Determinants of capital structure

An empirical study on large cap companies listed on Helsinki Stock Exchange between 2015-2019.

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Abstract:
One of the essential questions for companies’ managers is how they should opt for the set of securities to issue for the purpose of raising funds. This decision determines the firm’s capital structure, which is the relative proportions of debt, equity and other securities that a firm has outstanding. Considering the fact that choice of debt and equity depends on characteristics for firms as well as firm’s activities are governed differently in different countries due to distinctive environment and regulation, findings on the capital structure studied in the past were varied and contradictory. Capital structure decision is primarily analysed based on three main theories—pecking order theory (Myers and Majluf 1984), trade-off theory (Myers 1984) and agency cost (Jensen and Meckling 1976). The purpose of this study is to examine the factors and their different impacts on the choice of capital structure for publicly listed large firms in Finland. This thesis covered the leverage determinants of 30 non-financial firms listed in Large Cap index in Finland over the period of five years 2015-2019. In order to pursue the answer for the research questions, both quantitative and explanatory research approaches were employed. In this paper, three debt ratios were selected: total debt ratio, long-term debt ratio and short-term debt ratio. While the explanatory variables as firm-level determinants of capital structure were chosen as profitability, tangibility, firm size, non-debt tax shields, growth opportunity, and liquidity. Fixed effect panel data model was performed in order to identify the determinants of listed large cap companies in Finland. The results showed that there is significant positive impact of tangibility, firm size on leverage which supports Trade-off theory and Agency theory and the significant correlation between liquidity and leverage confirms Pecking Order theory. However, profitability and growth opportunity have no significant influence on capital structure choice. Among all the significant variables, non-debt tax shield has the strongest impact on capital structure choice of Finnish large cap firms.
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1 INTRODUCTION

1.1 Background

One of the essential questions for companies’ managers is how they should opt for the set of securities to issue for the purpose of raising funds. In fact, firms can still choose to issue new securities to repay debts or repurchase shares, despite the fact that they are not in need of new capital for investment. This decision determines the firm’s capital structure, which is the relative proportions of debt, equity and other securities that a firm has outstanding. On the one hand, public firms, theoretically, find it profitable to cherish the benefit of debt through tax shield to maximize their value. On the other hand, overusing debt can lead to higher probability of bankruptcy. The research by Deesomsak et al. in 2004 declared that debt and equity choice is subject to the firm’s characteristics. Therefore, an inadequate methodology can, often, make it difficult to interpret the empirical evidence. Considering the fact that choice of debt and equity depends on characteristics for firms as well as firm’s activities are governed differently in different countries due to distinctive environment and regulation, findings on the capital structure studied in the past were varied and contradictory. Thus, it is not recommended to generalize the results from a specific research and use for specific countries and sectors. In other words, firms’ managers cannot make financial decisions following the results from the researches done in other countries. In essence, capital structure choice is an important finance decision for firm managers as the choice of using debt or equity to finance may have a significant effect on the value of the firms.

The question of whether a firm’s capital (or leverage) structure is relevant or irrelevant to its value was already discussed by Williams in 1938 and Durand in 1952 but only until 1958 were Franco Modigliani and Merton Miller (M&M) able to offer a detailed theoretical analysis on the topic. However, this result only regards the condition of perfect capital markets. Following M&M, other theories such as the Trade-off theory (1973) and the Pecking-order theory (1984) were developed to explore the leverage structure from different perspectives. There are different approaches when explaining why firms have different leverage ratio. While the Trade-off theory focuses on the agency problem, and
that there is an optimal point of leverage where firm value is maximized, the Pecking-order theory believes that the market is aware of the asymmetric information. In view of Pecking-order theory, there is no optimal debt level for firms. As an alternative, firms settle on its capital structure choices by following a hierarchy order, initially from internal source of finance to debts, hybrid securities and finally equities (Myers and Majluf 1984). Besides that, the Market timing theory (2002) proposes that firms take advantage of high share prices, resulting in an increase in equity.

However, while most prior researches focus on examining the determinants of capital structure of firms from the U.S or European firms, very limited number of researches have been made concerning firms in Finland, especially in one specific market capitalization. In particular, total market value of a company's equity is called market capitalization. It is one of many ways to value company and is calculated by multiplying the price of the stock by the number of shares issued (Pavone 2019). If a firm has one type of stock its market capitalization will be the current market share price multiplied by the number of shares. However, if a company has multiple types of equities, the market cap will be the total of the market caps of the different types of shares. From the perspective of market cap, company size, which is measured by total market capitalization, and returns were found to have strong association in researches by Banz (1981) and Fama and French (1992). Yet again, the analysis of these results is controversial. The excess returns of small firms can be interpreted as inefficiency, but that maybe the sign of compensation for bearing high risk. In one strand of the literature, Gertler and Gilchrist (1994) and Sharpe (1994) suggest that large firms have a proportionate response, compared to small firms, to financial and monetary policy. Similarly, Kudlyak and Sanchez (2016) reprove that large companies may be far less sensitive to economic shocks than are smaller firms. Because the diversity in value of all outstanding shares of a corporation is believed to have different results in conclusion, it is motivated to study the leverage determinants of companies listed in the OMX Helsinki Large Cap index and hence, this study is considered significant to represent the large firms in Finland.
1.2 Research aim

The purpose of this study is to examine the factors and their different impacts on the choice of capital structure for publicly listed large firms in Finland. This thesis covers the leverage determinants of 30 non-financial firms listed in Large Cap index in Finland over the period of five years 2015-2019. There are studies about leverage structure of listed firms in Finnish stock exchange but to the author’s understanding, there is no precedent of such a study about companies with large market capitalization.

1.3 Research questions

To fulfil the objective of the thesis, the following research questions are addressed and answered:

- How do firm-specific determinants affect the choice of capital structure, regarding large cap companies listed on Helsinki Stock Exchange?

In contrary to unlevered firms, levered firms need to take into careful consideration many different aspects before deciding on their capital structure such as WACC, capital budgeting, riskiness and investments. So, understanding the importance of capital structure to the value of the company and comprehending which factors that can affect the capital structure decisions is actually crucial. Besides, the author appeals to describe some fundamental theories of capital structure to provide a comprehensive reading to the audience. Therefore, two sub questions are adopted to clarify the points above:

1. What are the determinants of capital structure?
2. What is the most influential factor of the capital structure choice, regarding large cap listed companies in Finland?

The first question tests the relationship between book leverage ratio as dependent variable and chosen independent variables. As the second and the third chapter will show, this relationship can be explained by the Pecking-order theory and the Trade-off theory. For this question, regressions will be run on the entire sample. In order to answer the second question, the empirical result will be evaluated to see which chosen factors have the strongest correlation with the leverage ratio.
1.4 Limitations

Due to the choice of only one country as well as the choice of a few companies in the data set, this thesis poses some limitations. The data sample for the paper is limited to only non-financial firms due to the difference in the capital structure of financial firms. Consequently, small sample can lead to a quite bias conclusion if conclusions are made for other large cap companies in other regions based on the result of this research. Additionally, only accessible data that can be derived from financial statements of target firms are concerned, it implies that the thesis only offers the viewpoint of an investor, given that only published information are analysed and internal information is unobtainable.

1.5 Validity and Reliability

In order to ensure validity and reliability of thesis results, three main steps were taken. First of all, the theoretical ground for this paper is retrieved from reliable sources, such as academic journals and course literature. Secondly, the data for variables is collected from global databases, i.e. Thomson Reuters DataStream, Morning stars, Nasdaq Helsinki, without any specific expectations from the author. Lastly, theories and previous findings are used as a fundament for the discussion of results. Meanwhile, sceptical and logical thinking is applied for data analysis in order to avoid biased viewpoints.

1.6 Structure of the thesis

After this introduction, the second chapter introduces some important theories relating to capital structure and relevant prior research about determinants of capital structure. Following that, the third chapter gives the details of data collection and methodology for the research that includes a detail introduction to all the determinants of capital structure, expected relationships and models used in the study. The fourth chapter provides an empirical research, which examines the influence of the chosen determinants on the firm’s capital structure then clarifies the outcomes after analysing the database using the estimate model and offers the response for the principal research question. Finally, chapter 5 concludes the thesis, justifies the reliability as well as the validity of the thesis, and proposes a few proposals for additional examination.
2 LITERATURE REVIEW

2.1 Theoretical background

In this first part of Literature review, all the notable theories relating to capital structure will be presented. This comprises Modigliani and Miller (1958), Trade-off theory, Perking Order Theory (Myers and Majluf 1984) and Agency Cost (Jensen and Meckling 1976).

2.1.1 M&M Capital Structure Irrelevance Proposition

Developed by Modigliani and Miller in 1958, the Modigliani and Miller Irrelevance Theorem (M&M theorem) was normally considered a fundamental theory for the later modern corporate finance theories about the capital structure determinants (Villamil 2008, p.1). The theorem is acquired based on a perfect capital market which implies five assumptions as (1) capital markets are not friction, in other words, there are no transaction costs or no taxes; (2) all market participants share similar expectations, i.e. all value-relevant information is available; (3) all market participants get symmetric access to credit markets, i.e. the borrowing costs are at the same rate with any market participants; (4) the firm’s investment program is fixed and known to all investors; and (5) the firm’s financing is fixed, i.e. the capital structure is fixed (Ogden et al. 2003 p. 30-31).

Their paper assumed that the firm has a stream of income over time, and the firm will divide this expected cash flow among its investors. As both the firm and the investors have equal access to financial market due to the assumption, the capital structure choices pose no impact on the market value of the firm. The first Proposition can also be demonstrated as:

\[ E + D = U = A \]

Where E and D stand for the market value of equity and debt of the firm respectively, U represents the market value of equity if the firm implies is unlevered, while A denotes the market value of assets of the firm.
The Proposition II can be illustrated as:

\[ r_E = r_U + \frac{D}{E} (r_U - r_D) \]

In which \( r_E \) and \( r_D \) are the cost of capital of levered equity and debt, \( r_U \) is the cost of capital of unlevered equity. The levered equity return is equal to the unlevered return plus the additional return for leverage risk which equals the debt-to-equity ratio multiplied by the spread of cost of capital of unlevered equity and levered debt.

However, the basic propositions are proved irrelevant in the real world where the assumption of the theorem cannot be applied. Acknowledged this limitation, some of the assumptions were withdrawn in their later papers: Modigliani and Miller (1963) and Miller (1988). M&M (1963) states that, in equilibrium, the market value of a levered firm is the sum of the uncertain stream of profit after tax and a sure stream of interest tax shield (capitalized with the rate of interest which is assumed to be constant and independent of the size of the debt). Therefore, tax advantage increases the firm value. However, M&M (1963) advised that firms should avoid maximizing debt financing. In some situations, financing by retain earnings might be cheaper when investors’ tax status is taken into account. One notable thing is that debt investors can execute disciplines on the firm operation and other costs that are not captured in their model.

