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DETERMINANTS OF CAPITAL STRUCTURE: EVIDENCE FROM FINNISH BASIC INDUSTRY AND INDUSTRIAL COMPANIES

Bachelor's thesis

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ABSTRACT

This research focuses on investigating how different vairables affect the capital structure of Finnish basic material and industrial companies. Sample consists of 46 listed companies and the timeframe is 2015-2018. As panel data was used, regression analysis was done by both random and fixed effect model. Hausman test indicated that fixed effect method was more suitable for this study. Results of this study show that profitability, size and tangibility are significant determinants and all of them got negative correlation with leverage. On the other hand, growth, liquidity and interest coverage ratio were insignificant. Additionally, the behaviour of determinants could be better described as in pecking order theory than trade-off theory.

Keywords: Capital structure, Determinants, Finland, Regression analysis

INTRODUCTION

Company's objective is to maximize its value to the shareholders. There are two factors which has a major impact on maximizing the value for shareholders, which are making good investment and financing decisions. A company can finance its operations with either internal or external funds. Internal funds include equity, which is retained earnings and external funds includes liabilities, which is debt. The mixture of internal and external financing a company chooses to use, is called capital structure. Capital structure and its determinants is an important topic because company management has to be aware of the factors which affect the decisions when trying to determine the capital structure which maximizes the company value. These factors can be also called determinants of capital structure. By having knowledge of the determinants of capital structure and capital structure theories, company management is able to do good and rational decisions in order to achieve the optimal capital structure. These good decisions will lead to that the company is able to maximizes its value and ensures that shareholders are satisfied.

Capital structure has been widely investigated. Gupta's (1969) study covered over 100 000 manufacturing companies from years 1961-1962. Additionally, Titman and Wessels (1988) has investigated the capital structure in listed companies in USA, while Jõeveer (2013, 2018) has investigated capital structure in Europe. Even though there are many studies conducted all over the world, there is very little research done of capital structure of Finnish companies. Nguyen's (2014) research of how company characteristics affect the capital structure of Finnish technology industry is one of the few papers written about Finnish capital structure. Additionally, I could not find any studies which would be specifically about basic material or industrial companies and their capital structure. Since no previous studies was found of these industries, it will be interesting to see how the results of this study compares to previous studies. Furthermore, basic materials and industrial companies includes 40% of all companies listed in Nasdaq Helsinki. The aim of this paper is to investigate which of the chosen variables affects the capital structure of Finnish basic materials and industrial companies.

Research question, which will be answered in this thesis are:

- How does capital structure theories differ from each other?
- Which determinants had the most impact on capital structure?
- Is there a dominant capital structure theory to explain the variable?

In addition to the research question, hypotheses will be formed based on capital structure theories and previous studies. These hypotheses will be used to analyze the results of this study.

This thesis investigates the determinants of capital structure of Finnish basic materials and industrial companies. Sample of this study is 46 companies, from which 9 is basic materials companies and 37 is industrial companies. The reason why these two industry categories were chosen is that they have similar asset structure with high amount of fixed assets. When a company has high amount of fixed assets, they tend to have more debt as well in order to cover the fixed assets. As the data is from several years and includes multiple companies, panel data analysis was chosen as the research method. Both fixed effect regression and random effect regression were used to determine which of the variables are significant and what relationship will each variable get. Hausman test was used to choose, whether the fixed effect or random effect model was more suitable for this study.

First chapter covers the literature review. The first part discusses the most common capital structures and how they define capital structure. Second part covers the determinants chosen for this thesis and based on the capital structure theories and previous studies hypothesis are formed for each determinant. Second chapter covers the methodology used in this research. Third chapter covers the results, which is divided to two parts. First part discusses the regression results while the second part answers the hypothesis's formed in the first chapter.

1. LITERATURE REVIEW

This chapter will introduce the literature of this research. The first part discusses the most common capital structure theories and how their perspective of capital structure differs from each other. The second part will discuss the determinants chosen for this thesis. Additionally, hypotheses are formed based on capital structure theories and previous studies.

1.1. Capital structure theories

Company management are continuously trying to maximize the value of the company by doing decisions whether to finance their operations with internal or external funds. Capital structure theories are trying to explain on which basis is the business management making the financing decisions in order to achieve a capital structure that maximizes the value of the company. Capital structure is described as optimal, when equity and liabilities are in such proportion that maximizes the value of a company.

