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Navigating the Capital Structure Maze: Firm Performance for the Nordic Real Estate Market

An Empirical Study of the Relationship between Capital Structure and Firm Performance

Jørgen Emil Veidung Johnson & Marius Stabell Eriksen

Supervisor: Are Oust

Master thesis, Economics and Business Administration
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NORWEGIAN SCHOOL OF ECONOMICS

Acknowledgements

We became particularly interested in Nordic real estate after taking the course Commercial real estate, which prompted us to pay close attention to the market. And as the market experienced more uncertainty, increasing inflation and rising key policy interest rates in the near horizon, we decided to investigate the impact capital structure has on firm performance within Nordic real estate firms in this master thesis providing 30 credits.

The past months of working with the thesis have been interesting and demanding. We have had the privilege of studying a topic of our choice while obtaining new information. As we embark on the final semester of our master's program in Business Administration and Economics, we are filled with a sense of excitement and accomplishment. Our journey at NHH has been both challenging and rewarding, and we have had the opportunity to learn from skillful professors and made great friends along the way. One could say this Master thesis concludes five memorable years at the Norwegian School of Economics.

First and foremost, we would like to express our gratitude to our supervisor; Professor Are Oust, whose open-door digital policy and counseling with real estate expertise has been invaluable to the process of this thesis. We would also like to convey our appreciation to our friends and family for their support in times of struggle and for sharing our rejoice in times of accomplishment.

Norwegian School of Economics

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Marius Stabell Eriksen

Jørgen Emil Veidung Johnson

Abstract

This thesis aims to evaluate the relationship between capital structure and firm performance for Nordic real estate firms. More specifically the thesis aims to answer the research questions (1) "Does the capital structure of Nordic real estate firms affect firm performance in the sector?" and (2) "Can the three dependent variables used in capital structure on firm performance: ROA, ROE and Tobin's Q describe the fluctuation in market value during the last decade?".

The thesis includes quarterly data for 59 listed companies from Q1 2006 to Q4 2022 for Norway, Sweden and Denmark. And seek to resolve these questions by implying a fixed-effect estimation using cluster robust standard errors.

Consistent with prior research and theory, we found a significant relationship for: LTD (-), STD (-), Size (+), Tangibility (-), Growth (+), Age (+) and the Covid pandemic (-).

Our findings suggest that the dependent variables used as a proxy for firm performance in capital structure literature: ROA, ROE and Tobin's Q, do not describe the fluctuations in the market value of Nordic real estate firms during the last decade. Since a fall in real estate value often correlates with a fall in market value for real estate firms, the mechanism contradicts its implications on ROE, ROA and Tobin's Q as ROE denotes total assets, ROA, Tobin's Q the measures increases with a decrease in property prices.

Keywords – Nordic Real Estate, Capital Structure, Key Policy Interest Rate, NHH

Abstract Norsk

Hensikten med denne oppgaven er å evaluere sammenhengen mellom kapitalstruktur og selskapers prestasjonsnivå for nordiske eiendomsselskaper. Mer spesifikt tar oppgaven sikte på å svarespørsmålene (1) «Påvirker kapitalstrukturen prestasjonsnivået til nordiske eiendomsfirmaer?» og (2) "Kan de tre avhengige variablene som brukes som proxy i kapitalstruktur for bedriftens prestasjonsnivå: ROA, ROE og Tobins Q beskrive fluktuasjonen i markedsverdi det siste tiåret?".

Oppgaven inkluderer kvartalsdata for 59 børsnoterte selskaper over perioden Q1 2006 til Q4 2022 for Norge, Sverige og Danmark. Og forsøker å besvare disse spørsmålene gjennom en fast-effekt estimering ved bruk av robuste feiledd.

I samsvar med tidligere forskning og teori finner vi at bedrifters prestasjonsnivå har en signifikant sammenheng for: LTD (-), STD (-), Size (+), Tangibility (-), Growth (+), Age (+), og Covidpandemien (-).

Våre funn tyder på at de avhengige variablene som brukes som en proxy for bedriftens presetasjonsnivå i kapitalstrukturlitteratur: ROA, ROE og Tobins Q, ikke beskriver svingningene i markedsverdi av nordiske eiendomsfirmaer det siste tiåret. Ettersom et fall i virkelig eiendomsverdi ofte korrelerer med et fall i markedsverdi for eiendomsselskaper har dette implikasjoner på de avhengige variablene ROE, ROA og Tobins Q. Ettersom totale eiendeler er under brøkstreken for disse ratene, vil en økning i eiendomsverdi medføre at nevneren til ROE, ROA, Tobins Q stiger, og dermed indikere et fall i prestasjonsnivå. Dette vil være i sterk kontrast til veksten en har vært vitne til i det nordiske eiendomsmarkedet det siste tiåret.