2.1.2 Trade-off Theory (1973): tax shield vs agency problem

The Trade-off theory (1973), which was developed from M&M theorem’s debate, recognizes the benefit of tax shield and the costs of financial distress. It implies that firms take advantage of debt to minimize the tax burden and exploit debt finance as much as possible but stop at the point where the financial distress cost starts to reduce the tax benefit. It assumes the existence of optimal capital structure where firm value is maximized.
Figure 1. Trade-off theory (Brealey, Myers and Allen 2011)

Financial distress costs take account of agency costs and bankruptcy costs. Agency problems, arising when a firm is on the verge of bankruptcy, trade off the benefit of debt and the cost of debt. As in the free cash flow theory, Jensen (1986) stated that managers with large amounts of free cash flow prefer to undertake non-optimal activities. When the operating cash flow of the organisation is more than its profitable investment opportunities, high-debt levels will increase the value of the firm. Moreover, when the organisation generates substantial free cash flow, conflicts of interest between shareholders and managers over payout policies are severe. Too much cash may encourage managers to take it easy and expand their benefits with cash that should be paid back to shareholders. Another problem is to motivate managers to utilise the cash instead of investing it below the cost of capital.

Managers tend to allocate the firm’s resources to their private benefit, especially when the firm is mainly equity financed (Jensen and Meckling 1976). Debt, therefore, is important to limit management spending the excess cash flow in non-profitable investments. The excess cash flow will be used to repay debts where indirectly diminishing the management’s control over the cash flows. According to Jensen (1986), debt can also be an effective substitute for dividend since it would tie up the owner-managers to pay out the debts for future cash flow. He also discussed that debt reduces the free cash available for managers to waste on incentives. Another benefit is that, considering management holding a portion of equity, an increase in debt allows them to retain a larger portion of the
(risky) equity. The tendency to have more debts is a signal of confidence in the firm’s future coming from managers in high-quality firms. On the other hand, costs of debt are born by equity holders. Debtholders know that debt motivates a near-bankruptcy firm to invest in risky projects and that equity holders benefit the most if these projects succeed but debtholders suffer the loss if they fail. This leads to a higher cost of debt (Brealey, Myers and Allen 2011 p. 452-456).

In addition, bankruptcy allows creditors to take control when the firm fails to pay. When the debt level becomes considerably large, the possible bankruptcy cost that creditors will have to pay in the case of bankruptcy are anticipated. As a result, the firm are mandated to bear higher interest even at the time the firm is not in trouble. This reduces possible payoffs to stockholders and consequently the market value of their shares (Brealey, Myers and Allen 2011 p. 449-450).

The Trade-off theory implies that the cost of debt can be reduced by some attributes such as safe and tangible assets, high taxable income. On the other hand, firms with low profit, high risk, intangible assets should rely on equity funding because they are vulnerable to financial distress costs. Firms with good growth opportunities have less debt because management are more likely to expropriate wealth from debt holders (Fama and Miller 1972; Jensen and Meckling 1976). Compared to large firms, solutions to agency problems are moderately expensive for small and medium enterprises (SMEs). The transaction costs between SMEs and their creditors or shareholders tend to be increased (Jensen and Meckling 1976). Vasilescu (2010) also implied that it could be more challenging and costly for SMEs to monitor due to the fact that they are not required to fully disclose information to the market as usually appears with large firms, which allow a reduction of agency costs.

### 2.1.3 Agency cost theory

The study on the possibility of different utility functions between managers and shareholders was initially examined by Fama and Miller (1972). Based on the work of Fama and Miller together with the expansion from Modigliani and Miller’s theory (1958), Jensen and Meckling (1976) developed an agency theory which concentrates on agency
costs. From the perspective of Jensen and Meckling, a conflict of interest between shareholders or equity-holders and managers and a conflict of interest between creditors and shareholders are the cause for agency costs to rise.

When managers have incentives to invest funds in a risky business for shareholders’ interest, the problem of agency cost of equity occurs (Harris and Raviv 1991). Creditors are most likely to bear the cost in case failure in investment happens due to the fact that members of limited liability entities have limited responsibility for the debts of the business. As a result, Jensen an Meckling (1986) claimed that debt can be an important factor in monitoring or reducing the conflicts between shareholders and managers. In addition, with additional debt being issued, the free cash flow of the firm’s owner may decrease because the firm is now committed to servicing the debt taken.

Meanwhile, the problem of agency cost of debt is caused by equity-holders’ motivation to sub optimally invest the funds obtained through debt. Leverage encourages the equity-holders to reallocate wealth from bondholders to equity-holders (Fama and Miller 1972; Jensen and Meckling 1976). However, when a firm have too much leverage financing, it is more likely to face financial distress (Jensen and Meckling 1976). If the lenders can correctly predict the equity-holders’ intentions, the loss can be minimized as equity-holders prefer more risky projects, while debt-holders prefer the opposite. In some previous studies, SMEs were stated to be more sensitive to the problem of agency cost of debt due to the opaqueness of their business which may lead to increased moral hazard and adverse selection problems (Van der Wijst 1989; Ang 1991). Michaelas et al. (1999) also discussed that agency costs are more significant in smaller firms, which leads their owner to run higher risks and in inaccessibility, especially in the first years when the firm’s survival is highly concerned.

2.1.4 Pecking Order theory (1984): asymmetric information

The Pecking Order Theory by Myers and Majluf (1984) referred to equity as the last resort of financing due to the presence of information asymmetry and risk. Asymmetric information has an effect on the decision of financing by internal or external source and between issuance of debt or equity, which leads to a pecking order for financing decisions.
The asymmetric information is based on the assumption that managers know more about firm value, growth and risk than bondholders and shareholders. The only reason for them to issue shares is when they believe that the shares are overvalued by the market. Conversely, by choosing debt over equity, they intend to imply that the stock is undervalued in the market. This arising issue is also called the lemon problem.

Considering that the market is aware of the asymmetric information, the Pecking-order theory states that firm managers want to avoid giving any signal to the market. Therefore, internal cash would be preferred first when managers decide on the choice of financing. In order to maintain the needed amount of cash, especially in case the internal cash is not enough, firms would adjust the dividend pay-out ratio. It is recommended that such changes in dividend policy are made without creating a surprise to the market. If the first two options are not feasible, the next resort would be to draw down its cash balance or obtain cash from selling marketable securities. External finance is the last choice, starting with the safest securities such as debt and convertible bond and equity at last. This theory says that profitable firms have low debt level because they have sufficient internal finance and do not need to resort to external channels. This opposes with the Trade-off theory (Brealey, Myers and Allen p. 460-463).

In the modified version of the pecking order theory, Myers (1984) also made an effort to recognise both asymmetric information and financial distress cost in the capital structure decision of the firms. It is stated there is higher possibility of arising financial distress cost and the cost of foregone net present value (NPV) investment opportunities when risky sources of finance are employed. For that reason, firms may choose to finance their investment projects beforehand to build up financial slacks, even though issuing equity earlier than investment time can also result in the same asymmetric information problem as later issuance of equity (Myers 1984).

Another critical issue in this theory is that of how the relationship between the capabilities to generate internal funds and the viewpoint of getting new investment projects affect capital structure. According to Hutchinson (2003), smaller firms are likely to have higher
demand on borrowing compared to larger firms when faced with investment opportunities. Alternatively, Shyam-Sunder and Myers (1999) attempted to test the pecking order theory using the set of 157 firms for the period 1971 to 1989. In their study, a model for testing the pecking order theory was introduced whose result showed that the deficit in finance will cause new issuance of debt. When correlating financing deficits and leverage, the slope coefficient is supposed to be approximately 1 which specifies that a unit increase in deficit lead to new debt issued to finance such deficit. An empirical result of coefficient of 0.75 from their study implied the conclusion that pecking order is a strong indicator of corporate financing behaviour. Moreover, the coefficients and significant of pecking order models were shown to be quite persistent while the target-adjustment model showed signs of degrades. However, many later researches challenged the interpretation of Shyam-Sunder and Myers (1999) (Chirinko and Singha 2000) or criticized the limitation in small sample set of data (Frank and Goyal 2003).

### 2.2 Previous research on capital structure

This section summarizes the empirical evidence regarding a firm’s capital structure and also makes an attempt to answer the basic question of knowing about existing corporate capital structure choices. The review of related studies on capital structure and its determinants has been organized chronologically:

**Ferri and Jones (1979)** examined the possible relationships between a firm's financial structure and its industrial class, size, variability of income, and operating leverage. The results of the study can be summarized in this way: (1) industry class has connection with a firm's leverage, but in a less noticeable and direct manner than has been previously proposed; (2) there is a relationship between a firm's use of debt and its size, but the correlation does not correspond to the positive, linear pattern that has been indicated in other work; (3) income variation which was measured in numerous ways, were proved to not be associated with a firm's leverage; and lastly, (4) operating leverage does have influence on the percentage of debt in a firm's financial structure and this relationship is quite similar to the negative, linear structure which financial theory would suggest.
Bradley (1984) developed a model investigating quite a few factors from modern capital structure theories such as the tax advantage and bankruptcy costs factor in the trade-off theory (Kraus and Litzenberger 1973), agency costs of debt (Jensen and Meckling 1976), non-debt tax shields (DeAngelo and Masulis 1980) and personal tax rates of income from stocks and bonds (Miller 1977). The authors studied a sample of 851 firms from 25 industries, and the results showed that industrial factor has a significant effect on firm leverage ratios. Their research also presented evidences that volatility of firm earnings, intensity of Research and Development and advertising expenditures are also negatively related to leverage. However, the amount of non-debt tax shields is shown to have a significantly positive relation with leverage.

Titman and Wessels (1988) examined the capital structure of 469 firms in the period 1974 to 1982 employing various models which comprised of joint hypotheses in the empirical tests. In their paper, it is found that debt levels and the uniqueness of a firm’s line of business are negatively correlated. Their empirical results also pointed to the conclusion that transaction costs can have a significant effect on capital structure choice due to the observed difference in financing practice between small firms and large firms. Another important finding is that while examining the factors relevant to the static trade-off theory, it was found that there are no significant impact of non-debt tax shields, volatility, collateral value or growth on leverage.