Modigliani and Miller first introduced their capital structure theory in 1958 which received a lot of attention from the public. This theory was the first publicly accepted capital structure theory in the modern corporate finance. According to their theory, capital structure does not have any significance when determine the value of a company. Modigliani's and Miller's theory assumes that the companies are operating in a perfect market in which they did not take taxes, bankruptcy expenses or trade expenses into account. Additionally, they assumed that the cost of debt was same for companies as well as individuals. Because of these strict assumptions, the theory has got a lot of critique. Modigliani's and Miller's analysis of capital structure led into two different propositions. (Frank, Goyal 2007)

First proposition without taxes states that there is no difference, whether the company chooses to finance its operations with equity or debt. This can be founded on that the price of debt is same for the company as for an individual investor. Additionally, the first proposition stated that the value of a firm is determined by assets rather than the capital structure. The assumption is that the value

of an unlevered company is exactly the same as the value of a levered one. (Ross, Westfield & Jordan 2010, 515 - 516)

According to the second proposition without taxes, the capital structure of a company does not affect the weighted average cost of capital (WACC). This means that the value of the company will remain the same, since the amount of debt used by company will grow in exactly in same proportion as the return on equity ratio. (Arnold, 2007)

Trade-off theory is together with pecking order-theory one of the most used capital structure theory. When making decisions affecting the capital structure, companies must weigh the tax benefits of debt and the expected costs of bankruptcy. This choice of between the amount of debt and equity is called the trade-off theory. Trade off-theory was created by Kraus and Litzenberger (1973) and was continued by Bradley, Jarrell and Kim (1984) whom came up with static trade-off theory based on Kraus' and Lizenberger's studies. The static trade-off theory assumes that the business activities and assets are constant and that the changes only occur in the capital structure of a company.

The cost of debt is the interest, which is tax deductible. The interest is determined in advance, which makes it significantly easier to determine the cost of debt rather than cost of equity. Cost of debt will be significantly lower than cost of equity, because the interest expenses are partly deductible, which will lower the cost of debt. Modigliani's and Miller's theory did not take taxes into account. This benefit of debt is called tax shied. Tax shield makes possible that the value of a company grows after taxes. In other words, for every dollar of debt issued the firm retains a certain fraction of taxes due. Debt financing increases the total after-tax dollar return to debt and equity and, thus, increases firm value. From this perspective it would be most beneficial to finance all operations with external funds, rather than with internal funds. (Tahvanainen 2003)

When the amount of debt grows high, so does the company's risk of handling its obligations to the creditors. If a company has troubles paying the creditors, there will be direct and indirect expenses. Direct expenses are costs of bankruptcy. On the other hand, indirect costs will occur when third parties lose trust in the company and will stop the co-operation or increase prices caused by the increase risk. (Berk, DeMarzo & Harford 2015)

The static trade-off theory points that company maximizes its value, by taking debt to the level where marginal value of tax shields on additional debt is just over the bankruptcy costs. According to the theory, this is the way to achieve the optimal capital structure. The benefit of debt is at this time the tax shield, which will increase the company's value and costs are the current bankruptcy costs (Tahvanainen 2003). Static trade-off theory takes only into account a specific point in time and does not take into account anything that happens in the future. There has been one dynamic model adapted into trade-off theory that takes future financial decisions into account (Frank & Goyal 2007, 18). In the dynamic theory transaction costs affects capital structure. Because of this, companies let the capital structure fluctuate between certain values, rather than trying forcefully to obtain a certain level while paying big transaction costs. (Fischer, Heinkel, Zechner 1989)

Agency theory was introduced by Jensen and Meckling (1976). This theory focuses on different parties of a company, so called agents and their different interests and priorities which lead to conflicts. Agency theory is based on trade-off theory, so its goal is to seek optimal capital structure. Furthermore, agency theory takes into consideration the agency problems, which are not taken into account in trade-off theory. Reason why agency problems occur is asymmetric information. Most common problems occur from differences in interest between the creditors and shareholders or between company management and shareholders. (Panda, Leepsa 2017, 80)

Differences in interests between management and shareholders are called principal-agent problem. Principal-agent problems occur when managers are more focused on their own interest rather than trying to maximize the value of the company. For example, a typical problem is that shareholders are more willing to take on risky projects in order to get higher returns, while managers are not willing to make risky investments because they are afraid of losing their job. Additionally, managers have a temporary job, in which they try to maximize their benefit. This may lead to that managers are only interested in the short-term results. (Jerzemowska 2006, 11-12)

The second agency problem that occur often, is the conflicts between creditors and shareholders. Main conflict in this agency problem is the investment decisions and dividend decisions. One common factor with the principal-agency problem is that creditors prefer less risky projects, because they have lower risk of default while shareholders tend to invest in risky projects in hope of higher returns. Riskiness of projects raise the cost of finance, which effect the creditors in terms of decreased value of outstanding debt. If a risky project succeeds, shareholders will get big profits, but creditors are stuck with interest profits which are a fixed percentage and does not increase with

increased risk. On the other hand, if the project fails, creditors share some of the loss. (Panda, Leepsa 2017, 80)

Pecking order theory is together with trade-off theory one of the most known and used capital structure theory. The differences between pecking order theory and trade-off theory is that pecking order theory does not aim to determine the optimal capital structure but rather focuses on explaining the decision making of management.

