangibility (Tan): The ratio of total tangible fixed assets (PPE) to total assets.

Preliminary Thesis Report

- Pecking Order Theory versus Trade-Off theory: How does financing decisions differ from large to small firms? -

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Supervisor:
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Campus:
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Programme:
Master of Science in Business, Major in Business Law, Tax and Accounting

1.Introduction and Motivation

The purpose of this paper is to investigate how financing decisions; more specifically capital structure is affected by company size. We want to investigate how managers of large firms differ in their financing decisions opposed to managers in small firms in Norway. We want to address this problem on the basis of two major theories that can be used to explain a company's financial structure; the Trade-off Theory and the Pecking Order Theory, hereafter TOT and POT.

The TOT by DeAngelo and Masaulis (1980) suggest that firms will target an optimal capital structure, which is where the advantages and disadvantages of debt converge. The POT suggests that firms have a particular preference order for capital used to finance their businesses (Myers and Majluf, 1984). Owing to the information asymmetries between the firm and potential investors, the firm will prefer retained earnings to debt, short-term debt over long-term debt and debt over equity.

The theories of corporate finance are not developed with small businesses in mind (Ang, 1991). In these theories the firm is assumed to have access to external capital market for debt and equity and the shareholders enjoys a limited liability position and holds diversified portfolios (Ang, 1991). These assumptions do not necessarily hold for small or non-listed companies.

Small and medium sized entities (SME) suffer from greater adverse selection and agency problems, thus the POT should be more suitable for explaining the capital structure of these firms. However, various researchers have investigated whether we can find support for the application of the POT for SME, resulting in mixed conclusions. These mixed results may be due to country, firm- or time specific factors, but in conclusion there is no widely accepted evidence of that POT can explain the financing decisions of these firms.

The research problem has not yet been extensively analysed on small non-listed firms, as the information is limited. Due to the access of high quality data on Norwegian private firms, we are able to investigate this area further. In addition

results gained from analysing foreign companies cannot necessarily be applied to Norwegian firms. Possible factors for this could be for example differences in external financing or funding sources, different taxation system, size, growth opportunities, ownership structure, and so on.

2. Theory

The pecking order theory

The POT (Myers and Majluf, 1984) contends that a firm, when financing new projects or investments, first should use internal funds over external, and debt over equity if external funding is needed. This implies that there is no optimal capital structure, instead the leverage level is decided by the need for external funding, once internal resources have been exhausted given that profitable investment opportunities exists. The theory is based on the notion of asymmetric information between firm insiders and outsiders. The management have more information about the true firm value than outside investors, and therefore investors closely observe the company`s financing decisions to gain knowledge about the firm`s prospects. Issuance of debt signals the management`s confidence that an investment is profitable and that the current stock price is undervalued. Contradictory, issuance of equity signals a lack of confidence in the project and an overpriced stock. An issuance of equity would therefore lead to a decrease in the share price. The main point is that a firm`s financing decisions send important signal effects to the investor`s about future performance (Baker and Gerald, 2011).

The Trade-off Theory

The TOT by DeAngelo and Masaulis (1980), however, suggest that firms will target an optimal capital structure, which is where the advantages and disadvantages of debt converge.

The main advantage of debt is reduced tax costs through the tax shield. The value of an indebted company is equal to that of a non-leveraged company, plus the present value of the tax benefits of debt (Modigliani and Miller, 1963). That is, firms have an incentive to use debt rather than equity since interest are deductible from taxable profits. In addition, leverage reduces the principal agent problem

between stockholders and the management (Jensen and Meckling, 1976). This is because it introduces a non-residual claim on the company`s cash flow, which reduces the management`s possibility of wasting it. On the other hand, the existence of cost related to financial distress (Stiglitz, 1969) will restrain the use of debt financing. The possibility of bankruptcy has a negative effect on the value of the firm. Direct financial distress costs related to for example lawyers and accountants' fees. Indirectly a state of financial distress may lead to impaired ability to conduct business and fees to be paid to agency to reduce conflicts between shareholders and debt holders (Jensen and Meckling, 1976). There are several possible agency conflicts related to financial distress. Firstly, it gives the management incentives to take large risks. Since the shareholders enjoy a limited liability position they will in a state of financial distress, only risk losing the bondholder's money in a possible investment. Contradictory, financial distress may give incentives for the shareholders to reject profitable investment opportunities, as the bondholders will claim the profits. Lastly, risk of bankruptcy may lead the management to milk the property by liquidating dividends or increase perquisites at the expense of the bondholders, although such tactics often violate bond indentures.