Love and Wickramanayake (1996) studied a sample of 112 Australian companies, over 14 industrial classifications between 1980 to 1994 to check the possibility of applying the theory of optimum capital structure at the industry level. The empirical work in the study employed three distinct tests to prove that there are variations existing in the capital structure of the sample industry groups. Initially, ANOVA tests are performed to measure differences in the debt-to-equity ratio between industries, at the same time to calculate the cross-sectional variance in firm leverage which can be explained by industry classification. Secondly, the authors used an OLS regression estimation procedure to calculate whether or not industrial classification is a significant determinant of financial leverage. Lastly, to test the similarity between a series of nominated industry relationships, namely size, profitability, growth and volatility, an apparently unrelated regression technique was performed. The results from the study showed some evidence consistent with capital
structure theory, which are relevant in the sample period and industries examined by using all three econometric techniques. Subsequently, after the formation of differences between the capital structures of the selected industries, the author performed a non-parametric test involving correlation analysis to examine whether or not macroeconomic shocks could have the same impact on the various capital structures. The results of a correlation analysis provide an explainable relationship for a number of industries, but overall, the results are unconvincing.

Wald (1999) investigated the factors affecting the capital structure choice of five countries: France, Germany, Japan, the U.K, and the U.S. The paper focused on firm-specific factors that are differently correlated with leverage across countries such as firm size, risk, sales growth, and inventories. In this paper, the author adopted the profits model to investigate the firms’ choice of whether to issue debt or equity for funding. For the proxy of leverage, long-term debt to book value of assets was applied. The research showed that the capital structure of the U.S is more sensitive to default risk than that of Japan. Firm size was found to be insignificant to the capital structure choice of firms in France and Germany while this factor is positively related to leverage in the other three countries. High-growth firms in the U.S was also found to take on less leverage than those in other countries.

Antonoiu, Guney and Paudyal (2002), using panel data, investigated determinants of capital structure a leverage ratio of French, German, and British firms. They analysed relation of profitability, size of firms, and fixed assets. Their results suggested that size of the firm and the leverage ratio have positive correlation. While the relationship between fixed asset ratio and level of leverage was mixed as the association is positive in Germany but negative in France and UK. As a result, it implied that tangibility of assets is more significant in borrowing from banks in Germany. In addition, the authors indicated that the impact of all these factors on leverage relies on financial environment and tradition of the country in which firm operates.

Voulgaris, Asteriou and Agiomirgianakis (2002) analysed the determinants of the capital structure of the large firms manufacturing sector in Greece, using the panel data of a
random sample of large Greek enterprises. Their findings suggested large-size enterprises’ capital structure are significantly affected by asset utilization, gross and net profitability and total assets growth. This study recommended that Greek manufacturing large-size enterprises should attain higher asset utilization and profit margins through economies of scale achieved mainly by higher exports in order to improve capital structure. Moreover, the focus of governmental measures aiming to support large-size enterprises should be on alleviating taxation, reducing bureaucratic burdens, minimizing market imperfections and subsidizing applications of new technology.

**Song (2005)** conducted an empirical study to examine the determinants of capital structure and debt level with the sample of 6000 Swedish based firms during the period from 1992 to 2000. Determinants mentioned in the study were tangibility, non-debt tax shield, profitability, size, expected growth uniqueness and income variability. Panel data regression was employed to examine the determinants affecting the three leverage measures, which are total debt ratio, short-term debt ratio and long-term debt ratio. Tangibility was found to have positive relationship with total and long-term debt and negative relationship with short-term debt ratio. There is no correlation between non-debt tax shield with total debt ratio, but it exists positive correlation with short-term debt ratio and negative correlation with long-term debt ratio. This result revealed that most of firms prefer long-term debt when they are engaged in tax shelter schemes. Aligning with pecking order theory, profitability in this study was found to be negatively correlated with all leverage measures. The relationship between size and long-term debt was found to be negative but it had positive impact on short-term debt and total debt. This result implied that small firms are more sensitive and not capable to employ long-term debt financing. In addition, the study found no relationship between leverage with expected growth as well as uniqueness. Meanwhile, the correlation between income variability and leverage was almost zero but statistically significant.

**Seppa (2008)** performed a research to study the relationship between firm-specific factors and capital structure decisions along with the behavioural differences with different sizes of firms. The dataset included 260 Estonian non-financial firms which were categorized into small, medium and large firms. The independent variable in the study was debt ratio.
Meanwhile, companies’ amortization, earnings before interest and taxes, return on investment, tangibility, net working assets and business size were chosen as the explanatory variables. The research results found that there was a significantly positive correlation between amortization and debt, while the business size was weakly related with debt. Regarding return on investment (ROI), it was found to have significantly negative related to debt. For business risk, it was found that only small firms had weak correlation between risk and debt. Seppa’s study showed that the Estonian non-financial firms follow the pecking order theory in their capital structure decisions. Consequently, it was not persuasive enough to support the optimal capital structure decisions in the long run. Moreover, small and large firms are proved to have different behavioural patterns. However, the differences were still ambiguous.

Qiu and La (2010) reinvestigated what influenced some firm characteristics have on Australian firms’ capital structures, employing a panel regression for the annual data for a cross-section listed Australian firms during the period between 1992 and 2006. In the research, the debt ratio was chosen as dependent variable while independent variables consist of firm size, asset tangibility, profitability, growth and firm risk. According to the research results, firm size and debt ratio were found insignificantly related. Besides, debt ratio was found to have positive correlation asset tangibility but negative with the other three independent variables. This result implied that pecking order theory is more relevant in Australia compared to the trade-off theory. In addition, the negative impacts of profitability, growth prospects and firm risk were expected to be significant and align with bankruptcy costs, signalling effect as well as the agency costs theories. However, this conclusion was in contrast with Deesomsak et al. (2004) who supposed that risk, profitability and growth do not exert significant impact on capital structure in Australia. Qiu and La’s research indicated that the agency costs are at the most concern of profitable firms while unprofitable firms are more affected by bankruptcy costs when making capital structure decision. Moreover, bankruptcy costs, agency costs, signalling effects and issuance cost of equities are considered the most important thing in Australian firms’ capital structure decisions.

Olayinka and Taiwo (2011) examined the determinants of capital structure of 66 firms listed on the Nigerian stock Exchange during the period 1999-2007 with the help of panel
data. In this study, total debt to total asset ratio was used as the proxy for debt ratio. According to the research result, leverage was found to have negative correlation with growth opportunities, which implied that growing firms do not use debt financing. Leverage was also found to have negative relationship with tangibility, but it has positive relationship with liquidity as well as size. This result in the three models confirmed the implication of pecking order hypothesis which claims that highly profitable firms prefer to use internally available funds for financing investment than through debt finance. It also illustrates that size and leverage are positively associated.

Sheikh and Wang (2011) performed a research to investigate the factors influencing the capital structure of manufacturing firms on Pakistan in order to confirming if capital structure models derived from Western settings can be applied to capital structure decisions of the Pakistani firms. Panel data regression for a sample of 160 listed firms in Karachi Stock Exchange for the period 2003-2007 was employed to test different conditional theories. The results proposed that there were negative relations between profitability, liquidity, earnings volatility, and tangibility (asset structure) and the debt ratio, while a significantly positive correlation was found between firm size and debt ratio. Additionally, non-debt tax shields and growth opportunities were found to have no significant impacts on debt ratio. The results showed a consistency with trade-off theory, pecking-order theory, and agency theory which implies that financing behaviour of firms in Pakistan could be moderately explained by the capital structure models derived from Western settings. However, the explanatory power of the capital structure models derived from Western settings might be limited due to the difference in long-term and short-term debt.

2.3 Summary of theories

According to theories discussed above, below is the summary of the factors that may have impacts on leverage structure of firms:

**Size:** According to Trade-off theory, larger companies are expected to have higher leverage, but they are expected by the Pecking-order theory to have low leverage.
**Profitability:** there is a contradiction between the Trade-off theory and the Pecking order theory regarding companies’ profitability. The former predicts that firms with good profit reasonably want to utilize the benefit of higher debt coming with tax shield and low financial distress costs. Meanwhile, proponents of the Pecking-order theory emphasize that profitable firms demand lower debt because they can fulfil financing needs using internal cash.

**Profit volatility:** According to the Trade-off theory, it is predicted that firms with earnings volatility are more cautious with using leverage because it may increase financial distress costs if they fail to meet financial obligations. Meanwhile, the Pecking-order theory predicts that firms with more volatile earnings will uphold spare debt capacity in an attempt to prevent them from issuing more costly debt at a later stage.

**Asset tangibility:** The Trade-off theory implies that firms that have safe and large tangible assets should have high debt ratio due to the fact that assets tangibility helps reduce financial distress costs as stakeholders can claim in the event of firm’s bankruptcy.

**Growth.** The asymmetric information indicates that management has insider information and knows about the future growth of the company. If the management believes that the firm has stable future growth, they will issue debt if they believe that the value of the company is currently too cheap. The Pecking-order theory states that growth companies need a lot of financing and tend to issue more debt since their internal resources are limited. On the other hand, the Trade-off theory suggests that firms with higher growth opportunities use less debt since growth are intangible and cannot be used as collateral.

**Tax shields:** firms are believed to utilize tax shields as a solution to reduce cost. The Trade-off theory predicts that firms want to increase the debt level until an optimal point where no more tax shield can be realized.
3 DATA AND METHODOLOGY

In this chapter, chosen research approach and research design will be discussed firstly. Following is the brief description of how and where the data is collected. Later, the determinants of capital structure or selected variables used in the study will be presented. All the determinants are robustly backed by the theories of capital structure and also exploited in previous research. Afterward, the model and hypothesis for this research will be explained.

3.1 Research approach

In order to pursue the answer for the research questions presented on section 1.3 Research questions, both quantitative and explanatory research approaches are employed. Bryman and Bell (2011 p. 150) describe that quantitative research methods help explain an issue or phenomenon through collecting data in numerical form and analysing with the help of mathematical or statistics method. From the view of the above definition, it could be inferred that the first aim a research tackles or embarks upon is elucidating a problem. The benefit from using quantitative method is that more empirical and reliable results are produced. The reliability of results is the result of using numerical values and these values are unrelated to researchers. Besides, numerical values also bring the advantages of involving longer periods in the research and make it possible for researchers to analyse data from different angles. Moreover, quantitative method allows researchers to compare the findings with already existing theories, assess the consistence of these theories, and then test the hypothesis (Saunders et al. 2015 p. 166).

Explanatory research method is conducted to explain and account for the descriptive information. In other words, it examines causes and reasons and presents evidence to endorse or disprove an explanation or prediction (Grey 2014). Therefore, using explanatory research method to uncover and state some relationships among different aspects of the phenomenon under study is believed to be appropriate in this paper. Especially, the aim of this study is to examine and explain the correlation between capital structure and its determinants (as firm specific factors).
3.2 Research Design

The purpose of this paper is to answer research questions in an ordered framework. Therefore, in combination with quantitative analysis method, a deductive reasoning is implemented. Firstly, related theories and other previous findings are discussed. Secondly, expected results are formulated for variables based on these theories and prior researches. Thirdly, data is analysed and, finally, the outcomes are compared with the expectations with the aim of identifying whether regression results are consistent with given expectations or not.