Pecking order theory originates from studies of Myers' (1984). Myers' and Majluf's (1984) study about adverse selection also has had an impact on pecking order theory. One of the main factors of pecking order theory is that because of asymmetric information, company management has more information than outside investors. Asymmetric information leads to that market-value of company is not equal to its real value. Pecking order theory focuses on creating a hierarchy in financing decision making. In this hierarchy, company's operations should be financed in firsthand with internal funds, but if internal funds are insufficient, should the company shift to external financing options. When external finance is needed, the company should try to seek finance from less risky external sources, such as bank loans before considering more risky forms of debt. The last resort for financing operations is issuing equity. In pecking order theory, the company does not aim to a certain level of debt, but rather debt is taken only if internal funds are not sufficient to finance investments. (Adair, Adaskou 2015)

According to Myers (1984) there is no optimal level of debt in pecking order theory. Asymmetric information leads to the hierarchy in which companies prefer to use internal funds over external and debt over equity. Additionally, asymmetric information affects the company's decision to use internal and external financing. Debt level of a company changes with the need of investments. Profitable companies try to get debt levels as low as possible, which is a result of that profitable companies are capable of financing their investments with internal funds and thus there is no need for external finance.

1.2. Determinants of capital structure

This chapter examines the determinants of capital structure, these determinants will be used later in the empirical part of the study. Determinants chosen for this research are: profitability, tangibility, company size, growth opportunities, liquidity and interest coverage ratio. Hypothesis's will be formed of each determinant based on capital structure theories discussed in chapter 1 and results from previous studies.

Profitability is one of the most crucial measures of performance. The simplest way of calculating profitability is to subtract expenses from revenues. However, profitability is often calculated by taking a ratio of net income against other factors, such as revenues, assets or equity. Some of the most used financial ratios to calculate profitability is profit margin, return on equity (ROE) and return on asset (ROA).

Trade-off theory suggests that profitability and the amount of debt a company is willing to use has a positive correlation. The reason why profitable firms are willing to use more debt is because profitable firms' debt burden and bankruptcy expenses are presumably lower than an unprofitable firm. Trade-off theory states that a company should increase its debt, so that benefits from tax shield could be maximized. In this case, the benefits of debt are greater than the disadvantages and thus taking more debt would be preferable. Agent expenses are likewise lower for a profitable company, which support a positive correlation between debt and profitability. (Frank, Goyal 2009)

Pecking order theory states that a company prefers internal financing over external financing. As a company becomes more profitable, its internal funds should also grow. This means that if the company has a solid financial standing, its internal funds should be enough to support its operations and thus would not need any external financing. This leads to that according to pecking order theory, profitability and leverage has negative correlation. (Abeywardhana, 2015)

Several studies support the pecking order theory's outcome of a negative correlation between profitability and leverage. Pandey (2001) found negative correlation between profitability and and leverage in emerging markets with data from 1984-1989 while, Jõeveer (2013) found similar negative correlation from European unlisted and listed SME's between 1995-2012. Furthermore, Titman and Wessels (1988) found negative relationship between profitability and leverage while

investigating determinants of capital structure of companies in USA between 1974-1982. Based on previous studies and capital structure theories, hypothesis is formed:

H1: Profitability has negative correlation to leverage.

Size is probably the most common variable when looking into literature about determinants of capital structure. Some of who has done research of this topic are Gupta (1969), Fama and French (2002), Nguye and Ramachandran (2006) and Mazur (2007). All of these studies show that company size has a positive correlation on the level of debt. According to Gupta (1969), small companies are more uncertain of their profitability and they have worse liquidity than big companies. This leads to that it is easier for big companies to acquire debt. According to Rajan and Zingalesi (1995) reasons why big companies has more debt than small companies is that big companies are often more diversificated than small companies, which makes them less likely to go bankrupt. Nguyen's and Ramachadran's (2006) research showed that small companies' debt is often short-term while big companies' debt is long-term. Faman and French (2002) stated that big companies has more debt than small companies, based on trade-off theory. Another explanatory factor according to the study was that big companies has lower cost of debt. According to Mazurin (2007) one factor why big companies uses more leverage is that big companies has less information asymmetry problems. Big companies give more information about themselves to the public, which reflects a better picture about their position in the market. Based on previous studies and capital structure theories, hypothesis is formed:

H2: Company size has positive correlation to leverage.

