TALLINN UNIVERSITY OF TECHNOLOGY

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THE DETERMINANTS OF THE CAPITAL STRUCTURE OF BANKS IN THE NORDIC COUNTRIES

Bachelor's thesis

Programme International Business Administration, specialisation Finance

Supervisor: Associate Professor, PhD, Karin Jõeveer

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I hereby declare that I have compiled the thesis independently

and all works, important standpoints and data by other authors

have been properly referenced and the same paper

has not been previously presented for grading.

The document length is 8482 words from the introduction to the end of conclusion.

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ABSTRACT

The aim of this thesis is to identify which chosen variables can determine the capital structure of banks in the four Nordic countries. The data was gathered from 55 banks from Denmark, Finland, Norway, and Sweden during the years of 2006-2019. The data included both private and publicly listed banks. The analysis for this study was done by the panel data analysis. Moreover, both fixed and random effect models were performed. There were together five independent variables, while leverage acted as the dependent variable. Overall, all the variables show significant correlations with financial leverage; profitability, collateral, size, growth and dividend. The chosen determinants can somehow explain the capital structure of banks. The capital structure theories applied to non-financial companies and buffer views can explain the capital structure of banks.

Keywords: capital structure, Nordic countries, banks, determinant

INTRODUCTION

The capital structure as a research field has been widely investigated since the first publication of capital structure theory by Modigliani and Miller (1963). However, the capital structure of financial companies, such as banks has been ignored in various researches. Mainly due to several reasons. One common belief states that there is no need to investigate them because banks, for example, are heavily regulated. In other words, the idea outlines that the capital structure for this field is determined by the regulations imposed. Additionally, the high leverage of financial companies could affect the final result when investigating both non-financial and financial companies. Due to many particular reasons, the determinants of the capital structure of banks have been abandoned from the different studies. Therefore, there are not many examples of research available when compared with non-financial companies.

There are major studies proposed that focus on the capital structure of banks. The study by Gropp and Heider (2009) research can be seen as a starting point for investigating the determinants of capital structure, especially for banks. This study showed that the variables and theories of capital structure for non-financial companies can also apply to the financial establishment. Since then, there have been numerous studies on this topic. However, the geographical focus has been mostly in developing countries and generally international level. Only attention related to banks in the Nordic countries has been investigated by Berglund and Mäkinen (2019). They showed that these countries outperformed during the financial crisis in 2008. This leads to questions about why did the banks located in the Nordic outperformed during the crisis. Can the capital structure of Nordic Banks explain those events? One argument could be that the previous experience of financial crises in the 1990s led to major changes in regulations.

The concept of capital structure is important to understand because it can have an impact on the company's value. In addition, it is a mix of internal and external funding. The internal refers usually to equity while external debt, for example, loans from banks. Also, external funding can include external equity. The optimal capital structure consists of a right balance of equity and debt. This balance is backed by different capital structure theories such as trade-off theory and pecking order theory. These previously mentioned studies have further developed from Modligliani-Miller

therom (1958). There have been many studies on this topic, but the optimal capital structure remains as a puzzle for many researchers.

The aim of this thesis is to identify which chosen variables can determine the capital structure of banks in the four Nordic countries. It is essential to outline that this thesis will mostly focus on the determinants of capital structure for non-financial companies. Moreover, there will be bank specific variables in this research. The capital buffer will be briefly stated. Furthermore, it is possible to gain new knowledge on how banks choose their capital after the regulations. Moreover, the differences between previous empirical findings. The following research questions will be answered in the thesis:

- Can the chosen variables somehow determine the capital structure of the banks in the four Nordic countries?
- Which theories can explain the capital structure of banks?

Additionally, the hypotheses are formed based on previous studies and capital structure theories. The hypothesizes are developed in the theoretical framework chapter and later to investigate the outcome of panel data.

The panel data method is used to investigate the determinants of capital structure. The data was gathered from four Nordic countries (Finland, Denmark, Norway, and Sweden) during the time series of 2006-2019. Iceland was excluded from this thesis due to lack of information. Together, there were 55 publicly listed and private banks operating in different fields, for example, commercial and investment banks.

The thesis is divided into three chapters. The first section includes the theoretical framework for the capital structure. It explains the different capital structure theories, introduces the previous literature, the empirical findings on banks' capital structure, and lastly develops the hypothesis for this research. The second chapter outlines the data and methodology. This includes the chosen sample and explaining the research method. Moreover, it covers the summary of data. The last chapter of this thesis is the empirical results. This section presents the analysis of the results and discussion. The thesis is finished by the conclusion.

1.THEORICAL FRAMEWORK

This chapter will outline the most important theories linked to the capital structure. Secondly, previous studies on the capital structure of banks. Lastly, the determinants of capital structure and hypotheses.

1.1. Capital Structure Theory

The capital structure is essential to companies to maximize their value and the wealth of their shareholders. The theories define how a company uses its debt and equity to finance its activities. Mostly, it has been believed that the regulations imposed on the financial sector explain the capital structure of financial institutions. However, there are many empirical studies to show that capital structure theory also applies to banks. This argument is shown by Gropp and Heider (2009). This means that the determinants of non-financial companies can be applied to financial firms. Previous researches have argued to determine the optimal capital structure for companies. This remains a puzzle for the future research field. The optimal capital structure of a firm could decline the possibility of financial risks, such as bankruptcy risks.