3.3 Data collection and Source

When analysing what impacts on firm’s leverage ratio, firm-specific determinants are the major types of variables to be considered. The primary source of the collected data is Thomson Reuters DataStream, which consists firm specific financial data across a wide range of industries around the world. The initial lists of 32 large capitalization (Large Cap) companies in Finland were retrieved from the NASDAQ online database. If a company is listed separately with both A and B stock that only represents the different types of stocks of the same firm, which is especially relevant for Finnish firms, they are not considered as different firms and just one is selected. Furthermore, the financial firms are excluded from the sample due to different capital structure and firm characteristics from non-financial firms. Therefore, the final sample of firms selected, for covered period from 2015 to 2019, is restricted to 30 non-financial Large Cap firms listed on the stock exchange market of Finland (See Appendix 1).

3.4 Determinants of capital structure

3.4.1 Measures of leverage (dependent variables)

The distribution of debt and equity of a company is called capital structure. However, due to the fact that composition of liabilities is complex, the proxy for capital structure differs considerably in previous literature. As the final results may be affected by the choice of
the measures of leverage, defining a proper proxy for this term is one of the most vital decisions.

Debt ratio is considered as the broadest definition for leverage ratio, which is total liabilities to total assets. This measure of leverage provides a signal of the remaining for shareholders after a liquidation, however, it also has its limitations as it is not able to show the situation in the near future. In this regard, the short-term debt ratio should function better as a choice of leverage proxy. Another hindrance of using total liabilities is because of including account payable, which sequentially can overestimate the amount of leverage (Rajan and Zingales 1995).

There are also differences in choosing between book leverage and market leverage in previous research. Book leverage is the debt ratio which uses book value of equity, while market leverage is the debt ratio which uses market capitalisation of the firm. Myers (1977) indicated that book leverage is more stable as it is not affected by market outlooks, which can cause unstable value over time. Additionally, it was argued that investors focus more on the firm’s assets rather than the growth opportunities. Nevertheless, many previous studies did adopt market debt ratio, which emphasizes on the market value of total assets of firms. It was argued that including market values will help minimize the risk of mismeasurement (Bowman 1980).

In this paper, the ratio of total debt to total assets is chosen as the proxy of leverage. Contradictory to total liabilities, some certain liabilities for transaction purposes, for example untaxed reserves or accounts payable are excluded in total debt. Therefore, using total debt instead of total liabilities is considered more appropriate. Some researchers such as Bevan and Danbolt (2000) and Song (2005) argued that when studying capital structure, it is necessary to examine a detailed analysis of corporate debt since it exists significant difference in the determinants of several types of debt, such as long-term debt and short-term debt. As a result, based on only total debt to total assets ratio when doing research on leverage might conceal the impact of capital structure determinants on long-term debt and short-term debt (Song 2005). Hence, in this paper, total debt is decomposed
into long-term debt and short-term debt in purpose of examining the impacts of determinants on the ratio of long-term debt to total assets and short-term debt to total assets. All three leverage measures are presented as the formulas below:

\[
\text{Total book debt ratio (LEV1)} = \frac{\text{Book value of Total liabilities}}{BV \text{ of total assets}}
\]

\[
\text{Long – term book debt ratio (LEV2)} = \frac{\text{Book value of Long – term liabilities}}{BV \text{ of total assets}}
\]

\[
\text{Short – term book debt ratio (LEV3)} = \frac{\text{Book value of Short – term liabilities}}{BV \text{ of total assets}}
\]

### 3.4.2 Firm-specific factors (independent variables) and expected results

Due to the fact that how to decide on a set of firm-level factors that influence the capital structure are quite controversial in previous literature, most of the selection in this study were established following traditional capital structure theories, including static trade-off theory, pecking order theory, agency cost and asymmetric information. While there were various different models implemented in prior empirical studies, the most frequently used variables, as firm-level determinants of capital structure, are profitability, tangibility, firm size, non-debt tax shields, growth opportunity, and liquidity.

#### a. Profitability (PROFIT)

The Pecking Order Theory suggests that capital structure choice is considered by companies based on a hierarchy system: internal financing will be preferred at first, then external financing starting from debt to hybrid securities and finally equity. For that reason, high profitable firms should generate more earnings while less profitable firms will have less available earnings for retaining purpose, thus have higher demand for external financing. Profitability has been used in many prior research (Titman and Wessels 1988; Booth et al. 2001; Deesomsak et al. 2004) and the most common result is that past profitability of firms is negatively associated with leverage.

In this paper, following Booth et al. (2001), Return on Assets is calculated as follows:

\[
\text{Return on Assets (PROFIT)} = \frac{\text{Earnings before Interest and Tax}}{\text{Book value of Total Assets}}
\]
It is anticipated that Profitability is negatively associated to debt ratio.

b. Tangibility (TANG)
Tangible assets are physical assets, such as land, buildings, machinery, and construction in progress, being used through a relatively long period in the operation of the business, which can be offered as collateral to creditors in circumstance of bankruptcy. Therefore, trade-off theory suggests that public firms with a high ratio of tangible assets are expected to have a high level of adopted leverage as these firms are more likely to have a lower cost of debt compared to other public companies whose tangible assets level is low. A statistically significant positive relationship between tangibility and leverage were also proved in previous research (Rajan and Zingales 1995; De Jong et al. 2008; Fan et al. 2012). From the view of Agency theory (Jensen and Meckling 1976), asymmetry information suggests that when having access to debt, firms may have an incentive to invest to use the funds sub optimally, which leads to the firms’ creditors being confiscated. The use of collaterals will make the firms have more incentive to use the funds for profitable project. Myers and Majluf (1984) also argued that the firms can avoid asymmetric information cost and at the same time, it will be more advantageous for the borrowing firms when secured debt is issued. As a firm has high level of tangible assets, the firm will have more assets to be used as collaterals, and thus may get access to more debt financing. In this paper, the proxy for tangibility is calculated as follows:

\[
Tangibility (TANG) = \frac{Inventory + Plant, Property and Equipment}{Total Assets}
\]

Tangibility is expected to have a positive relationship with debt ratio.

c. Firm size (SIZE)
A large number of papers have proposed that leverage ratio and firm size are positively related. The validation for this belief is the evidence delivered by Warner (1977) and Ang et al. (1982) that the higher the firm value, the lower the direct bankruptcy costs. As a result, the impact of these costs is not significantly concerned on the borrowing decisions of large firms. Titman and Wessels (1988) also claimed that larger firms have less constraints to capital markets and are able to borrow at more favourable interest rates (Ferri
and Jones 1979). Furthermore, tax shields from interest payment are important advantages that larger firms with less volatile benefits are also likely to have as the expected tax benefits of debt increase (Smith and Stulz 1985).

In this paper, firm size indicator is measured by the natural logarithm of the book value of the total assets, which is a common proxy in many previous researches (Titman and Wessels, 1988, De Jong et al., 2008).

\[
\text{Firm Size (SIZE)} = \ln(\text{Total Assets})
\]

Firm size is expected to be positively associated with debt ratio.

d. Non-debt Tax Shields (NDTS)

From the aspects of trade-off theory, firms mainly optimize the benefits of tax to decide on debt instead of equity when financing. However, depreciation and investment tax credits can also serve as non-debt tax shields to reduce corporate tax for firms and these non-debt shields are an alternate for the tax benefits of debt financing (DeAngelo and Masulis, 1980). For that reason, non-debt tax can stimulate firms to use less debt.

In this paper, non-debt tax shield is calculated as depreciation and amortization over total assets for simplification. It is also important to note that this indicator only reflect partially the non-debt tax shield variable in the study of DeAngelo and Masulis (1980).

\[
\text{Non – debt tax shields (NDTS)} = \frac{\text{Depreciation} + \text{Amortization}}{\text{Total Assets}}
\]

It is expected that non-debt tax shields are negatively associated with leverage.

e. Growth Opportunity (GROWTH)

Another determinant of capital structure proposed by prior studies is growth opportunity. The reverse relationship between growth opportunities and the amount of firm’s debt was suggested by Myers (1977). It was later argued that companies in growing industries encounter higher agency costs due to greater flexibility in taking future investments (Titman and Wessels 1988). Additionally, growth increases bankruptcy costs, reduces free cash flow problems and agency problems. Therefore, according to trade-off theory, growth
reduces the firms’ incentives to seek for external debt financing but to use internal sources of finance or equity to finance their investment projects. Some studies also supported proposition that there is a negative and significant relation between growth opportunities and capital structure (Deesomsak et al. 2004, De Jong et al. 2008).

In this paper, the growth of total assets is used to measure growth opportunities, following Titman and Wessels (1988):

\[
\text{Growth opportunity (GROWTH) = % change in Total Assets}
\]

The relation between growth and debt ratio is expected to be negative.

f. Liquidity (LIQ)

The impact of liquidity of a firm’s assets on optimal leverage has been a source of debate for many years. Liquidity is a trait of the company’s assets that can be converted into cash in a short period. Notionally, from the view of the pecking order theory, firms with high liquidity tend to have less incentive to borrow, compared to low-liquidity firms, because cash and other liquid assets could perform as a trusted financial source for future investment opportunities. Moreover, the manipulation of liquid assets by managers in favour of shareholders in contrast to the interest of debt holders, which make the agency costs of debt increase and debt financing become less favoured (Deesomsak et al. 2004). Thus, the relation between liquidity and leverage ratio is expected to be negative.

In contrast, unlike the pecking order theory, the static trade-off theory suggests that there is a positive correlation between liquidity and leverage ratio. It is explained that public firms with high liquidity are able to fulfil their short-term debt obligations, thus face a lower risk of insolvency. As a result, these firms are motivated to make use of a higher level of leverage in order to take benefits of their lower default risk and their lower cost of debt compared to other firms.

Liquidity is evaluated as follows:

\[
\text{Liquidity} = \frac{\text{Current Assets}}{\text{Current Liabilities}}
\]
In this study, the effect of the pecking order theory is employed. Therefore, it is expected that liquidity is negatively associated with leverage.

Table 1 below provides a summary of all the selected firm-specific factors as independent variables, how they are measured as well as the expected sign in relation to three leverage ratios. These relationships have been discussed recently.