Growth opportunities can be measured in various ways. Often some sort of percentage increase in parts of income statement or balance sheet are used. Some studies have used the percentage change in revenues while other studies have preferred percentage change in total assets. Additionally, the price to book ratio (P/B) ratio has been popular. Wrong valuations of the stock will affect P/B ratio and thus will not be used in this research (Rajan & Zingales, 1995). This thesis will measure growth opportunities as the percentage change in total assets. A growing company often has an increased demand of finance, and if company's internal funds are not enough to finance the investments, must the company rely on financing options outside the company or in the worst case even abandon profitable investments. Outside financing enables companies to invest and support growth by simultaneously adding risks concerning debt. (Eriotis *et al.* 2007)

Pecking order theory suggests that leverage and growth opportunities has a positive correlation. When a company grows, its investment opportunities grow, at which time it's probable that company's internal funds are not enough to finance their investments. According to pecking order theory, if the company's internal funds are not enough to finance profitable investments, companies should turn to debt, which naturally increases the level debt and thus increases the debt to equity ratio (Frank & Goyal, 2009). On the other hand, trade off theory suggests that leverage decreases as growth opportunities increase. Valuation of growing companies are usually high, and they even might be overvalued as a result of beliefs in high future returns. Highly valued companies' cost of equity is at the same time at an attractive level comparing to cost of debt. Furthermore, the added value of high growth opportunities cannot be used as collateral for loans. (Titman & Wessels, 1988) Based on previous studies and capital structure theories, hypothesis is formed:

H3: There is negative relationship between leverage and growth opportunities.

Tangibility is the definition of how company's assets are divided into tangible and intangible assets. Tangible assets are assets that has a physical form, such as inventory, machinery or property. On the other hand, intangible assets are assets with no physical form such as patents or trademarks. Tangibility's effect on capital structure has been widely investigated, but the outcome of studies has been somewhat different.

Authors agree that tangibility is an important factor in determining the capital structure but there is no consensus among authors on the direction of the relationship. Trade-off theory suggests that leverage and tangibility would have positive relationship because tangible assets are often used as collateral and they decrease in value if company's financial situation decreases (Frank, Goyal 2005). Skoogh's and Swärd's (2015) research showed positive correlation between tangibility and leverage among Swedish listed companies while Harc's (2015) study about Croatian small and medium-sized companies showed a negative relationship between tangibility and short-term debt but a positive relationship between tangibility and long-term debt. Additionally, Jõeveer's (2018) results show negative relationship between tangibility and leverage of European CEE and Western companies.

According to pecking order theory, a large amount of fixed assets has a negative effect on leverage. If balance sheet shows large amount of fixed assets, it is easier to evaluate a company, which has a decreasing effect in asymmetric information between managers and shareholders. This will lead

to that the company is less likely to issue debt. On the other hand, trade off theory suggests a positive relationship between fixed assets and leverage because fixed assets can be used as collateral for loans which decreases the cost of debt. (Frank, Goyal 2005) Based on previous studies and capital structure theories, hypothesis is formed:

H4: Increases in fixed assets leads to increase in leverage.

Liquidity ratios indicates how a company is able to meet its obligations towards creditors in the short-term. If a company has high liquidity ratios, it can be seen as a downside, since it can be interpreted that the company could use those assets to for example generate sales. On the other hand, to low liquidity ratios indicates that the company has problems meeting its obligations towards creditors which might in the worst-case lead to bankruptcy. From the creditor's viewpoint, high liquidity firms are more attractive because they have many liquid assets which they are able to convert to cash and fulfill debt obligations. (Ross *et al.* 1994)

High liquidity means that there is low default risk for the company and thus they are able to increase their leverage based on the level of liquidity. But on the other hand, high liquidity can also mean that the company is not performing well because they are not able to collect their receivables. Additionally, there has been controversial results in previous studies. Jõeveer's studies (2013, 2018) has got diverse results of tangibility's and leverages correlation in Europe. The comparative study between European CEE and Western companies found negative correlation while the study of European SME's found positive relationship between leverage and tangibility of listed companies while unlisted companies had positive relationship when measuring the narrow leverage. Based on previous studies and capital structure theories, hypothesis is formed:

H5: Liquidity has positive relationship with capital structure.

Interest coverage ratio indicates how many times the company is able to pay its annual interest expenses with their operating income. Companies which use debt as a financing option always has the risk of going bankrupt. A high interest coverage indicates to the creditor that the company's operating income is enough to meet the obligations towards the creditor which leads to that it is easier for the company to borrow capital. On the other hand, high level of debt has a positive impact on interest expenses which in turn has a negative effect on interest coverage ratio and thus shows negative relationship between leverage and interest coverage ratio. Not many studies have included interest coverage ratio as determinant of capital structure but Nguyen's (2014) study showed positive relationship between leverage and interest coverage ratio when he investigated

the Finnish technology companies. Based on previous studies and capital structure theories, hypothesis is formed:

H6: Interest coverage ratio has positive effect on leverage.

2. DATA AND METHODOLOGY

2.1. Sample

Empirical part of this research paper will be done by using panel data, which consist of key financial ratios at a certain time period. Nasdaq Helsinki divides companies into 10 different categories, which are: Basic Materials, Consumer Goods, Consumer services, Financials, Health Care, Industrials, Oil & Gas, Technology, Telecommunications and Utilities (Nasdaq Helsinki). This research will use companies from both Basic Materials and Industrials category. The sample consists of 46 companies from which 9 are basic materials companies and 37 industrial companies. Financial ratios, which are used as variables, are obtained from financial statements (Income Statement and Balance Sheet). All financial statements are retrieved from Morningstar Financials' database. Four years' time-period is used between years 2015-2018. The sample has been modified in one way, companies from which data could not be found or had insufficient data was eliminated from the sample. After modifications to sample data, 46 companies were remaining out of the original 56 companies.