1.1.1. Modigliani and Miller Theorem

The theory of capital structure proposed by Modigliani and Miller (1958), is usually seen as a starting point for the research topic. They presented different propositions for the capital structure. Proposition I outlines that the market value of a company is not impacted by the capital structure of the company. The common assumptions were that there would not be any taxes, cost of financial distress, nor agency costs. Furthermore, the investors would value firms in the same way regardless of the mixture of debt and equity the firm is funded. Proposition II argues that an increase in leverage affects the risk of the company, and thus the cost of equity increases (Abeywardhana, 2017).

Since the first theorem, Modigliani and Miller (1963) developed the theory further, adding the effect of corporate tax. The tax will give a more accurate result because companies can benefit from the tax shield. Therefore, it creates more value for the company. The particular reason for the

tax shield, the cost of debt, will be lower. Moreover, it decreases the weighted average cost of capital (WACC).

The problem with this theory is that it expects companies to operate in perfect market conditions, but this is impossible in the actual environment. However, Modigliani and Miller theorem has influenced the development of other capital structure theories, for example, the static trade-off theory and the pecking order theory (Luigi and Sorin, 2009).

1.1.2. Trade-off Theory

The trade-off theory evolved from the Modigliani-Miller theorem. Moreover, it further defines the choice of the capital structure. Furthermore, it takes into account the tax advantage of debt and bankruptcy penalties. The theory suggests the firms to find the right level of financial leverage. The balance should lie where the marginal benefits of leverage should be higher than financial distress costs. The theory was originally presented by Kraus and Litzenberger (1973). They argued that the taxation of corporate and bankruptcy penalties influences the leverage of the value of companies. Over the years, the trade-off theory has become more complex (Abel, 2017).

There is empirical evidence that the theory explains the capital structure of companies. Hackbarth et al. (2007) found the differences between vulnerable and powerful firms. It seems that weak companies mostly finance with bank debt, while strong companies mix with bank and market debt. Moreover, there were differences at the international level.

In some situations, the trade-off theory might not be practical. Abel (2017) outlined that a low tax rate cannot create enough marginal benefit of the tax shield. This demonstrates that the companies are taking advantage of the interest deductibility. Furthermore, they are only obtaining as much as without exposing themselves to the possibility of default. Additionally, an extremely high tax rate is not sufficient in theory. For this particular reason, the marginal benefit of the tax shield is not achieved. In this case, the firms are only borrowing as much as the leaders are able. Moreover, the trade-off theory will fail if the earnings before interest and tax (EBIT) are lower than the critical level. (Abel, 2017). Other issues considering the theory are, for instance, the lack of impact of information asymmetry (Abeywardhana, 2017). Furthermore, Myers (1984) found some issues of trade-off theory such as asymmetric information and agency problems.

1.1.3. Agency Cost

The agency cost theory was presented by Jensen and Meckling (1976). The approach outlines the different interests and priorities between various parties in the company that could lead to conflicts. The previous capital structure theories have not taken into account the agency problems. The issues arise when there is a different interest between, for example, the shareholders and management or creditors. The theory has evolved from trade-off theory because it does not take into account the asymmetric information.

The first difference in interest between the shareholder and management is known as a principal-agent problem. This matter rises when managers' decisions could maximize their welfare, forgetting the shareholders' interests. In some cases, the managers might play safe to guarantee their career and thus avoid high-risk decisions. These actions do not support shareholders' interests. The second issue between interests may arise between shareholders and creditors when investment and dividend decisions are relevant. Moreover, the problem is quite similar to managers versus shareholders, for example, the creditors prefer less risky arrangements. The shareholders prefer unsafe projects because those investments can lead to higher profits, while creditors like to play safe. For this particular reason, the creditors are following the interest and the ability of the company to survive.

Jensen and Mecking (1976) suggest that agency costs are similar to other expenses the companies face. The agency cost can be divided into three inputs: monitoring expenditure, residual loss, and bonding expenditures.

1.1.4. Pecking Order Theory

The pecking order theory is a well-known theory besides the trade-off theory to explain the capital structure of companies. The main difference between these two theories is that the pecking order theory states the companies prefer internal funding over external (Luigi & Sorin, 2009). Moreover, it takes asymmetric information into account. The pecking order theory outlines that firms favor internal finance before issuing debt, and lastly distribute equity.

The pecking order theory was first proposed by Myers and Majluf (1984). The study presumes the management understands better the value of the company than investors. For this particular reason, the manager can make decisions that can signal "bad news" to potential investors because the management may have a piece of inside information. Additionally, the companies should prefer first the safe securities before riskier ones. In other words, using debt is better than that of equity.

According to Myers and Majluf (1984), the companies should obtain all projects which fulfill the requirement of a positive net present value (NPV). Nonetheless, the management has more information. Therefore, they might accept investments that have negative NPV.

According to Myers (1984), the pecking-order theory depends on the sticky dividends. However, this does not explain the reason for this. Moreover, it leaves problems with the timing of issuing the common equity. To reduce the cost of asymmetric information costs, the company needs to finance its investments with internal funds.

1.1.5. Market Timing Theory

The market timing theory challenges the static tradeoff and pecking order theories. It focuses on the practice of how companies issue new stock when its price is recognized to be overvalued and then buy back the company's shares when there is undervaluation (Luigi & Sorin, 2009). There are two versions available to explain the theory.

The first version focuses on the economic agents, for example, shareholders and managers. It is assumed that firms distribute equity directly after a piece of positive information. This event leads to a decrease in the asymmetry problem between management and shareholders. Additionally, an increase in stock price. Therefore, the company creates its own timing opportunities. (Luigi & Sorin, 2009)

According to Baker and Wurgler (2002), the second version will focus on perceptions of mispricing and illogical investors. They outlined that the management distributes shares when they assume its cost is illogically low. Moreover, they repurchases shares when its cost is assumed to be illogically high. The managers' misvaluation can influence variations of the market-to-book ratio. Furthermore, the theory does not need the market to be inefficient. Due to this particular reason, the managers do not predict perfect returns from stocks. Lastly, there is no optimal capital structure because of the fluctuations in the market valuations.