Table 1. Summary of all the chosen independent variables

<table>
<thead>
<tr>
<th>Firm-specific factors</th>
<th>Indicators</th>
<th>Expected sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Profitability (PROFIT)</td>
<td>Return on Asset = EBIT/Total Assets</td>
<td>−</td>
</tr>
<tr>
<td>2. Tangibility (TANG)</td>
<td>(Inventories + Gross Plant Property and Equipment)/Total Assets</td>
<td>+</td>
</tr>
<tr>
<td>3. Non-debt tax shields (NDTS)</td>
<td>(Depreciation + Amortization)/Total Assets</td>
<td>−</td>
</tr>
<tr>
<td>4. Firm size (SIZE)</td>
<td>Ln (Total Assets)</td>
<td>+</td>
</tr>
<tr>
<td>5. Liquidity (LIQ)</td>
<td>Current Asset/Current Liabilities</td>
<td>−</td>
</tr>
<tr>
<td>6. Growth opportunity (GROWTH)</td>
<td>Percentage change in total assets</td>
<td>−</td>
</tr>
</tbody>
</table>
3.5 Empirical Model

3.5.1 Introduction to research method

Following previous academic papers studying determinants of capital structure across firms, the data set in this thesis is classified as panel data, which consists of both cross-sectional and time-series observations. As the nature of panel data set, panel data analysis was employed and it involves three most common approaches, namely Ordinary Least Squares (OLS), fixed effect and random effect method. However, to avoid the likelihood of endogeneity or heteroskedasticity in OLS, previous researches less preferred using OLS but fixed effect and random effect are more often adopted. This section provides a comparative analysis of these empirical methods.

3.5.2 Pooled OLS versus Fixed Effects

The standard regression model for cross-sectional individual \( i = 1, \ldots, N \) and time series \( t = 1, \ldots, N \) can be written as:

\[
y_{it} = \alpha + \beta x_{it} + \varepsilon_{it} \tag{1}
\]

in which \( x_{it} \) is the K-dimensional vector of the explanatory variables and \( \beta \) is the slope coefficients estimating the magnitude of the effect that the explanatory variable has on the dependent variable \( y_{it} \) and is independent of \( i \) and \( t \). The error term \( \varepsilon_{it} \) captured all the unobserved factors which have an effect on \( y_{it} \) (Brooks 2008).

A pooled OLS regression can be utilized to simply estimate this model. In order to estimate the model with OLS regression, the data set for \( y \) and \( x \) will be pooled into a single column which includes all the cross-sectional and time-series observations. However, there has been numerous criticisms due to restrictive and unrealistic features of this method. Firstly, it unrealistically assumes that the error terms from various time periods are uncorrelated as in many cases, unobservable characteristics which affect the dependent variable can vary little over time. This assumption of independently and identically distributed error terms, in turn, will lead to rather misleading OLS estimation for panel data applications (Verbeek 2008).
Another setback with the pooled OLS regression is that the average values of the variables and the relationships between them are implicitly assumed to be constant over time and across all the cross-sectional units. If the error terms are not constant across independent variables, then there is the existence of heteroscedasticity in the data model (Brooks 2008).

Another critic for using Pooled OLS for dynamic models, in this case of capital structure, is that inconsistent and biased estimators in the presence of a lagged dependent variable is the consequence of using Pooled OLS regression. The assumption of this model implies that the observable variables in $x_{it}$ are not correlated with the unobservable characteristics in the error terms. However, in dynamic model, the presence of the lagged dependent variable as an observable variable is likely to lead to correlation between the lagged variables and the unobserved characteristics in the error terms and thus result in biased estimators.

Due to the fact that Pooled OLS has many problems when projected panel data, fixed effects model is believed to be able to solve the problem with the variables that vary over time. The fixed effect model is a linear regression model quite similar to equation (1); however, in this model the error term $\varepsilon_{it}$ is split into an individual specific effect $\alpha_i$, and the “remainder disturbance”, $u_{it}$

$$y_{it} = \alpha + \beta x_{it} + \alpha_i + u_{it} \quad (2)$$

in which $u_{it}$ ($i = 1, \ldots, N$) are fixed unknown constant that captivates all the time-invariant variables that have effects on $y_{it}$. As a result, it is normally implied as fixed (individual) effects. The overall intercept term $\alpha$ is normally removed as its effect is now involved in the individual intercept $\alpha_i$. In this model, $x_{it}$ are commonly assumed to be independent of all $u_{it}$ (Verbeek 2008).

In conclusion, using Pooled OLS regression for Panel data requires many assumptions which are considered unrealistic for panel data applications. Furthermore, Pooled OLS estimation ignores the fixed effects and the structure of panel data. For that reason, many previous papers exploit the Fixed Effects model to solve these problems, as Fixed Effects model is less restrictive for application.
### 3.5.3 The Fixed Effects Model

The model for firm-specific determinants comprises of debt ratio (LEV) as the dependent variables and all the firm-specific determinants as explanatory variables. A regression of the debt ratios of the firm against the firm-specific determinants will be performed:

\[
LEV_{i,t} = \sum_{j=1}^{n} \beta_j X_{i,j,t} + \alpha_i + u_{i,t} \quad (3)
\]

In which:
- \(LEV_{i,t}\) is the debt ratio for the \(i^{th}\) firm at time \(t\).
- \(\alpha_i\) is the intercept.
- \(X_{i,j,t}\) is the \(j^{th}\) capital structure determinant for the \(i^{th}\) firm at time \(t\).
- \(\beta_j\) is the coefficient of the explanatory variables.
- \(u_{i,t}\) is the error term of firm \(i\) at time \(t\).

Before deciding on the choice between Pooled OLS and Fixed effects model, there is a need for testing. In this paper, the default joint F test is employed for the observed and unobserved fixed to test for this choice. In case the null hypothesis is rejected, it means that the fixed effects in the model are non-zero and therefore using Pooled OLS is not the most appropriate way to evaluate the relation between leverage and its determinants.

- Ho: \(\alpha_i = 0\)
- H1: \(\alpha_i \neq 0\)

The random effects model can be used as an alternative to the fixed effect model.

\[
LEV_{i,t} = \sum_{j=1}^{n} \beta_j X_{i,j,t} + \alpha + \epsilon_i + u_{i,t} \quad (4)
\]

In which \(\epsilon_i\) is a random variable which has zero mean, constant variance and is independent of the observation error term \(u_{i,t}\) and the explanatory variables \(X_{i,j,t}\).

Random effects model and fixed effects model both have the intercept. Both models have different intercepts for each entity and these intercepts are constant over time. However, there are a few differences between these two models. First of all, the intercepts for each unit in the random effects model are assumed to be from a common intercept \(\alpha\), plus a random variable \(\epsilon_i\) varying cross-sectionally and constant over time. Secondly, under the random effects model, the random variable \(\epsilon_i\) will capture the heterogeneity in the cross-
sectional dimension instead of the dummy variables in the fixed effects model. (Brook 2008).

Even though the random effects model is argued to offer more efficient estimation than the fixed effects model due to fewer estimated parameters and more degree of freedom, this approach also has its drawbacks. In this model, both the random variable \( \epsilon_i \) and the observation error term \( u_{i,t} \) are requested to be independent of all the independent variables (Brooks 2008). For this reason, random effects model has stricter condition than fixed effects model.

Since the model requires that the unobserved individual effects are not correlated with the independent variables, the Hausman test can be used to test for endogeneity. However, due to the complex of the test, only its result is presented in the thesis to identify which model is more appropriate. The hypotheses for this test are as follows:

- Ho: there is no correlation between non-observable individual effects and the independent variables
- H1: there is correlation between non-observable individual effects and the independent variables

For firm-specific determinants, the following linear equations are estimated in STATA based on the fixed effect panel data model.

\[
LEV_{i,t} = \beta_1 \text{PROFIT}_{i,t} + \beta_2 \text{TANG}_{i,t} + \beta_3 \text{NDTS}_{i,t} + \beta_4 \text{SIZE}_{i,t} + \beta_5 \text{LIQ}_{i,t} + \beta_6 \text{GROWTH}_{i,t} + \alpha + u_{i,t}
\]

in which \( L E V_{i,t} \) is the leverage ratio for the \( i^{th} \) firm at time \( t \), representing all three measures of leverage and during the test it is replaced by either total debt ratio, long-term debt ratio or short-term debt ratio. \( \text{PROFIT} \) (profitability) is the ratio of earnings before interest and tax to total assets. \( \text{TANG} \) (tangibility) is the ratio of inventories and gross plant, property and equipment to total assets. \( \text{NDTS} \) (Non-debt tax shield) is the ratio of depreciation to total assets. \( \text{SIZE} \) is the natural logarithm of total asset. \( \text{LIQ} \) (Liquidity) is the ratio of current assets to current liabilities. \( \text{GROWTH} \) is the percentage change in total assets.
4 EMPIRICAL RESULTS

This chapter presents some tests and discusses the valuation on Pooled OLS model, fixed-effect model, and random-effect model to decide which model is the most suitable one to explain the determinants of capital structure.

Firstly, Breusch-Pagan/Cook-Weisberg test was employed to test whether heteroskedasticity exist in the sample set in linear regressions. If heteroscedasticity is present in the data, then the results of Pooled OLS is not reliable. Secondly, the default joint F test is employed for the observed and unobserved fixed to test for whether Pooled OLS is appropriate. In case the null hypothesis of the test is rejected, it means that the fixed effects in the model are non-zero and therefore using Pooled OLS is not the most appropriate way to evaluate the relation between leverage and its determinants. Next, Breusch-Pagan Lagrange multiplier test was employed to examine whether to choose the random-effects model or OLS regression model for analysis. In case Pooled OLS model cannot pass the test and both fixed and random effect models are significant, it is important to decide which model is more significant and which one is better than the other. In this paper, the Hausman specification test was used to examine if the individual effects are uncorrelated with other regressors in the model. If there is correlation between individual effects and other regressors, fixed-effect model is better than random-effect model for this analysis. Subsequently, the regression results based on 149 firm-year observations are demonstrated and explained with a detailed analysis through comparison between the regression results and expected results.