Keywords – Nordic Real Estate, Capital Structure, Key Policy Interest Rate, NHH

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Table 0.1: Abbreviations

Abbreviation	In full
C19	Covid pandemic
CPI	Consumer Price Index
D/E	Debt over equity
DKK	Danish Kroner
F08	Financial crisis of 2008
GDP	Gross Domestic Product
IAS	International Accounting Standards
K	Capital
K0	Return on capital
Kdebt	Return on debt employed
Kequity	Return on equity employed
LOG	Logarithm
LTD	Long-term debt
NHH	Norwegian School of Economics
NOK	Norwegian Kroner
OMX Copenhagen	Copenhagen Stock Exchange Benchmark
OMX Stockholm	Stockholm Stock Exchange Benchmark
OSEBX	Oslo Stock Exchange Benchmark
Polrate	Key policy interest rate
Q1,Q2..,Q3	Quarter 1,2..,4
REIT	Real Estate Investment Trust
ROA	Return on Assets
ROE	Return on equity
SBB	Samhallsbyggnadsbolaget I Norden AB
SEK	Swedish kroner
STD	Short-term debt
U.S	United States
YTD	Year-to-date

Note: *The abbreviations for this thesis.*

1 Introduction

The global market has experienced steady growth over the past decade, partly due to low interest rates, stable inflation, and well-established financial policies in the aftermath of the financial crisis in 2008 (de Soyre et al., 2021). This environment has encouraged investors with a certain appetite for risk and a willingness to carry debt to raise leverage in pursuit of profit- activities, particularly in the real estate market. As a result, the world real estate index has outperformed the world index by approximately 80 percent in the last decade (MSCI, 2022). In the Nordics, the real estate market has grown by around 900 percent from 2009 to 2021 (MSCI, 2022), led by interest rates fluctuating around zero bound, stable inflation, and balanced yields. However, the Nordic real estate market experienced a significant correction in 2022 with rising key policy interest rates, falling about 50 percent, offset by an increase in rental income due to higher inflation. The development depicted in figure 1.1 raises the question of the relationship between capital structure and firm performance. Specifically, how does capital structure affect the performance of Nordic real estate firms, and can the large fluctuations in the market be explained by capital structure literature's proxy for firm performance?

Figure 1.1: Return on Nordic Real Estate and Key policy Interest Rate

Note:*Return on the Nordic Real estate and Average key policy interest rate between Denmark from Q2 2009 to Q3 2022, Norway and Sweden. Sources: Refinitiv, IMF.*

As a firm's performance reflects its success in the capital market, optimizing performance is crucial for every company. Various research has displayed the various factors affecting a firm's performance, and capital structure is shown to be one of the most significant explanatory factors among them (Aimagh and Larsson, 2018; Amjed, 2007; Weill, 2008). Given the importance of firm performance, findings from studies examining specific market conditions often serve as benchmarks for companies operating in them.

A growing body of international research employs fixed-effect regression models to evaluate the impact of capital structure on firm performance. These studies vary in the number and type of dependent and independent variables they include, but most commonly employ dependent variables such as return on assets (ROA), return on equity (ROE), and Tobin's Q, either in isolation or in combination.

As of today, many studies are tasked with finding the impact capital structure has on stock prices for a single stock exchange (Le and Phan, 2017; Song, 2005; Zeitun et al., 2007; Gill et al., 2010). Other studies are more centered on quantifying capital structure impact on firm performance between multiple countries (Weill, 2008; Aimagh and Larsson, 2018). While some have focused more on single sectors within a country (Tifow and Sayilir, 2015; Qayyum and Noreen, 2019). They all point to the fact that financial leverage and tangibility have a negative effect on firm performance, while the size and age of a company often suggest higher firm performance. For the literature on Nordic countries, the main focus of the thesis has been to identify the capital structure of the Norwegian (Aimagh and Larsson, 2018) and Swedish (Song, 2005) stock exchange. In contrast, the impact between Nordic countries, or in single market sectors is receiving less attention.

Hence, uncertainty still exists on the effect capital structure has on firm performance of Nordic real estate firms. Therefore, this paper aims to contribute to the literature from an empirical perspective. Building on a large extent of capital structure literature, this thesis employs fixed-effect estimation using cluster robust standard errors on dependent variables of ROA, ROE and Tobin's Q with independent variables in financial leverage and firm characteristics. Furthermore, this study will be the second thesis to examine the effect of changes in the key policy interest rates on firm performance measures, adding to the existing literature on capital structure analysis (Zeitun et al., 2007). Our research attempts to offer updated validity to the literature regarding capital structure analysis on

a single sector for multiple countries and the Nordic real estate market in general. Lastly, the thesis seeks to elaborate if the firm performance measures of ROA, ROE and Tobin's Q have the same effect on asset focused industries as the majority of literature on capital structure.