1.1.6. Capital Buffer View

The banking sector is more regulated than the other fields across countries. Due to the regulations, the banks need to hold a capital buffer against the regulatory minimum capital requirement. The capital buffer can be seen as insurance. This action can lead to the violation of regulated minimum capital and causes a high cost of supervisory actions. Moreover, it could lead to the bank's closure. Raising financial assets can be costly related to insured deposits. (Stolz and Wedow, 2011).

According to Gropp and Heider (2009), the higher costs of distributing equity at short notice are less levered due to capital buffer. The capital buffer could impact on the capital structure of banks´.

1.2. Previous Researches

The capital structure of a company has been widely researched since the first theories. Mostly the previous researches have focused on nonfinancial companies. Furthermore, the focus has been frequently at the international level with a limited focus on Nordic countries. However, there are few studies on the capital structure of banks. These researches have focused on developing countries, the U.S., and a few European countries.

One most important study to investigate the capital structure of banks was conducted by Gropp and Heider (2009). The study included the 200 largest publicly listed banks in the United States of America and 15 European Union countries between 1991 and 2004. They used the empirical literature on nonfinancial companies to illustrate the capital structure of banks. According to Gropp and Heider (2009), the buffer over the regulatory minimum does not explain the capital of banks. The buffers are the insurance against declining under the minimum capital requirement. Furthermore, they did not have any effect on deposit insurance coverage. The difference in capital structure between banks' and nonfinancial companies' is quite small in reality. Nearly all banks develop their capital structure in much the same way as companies do. However, when the bank capital starts to reach the regular minimum, the difference will be much higher.

Octavia and Brown (2010) investigated the determinants of the capital structure of banks in developing countries. The study was a further examination of Gropp and Heider (2009). They examined 56 publicly listed commercial banks from ten developing countries during 1996 and 2005. The findings illustrate the determinants of capital structure that can be used to explain the capital of the banks. Nevertheless, the findings do not support the buffer theory because of the mixed results.

The bank capital ratios can vary across industrial countries. Brewer III et al., (2008) researched 78 private banks headquartered in 12 developed countries during 1992 and 2005. The differences between capital ratios are explained by country characteristics and policies. Moreover, there were no relationships between bank variables and the leverages.

Hoque and Pour (2018) studied worldwide the capital structure of banks. The sample included 347 large global banks between 1998 and 2016 from 57 countries. Additionally, they found out that

the banks' structure is correlated with corporate capital structure theory and the buffer view. There were differences in capital structure between countries, for example, banks' leverage. This reason is mostly explained by the characteristics of locations, such as tax systems and corruption. The research strongly supports the capital structure can be applied to the capital structure of banks.

There have been many studies on the capital structure of banks focused on specific countries. Examples of these studies are Çağlayan and Sak (2010) on Turkish banks and Amidu (2007) on banks in Ghana.

1.3. Determinants of capital structure

Many factors are influencing the capital structure. This thesis uses five variables, which are the following; profitability, tangibility, size, growth, opportunities, and dividend. The variables are based on past empirical studies on the determinants of capital structure. Both determinants of the firm generally and on banks are taken into account in this research. There will be differences in how each variable is calculated with no change in effect. There have been hints of obvious relationships between the chosen variables and financial leverage.

Profitability has a major role when determining the capital structure. In the trade-off theory, the firms prefer taking more leverage due to the benefits from tax shield. This means more profitable companies have more financial leverage than less profitable companies. Moreover, the profitable firms have more leverage just in case of financial distress.

According to the pecking order theory, the profitable company uses internal funds before external funds. The internal financing increases when the company becomes more profitable. Therefore, the internal funds support the company's activities. Myers (2001) outlines target debt ratios lower for profitable companies because their borrow is less due to sufficient internal funding. At the same time, less profitable companies are more committed to external funds and thus consequently acquiring debt. Therefore, there is a negative relationship between profitability and financial leverage.

There are studies to show that there is a negative relationship between leverage and profitability. Abel (2017) investigated the profitability in trade-off theory. The study proposes that the increase in profitability leads to a decrease in the leverage ratio. This illustrates the leverage is negatively related to profitability if the trade-off theory is operative. Besides, Gropp and Heider (2009) found larger banks tend to have less profit while more leverage.

H1: The profitability has a negative effect on financial leverage.

Collateral is defined by an asset that secures a loan, for example, a house to secure mortgage loans. According to the trade-off theory, collateral assets support in reducing the financial distress cost and agency cost of leverage. Therefore, collaterals increase the financial leverage. Titman and Wessels (1988) determine that higher collateral value leads to higher debt levels.

The pecking order theory explains the relationship between financial leverage and collateral as negative. The previous studies on the capital structure of banks have different results. For example, Gropp and Heider (2009) outlined that banks that have less collateral also have less leverage. Several studies show the relationships as insignificant, for example, Octavia and Brown (2010) and Hoque and Pour (2018). Nguyen and Kayani (2013) found a significant negative relationship between profitability and leverage.

H2: The collateral has a negative effect on financial leverage.

According to capital structure theory, size determines the capital structure. The trade-off theory outlines that larger companies have smaller bankruptcy costs and they are more stable to handle debt. Various studies are showing a positive relationship between leverage and size, for example, Titman & Wessels (1988). They argued that larger companies have better borrowing capacities. Therefore, the firms have higher debt levels relative to book values. Similar relationships have been found by Gropp and Heider (2009) and Octavia and Brown (2010).