4.1 Descriptive Statistics, Correlation Matrix and Heteroscedasticity Test

- Descriptive Statistics

Table 2 below shows a summary descriptive statistic of all firm-specific independent variables that have been discussed earlier.
Table 2: Descriptive statistic of all variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEV1</td>
<td>0.4741</td>
<td>0.1234</td>
<td>0.0628</td>
<td>0.7025</td>
<td>149</td>
</tr>
<tr>
<td>LEV2</td>
<td>0.1853</td>
<td>0.1147</td>
<td>0.0005</td>
<td>0.4595</td>
<td>149</td>
</tr>
<tr>
<td>LEV3</td>
<td>0.2888</td>
<td>0.1447</td>
<td>0.0323</td>
<td>0.5935</td>
<td>149</td>
</tr>
<tr>
<td>NDTS</td>
<td>0.0292</td>
<td>0.0252</td>
<td>0.0001</td>
<td>0.1201</td>
<td>149</td>
</tr>
<tr>
<td>SIZE</td>
<td>22.1538</td>
<td>0.9349</td>
<td>20.4142</td>
<td>24.5277</td>
<td>149</td>
</tr>
<tr>
<td>GROWTH</td>
<td>0.0830</td>
<td>0.2614</td>
<td>-0.3897</td>
<td>2.1946</td>
<td>149</td>
</tr>
<tr>
<td>TANG</td>
<td>0.7144</td>
<td>0.4800</td>
<td>0.0002</td>
<td>1.7132</td>
<td>149</td>
</tr>
<tr>
<td>LIQUIDITY</td>
<td>1.5598</td>
<td>0.8979</td>
<td>0.1458</td>
<td>4.8662</td>
<td>149</td>
</tr>
<tr>
<td>PROFIT</td>
<td>0.0748</td>
<td>0.0597</td>
<td>-0.2018</td>
<td>0.2756</td>
<td>149</td>
</tr>
</tbody>
</table>

LEV 1 is the Total Debt ratio, LEV 2 is the Long-Term debt ratio, LEV3 is the Short-Term debt ratio, NDTS (Non-debt tax shield) is the ratio of depreciation to total assets, SIZE is the natural logarithm of total asset, GROWTH is the percentage change in total assets, TANG (tangibility) is the ratio of inventories and gross plant, property and equipment to total assets, LIQUIDITY is the ratio of current assets to current liabilities, PROFIT is the ratio EBIT to total assets.

In general, regarding leverage ratio of large listed firms in Finland, there are big variances between minimum and maximum values in all three leverage measures, among which total debt ratio has the highest average value, amounted to 47% with the range from 6.3% to 70.3%. Followed by short-term debt ratio with mean value of approximately 29% ranging from 3.2% to 59.3%. Long-term debt ratio has the lowest average value of almost 19% and the ratio spreads from 0.05% to 46%. According to the statistic of total debt to total asset, it is implied that the average of 47% of the company’s assets are being financed through borrowing, and the owners are providing nearly 53% of the assets’ cost, which is considered moderately good ratio.

In this paper, when measuring profitability of large firms in Finland, return on asset (ROA) is used by taking earnings before interest and tax (EBIT) divided by total asset. The result in Table 2 shows that Finnish large cap companies can be considered profitable with average ROA amounted to 7.5%. Also, the mean value of liquidity is higher than 1, which indicates that these companies are in good financial health and are less prone to encounter financial hardships.
- **Multicollinearity**

According to Bewick, Cheek, and Ball (2005), multicollinearity is a potential problem that needs to be examined in regression analysis. Multicollinearity exists when there is a high correlation of two or more independent variables in the model (Field 2009). As a result, the predictive power of any independent variable can be reduced by having association with other independent variables (Hair et al. 2010).

The correlation matrix is presented in Table 3. Among the correlation coefficients, Total debt ratio (LEV1) and short-term debt ratio (LEV3) is positively high in nature 65%, while there is a negative correlation between long-term debt ratio (LEV2) and short-term ratio (LEV3) -57%. In addition, liquidity is found to have significantly negative and strong relationship with total debt ratio (LEV1), which is aligned with the effect of the pecking order theory discussed earlier. Other than that, most correlation coefficients between all independent variables are small (less than 0.8) that, as a result, gives no concern about the problem of multicollinearity.

![Table 3: Correlation matrix](image)

<table>
<thead>
<tr>
<th></th>
<th>LEV1</th>
<th>LEV2</th>
<th>LEV3</th>
<th>NDTS</th>
<th>SIZE</th>
<th>GROWTH</th>
<th>TANG</th>
<th>LIQUID</th>
<th>PROFIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEV1</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LEV2</td>
<td>0.2625</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LEV3</td>
<td>0.6447</td>
<td>-0.5684</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NDTS</td>
<td>0.1247</td>
<td>0.0592</td>
<td>0.0594</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SIZE</td>
<td>-0.1598</td>
<td>0.1209</td>
<td>-0.2321</td>
<td>-0.2521</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GROWTH</td>
<td>0.0498</td>
<td>0.0616</td>
<td>-0.0063</td>
<td>-0.0539</td>
<td>0.0228</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TANG</td>
<td>-0.1958</td>
<td>0.0377</td>
<td>-0.1968</td>
<td>0.2766</td>
<td>0.1239</td>
<td>-0.1379</td>
<td>1.0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIQUID</td>
<td>-0.6400</td>
<td>-0.3162</td>
<td>-0.2952</td>
<td>-0.2094</td>
<td>0.0511</td>
<td>-0.1206</td>
<td>0.2036</td>
<td>1.0000</td>
<td></td>
</tr>
<tr>
<td>PROFIT</td>
<td>-0.2632</td>
<td>-0.2459</td>
<td>-0.0297</td>
<td>0.0327</td>
<td>-0.1588</td>
<td>-0.0305</td>
<td>0.2212</td>
<td>0.3270</td>
<td>1.0000</td>
</tr>
</tbody>
</table>

- **Heteroskedasticity**

In order to test whether heteroskedasticity exist in the sample set in linear regressions, Breusch-Pagan/Cook-Weisberg test was employed. The null hypothesis of heteroscedasticity is the variance of the error term is constant or no heteroscedasticity. The result for all separate three models of total debt ratio, long-term debt ratio and short-term debt ratio (Table 4) shows that value of Prob > chi2 (p-value) is less than 0.05. Therefore, the null hypothesis can be rejected and that heteroscedasticity is present in the data. Existence of
heteroscedasticity in the regression model determined that dependent variable was inconsistent across the data. As a result, the result of the OLS regression would not be reliable to examine the relationship between dependent and independent variables but panel effects models could be taken into consideration for further research.

Table 4: Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

<table>
<thead>
<tr>
<th>Breusch-Pagan / Cook-Weisberg test for heteroskedasticity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total debt ratio</td>
</tr>
<tr>
<td>chi2(6)</td>
</tr>
<tr>
<td>Prob &gt; chi2</td>
</tr>
</tbody>
</table>

4.2 Evaluation of estimation model

- Pooled OLS versus Fixed effects

The detailed result for the fixed effects regression model for three leverage ratios run in STATA can be found in Appendix 2. According to table 5 below, the F-test in the last line of the outputs which examines for \( \alpha_i \) equal zero shows P-value of zero for all three leverage ratios model, which means there is a significant fixed effect and null hypothesis that all \( \alpha_i \) equal zero can be rejected. Therefore, using Pooled OLS is not the most appropriate way to evaluate the relation between leverage and its determinants.

Table 5: F-test result for fixed effects \( \alpha_i \)

<table>
<thead>
<tr>
<th>F-test for fixed-effect ( \alpha_i )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total debt ratio</td>
</tr>
<tr>
<td>F (29, 113)</td>
</tr>
<tr>
<td>Prob &gt; F</td>
</tr>
</tbody>
</table>

- Pooled OLS versus Random effects

In this paper, Breusch-Pagan Lagrange multiplier test was employed to examine whether to choose the random-effects model or OLS regression model for analysis. The null hypothesis of the test is that individual-specific or time-specific error variance components are zero. In the other word, if the null hypothesis is rejected, then random effect model is
appropriate. In case null hypothesis is accepted, pooled OLS is preferred. The test results for three leverage panel models are as below:

Table 6: Breusch and Pagan Lagrange test for random effects

<table>
<thead>
<tr>
<th>Breusch and Pagan Lagrange multiplier test for random effects</th>
<th>Total debt ratio</th>
<th>Long debt ratio</th>
<th>Short debt ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Var (u) = 0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>chibar2(01)</td>
<td>93.93</td>
<td>146.88</td>
<td>232.36</td>
</tr>
<tr>
<td>Prob &gt; chibar2</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

Table 6 shows the result of Prob > chibar2 = 0 < p = 0.005, which means null hypothesis can be rejected. Therefore, random effect is more appropriate than pool OLS in explaining the relationship between variables in this research.

• Fixed effects model versus Random effects model

Since both fixed and random effect models are significant, it is important to decide which model is more significant and which one is better than the other. To answer that question, the Hausman specification test was used to examine if the individual effects are uncorrelated with other regressors in the model. If there is correlation between individual effects and other regressors, the random effect model violates a Gauss-Markov assumption and is no longer Best Linear Unbiased Estimate (BLUE) due to the fact that individual effects are part of the error term in a random effect model (Hausman 1978)

Table 7: Hausman specification test

<table>
<thead>
<tr>
<th>Hausman test</th>
<th>Total debt ratio</th>
<th>Long debt ratio</th>
<th>Short debt ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>chi2(6)</td>
<td>36.77</td>
<td>32.97</td>
<td>14.05</td>
</tr>
<tr>
<td>Prob&gt;chi2</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0291</td>
</tr>
</tbody>
</table>

The result from Hausman test in table 6 shows that in total debt ratio and long-term debt ratio, Prob > chi2 = 0.0000 < p = 0.05 and in short-term ratio Prob > chi2 = 0.0291 < p = 0.05. As a result, null hypothesis which indicates no correlation between firms’ non-observable individual effects and the independent variables can be rejected. Fixed-effect model is proved to be the most appropriate to evaluate the relation between leverage ratio and its determinants.
4.3 Regression Results and Analysis

**Profitability** is expected to have a negative impact on three leverage ratios. The results in table 8 presents a negative correlation in both total debt ratio and long-term debt ratio but a positive relation in short-term debt. However, the results show no significant relationship between profitability and all three leverage measurements, which indicates that the effect from the point of view of both theories may be not strong enough for the profitability to have a meaningful impact on capital structure decision, especially for large cap firms in Finland.

In general, the negative result is consistent with previous studies that support Pecking order theory assumptions (Frank and Goyal 2009; Rajan and Zingales 1995; Myers 1984). As mentioned above in descriptive statistic, large companies in Finland are considered profitable with good ROA ratio. Therefore, managers in profitable companies prefer the hierarchy in financing, exploiting retained earnings and internal sources. In contrary, the regression result with a positive impact of profitability on short-term debt ratio confirms the Trade-off theory assumption. This positive relation can be explained by tax shield benefits, bankruptcy risk and agency costs. Firms with higher profitability can afford and intend to use more short-term debt since they have decent cash flow and high liquidity and are able to enjoy more tax shield benefits brought from higher leverage.

**Tangibility** (TANG) is found to have positive correlation with three leverage ratios, which is consistent with the expectation and confirm many prior studies (Frank and Goyal 2009; Ayed and Zouari 2014). However, the positive impact of tangibility is only highly significant in case of total debt ratio and short-term debt ratio, at .001 confidence level. The results indicate that, if the firms owned more fixed assets, they would use less retained earnings. Concerning the long-term debt ratio, the result is not statistically significant for the observed period.