1.1 Research Question

Based on the preceding section, this thesis aims to address two research questions:

1: *Can the dependent variables commonly used in capital structure and firm performance studies, ROA, ROE, and Tobin's Q, explain the fluctuations in market value for Nordic real estate companies during the past decade?*

2: *How does the capital structure of Nordic real estate firms affect firm performance in the sector?*

1.2 Outline

This thesis is organized into a total of eight chapters, including this introduction. The second chapter presents an overview of the Nordic real estate market, emphasizing past and current market conditions. The third chapter discusses the theoretical components of capital structure and provides a summary of the worldwide literature on the subject of using capital structure and its connection with firm performance. In chapter four, data collection and processing are discussed, this study's methodology, the regression parameters, and its underlying assumptions. In addition, chapter five contains our findings and comments, as well as results' limitations. The final chapter concludes the thesis by offering ideas for further study, followed by some concluding notes.

2 Characteristics of the Real Estate market

2.1 Nordic Countries Display

The following discussion will provide an overview of the macroeconomic situation in each Nordic country from 2006 to 2022. The overview is important as regional inequalities in the firms' home countries may impact their debt and performance. Prior research (Baker and Martin, 2011; Fan et al., 2012; Lepore et al., 2017) has shown that the nation's economic environment is a critical factor when investigating firm performance. As this notion underpins the geographical importance of this study, the next section will give a complete evaluation of the Nordic macroeconomic conditions from 2006 to 2022. The thesis will also provide a short overview of the favorable market conditions in the Nordics that contributed to the strong performance of the real estate market during this period.

2.2 Market Sizing

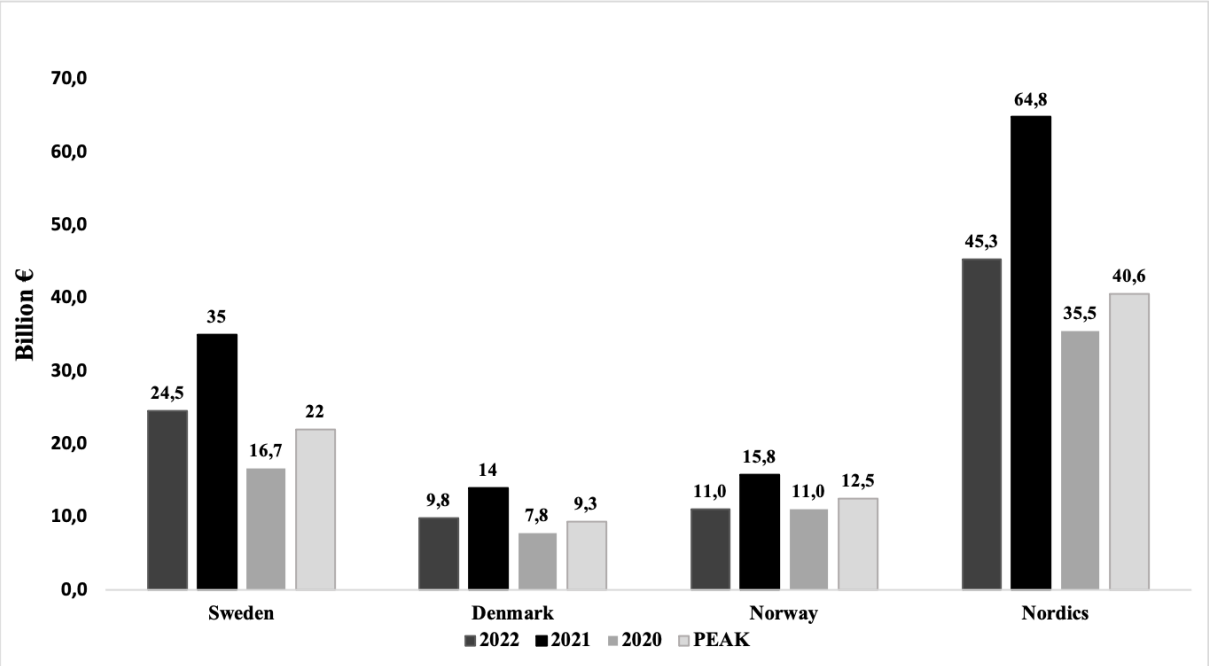
As the main store of wealth, the total market size of the real estate market is estimated to be 381 trillion USD in 2022 (MSCI, 2022). The vast amount includes the value of all real estate in the world, including residential, industrial, commercial, and agricultural lands. As the largest investment for an average household, the residential real estate market is the largest. Real estate markets often serve as local markets with low entry barriers, and there are several major and minor players in the more commercialized areas. In its most basic form, commercial property is any property that is not the owner's primary dwelling or personal property. In principle, anything an owner can rent out, and in any case everything that is utilized for other purposes, is non-residential, commercial property. By narrowing down the market to focus on listed commercial real estate firms, the market capitalization for publicly traded real estate is limited to 11.4 $ trillion by the end of 2021 (MSCI, 2022). Of this amount, 615 billion USD are located in Europe and a combined value of 117 billion USD in the Nordic market. With an 83 percent share of the overall market capitalization, Sweden is by far the largest of the Nordic markets, followed by Norway at 7.69 percent and Denmark at 1.9 percent (Anundsen, 2021). The primary reason for Sweden's high proportion of listed real estate is its residential sector. Only