However, there can also be a negative relationship between size and leverage. The larger companies handle better informational asymmetries. Therefore, the cost of asymmetric information is lower and thus has less leverage. (Rajan and Zingales, 1995)

H3: The size has a positive effect on financial leverage.

There are different ways to calculate growth opportunities. For example, the percentage change of assets or income in a given period. Besides, the market-to-book ratio has been quite variable to calculate the growth. This thesis will use a percentage change of assets to calculate the growth opportunities. Due to a particular reason, the market for books has moved aside because it is heavily influenced by the stock market.

According to the pecking order theory, companies borrow more when internal funds are insufficient to fulfill the need for investment (Abeywardhana, 2017). Myers (2001) stated the companies which are more profitable and better growth opportunities would handle less debt.

Furthermore, the profits are retained to avoid future external funding if there are no investment opportunities.

The trade-off theory outlines a negative correlation between growth opportunities and financial leverage. This means that the companies which have greater growth opportunities can have lower-level debt and thus better investment opportunities. However, flexible investment opportunities can increase asymmetric information between management and shareholders. Therefore, the agency costs are likely higher for growing firms (Titman and Wessels, 1988).

According to the marketing timing theory, there is a negative relationship between growth and leverage (Baker and Wurgler, 2002). They found out low leverage companies raise funds when market valuations are high, while high leverage companies raise funds when market valuations are low.

The previous studies on the capital structure of banks show different results. Gropp and Heider (2009) show a negative relationship, while Octavia and Brown (2010) had a mixed relationship. Çağlayan and Sak (2010) indicate a positive relationship.

H4: The growth opportunities have a negative effect on financial leverage.

Companies that pay dividends have a lower level of leverage than companies that do not pay (Frank and Goyal, 2009). According to the pecking order theory, the companies issue more equity due to the lack of information asymmetry in the equity market. Therefore, there is a negative correlation between dividends and leverage.

Gropp and Heider (2009) argued that the dividend-paying banks issue more equity because they know their market better. Moreover, the banks are less levered if the cost of equity is high. Furthermore, they agreed with the negative correlation between dividend and leverage. However, the banks which pay dividends have higher leverage because they expect less costly equity (Hoque and Pour, 2018).

H5: The dividends have a negative effect on financial leverage.

To summarize this thesis' hypotheses, Table 1 summarizes the relationships between determinants and theory.

Table 1. The expected effects according to capital structure theory

Variable	Theory				
	Agency theory	Trade-off theory	Pecking order theory	Market timing theory	Buffer view
Profitability	+	+	-		+
Collateral	+	+	-		+
Size		+			-/+
Growth		-	-	-	+
Dividends			-		+

Source: Compiled by the author

(+) illustrates a positive relationship, while (-) is a negative relationship. The buffer view variations are based on the study by Hoque and Pour (2018). As seen in Table 1, the trade-off theory and the pecking order theory are popular theories to explain the correlation from corporate view.

2. DATA AND METHODOLOGY

This chapter includes the samples and research mythology used in this thesis. Firstly, present the chosen sample, and then the dependent and intedependent variables. Secondly, summary of the data and lastly, the regression method for this thesis.

2.1. Sample Selection

The empirical part of this thesis will be done by working with panel data. This data was gathered from different time points of companies. Furthermore, this thesis includes five determinants of capital structure and one variable to measure financial leverage. The period for the study is the years 2006-2019. This time frame can give the full economic cycle and regression phases because it includes the financial crisis in 2008.

The geographical area focus is in the Nordic countries; Denmark, Finland, Norway, and Sweden. Iceland was removed from the study because of a lack of sufficient information. Furthermore, all the biggest Icelandic banks collapsed in 2008 due to the financial crisis. The Nordic countries share a lot together, for instance, history and social structure. Besides, before the financial crisis in 2008, Finland, Norway, and Sweden faced several financial crises in the 1900s. According to Berglund and Mäkinen (2019), the Nordic banks outperformed during 2008 and thus learned from previous crises.

The data was gathered from banks in the Nordic states. In total, 55 banks were chosen. The original number was 101. Due to a lack of data and information, the sample size was reduced to 55 banks. The sample includes both publicly listed and private companies. In addition, most of the companies are located in Norway. Therefore, the companies were randomly chosen from Norway. At the same time, the same actions were taken on choosing the banks from other Nordic countries. The number of banks are represented below. The sample includes different banks operating various fields, for example, commercial, savings, investment, and mortgage. Major financial companies are located in Norway (17 banks), Denmark (16), and Sweden (16). The smallest number of banks located in Finland (6).

The data was gathered by using Moody's Analytics BankFocus database. The BankFocus gathers banking data from Bureau van Dijk and Moody's Investors Service. The financial ratios are calculated from the financial statements, especially the income statement and balance sheet.

2.2. Measurement of Variables

In this thesis, all measurement determinants are formed from previous studies. Calculating the financial ratios is various between different research, and thus there may be changes in the formulas, etc. Furthermore, the lack of information can also influence these formulas.