From creditors’ point of view, in order to protect themselves, they will require tangible assets as collateral for their lending and would be more willing to lend to firms with larger tangible assets; while from the perspective of firms, large tangible assets are often considered greater liquidation value. As a result, higher amount of tangible assets makes it possible to take on more debt. In addition, it supports the positive effect of the agency theory by Jensen and Meckling (1976). In their study, stockholders of levered firms were
said to have an inducement to invest excess cash sub optimally to expropriate wealth from bondholders. In case the debt can be collateralised, the borrower would be restricted to use these funds in particular projects. Additionally, the collateralised assets can be used as a monitoring instrument for the purpose of reducing the agency costs of debt in an indirect way. The results in Jensen and Meckling study (1976) indicate that firms owning a high level of fixed assets weaken the problems of asymmetric information by pledging collateral to secure debt finance. In case firm assets are not sufficient for loan secure, the firm owner personal asset will become an important source of collateral. The insignificant result of tangibility for the case of long-term debt ratio in Finnish large cap firms can probably be explained by the close relationship of firms with lenders, as a result less demand for collateral when borrowing.

**Non-debt tax shield (NDTS)** is expected to have a negative relation with leverage ratio. However, the results from table 8 shows a variety in three leverage ratios. In particular, non-debt tax shield is found to be positively related to total debt and long term-debt ratio, significant at the .05 and .001 level respectively. Meanwhile, short-term debt ratio and non-debt tax shields are found to have negative relation as expectation, at the .1 significance level, which show that increase in non-debt tax shield will reduce the use of short-term debt in Finnish large cap companies. The result also indicates that large cap firms in Finland with greater non-debt tax deductions are more likely to choose long-term debt for their external financing due to having more incentives for the tax deducted benefits provided by debt, which is against the prediction of the Trade-off Theory but supports the statement of Bradley et al. (1984). According to Bradley et al. (1984) company with high fixed assets can get more tax profit like the reduction expense that can be subtracted from the calculation of debt tax. Dwenger and Steiner (2014) also found significant positive effect between non-debt tax shield and leverage ratio and relatively bigger than the company leverage tax charge for listed companies in Germany.

It is also worthwhile mentioning that in this study, the influence of non-debt tax shield on long-debt ratio (+2.4051) is the strongest among all the significant firm specific variables. In other words, for one unit increase in non-debt tax shield, long-term debt ratio is expected to increase by 2.4 units, holding all other variables constant. The second and third strongest impact of non-debt tax shield are on the total debt ratio (+1.4754) and short-term debt ratio (-0.9296). Therefore, it can be concluded that for this specific dataset, non-
debt tax shield is the most influential factor of the capital structure choice, regarding large cap listed companies in Finland.

**Firm size (SIZE)** is expected to have a positive relation with leverage ratio. The regression results reveal that firm size is positively correlated with total debt ratio and long-term debt ratio which are consistent with expected signs. Meanwhile, a negative relationship is found in short-term debt ratio and size of firms. However, the impact of firm size is not statistically significant in case of total debt ratio, but highly significant with long-term debt and short-term debt ratio at the .01 level. The coefficient of SIZE with long-term leverage (+0.0902) is the highest, which indicates that the large companies in Finland are more likely to use more debt, especially debts with longer maturity.

The positive relation between firm size and capital structure can be explained by trade-off theory and the relationship between firm size and credit rating when firm size is one of the main elements for indicating a firm’s bankruptcy probability and credit rating is given based on that factor. Large firms having their diversification in business and greater amount of collateral as guarantee are generally expected to be less likely to fail or default, hence probably have a higher credit rating. Also, it is easier for large firms to take long-term debt as such firms face lower financial distress costs and lower bankruptcy risks. In addition, firms with high credit rating can enjoy lower risk premium when borrowing due to the fact that such firms are secure, and creditors bear less risks. When the costs of debt issuing for larger firms are reduced, firms’ costs of borrowing as well as their cost of capital can also decrease due to lower bankruptcy risk.

**Liquidity** is expected to have negative relation with leverage ratio. The regression results align with the expectation, except for the case of long-term debt ratio, even if such a positive correlation is insignificant. The negative findings in total debt and short-term debt ratio are consistent with the pecking order theory which proposes that firms with highly liquid assets have a preference of using internal source of finance for investment. The same results for the negative correlation between liquidity and leverage ratio can also be found in many previous studies (Deesomsak et al. 2004; Sheikh and Wang 2011). The positive sign in the case of long-term debt ratio for large firm in Finland can also be explained by the view of trade-off theory as firms with high liquidity have more ability to pay for its debt obligation, thus they are able to adopt higher debt ratio. However, the
result for this case is not statistically significant, which implies that the effect of the pecking order theory might be stronger than the effect of trade-off theory for this specific sample dataset.

**Growth opportunities (GROWTH)** is expected to have a negative relation with leverage ratios. However, the results from the regression show no significant impacts of growth opportunities on all three leverage measures in the sample, which indicates that growth opportunity does not play a crucial role in capital structure decision in large cap companies in Finland. The similar results of no significant relationship between growth opportunity and leverage ratio can be found in some previous studies (Sheikh and Wang 2011)

In general, there is a negative relation between growth opportunity with short-term debt ratio, which is consistent with the expected sign, even though the relationship is insignificant. The same negative relation can be found in many previous researches (Deesomsak et al. 2004; De Jong et al. 2008; Sheikh and Wang 2011). From the view of trade-off theory and agency theory, firms with high growth opportunity commonly feel motivated to invest in riskier projects leading to a conflict between debt holders and shareholders and managers of firms. The higher the probability of the financial distress may occur, the lower the level of debt firms will take. A contrary relationship between growth opportunities and leverage are uncovered with both total debt ratio and long-term debt ratio. From this argument, the insignificant coefficients can be explained by the fact that firms in the sample countries are relatively less risk-sensitive and growth opportunity.
Table 8: Model estimation using Fixed Effects model for Total Debt Ratio, Long-Term Debt Ratio and Short-Term Debt Ratio period 2015-2019

<table>
<thead>
<tr>
<th></th>
<th>Total debt ratio</th>
<th>Long debt ratio</th>
<th>Short debt ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>NDTS</td>
<td>1.4754**</td>
<td>2.4051***</td>
<td>-0.9296*</td>
</tr>
<tr>
<td></td>
<td>(0.043)</td>
<td>(0.001)</td>
<td>(0.091)</td>
</tr>
<tr>
<td>TANG</td>
<td>0.3086***</td>
<td>0.0904</td>
<td>0.2182***</td>
</tr>
<tr>
<td></td>
<td>(0.000)</td>
<td>(0.221)</td>
<td>(0.000)</td>
</tr>
<tr>
<td>LIQUIDITY</td>
<td>-0.0227**</td>
<td>0.0088</td>
<td>-0.0315***</td>
</tr>
<tr>
<td></td>
<td>(0.018)</td>
<td>(0.337)</td>
<td>(0.000)</td>
</tr>
<tr>
<td>PROFIT</td>
<td>-0.0002</td>
<td>-0.1525</td>
<td>0.1507</td>
</tr>
<tr>
<td></td>
<td>(0.990)</td>
<td>(0.310)</td>
<td>(0.202)</td>
</tr>
<tr>
<td>SIZE</td>
<td>0.0139</td>
<td>0.0902***</td>
<td>-0.0763***</td>
</tr>
<tr>
<td></td>
<td>(0.622)</td>
<td>(0.001)</td>
<td>(0.001)</td>
</tr>
<tr>
<td>GROWTH</td>
<td>0.0093</td>
<td>0.0116</td>
<td>-0.0023</td>
</tr>
<tr>
<td></td>
<td>(0.678)</td>
<td>(0.590)</td>
<td>(0.891)</td>
</tr>
<tr>
<td>_cons</td>
<td>-0.0641</td>
<td>-1.9520**</td>
<td>1.888***</td>
</tr>
<tr>
<td></td>
<td>(0.920)</td>
<td>(0.002)</td>
<td>(0.000)</td>
</tr>
<tr>
<td>Observations</td>
<td>149</td>
<td>149</td>
<td>149</td>
</tr>
<tr>
<td>R-Sq</td>
<td>0.2835</td>
<td>0.2563</td>
<td>0.4163</td>
</tr>
<tr>
<td>F (29, 113)</td>
<td>13.63</td>
<td>20.65</td>
<td>59.37</td>
</tr>
<tr>
<td>Prob &gt; F</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

$LEV_i,t = \beta_1NDTS_i,t + \beta_2TANG_i,t + \beta_3LIQUIDITY_i,t + \beta_4PROFIT_i,t + \beta_5SIZE_i,t + \beta_6GROWTH_i,t + \alpha_i + \mu_i,t$

NDTS (Non-debt tax shield) is the ratio of depreciation to total assets, SIZE is the natural logarithm of total asset, GROWTH is the percentage change in total assets, TANG (tangibility) is the ratio of inventories and gross plant, property and equipment to total assets, LIQUIDITY is the ratio of current assets to current liabilities, PROFIT is the ratio EBIT to total assets.

*, **, *** significant level at 10%, 5% and 1% respectively
Table 9 below summarizes the empirical results of the relationship between all independent variables and three leverage measurements namely total debt ratio, long-term debt ratio and short-term debt ratio using fixed-model effect regression, together with the comparison with the initial expected signs.

**Table 9: Expected sign according to theory and actual regression results.**

<table>
<thead>
<tr>
<th>Expectation</th>
<th>Total debt ratio</th>
<th>Long debt ratio</th>
<th>Short debt ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>NDTS</td>
<td>-/+Significant</td>
<td>+/+Significant</td>
<td>-/-Significant</td>
</tr>
<tr>
<td>TANG</td>
<td>+/+Significant</td>
<td>+/+Insignificant</td>
<td>+/+Significant</td>
</tr>
<tr>
<td>LIQUIDITY</td>
<td>-/-Significant</td>
<td>+/+Insignificant</td>
<td>-/-Significant</td>
</tr>
<tr>
<td>PROFIT</td>
<td>-/-Insignificant</td>
<td>-/-Insignificant</td>
<td>+/+Insignificant</td>
</tr>
<tr>
<td>SIZE</td>
<td>+/+Insignificant</td>
<td>+/+Significant</td>
<td>-/-Significant</td>
</tr>
<tr>
<td>GROWTH</td>
<td>-/+Insignificant</td>
<td>+/+Insignificant</td>
<td>-/-Insignificant</td>
</tr>
</tbody>
</table>
5 CONCLUSION

This chapter is presenting the conclusion based on the analysis of regression results. At the same time, the limitations as well as suggestions for future study are also discussed.

5.1 Conclusion

The lack of comparative studies on capital structure decision of large cap companies in Finland is the main motivation for this study. Since the result of the relationship of firm-specific on the capital structure in different regions have been mixed in existing empirical studies, it is very necessary to examine these effects more closely in Finland as public firms with large market capitalization are more likely to behave differently and even in a very unique way.