2.2. Measurement of variables

This thesis decided to calculate leverage as total liabilities divided by the sum of total liabilities and total equity. Other popular ways to calculate leverage are to divide short-term debt or long-term debt with the sum of total equity and liabilities.

$$Leverage = \frac{Total\ liabilities}{Total\ shareholder's\ equity + Total\ Liabilities} \quad (1)$$

Profitability can be calculated in various ways, from which most common are net profit margin, return on assets and return on equity. In this research, author decided to use return on assets (ROA) as the variable for profitability.

$$Return\ on\ assets = \frac{Net\ Income + Interest\ Expenses}{Total\ Assets} \quad (2)$$

Tangibility is calculated in this thesis by taking the proportion of fixed assets from total assets.

$$Tangibility = \frac{Fixed\ Assets}{Total\ Assets} \quad (3)$$

Size is calculated in this research as total revenues, which the company has generated during the one-year period. Other studies have used the same formula or has taken the logarithm of revenues.

Growth opportunities can be calculated in various ways, some studies have calculated growth opportunities as increase in revenues while others prefer the change in assets. Additionally, price-to-book ratio has been popular among some authors when calculating growth opportunities. However, in this research growth is calculated as the increase in total assets.

$$Growth\ opportunities = \%\ Change\ in\ Total\ Assets \quad (4)$$

Liquidity is usually calculated by using either quick or current ratio. Quick ratio was chosen for this research because it provides information about the true liquidity of a company since inventory is the least liquid current asset.

$$Quick\ ratio = \frac{Current\ Assets - Inventory - Prepaid\ expenses}{Current\ Liabilities} \quad (5)$$

Interest coverage ratio is either calculated by dividing earnings before interest and taxes (EBIT) or earnings before interest, taxes, depreciation and amortization (EBITDA) with interest expenses. This paper decided to use EBITDA over EBIT because it gives a more accurate picture and was easily obtainable from the financial statement. Several companies did not have any interest expenses, so the data was adjusted so that all companies had at least value 1 in interest expenses.

$$Interest\ coverage\ ratio = \frac{EBITDA}{Interest\ expenses} \quad (6)$$

2.3 Descriptive statistics

As seen from table 2.1. the number of basic materials companies is relatively low compared to industrial companies. The number of basic materials companies is 9 from the total 46 companies, which makes 20% of the sample while industrial companies consists of 37 companies, which is 80% of the sample. Additionally, the mean leverage has between the two industries vary quite a lot. Industrial companies have 28% more debt than basic material companies.

Table 2.1 Distribution of industries

Industry	N	%	Leverage
Basic materials	9	20 %	0,496
Industrials	37	80 %	0,636

(Source: Author's own calculations)

Table 2.2. shows the statistics of each variable. The statistics show the mean, median, standard deviation (S.D.), minimum (Min) and maximum (Max) values for each variable.

Table 2.2. Descriptive statistics of variables

Variable	Mean	Median	S.D.	Min	Max
Leverage	0,608	0,611	0,194	0,279	2,548
Profitability	0,031	0,045	0,264	-2,286	2,434
Tangibility	0,221	0,191	0,167	0,006	0,664
Size	1695	583	2512	9	10486
Growth	0,073	0,028	0,249	-0,791	1,429
Liquidity	0,911	0,832	0,480	0,142	3,667
Interest coverage	19,320	9,456	34,79	-17,5	245

(Source: Author's own calculations)

There are no exceptional results regarding the means of variables except for profitability, which is about 3%. Profitability above 5% is often considered good. However, median of profitability is about 4,5% which is decent. Additionally, the minimum value of profitability is -228%. This can be explained when looking into the financial statements of Componenta OYJ, which had net income of -206 million euros in 2016.

2.4 Research method

The data of this research consists of multiple companies and the financial data is from multiple years, so it can be said that it has both cross-sectional and time series dimension. This kind of data is called panel data and therefore, we use panel data analysis as our main research method for the empirical part of the thesis. Panel data analysis is a widely used method because it gives information about the cross-sections, which in our case are the companies and the time period which can be days, months or years. Additionally, panel data analysis provides information about how multiple variables affect the dependent variable. One clear advantage of panel data is that with panel data it is possible to use individual variables. These variables can either be fixed for each company or random. Another advantage is that panel data does not require a long series. There are two main approaches in panel data analysis, which are fixed effect model and random effect model. Pooled model will be presented in order to show the differences in equations to fixed and random effect models. (Sheytanova 2014, 5-6)

Pooled model is similar to simple regression model. It treats each observation as unrelated to others while ignoring panels and time. Pooled model is not the best option for panel data because it is likely that there is autocorrelation within individuals which would lead to false estimates of standard error. Additionally, it does not include the advantages of panel data. (Sheytanova, 2014) Formula for pooled model is:

$$y_{it}=\beta_0+\beta_1 x_{1,it}+\beta_2 x_{2,it}+ \dots +\beta_k x_{k,it}+\varepsilon_{it} \quad (7)$$

where

y=dependent variable,

x=independent variable

ε=error term

β=coefficient

i=company

t=time indexes.