64 percent of the population owns a home, compared to 80 percent of the population in Norway, where tax policies encourage privately owned dwellings. In all Nordic nations, taxable returns on owner-occupied homes, if taxed at all, are calculated at rates lower than the average return on other assets. Sweden and Denmark impose property taxes at modest rates, whereas only Sweden charges capital gains, creating especially favorable taxing systems for real estate investors (Anundsen, 2021)

2.3 The Favourable Nordic Real Estate Market

"Everyone Wants In" was one of the major themes of the preceding year in real estate, reflecting investor demand for nearly every type of real estate. As displayed in 2.1, Sweden's transaction volumes surged to above 380 billion SEK in 2021, a 110 percent rise over the constrained amount in the first pandemic year of 2020 and surpassing the 2019 record of 230 billion SEK.

Figure 2.1: Transaction Volume



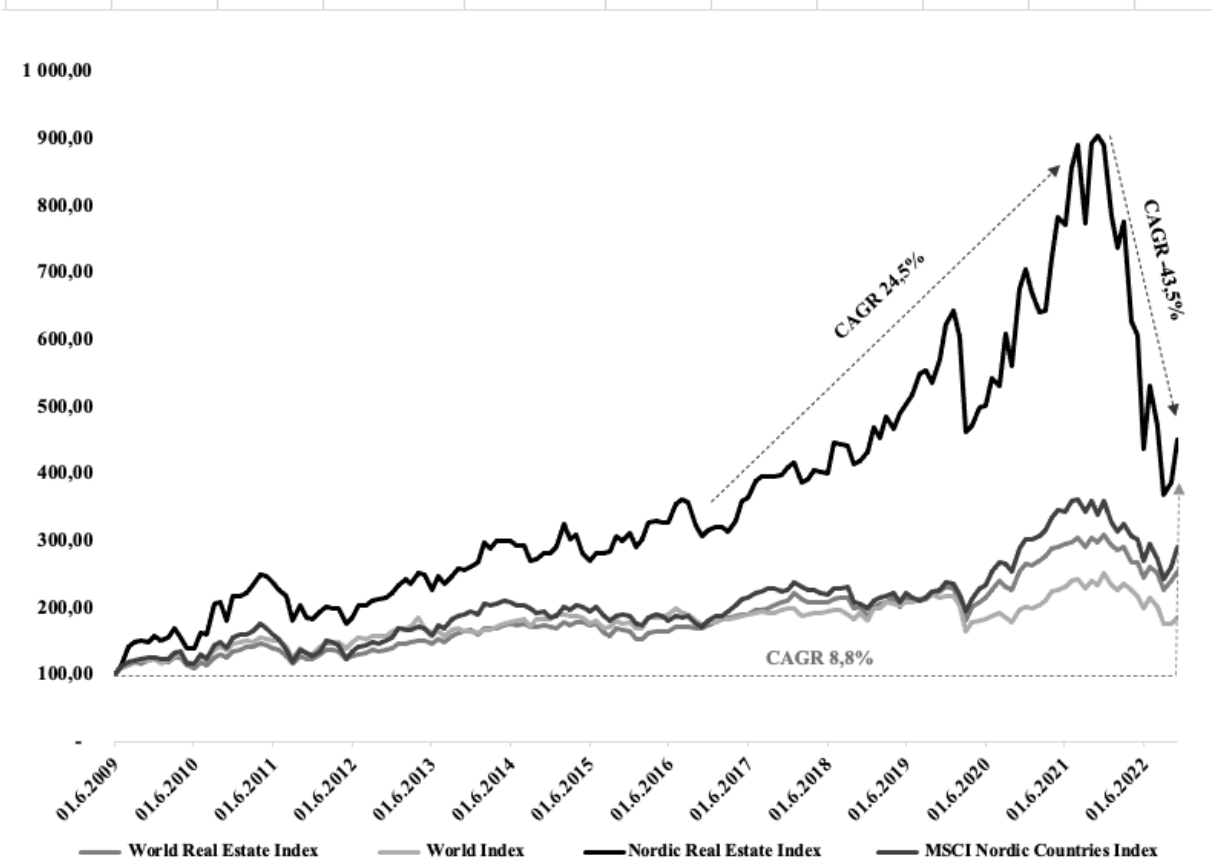
Note: *Transaction volume 2019-2022 & Peak for Norway, Sweden and Denmark incldluing the Nordics. Sources: Artic, Refinitiv.*

With increases of 40 and 83 percent, respectively, Norway and Denmark only partially matched this transaction volume growth during the last year. The number of transactions in the Nordics is 40.6 percent greater than in 2020 and has reached a new all-time high

for a single year in the Nordics. While the market reached an all-time high for 2021, the decrease in transaction volume for 2022 can best be explained by comparing the Nordic index to the Nordic real estate index.