2.2.1. Dependent Variable

The dependent variable for this thesis is the financial leverage. This is calculated by the total liabilities divided by the sum total shareholders' equity and total liabilities. Other popular methods are, for example, book and market leverages.

$$LEVERAGE\ (LEV) = \frac{Total\ liabilities}{Total\ shareholder's equity + Total\ liabilities} \tag{1}$$

2.2.2. Independent Variables

There are many ways to calculate the profitability. In this case, the profitability is measured by earnings before interest and tax (EBIT) divided by total assets.

$$PROFITABILITY\ (PROF) = \frac{EBIT}{Total\ Assets} \tag{2}$$

The collateral is calculated by total securities, treasury bills, other bills, bonds, cash, and dues from banks, land and buildings, and other tangible assets divided by the book value of assets. The formula is similar to the study by Gropp and Heider (2009).

$$COLLATERAL\ (COLL) = \frac{\begin{array}{c}(Total\ securitites + treasure\ bills \\ + other\ bills + bonds + cash\ and\ due\ from\ banks + land\ and\ buildings \\ + and\ other\ tangible\ assets)\end{array}}{Book\ value\ of\ assets} \tag{3}$$

The size of the bank is determined by the natural logarithm of total assets.

$$SIZE\ (SIZE) = ln\ (Total\ Assets) \tag{4}$$

The growth opportunities are measured by a percentage change in total assets.

$$GROWTH\ (GROWTH) = \%\ change\ in\ Total\ Assets \tag{5}$$

The last independent variable in this thesis is the dividend. Furthermore, this variable plays as a dummy variable. The determinant will be one if a bank pays a dividend in a given year.

$$DIVIDEND\ (DIV) = 1\ if\ a\ bank\ pays\ a\ dividend\ in\ a\ given\ year \tag{6}$$

2.3. Descriptive Statistics

Table 2.1. Descriptive statistics for the data

Variable	Min	1st Q.	Median	Mean	3rd Q.	Max	S.D.
lev	0.1972	0.9204	0.9439	0.9331	0.958	1	0.05121
prof	-0.1567	0.00317	0.00637	0.02288	0.00982	0.93468	0.1234
coll	0.00374	0.16392	0.2969	0.34519	0.47607	1	0.23307
size	12.93	15.77	17.11	17.17	18.7	20.39	1.68539
growth	-0.8353	-0.0075	0.04474	0.14293	0.11831	24.0503	1.17466
div	0	0	1	0.5007	1	1	0.50035

Source: author's calculation

Table 2.1. Summarize the data gathered for this thesis. This is illustrated by the minimum (min), 1st quartile (1st Q), median, mean, 3rd quartile (3rd Q), the maximum (max), and standard deviation (S.D.). The descriptive statistics demonstrate how the data is distributed and thus gives a better understanding of the dataset. Nguyen and Kayani (2013) got the same results on the leverage of banks in developed countries in Asia. The mean profitability across banks in the Nordic is quite small, around 2.3%. Furthermore, 75% of the banks´ profitability was less than 1%. Similar results are also presented by, for instance, Hoque and Pour (2018). They investigated banks in 57 different countries. The collateral values are quite close to developed countries in Asia according to the study by Nguyen and Kayani (2013). In Table 2.1. the half of the banks paid dividends during 2006-2019. According to Hoque and Pour (2018) banks hold capital more than the level of minimum regulatory. Therefore, the high mean of the 0.9331 could be explained by the Basel regulations.

Table 2.2. Correlation coefficient matrix

Variable	lev	prof	coll	size	growth	div
lev	1					
prof	-0.0538	1				
coll	-0.0879	0.01254	1			
size	0.46307	0.09927	0.05718	1		
growth	0.05295	-0.0079	-0.0785	-0.0733	1	
div	0.01057	0.1527	0.0047	0.07974	-0.0568	1

Source: author's calculation

Table 2.2. present the correlation coefficient matrix between the dependent variable, which is leverage (lev) and independent variables, such as profitability (prof), collateral (coll), size, growth, and dividend (div). The table coefficient matrix aims to present the correlation between the determinants of the capital structure of banks. The high correlation among the determinants can later affect the results of the regression analysis. According to the above, Table 2.2., the correlations among determinants are quite small, less than 1%. However, the highest correlation between independent variables is between the dividend and profitability. The value for this is 0.1527 which illustrates a weak coefficient. This result illustrates that one of the variables could be determined by another independent variable. This is also known as endogeneity issue. The highest correlation can see between dividend and profitability. Moreover, the correlation coefficient between size and leverage is high at around 46%. Overall, the coefficient matrix illustrates that the influence between the independent variables is quite small and the risk of endogeneity issue is quite small in the end.

Table 2.3. The mean values of each variable across the Nordic countries during 2006-2019.

	DK	FI	NO	SE
lev	0.9322	0.9188	0.9212	0.9519
prof	0.00497	0.16023	0.00748	0.00564
coll	0.4186	0.43524	0.22993	0.36047
size	17.41	17.66	16.35	17.6
growth	0.06493	0.16879	0.27464	0.07128
div	0.274	0.6795	0.6244	0.5288

Source: author's calculation

The above Table 2.3. summarize the mean values for the dependent variable and independent variable for each Nordic county. The most similarities between the countries are located in the leverage and size. The largest changes are in the values of the dividend and profitability. The most profitable companies are located in Finland. The ratio is almost 2%, while in the other Nordic

countries, the profitability is less than 1%. According to Table 2.3., the banks in Denmark and Finland have more collateral than in Norway and Sweden. The collateral in Norway is almost half of the value of collateral in Finland. The value in Norway is 0.23 while 0.44 in Finland. The banks in Norway have had a larger growth rate among the Nordic countries. The growth rate for Norway is 27%, the smallest growth has been in Denmark, which is only 6%. Less than 30% of banks paid dividends in Denmark. This can be seen as a small value because in the other Nordic countries the values for those countries are more than 50%. Most dividend paid banks are operating in Finland. The dividend ratio is almost 70% from 2006 to 2009.