Fixed effect model has a company specific variable, which is constant for all companies. This variable helps to explain the heterogeneity of data and reduces the mean squared error, which leads to more efficient results. Formula for fixed effect model is:

$$y_{it}=\alpha_i+\beta_1 x_{1,it}+\beta_2 x_{2,it}+ \dots +\beta_k x_{k,it}+\varepsilon_{it} \quad (8)$$

As seen from formula 8, all other variables are identical to pooled model (formula 7) but the constant factor β_0 has changed to the company specific variable α_i.

Random effect model differs from fixed effect model in terms of that rather than keeping the company specific variable constant for all companies, it is treated as random. This means that it is not treated as a parameter. Formula for random effect model:

$$y_{it}=(\alpha_i+v_i)+\beta_1 x_{1,it}+\beta_2 x_{2,it}\pm \dots +\beta_k x_{k,it}+\varepsilon_{it} \quad (9)$$

where

v_i =the zero mean standard random variable.

What separates random effect model from fixed effect model is that random effect model estimates that the companies differ in error term while fixed effect model estimates that companies differ in the company variable. Furthermore, in order to get correct results, random effect model requires specific assumptions.

In order to decide which of the two models will be suitable for this research, Hausmann test will be performed and based on its result, either fixed or random effect model's results is chosen.

3. EMPIRICAL PART

This chapter will investigate the linear regression results and compare them with the hypotheses made based on previous studies and capital structure theories in chapter 2. First, the fixed and random effect models are introduced and then the regression results will be compared to the hypotheses.

3.1. Regression analysis

Results of the fixed effect linear regression can be seen in table 3.1. The table includes each variable and its coefficient, standard error, t-ratio and p-value. Additionally, R-squared and F-statistic can be found in the bottom of the table. R-squared indicates how much variation of the dependent variable, which in our study is leverage is explained by the independent variables. Our results from the fixed effect model shows R-Squared of 0,89, which means that our variables explain 89% of the changes in leverage. P-value indicates the significance of the variables.

Table 3.1. Fixed effect linear regression results

Dependent variable: Leverage				
Variable	**coefficient**	**std. Error**	**t-ratio**	**p-value**
const	1,048	0,0727	14,4200	6,92E-29 ***
Profitability	-0,395	0,0233	−16,95	6,29E-35 ***
Tangibility	-1,406	0,2310	−6,087	1,17E-08 ***
Size	-4,86E-05	2,67E-05	−1,818	0,0714 *
Growth	-0,041	0,0310	−1,325	0,188
Liquidity	-0,038	0,0233	−1,615	0,109
Interest coverage	1,30E-04	0,0007	0,1855	0,853
R-Squared	0,892	N	186	

(Source: Author's own calculations)

According to the results of fixed effect model, profitability has negative relationship with leverage. It got the coefficient of −0,395. As the p-value is below 0,1 (6,29E-35) it indicates that the relationship between profitability and leverage is significant. Additionally, tangibility and size got

negative coefficients (−1,406 and −4,86e-05) which likewise shows negative relationship. Both tangibility and size have p-values lower than 0,1 (6,29E-35 and 1,17E-08) which shows that both tangibility's and size's relationship with leverage is significant. Meanwhile, growth and liquidity got negative correlation with −0,041 and −0,038 coefficients. Results of both of these variables are rejected because of the insignificant p-values (0,188 and 0,109). Interest coverage ratio has the only positive relationship in this model with coefficient of 1,30E-04. But p-value of 0,853 makes this variable insignificant for this research.

Table 3.2. shows the results of random effect linear regression. The results are somewhat similar to the fixed effect model, but some differences can be found. Profitability and tangibility both have negative coefficients (-0,378 and -0,363), as in fixed effect model and both have p-value below 0,10 (5,21E-52 and 0,002) which indicates that they are significant variables also in the random effect model. However, tangibility's coefficient has dropped from -1,4 in fixed effect model to -0,36 in random effect model. On the other hand, size has become an insignificant variable in random effect model, as p-value increases above 0,1. P-value in fixed effect model was 0,07 but it has taken a big increase in random effect model to 0,32. Growth opportunities and interest coverage ratio has not drastically changed in random effect model. Table 3.2. show that both growth opportunities and interest coverage ratio has remained as insignificant variables while growth has negative relationship and interest coverage ratio positive relationship. Liquidity is together with size the only variables which's significance has changed between fixed and random effect model. Liquidity was insignificant in the fixed effect model when its p-value was just slightly over 0,10. In random effect model the p-value of liquidity has dropped to 0,014, which makes it significant. Additionally, the coefficient has increased a little bit from fixed effect models coefficient of -0,38 to random effect models corresponding -0,057.