In contrast to other sectors and markets, the value of the Nordic real estate has increased exponentially during the past decade, displayed in figure 2.2. The value of the MSCI Nordic real estate index climbed by 903 percent between 01.06.2009 and 01.11.2021, while the MSCI Nordic Index returned 337.5 percent. Both of these markets significantly outperform the World real estate index, the World index.

Figure 2.2: Comparative Return for Nordic Real Estate



Note: *Return on MSCI Real Estate Nordics, Nordic Benchmark index, World Index and World Real Estate Index Q1 2006 - Q3 2022. Sources: Refinitiv.*

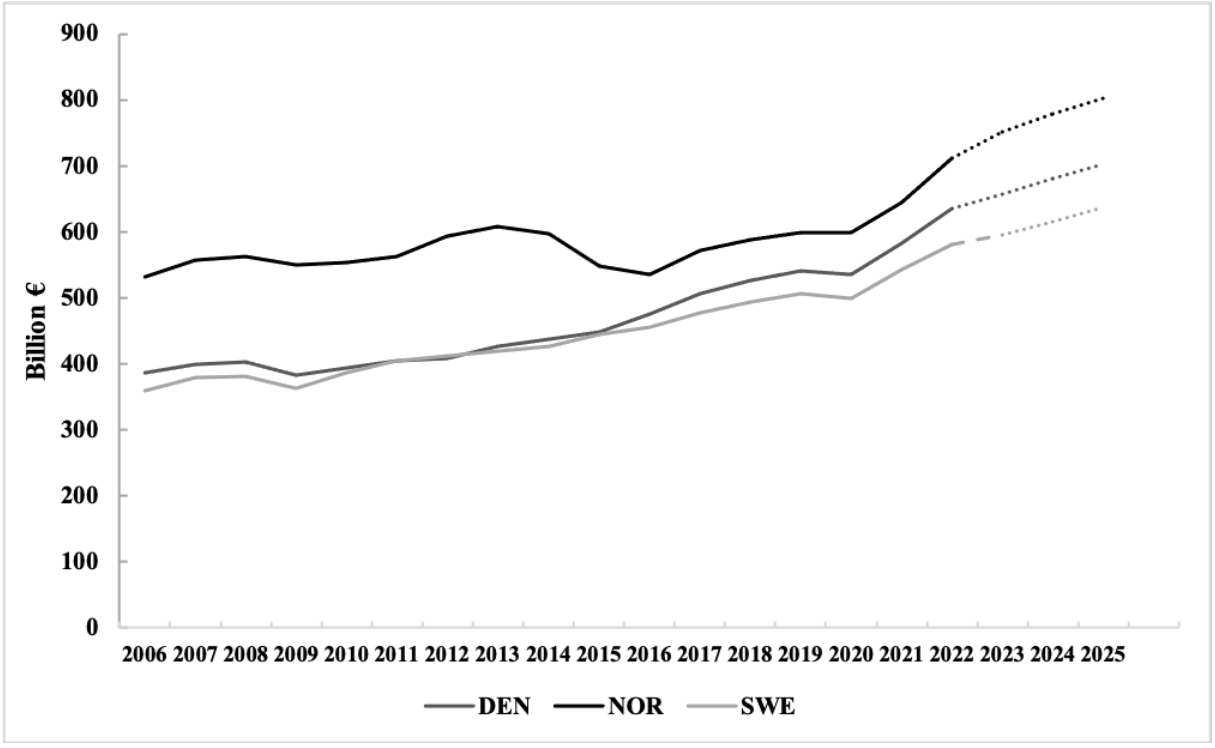
In the five years between 2017 and 2021, the market has exceeded expectations, with the real estate market expanding by an annual increase of 24.5 percent and the Nordic index increasing by 15.7 annually. As of November 2022, the Nordic real estate sector will produce negative returns for the first time in ten years. From a tailwind of 49.3 percent growth in real estate for 2021 for the Nordics, the sector is down 43.5 percent

as of November 2022 (Johannson, 2022). In the same period, the benchmark index for the general market in the Nordics fell by 16 percent. The prime yield in the Nordics will likely settle at approximately 5 percent when the increase in real key policy interest rates is included. Given a consistent rental income, this suggests a 35 percent fall in property value from the peak. When one includes rent increases, the value reduction might be as much as 25-30 percent (Wetterling, 2022).