2.4. Research methodology

Already mentioned, this thesis uses panel data analysis as the main research method for the empirical part of the thesis. The data includes the financial information from the various banks from different years. Therefore, the data of this thesis consists of both cross-sectional and time-series inputs. Two popular panel data methods, also known as regression models, are the fixed effect model and random effect model. Other models in the panel data are the pooled model. However, the method is quite the same as the simple regression model and rejects the time information (Sheytanova, 2015). Therefore, the pooled model will not use aside from the fixed effect and random effect models. Lastly, the Hausman test will determine which one of the panel analysis methods will be used in the research.

The first regression model which the author uses is the fixed effect model. The formula applied in the fixed effect model is:

$$y_{it} = \alpha_i + \beta_1 x_{it} + \beta_2 x_{it} + \ldots + \beta_n x_{it} + \varepsilon \qquad (7)$$

where

y = dependent variable (leverage),

α = company specific variable,

β = coefficient,

x = independent variable,

ε = error term.

The second formula in this thesis is the random effect model. The following formula is used:

$$y_{it} = (\alpha_i + v_1) + \beta_1 x_{it} + \beta_2 x_{it} + \ldots + \beta_n x_{it} + \varepsilon \tag{8}$$

where

y = dependent variable (leverage),

α = company specific variable,

β = coefficient,

x = independent variable,

ε = error term,

v = zero mean standard random variable.

To be able to decide whether a fixed effects model or random effect model is more suitable for this research, a statistical hypothesis is required. The most popular statistical hypothesis test is the Hausman test. Furthermore, the significance level is determined. The significance level in this thesis is set to 5%. In other words, the p-value is 0.05. Therefore, the following null and alternative hypothesizes are developed for the Hausman test:

H_0 = random effects are differed from the independent variables. (The random effect model is chosen.)

H_a = random effects do not have a significant relationship between the independent variables. (The fixed effect model is chosen.)

3. EMPIRICAL RESULTS

In this chapter, the results of the regression analysis will be presented. Firstly, the fixed and random effect models are presented, and after that the Hausman test. Additionally, a discussion of the results is presented, where the results are compared to hypotheses and capital structures. The theories and hypotheses are outlined in chapter 1.

3.1. Regression Analysis

The fixed and random effect models were performed for this thesis. Additionally, the correlation coefficient matrix was performed in the second chapter. There were some correlations between the independent variables. This raised an issue about endogeneity between dividend and other variables. Additionally, mostly the collinearities between variables were quite small and thus any of the bank-specific variables were not removed from the models.

The table of results for fixed and random effects show the bank-specific variables, coefficient, standard error (std. Error), and p-value. The coefficient shows the relationships between dependent and independent variables. If the value is positive, it means that there are increases in both variables, independent and dependent. In the negative relationship, for example, the independent variable increases while the dependent variable decreases. The aim of the standard error is to present the distance of the sample mean from the population mean. The purpose of the p-value is to outline the significance of the independent variable. In addition, helping to decide whether to reject the null hypothesis. Lastly, R-squared shows the variation of the dependent variable caused by the independent variables. In other words, how much the bank-specific variables explain the changes in the leverage. The dividend variable acted as a dummy variable and the result for the determinant is shown in the results. The time fixed effect was added to the model to control macro effects. However, the findings are not included in the results. There were 715 observations of eight variables. This value also includes the dummy variables such as dividend, country, and year.

Table 3.1. Fixed effect and random effect regression results

Variables	Fixed effect regression results			Random effect regression results		
	coefficient	Std.Error	p-value	coefficient	Std.Error	p-value
prof	-0.57287	0.0727	1.468e-14 ***	-0.10255799	0.0390	8.64e-12 ***
coll	-0.12388	0.0130	2.2e-16 ***	-0.19255799	0.1276	4.45e-07 ***
size	0.068809	0.0028	2.2e-16 ***	0.0424984	0.0381	2.2e-16 ***
growth	0.003971	0.0079	4.986e-07 ***	0.00334947	0.0009	2.2e-16 ***
div	0.008068	0.0029	0.004863 **	0.00700138	0.0032	0.0332674*
R-Squared	0.62894			0.45143		

Source: author's own calculation

Notes:

1. The statistical significance; * 0.05, ** 0.01, and *** 0.001.

Table 3.1. shows the results for the fixed effect model. The results show that only two variables had a negative relationship with leverage. The determinants were profitability and collateral. The coefficient of profitability (-0.57287) is larger than the coefficient of collateral (-0.12388). Moreover, their p-values (1.468e-14 and 2.2e-16) are less than 0.1, which shows the relationship between these independent variables and the dependent variable is significant. Other variables had a positive relationship with leverage. These variables were size, growth, and dividend. The coefficient for these variables is as follows; 0.068809, 0.003971, and 0.008068. For the size and growth, the p-values for both variables (2.2e-16 and 4.986e-07). The findings are significant because those values are less than 0.1. The p-value for the dividend is the highest, and it is 0.004863. This value is also less than 0.1 and thus makes this independent variable significant for this thesis. Furthermore, the results include the R-squared. For the fixed effect regression, the value is 0.62894. Therefore, more than half variation in the dependent variable can be explained by the determinants. To sum up the results of fixed effect, all the independent variables had significant coefficient with the financial leverage.