3. Research question and objective of the thesis

In our paper we want to investigate how managers of large firms differ in their financing decisions opposed to managers in small firms in Norway. We want to address this problem with base in the POT and the TOT. Our research question will be:

Pecking Order Theory vs. Trade-Off Theory: How does financing decisions differ from large to small firms?

Firm size is assumed to have influence on the capital structure decision-making. Literature suggests that the POT should explain more of small firms behaviour than the TOT.

The POT sugets financing behaviour is driven by the cost of asymmetric information. For small businesses, asymmetry of information and agency problems between management and outside investors are more acute than for large firms,

making differences in costs between internal equity, debt, and external equity consequently greater. Therefore, the hierarchical approach should have even more appeal to small firms than to large (Scherr et al., 1990).

In addition, smaller firms might experience less benefits of debt for mainly three reasons. Since small businesses tend to be less profitable they might not be able to take full advantage of the tax shield provided by debt (McConnell and Pettit, 1984; Pettit and Singer, 1985). Further, smaller firms face higher risk of bankruptcy as they tend to be less diversified, which increases the cost of financial distress. Compared to large firms with high quality of financial reporting, that increases transparency, small firms experience higher agency costs as they are more "closed".

It has also been argued that managers in small firms tend to show a desire to retain control of the firm and maintaining managerial independence (Chittenden et al. 1996; Jordan et al. 1998; Kent and Holmes; 1991). They will therefor first prefer the use of internal funds, as this totally maintains control. Secondly, if debt is needed, the preferred debt is short-term debt, as this does not tend to involve debt covenants and security over specific assets (Kent and Holmes; 1991).

4. Literature review

Several papers have investigated the explanatory power of the TOT and the POT in firms financing decisions.

Fama and French (2005) have shown criticism towards both the POT and the TOT. Their results show that how often and under what circumstances firms issue and repurchase equity cannot be explained by the POT. They point to that there may be ways to issue equity that avoid the transaction costs and asymmetric information problems purposed by the POT, which breaks down the model (Fama and French, 2005). With regards to the TOT various research suggests that there is a negative relation between firm's debt ratio and their profitability (e.g., Kester 1986; Titman and Wessels, 1988; Rajan and Zingales, 1995; Fama and French, 2002). Fama and French (2005) claims that this relation is a serious contradiction of the model`s central predictions about the tax and agency benefits of debt. Further, they point to

research suggesting that firms show a slow reversion towards leverage targets purposing question about the existence of targets (Sunder and Myers, 1999).

Shyam-Sunder and Myers (1999) found evidence for the use of POT in financing decisions. Although, they doubt the suitability of the POT for growth companies investing heavily in intangible assets. Further, a study by Goyal and Frank (2003) suggest that POT better explain large firms financing decisions, which contradicts the main point of the theory since smaller firms is assumed to have a greater issue with information asymmetry.

Frank and Goyal (2009) investigated capital structure in publicly traded American firms. They found six core factors assumed to have most importance when determining the firm`s capital structure. Five of these six factors support the use of the TOT in financing decisions. They find that more profitable firms tend to have lower leverage, which support the POT, although the importance of profitability as a determinant of capital structure is declining over the observed years. Contradictory, the TOT provides accounts for factors such as industry leverage, firm size, tangibility and market-to-book (Frank and Goyal, 2009).

Sogorb-Mira and José López-Gracia (2003) investigated the determinants of capital structure decisions using panel data on 32,410 small and medium sized Spanish firms over the period 1994-1998. The hypothesis tested derived from the POT and TOT. The results supported that both theoretical approaches influenced the company`s decisions. Regarding the TOT, their results clearly indicated that firms adjust their leverage level to reach an optimal level over the long-term. Further they found that the effective tax rate was positively related to the debt level and that non-debt tax shields were negatively related to debt level. Lastly they found support for the hypothesis that firm size is positively related to the debt level.

The founding's indicated that small Spanish firms do not adjust their level of debt to their financial deficits, which does not support the POT (Sogorb-Mira and José López-Gracia, 2003). Nevertheless, they did find that the level of debt was negatively related to the size of the generated cash flows, that company age was negatively related to the debt level and that firms with strong growth prospects have higher debt ratios.