Table 3.2. Random effect linear regression results

Dependent variable:	Leverage			
Variable	**coefficient**	**std. error**	**t-ratio**	**p-value**
const	0,767	0,043	17,830	4,33E-71***
Profitability	-0,378	0,025	-15,170	5,21E-52 ***
Tangibility	-0,363	0,118	-3,080	0,002 ***
Size	-8,57E-06	8,68E-06	-0,987	0,324
Growth	-0,046	0,032	-1,436	0,151
Liquidity	-0,057	0,023	-2,471	0,013 **
Interest coverage	1,32E-04	0,001	0,257	0,797

(Source: Author's own calculations)

Hausman test will be used in this thesis in order to determine whether analysis of the data will be done by using either fixed effect or random effect model. If the p-value in the test is lower than 0,05 it means that the null hypothesis is rejected, while a p-value above 0,05 suggests that null hypothesis is accepted. If the null hypothesis is rejected, fixed effect model is more suitable, while if the null hypothesis is accepted it indicates that random effect model is better. The Hausman test got p-value of 8,86e-008, which is lower than 0,05 so fixed effects model will be used in the analysis of regression results.

As fixed effect model was chosen, it means that significant variables are profitability, tangibility and size which all has negative relationship to leverage. On the other hand, growth opportunities and liquidity got negative relationships as well, but p-values indicate that they are insignificant. Lastly, interest coverage ratio got the only positive relationship of this study, which also had p-value over 0,10 which made it insignificant.

3.2 Results

H1: Profitability has negative correlation to leverage.

As seen from table 3.1 profitability gets a negative coefficient. P-value of 6,95e-35 indicates that profitability is a significant determinant. The coefficient of -0,39 tells that when profitability increases it will have a decreasing effect on leverage, which makes our hypothesis correct.

Comparing our result with previous studies, it can be said that the result of this study is in line with previous findings. Jõeveer's (2018) study of European CEE and Western companies got coefficient off -0,933 for CEE companies and -0,335 for Western companies, while using the same leverage ratio as the dependent variable. Additionally, the corresponding p-values were 0,075 and 0,036 which indicates that the relationship is significant. Furthermore, Frank and Goyal's (2009) study of publicly traded American firms between 1950-2003 got a negative coefficient of -0,250 when using return on asset as the ratio to measure profitability.

Results of this study indicates that profitability behaves according to pecking order theory. This means that profitable companies are able to generate enough capital in order to make new investments and pay dividends without taking new debt.

H2: Company size has positive correlation to leverage.

Most surprising outcome of the regression is the company size, which's coefficient which is negative. Results from the United Kingdom (Michaelas et al. 1999), Finland (Nguyen 2014) and China (Huang, Son 2006) all show positive relationship between company size and leverage. Previous studies would indicate that company size as a determinant would behave as in trade-off theory. Trade-off theory states that while companies grow larger, it is easier for them to get debt because they are able to get lower cost of debt than small companies. Additionally, big companies are well diversificated which lead to lower risk of default. On the other hand, Titman and Wessels (1988) found a negative correlation between company size and short-term debt. They argued that high transaction costs would be the reason why negative relationship appeared.

Coefficient for company size was −4,86e-05 which means that company size and leverage has a negative relationship and p-value of 0,071 indicates that size is a significant determinant of leverage. This thesis found similar results to Titman and Wessels (1988), which would indicate that pecking order theory would describe company size better than trade-off theory. Pecking order theory suggests that large companies has enough internal funds to finance their operations.

H3: There is negative relationship between leverage and growth opportunities.

Growth opportunities got a negative coefficient of -0,065. Our hypothesis is correct, and the result indicates that growth opportunities are in line with trade-off theory. Trade-off theory suggests that the valuation of a growing company is high, and this leads to that equity seems like an attractive option. At the same time, creditors do not value growth opportunities as high as other ratios, since they cannot be used as collateral for loans.

There has been variety in term of which relationship growth opportunities has with leverage. Gupta (1969) found positive correlation, which would indicate that the correlation of growth opportunities would behave as in pecking order theory. On the other hand, Bauer's (2004) results from Czech's listed companies indicate a negative relationship between growth opportunities and leverage. Negative correlation indicates that growth opportunities behave as stated in trade-off theory. However, the p-value of growth is 0,18 which makes it insignificant for this research.