The random effect results, also presented at Table 3.1, are quite similar findings to the fixed effect regression. The profitability and collateral had a negative relationship with the leverage. The coefficients for both determinants were -0.10255799 and -0.19255799. The p-value for the profitability was 8.64e-12 and for collateral 4.45e-07. The p-value for the two previous variables illustrates the relationship between the independent variables and the dependent variable as significant. The rest of the three variables (size, growth, and dividend) had a positive relation to leverage. The coefficient for the size is 0.0424984 and the p-value is 2.2e-16, while the coefficient for growth is 0.00334947 and the p-value is 2.2e-16. The p-values for size and growth are less than

0.1 and thus the variables are significant. The value for the dividend is quite identical to findings in the fixed effect regression. The coefficient is 0.00700138, while the p-value is 0.0332674, which is less than 0.1. Therefore, the determinant is significant for this research. R-squared for random effect model regression is 0.45143. This value illustrates that around 45% of changes in the dependent variable can be explained by independent variables.

When comparing the results of random effect model regression to the fixed effect, the overall findings are quite similar between the models. For instance, the relationship between variables and the p-value, the logic remains the same. However, there are changes in the values. All coefficient values are smaller in the random effect regression. There were different changes in the p-values among the variables. For example, the p-value for size remained the same while other variables increased. Even though there were changes, the significant level remains the same. Moreover, the R-squared is higher in the fixed effect model.

A Hausman test was performed to determine which regression model is more suitable to analyze the data for this thesis. The regression models for the research were fixed effect and random effect regression. The hypotheses for the Hausman test are presented in chapter 2. The null hypothesis will be rejected if the test indicates that p-value is lower than 0.05. At the same time, if the p-value is more than 0.05, the null hypothesis is approved for this study. When the null hypothesis is rejected, this response means that the fixed effect model regression is more suitable. If the null hypothesis is accepted, the random effect is more relevant to analyze the findings. The results of the Hausman test present the p-value as 2.2e-16. The result is smaller than 0.05 and thus the null hypothesis is rejected. Moreover, the fixed effect model is to use to analyze the data in this research.

3.2. Results and Discussion

H1: The profitability has a negative effect on financial leverage.

Table 3.1. illustrates a negative relationship between leverage and profitability. The coefficient for the profitability is -0.57287, which is close to a strong negative relationship between those two variables. Furthermore, the p-value is 1.468e-14, which outlines a significant coefficient. Therefore, the variable can be seen as an important determinant to explain the leverage of banks.

The negative relation may be explained by the pecking order theory. According to this theory, profitable companies tend to use internal funds before external funds. Due to a particular reason of internal funding, it is usually seen as a cheaper option than external funding.

Many previous studies have conducted similar results between profitability and leverage. Gropp and Heider (2009) found a negative relation between this determinant and dependent variable in the Western countries, while Octavia and Brown (2010) found a similar result in developing countries. Moreover, the correlation was significant in both studies. These findings are the determinants of capital structure theory and can explain the banks' capital structure. In other words, the results can be against the buffet capital structure theory.

H2: The collateral has a negative effect on financial leverage.

In Table 3.1. The relationship between collateral and leverage is negative. The coefficient of collateral is -0.12388, which illustrates a weak negative correlation. The p-value for this variable is 2.2e-16, which illustrates a significant relationship. Therefore, the collateral can be a significant variable to explain the capital structure of financial companies.

According to trade-off theory, high tangibility can support in reducing the financial distress cost and agency cost leverage. Therefore, showing a positive relationship between leverage and tangibility. This might be acceptable for nonfinancial firms but not for banks. Due to a particular reason, banks generally hold a deposit from, for example, business organizations and individuals, and thus there might not be the effect on the tangible (Nguyen and Kayani, 2013). On the other hand, the pecking order theory shows the relationship between financial leverage and collateral as negative.

The previous studies on the capital structure of banks have reached different results. The positive relationship between financial leverage and collateral was found by, for example, Hoque and Pour (2018) and Gropp and Heider (2009). At the same time, Nguyen and Kayani (2013) found a negative relationship in the developed countries. Nguyen and Kayani (2013) argued that the banks in advanced countries have more securities as collateral.

To sum up the findings on a negative correlation between financial leverage and collateral, the hypothesis is accepted. Moreover, the security or pecking order theory that banks hold in the Nordic countries could explain the negative relationship. The data included the biggest bank in the Nordic and medium sized. Therefore, larger companies might have more security than the medium-sized. On the other hand, the relationship is quite weak, but still significant to explain the

capital structure. To some extent, the capital structure theory could explain the structure of banks, but there are differences between non-financial and financial companies. However, there are many different results on this topic.

H3: The size has a positive effect on financial leverage.

The results in Table 3.1. show a positive relationship between size and financial leverage. The coefficient of size is 0.068809, while the p-value is 2.2e-16. The p-value shows a significant relationship. Therefore, the size can be a significant variable to explain the capital structure of financial companies.

The positive effect can be explained by trade-off theory. The theory states that larger banks have smaller bankruptcy costs and thus more stable to handle debt. Furthermore, larger companies have better borrowing capacity and can source cheaper finance. Octavia and Brown (2010) suggested that the larger banks carry less capital for buffer because of the underpricing, they can raise equity quickly with cheap price. At the same time, Hoque and Pour (2018) argues that larger banks may hold more buffer because of the high of asymmetric risk. Futhermore, they outlined that the effect of size is still uncertain.

Similar results between size and leverage are found in many studies on the capital structure of banks in developed and developing countries. For instance, Gropp and Heider (2009) and Hoque and Pour (2018). In additionally, there has been found also a negative relationship between size and leverage by Brewer III et al. (2008). To sum up the following findings, the capital structure theory for nonfinancial companies can be applied also to financial firms. Furthermore, it seems that both corporate finance theories and buffer view can explain.

H4: The growth opportunities have a negative effect on financial leverage.

The result for the relationship between growth and leverage is 0.003971 and the p-value is 4.986e-07. This means that there is a weak positive and significant correlation between these two variables. Therefore, in this thesis, the hypothesis is rejected.