2.4 The Steady Growth in the Nordics

Figure 2.3 displays GDP (Gross Domestic Product) per capita in Euros at current prices and buying power parities between 2006 and 2022. GDP is the most often used indicator of economic activity since it measures the ultimate market value of all goods and services produced in a country. Furthermore, GDP per capita is commonly used to measure the living standard in a country dependent on the population of the country(de Soyre et al., 2021).

Figure 2.3: GDP Capita



Note: *GDP debt in Billion euros for Denmark, Norway and Sweden between Q1 2006 and Q4 2021.Q1 2022 to Q4 2025 is the IMFs suggested GDP Capita the next three years, Sources: IMF, Refinitiv.*

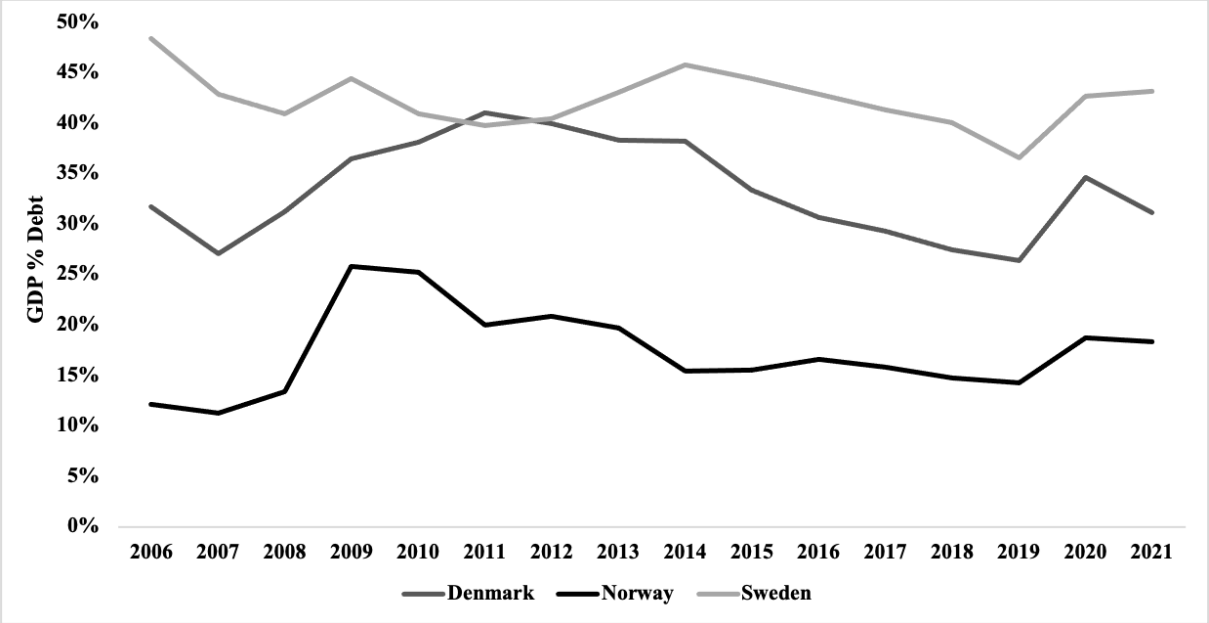
Since 2009 the Nordic economies have been generally steady and rising. For the period investigated in this thesis, Norway has remained relatively stable, with a growth of 33 percent. Sweden and Denmark have relatively grown by 61 and 64 percent. Norway has generally had a substantially larger GDP per country than other Nordic countries during the period. Denmark and Sweden on the other hand, experienced a greater increase in GDP between the end of 2008 and the start of 2016. As the Norwegian real economy is more volatile and heavily dependent on oil prices, the period between 2008 and 2016 included the oil crisis of 2014, which can partially explain lower growth until 2016. Notably, the GDP during the financial crisis of 2008 was quick to recover, while the global health crisis of 2020-22 had a relatively small impact on the GDP (de Soyre et al., 2021).

Consistent growth is significant as GDP may be used as a decent proxy for the evolution of most real estate values. When GDP rises, so does the demand for commercial and residential space. From the standpoint of an investor, this will boost the projected income and capital value appreciation from real estate assets raising the firm performance. A stable and rising economic environment, together with rapid recovery from previous crises, contributes to the attractiveness of the listed Nordic property market.