This paper, utilizing panel data regression with period fixed effects, examines how firm specific determinants affect firms’ capital structure decisions based on the sample of large cap firms in Finland during the period 2015 to 2019. This study employed three measures for leverage (total debt to total assets ratio, long-term debt to total assets ratio and short-term debt to total assets ratio) and decomposed total debt into long-term debt and short-term debt in order to achieve a more detailed analysis of the impact of capital structure determinants. The empirical evidences of this research demonstrate that 1) there are significant difference in the determinants of three leverage measures; 2) Trade-off theory and Agency theory are considered stronger explanation than Pecking Order theory. The most important findings of this research are summarized as following:

- In terms of firm specific determinants, among all the significant variables, non-debt tax shield has the strongest impact on capital structure choice of Finnish large cap firms. In particular, non-debt tax shield has the highest correlation with long-term debt ratio, followed by its impact on total debt ratio and short-term debt ratio. The effects of firm size, tangibility and liquidity, however, varies and are also different for each debt ratio. Surprisingly, profitability has no significant influence on the decision of leverage including all three measures. Also, growth opportunity is found to have no significant effect on leverage ratios in the sample.
• The significant positive impact of tangibility, firm size on leverage provides support to Trade-off theory and Agency theory. However, the significant correlation between liquidity and leverage confirms Pecking Order theory.

5.2 Limitations and suggestions for future research

There are two main reasons that make the author believes that the findings are reliable and valid. Firstly, the basic framework presented is supported by many academic studies. Additionally, financial data and figures of all companies in sample are collected from reliable sources and regression models are employed based on the widely-used models that appear in many researches. Secondly, this research is exploratory and archival, which implies that the finding is not influenced by any uncertainties. Within the scope of this study, on the assumption that the database stays reliable, the result remains fixed. However, some noticeable weaknesses still exist and how further researches can improve.

The first limitation is that the choice of only one country as well as the choice of a few companies in the data set can lead to a quite bias conclusion if conclusions are made for other large cap companies in other regions based on the result of this research. Additionally, only accessible data that can be derived from financial statements of target firms are concerned, it implies that the thesis only offers the viewpoint of an investor, given that only published information are analysed and internal information is unobtainable. It is recommended that further research can take some point of view from business’s owners using questionnaire, interview etc. in order to reflect how they choose and adjust their financing behaviours because information from the managers is very useful for investors and other stakeholders to decide on future investment opportunities.

The second limitation is that this study from the beginning has excluded financial firms from the final sample set due to their special liquidity characteristic. This exclusion may create a different estimation result when compared to the sample set with full list of firms. However, it is suggested that a separate analysis should be conducted for these financial firms then make a comparison to firms in other sectors to gain an in-depth understanding of the determinants of capital structure. Moreover, a research on large firms and small
and medium enterprises can be implemented to provide a decent comparison on how different firm size affect their choice of capital structure.

Lastly, this study lacks another angle to analyze the capital structure such as examining industry effect or other macroeconomic factors. It is well known that separation of industry could give a better insight about which firm-specific factors have the strongest impact on the capital structure decision for a specific industry in a specific country. Therefore, it is recommended to further examine the effect of determinants on leverage in different industries by dividing the sample into subsamples with different industries to examine and compare the relation between leverage ratio and its determinants of firms in different industries. Regarding country-specific or macroeconomic factors, including other countries sharing the same characteristics (in financial system or laws) in a cross-country analysis can lead to more reliable results due to the increase in observations.
REFERENCES


Love, R. and Wickramanayake, J., 1996, *Industry effects on the capital structure decisions of Australian companies*, Monash University, Syme Department of Banking and Finance, Faculty of Business and Economics.


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### APPENDIX 1. COMPANIES UNDER RESEARCH PERIOD (2015-2019)

<table>
<thead>
<tr>
<th>Company</th>
<th>Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ahlstrom-Munksjö Oyj</td>
<td>Basic Materials</td>
</tr>
<tr>
<td>Kemira Oyj</td>
<td></td>
</tr>
<tr>
<td>Metsä Board Oyj A</td>
<td></td>
</tr>
<tr>
<td>Outokumpu Oyj</td>
<td></td>
</tr>
<tr>
<td>SSAB AB ser. A</td>
<td></td>
</tr>
<tr>
<td>Stora Enso Oyj A</td>
<td></td>
</tr>
<tr>
<td>UPM-Kymmene Oyj</td>
<td></td>
</tr>
<tr>
<td>Fiskars Oyj</td>
<td></td>
</tr>
<tr>
<td>Nokian Renkaat Oyj</td>
<td>Consumer Discretionary</td>
</tr>
<tr>
<td>Kesko Oyj A</td>
<td></td>
</tr>
<tr>
<td>Sanoma Oyj</td>
<td></td>
</tr>
<tr>
<td>Citycon Oyj</td>
<td>Real Estate</td>
</tr>
<tr>
<td>Kojamo Oyj</td>
<td></td>
</tr>
<tr>
<td>Orion Oyj A</td>
<td>Health Care</td>
</tr>
<tr>
<td>Terveystalo Oyj</td>
<td></td>
</tr>
<tr>
<td>Cargotec Oyj</td>
<td>Industrials</td>
</tr>
<tr>
<td>Huhtamäki Oyj</td>
<td></td>
</tr>
<tr>
<td>KONE Oyj</td>
<td></td>
</tr>
<tr>
<td>Konecranes Oyj</td>
<td></td>
</tr>
<tr>
<td>Metso Outotec Oyj</td>
<td></td>
</tr>
<tr>
<td>Neles Oyj</td>
<td></td>
</tr>
<tr>
<td>Valmet Corporation</td>
<td></td>
</tr>
<tr>
<td>Wärtsilä Oyj Abp</td>
<td></td>
</tr>
<tr>
<td>YIT Oyj</td>
<td></td>
</tr>
<tr>
<td>Neste Oyj</td>
<td>Energy</td>
</tr>
<tr>
<td>Nokia Oyj</td>
<td>Technology</td>
</tr>
<tr>
<td>TietoEVRY Oyj</td>
<td></td>
</tr>
<tr>
<td>Elisa Oyj</td>
<td>Telecommunications</td>
</tr>
<tr>
<td>Telia Company AB</td>
<td></td>
</tr>
<tr>
<td>Fortum Oyj</td>
<td>Utilities</td>
</tr>
</tbody>
</table>
APPENDIX 2: STATISTIC RESULTS FROM STATA

Fixed-effects (within) regression
Group variable: ID
Number of obs = 149
Number of groups = 30

R-sq:
within = 0.2835
between = 0.0185
overall = 0.0067

Obs per group:
min = 4
avg = 5.0
max = 5

F(6, 113) = 7.40
Prob > F = 0.0000
corr(u_i, Xb) = -0.8312

| LEV1 | Coef.    | Std. Err. | t     | P>|t| | 95% Conf. Interval |
|------|----------|-----------|-------|-----|-------------------|
| NUTS | 1.475447 | .7210962  | 2.05  | 0.043 | .0668257 - 2.904069 |
| SIZE | .0139722 | .0282558  | 0.49  | 0.622 | -.0520077 - .069921 |
| GROWTH| .0093275 | .0223917  | 0.42  | 0.678 | -.0350345 - .0536895 |
| TANG | .3095868 | .076235   | 4.05  | 0.000 | .2175515 - .401621 |
| LIQUIDITY| -.0229704 | .0944808 | -2.40 | 0.018 | -.0414616 - .0039252 |
| PROFIT| -.001863 | .1553893  | -0.10 | 0.920 | -.3095965 - .3058704 |
| _cons | -.0641492 | .6391172 | -0.10 | 0.920 | -.3303566 - 1.202657 |

sigma_u = .20939232
sigma_e = .05004091
rho = .94597337 (fraction of variance due to u_i)

F test that all u_i=0: F(29, 113) = 13.63
Prob > F = 0.0000

Fixed-effect model: Total debt to Total asset.

Fixed-effects (within) regression
Group variable: ID
Number of obs = 149
Number of groups = 30

R-sq:
within = 0.2563
between = 0.0076
overall = 0.0198

Obs per group:
min = 4
avg = 5.0
max = 5

F(6, 113) = 6.49
Prob > F = 0.0000
corr(u_i, Xb) = -0.6745

| LEV2 | Coef.    | Std. Err. | t     | P>|t| | 95% Conf. Interval |
|------|----------|-----------|-------|-----|-------------------|
| NUTS | 2.4005068 | .694619   | 3.46  | 0.001 | 1.028921 - 3.781252 |
| SIZE | .0902478  | .0272183  | 3.32  | 0.001 | .0363234 - .1441723 |
| GROWTH| .0116421 | .0215695  | 0.54  | 0.590 | -.031091 - .0543753 |
| TANG | .0903608  | .0734358  | 1.23  | 0.221 | -.055128 - .2358503 |
| LIQUIDITY| .0088036 | .0091327 | 0.96  | 0.337 | -.0092839 - .0269032 |
| PROFIT| -.1525325 | .149625   | -1.02 | 0.310 | -.4485666 - .143017 |
| _cons| -.1952708 | .6156501  | -3.17 | 0.002 | -.3171792 - .792364 |

sigma_u = .14647113
sigma_e = .04826031
rho = .90227773 (fraction of variance due to u_i)

F test that all u_i=0: F(29, 113) = 20.65
Prob > F = 0.0000

Fixed-effect model: Long-term debt to Total asset
Fixed-effects (within) regression

| LEV3       | Coef.  | Std. Err. | t     | P>|t|  | [95% Conf. Interval] |
|------------|--------|-----------|-------|------|---------------------|
| NDT5       | -.9296389 | .544954     | -1.71 | 0.091 | -2.009291 to .1500134 |
| SIZE       | -.0762757  | .0213538    | -3.57 | 0.001 | -.1185814 to -.03397 |
| GROWTH     | -.0023147  | .0169221    | -0.14 | 0.891 | -.0358404 to .031211 |
| TANG       | .218226     | .0576131    | 3.79  | 0.000 | .1040841 to .3323679 |
| LIQUIDITY  | -.031518    | .0071649    | -4.40 | 0.000 | -.0457131 to -.017323 |
| PROFIT     | .1506694    | .1173863    | 1.28  | 0.202 | -.081894 to .3832328 |
| _cons      | 1.887929    | .4830001    | 3.91  | 0.000 | .9310185 to 2.844839 |

\[\text{sigma_u} = 0.18018999, \quad \text{sigma_c} = 0.03781742, \quad \text{rho} = 0.95781071 \ (\text{fraction of variance due to } u_i)\]

F test that all \( u_i = 0 \): \( F(29, 113) = 59.37 \) \( \text{Prob > F} = 0.0000 \)

Fixed-effect model: Short-term debt to Total asset