H4: Amount of fixed assets has positive correlation with leverage

Tangibility got a negative coefficient of −0,141 which means that when the amount of fixed assets increases, it will lead to decrease in leverage and is against our hypothesis. P-value of 0,044 indicates that tangibility is a significant determinant. This indicates that tangibility behaves as in pecking order theory. According to pecking order theory, it is easier to valuate a company when it has high amount of fixed assets, which leads to lowers asymmetric information between company and the shareholders. This will lead to lower cost of equity.

Results from this research match partly with Harc's (2015) research of Croatian companies. Harc's (2015) results show a coefficient between 0,048 and -0,033 during the years 2005-2010 when comparing the relationship between tangibility and leverage. What is noticeable that her results show positive correlation between long-term debt and tangibility, while short-term debt and tangibility had negative relationship. Additionally, Jõeveer's (2015) study of European CEE and Western companies showed negative correlation between tangibility and leverage.

H5: Liquidity has positive relationship with capital structure.

Liquidity got a negative coefficient of −0,038 which suggests that there is a negative correlation between liquidity and leverage. Other studies have found similar results, Nikolaos, Vasiliou and Ventoura-Neokosmidi (2007) investigated the determinants of capital structure of listed companies in Greece between 1997-2001. Their results showed a negative coefficient of -0,011 and p-value of 0,019 which indicates that the variable is significant. Additionally, Nguyen's (2014) results from Finnish technology companies got similar results as this thesis. He got coefficient of -11,195 for liquidity while using quick ratio as the determinant for liquidity.

The negative relationship suggests that liquidity would behave as in pecking order theory. According to pecking order theory highly liquid companies issues less debt. Additionally, manipulation of liquid assets can be done by the managers in order to favor shareholders which leads to increasing agency costs of debt (Deesomsak *et al*. 2004). Liquidity got p-value of 0,1087 which is just over the significant level of 0,1 and makes this variable insignificant.

H6: Interest coverage ratio has positive effect on leverage.

As not many studies have included interest coverage ratio in their list of determinants, this hypothesis was made based on Nguyen's (2014) study of Finnish technology companies and their

capital structure. Since this study also deal with Finnish companies, it seemed logical that the two studies would get somewhat same results. As seen from table 3, interest coverage ratio had a low coefficient of 0,000129 with a high p-value of 0,85. These results are similar to Nguyen's (2014) results, since he got coefficient of 0,010 with p-value of 0,61. It has to be noted that Nguyen used a little bit different formula while calculating interest coverage ratio as he used earnings before interest and taxes (EBIT) while this study used earnings before interest, taxes, depreciation and amortization (EBITDA)

CONCLUSION

The aim of this paper was to investigate how the chosen determinants affect the capital structure of Finnish basic materials and industrial companies and how the results differs from previous studies. Hypothesis's were formed based on capital structure theories and previous studies. These hypotheses were that profitability and growth opportunities would have negative relationship with leverage while size, tangibility, liquidity and interest coverage ratio would have positive relationship.

The results in chapter 3 shows that three of these hypotheses were correct. Profitability, growth opportunities got negative relationship while interest coverage ratio got positive relationship. On the other hand, size, tangibility and liquidity got negative relationship, which was the opposite result from the hypotheses. The result that tangibility and liquidity got negative relationship was not surprising, since both variables has got diverse results in previous studies.

Answers to research questions:

- How does capital structure theories differ from each other?

Capital structure theories are trying to explain on which basis is the business management making the financing decisions in order to achieve a capital structure that maximizes the value of the company. Pecking order theory does not seek for an optimal capital structure but rather provides a hierarchy, on which basis companies should finance their operations. This hierarchy states that a company should in firsthand finance their operations with internal funds. Only when internal funds are insufficient should company seek for outside financing. Issuing new equity should be used as a last resort. On the other hand, trade-off theory suggests that optimal capital structure can be achieved through a mixture of debt and equity. A company should take advantage of tax benefits of debt to the point where bankruptcy costs become too high and exceeds the advantages of debt.

- Which determinants had the most impact on capital structure?

The results show that determinants which has a significant effect on the capital structure of Finnish basic industry and industrial companies are size, profitability and tangibility. Based on the fixed effect regression results, profitability had the largest impact on capital structure among all variables. Size, profitability and tangibility has also been significant variables in previous studies done worldwide. Liquidity got significant results in random effect model, but since the Hausman test verified the use of fixed effect model, it cannot be taken into account.

Both growth opportunities, liquidity and interest coverage ratio all got insignificant results in the fixed effect model. Liquidity showed similar negative results as Nguyen (2014) got when he investigated the capital structure of Finnish technology companies.

- Is there a dominant capital structure theory to explain the variable relationships?

Total of five determinants was used in this research, from which four was acting like in pecking order theory. From these five determinants, profitability, size and tangibility were significant and all of these variables behaved as in pecking order theory. Author would not make any assumptions even though; the results would suggest that pecking order theory explains the capital structure of Finnish basic materials and industrial companies better than trade-off theory. This research used only a handful of determinants, in order to get a better insight, a broader study should be conducted with more determinants.

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