The capital structure of the Nordics has been robust since the financial crisis of 2008, and it is important as public debt overhang may reduce the growth rate in a country. High domestic debt levels harm growth, change expectations and change sovereign yield spreads and real interest rates, resulting in lower private investment (Laubach, 2009). The resulting decrease in savings raises interest rates, reducing incentives to invest and reduced investment results in lower capital accumulation, dragging down economic development. As a result, according to endogenous growth models, public debt usually has a negative influence on long-term growth (Barro, 1990).

In figure 2.4 the general government gross debt as a percentage of GDP for Norway, Sweden and Denmark is displayed. The debt ratios for the Nordic countries can be viewed as minor in contrast to the global average public debt to GDP ratio. Over time, Sweden fluctuates around 40-50 percent, Denmark around 25-40 percent, and Norway around 15-25 percent. The issues of high domestic public debt levels are not of concern for the Nordic countries, thereby creating a playground for real estate investors with healthy economic fundamentals enabling cheap funding.

Figure 2.4: GDP Debt



Note: *GDP debt in percent for Denmark, Norway and Sweden between Q1 2006 and Q4 2021, Sources: IMF, Refinitiv.*

2.5 Inflation and Interest Rates

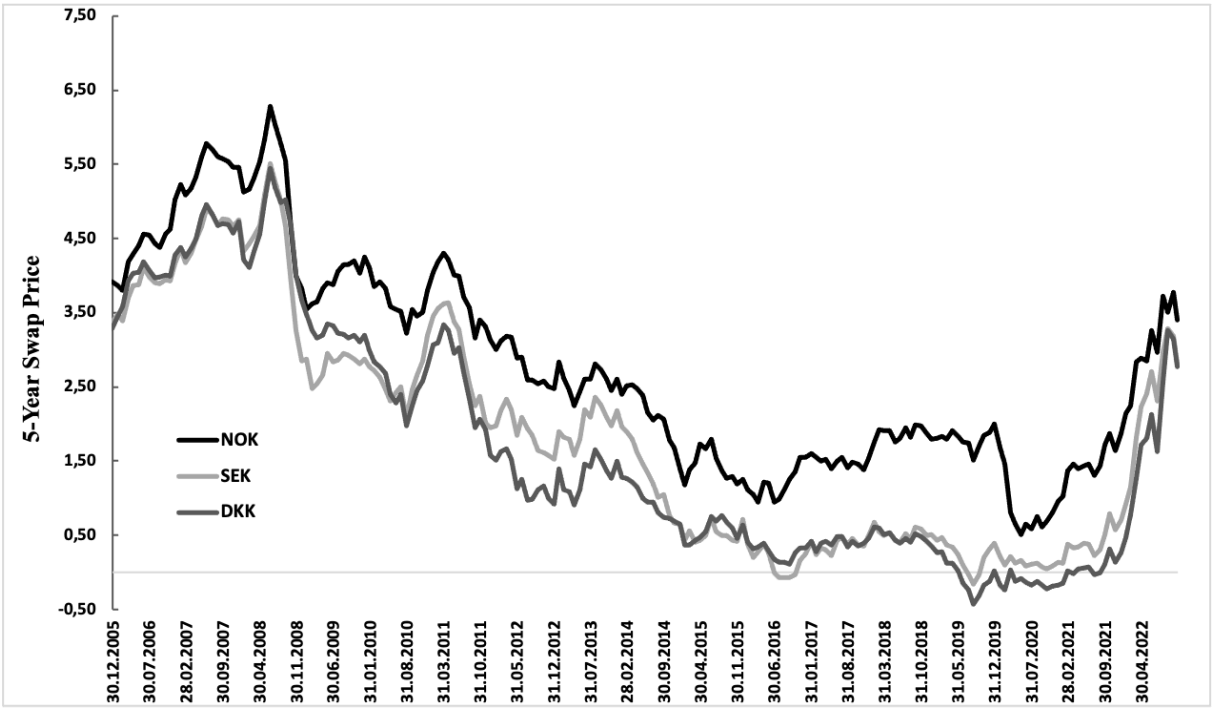
The global financial crisis of 2007-2009 underlined the significance of considering financial stability (Røisland and Sveen, 2018). The crisis demonstrated the need for a robust financial system and how its absence may result in a severe and long-lasting recession. As several European countries have struggled with low inflation rates over the last few years, the key policy interest rates have been falling worldwide, as shown in 2.5.

Since the market turmoil and central bank actions in 2008, swap rates in the Nordic countries have decreased significantly, reaching historically low levels during the last years. As the nordic countries are small open economies with free capital flows, their interest rates cannot diverge much from those of their training partners (Jonassen and Nordbæ, 2006). For real estate investors, when interest rates fall toward lower levels, there is often a particular appetite for credit and a willingness to assume risk as the cost of capital decreases. As the investors search at full edge for returns, they often create a demand-driven price increase. Investors drive capital from safer assets as obligations and bank deposits into riskier assets like real estate and stocks. For the real estate market, this causes a domino effect. The falling interest rate increases the yield on real estate

rents, thereby pushing property prices upwards. These dynamic impacts the capitalization rate, defined as the annual expected net operating income divided by property price. The valuation metric will increase for commercial real estate. As a result, a decrease in interest rates impacts many aspects for an ordinary real estate investor. It provides an appreciation in the value of their assets, often higher risk-taking, increased funding possibilities, and a possibility for substantial transaction volumes.