Bhaird and Lucey (2009) investigated capital structure in Irish SMEs. They found a positive relationship between the use of retained earnings and the age and size of the firms, which indicates that surviving firms are increasingly reliant on internal recourses as accumulated profits are reinvested. Their findings suggest a tendency to use capital which that avoids outsiders interfering in the decision process of the firm (Bhaird and Lucey, 2010).

5. Methodology and data

This thesis seeks to examine explanatory factors of the capital structure in Norwegian firms. The data will be obtained from the Center of Governance Research (CCGR) database. This database contains information about all Norwegian private and non-private firms. The relevant data is available from the time period 2000 until 2015. We will use panel data regression.

When collecting the data, there are several factors that have to be considered. First, financial firms will be excluded from the data as they have specific regulations regarding capital structure. Secondly, daughter firms are excluded as they have capital structure decided by their parent company. Lastly, firms with inconsistent accounting information such as negative assets are excluded.

The sample will most likely be divided into three different groups; small, medium and large firms. The separation is done in accordance with Garcia de Olalla (2011). Small firms have less than 1 MNOK in total equity, medium firms have more than 1 MNOK in total equity, but are not listed and big firms are listed companies with equity of more than 1 MNOK.

Using panel data techniques, we will run a regression with the leverage ratio as the dependent variable. Following Frank and Goyal (2009) and Garcia de Olalla (2011) we will make use of two different definitions of leverage, total debt to total assets, and long-term debt to total assets. Previous research gives us several suggestions on firm specific as well as macroeconomic factors that influence capital structure. We will focus on the most common and standard elements which are claimed to affect the debt level, which will be used as our model's explanatory variables.

Operating profitability

In accordance with the POT a profitable company should have more internally generated resources to use as basis for financing new project. This results in a negative relationship between leverage and the firm`s profitability (Myers, 1984). Contradictory, the TOT assumes a positive relationship between profitability and leverage. Firstly, a profitable company will prefer debt financing to decrease their taxable profit through the tax shield. Secondly, bankruptcy costs decline as profitability increases. Lastly, leverage reduces the principal agent problem between stockholders and the management by reducing the excess cash available to the management (Jensen and Meckling, 1976).

Growth opportunities

The TOT suggest a negative relationship between growth opportunities and debt, since firms with investment opportunities have strong incentives to avoid underinvestment and asset substitution inefficiencies due to agency problems (Jensen and Meckling, 1976; Myers, 1977). On the other hand, the POT suggest a positive relationship since high growth opportunities forces the firm to search for external financing and debt should be the preferred choice.

Asset tangibility

Tangible assets serve as collateral for lenders, thus reducing the cost of debt. According to TOT, the company debt is positively related with the level of tangibility (Myers, 1977; Scott, 1977; Myers and Majluf, 1984). In contrast, the POT suggests a negative relationship, as higher level of tangible assets reduces the information asymmetry, making equity cheaper (Harris and Raviv, 1991).

Taxes

According to the TOT a higher effective tax rate would incentivize debt financing through a greater tax benefit. Further, non-debt tax shield are a substitute for tax benefit of debt financing (Deangelo and Masulis, 1980). In comparison, according to POT, firms don’t aim for a specific debt ratio, and the positive and negative effects of the tax shield and financial distress respectively are assumed second order.

Industry

If a firm is following the POT, there should not exist a clear relationship between the industry leverage and the firm leverage. Whereas in TOT, the relationship should be positive as the average leverage level in the industry might serve as a benchmark for the optimal debt ratio. In general, the industry variable might capture other factors that can help explain the differences in capital structure between industries, beside the capital-intensity nature of the sector.

Risk in sales

High-risk firms face higher risk of bankruptcy which increases the cost of debt. The TOT therefor predicts a negative relationship between risk and leverage. According to POT higher risk might increase asymmetric information problems leading to higher leverage (Frank and Goyal, 2009)

6. Progress plan

Progress	**Deadline**
Define hypothesis and collect data needed	January and February 2018
Processing data and create data set	February 2018
Analyze model and data in e-views	February – March 2018
Interpret and comment upon results	April 2018
Hand in first draft of thesis for feedback	Late April 2018
Review and additional proofreading	May-August 2018
Hand in final version of Master Thesis	15 August

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