The positive relationship between financial leverage and growth is explained by the pecking order theory. It argues that the high amount of information asymmetry between the insiders and the market leads to companies issuing more debt. The negative relationship is usually explained by market timing and trade-off theory.

Similar results have been found by Çağlayan and Sak (2010) and Octavia and Brown (2010). According to Hoque and Pour (2018), banks with higher growth opportunities are expected to have

a higher level of financial leverage. Furthermore, they outlined the banks which face better growth opportunities handle more debt to finance their activities. The high market-to-book ratio could be linked to the buffer theory. This view outlines the banks are holding more capital buffer to prevent the cost of issuing equity at short notice and thus they have higher market-to-book ratios. (Hoque and Pour, 2018; Gropp and Heider, 2009). The study by Gropp and Heider (2009) found a negative correlation between growth opportunities and financial leverage in the U.S. and Europe. The differences in growth opportunities could be explained by different calculation methods. In the Nordic countries, there are few companies which are publicly listed and thus it is impossible to analyze the data on the market-to-book ratio.

H5: The dividends have a negative effect on financial leverage

According to Table 3.1. Coefficients between financial leverage and dividend show a weak positive relationship as 0.008068. The p-value is quite high at 0.004863, which illustrates also this variable shows the significant coefficient with the financial leverage. Therefore, this independent variable can be seen as important to determine the capital structure of banks in this thesis.

The results on this variable across studies. For instance, Nguyen and Kayani (2013) and Gropp and Heider (2009) had a negative correlation with dividends and financial leverage. On the other hand, Hoque & Pour (2018) show a positive relationship between these two variables. For market leverage, it showed insignificant, while dividend and book leverage had a positive relationship. Furthermore, this could illustrate the findings might be explained by the buffer view (Hoque and Pour, 2018; Gropp & Heider, 2009). The positive relationship could be outlined as the higher cost of equity (Octavia & Brown, 2010). Furthermore, Octavia and Brown (2010) had also a positive correlation at a significant level. The negative relationship could be explained by asymmetric information. The results from this study could be affected by that only half of the companies paid dividends from 2006 to 2019.

CONCLUSION

The aim of the thesis was to understand which chosen variables can determine the capital structure of banks in the four Nordic countries. The motivation for this thesis came from the lack of studies done in banks, especially in the Nordic countries. Additionally, it can be important to understand the capital structure of financial institutions to develop future regulations for them. The banks in Iceland were rejected from this study because of the lack of information. There were a total of 55 banks operating in the Nordics. Those banks were operating in different fields, for example, the data included commercial and investment banks. Most of the banks were located in Norway, while the smallest number of banks operated from Finland. The data was gathered from the years 2006-2019. In addition, the data included both private and publicly listed companies. The analyzing the data was done by panel data analysis. Two regression models were performed, and the Hausmann test helped to determine the right method to analyze the findings. In the end, the fixed effect model was chosen for this thesis.

The independent variables were profitability, collateral size, growth, and dividend, while financial leverage acted as the dependent variable. Since there were also private banks in the data, and some variables were left out from the study. Some examples of the variables could have been market leverage and the market-to-book variable. These financial ratios usually need stock data to calculate. Therefore, it would be difficult to calculate multiple leverages or other independent variables for this study.

The following research questions for this thesis were:

- What determinates the bank´s capital structure in the Nordic countries?
- Which theories can explain the capital structure of banks?

The answer to the first question would be that there are determinants that can somehow explain the capital structure of the banks. According to the fixed effect regression findings, the significant factors were all the independent variables; profitability, collateral, size, growth, and dividend. However, the differences between significant results across independent variables are the same, except for the one variable. For example, the significant level was higher for the dividend. The change between the fixed effect and the random effect was quite small in the end.

Some of the findings can be explained by the capital structure theories for the non-financial companies and the buffer view. The profitability and collateral are explained more with corporate finance theories, for example, the pecking order theory. Additionally, the growth is also can be explained by the pecking order theory. The other variables like, the effect of size is determined by both views, for example trade-off theory and buffer view. The relationship between dividend and financial leverage can be mostly defined by the buffer view. To sum up, some variables are mostly explained by the corporate finance theories, such as, the pecking order theory or trade-off theory, while some determinants are defined only by the buffer view. The size is only variable explained with both theories for non-financial firms and the regulations. Therefore, the corporate finance view can also apply to the financial companies.

There are many limitations for this research. Firstly, the lack of several publicly listed companies. Due to this particular problem, it was difficult to analyze the financial ratios related to stock data. Many previous studies have focused on them and many bank specific variables use this, for example, asset risk according to previous studies. Therefore, it was sometimes difficult to compare the results on those studies. On the other hand, it would be difficult to research on small numbers of publicly listed firms in the Nordics. Therefore, it is limited to choose a small number of variables, which are more related to non-financial companies. Due to various issues related to the sample, whether the geographical area is best for this kind of research. Additionally, there can be some bias in the data, because mostly the banks operating in Finland were large companies and there were only a small number of banks when compared to other countries, such as Norway.

For further research, the importance of the macroeconomic variables, and how these determinants affect the capital structure of financial companies. For instance, many studies related to banks' capital structure have found a significant relationship between, for example, the gross domestic product (GDP) and banks' leverage. According to Nguyen and Kayani (2013), the macroeconomic factors indicate more changes influencing the capital structure. Therefore, it can say that the economic growth state might have an important role to explain the capital structure of banks. Moreover, more publicly listed banks could help to have more bank specific determinants. This also means to increase the geographical area. Lastly, it would be interesting to compare the differences between the Nordic and South European banks.

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