As shown in figure 2.5, the five years swap-rates of NOK, SEK and DKK have been stably declining after the spike leading up to the financial crisis of 2008. The situation has led to Nordic real estate firms, to be possible to pay less for their loans and increase their debt. For some periods in 2019 and 2020 the fixed swap- rates posted negative numbers, but during 2022 experienced a reversion to the mean.

Figure 2.5: Five Year Swap

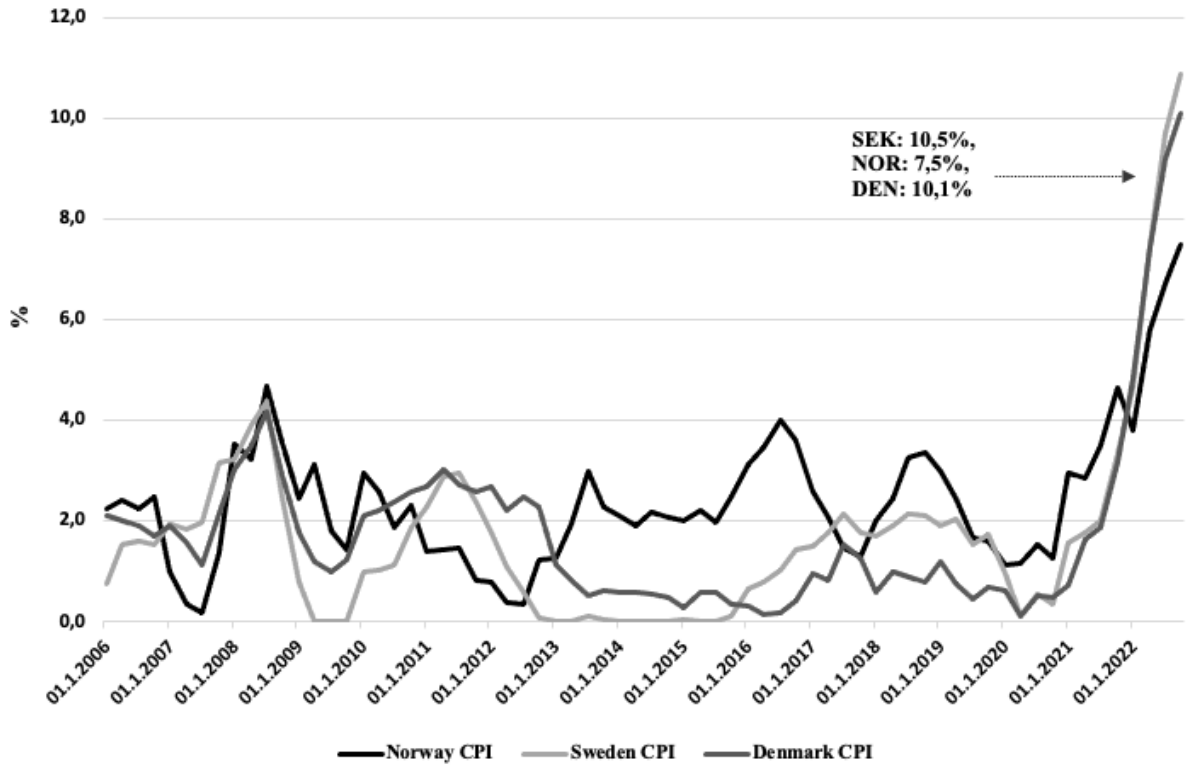


Note: *5 Year Swap Q1 2006- Q3 2022 for Denmark, Norway and Sweden, Sources: Refinitiv.*

Contrary to virtually every forecast made during the uncertain days of the COVID-19 lockdown, the Nordic property markets have had some of the highest returns, rent growth, and price appreciation rates in real estate history. As of November 2022, property investors and managers are again finding that astronomical growth and profits are inevitably normalizing an unpredictable real estate value rise. As the interest rates heads *higher*

for longer, the probability of a deeper, full-fledged recession is rising, according to the growing consensus of economists (Kramer, 2022). Soaring heating bills reinforce the poor global economic outlook from Europe in the autumn, and forecasts of continuing rising heating expenditures this winter. These conditions would be troublesome for real estate markets as declining economic growth would reduce tenant demand. At the same time, inflation would increase the cost of building or acquiring properties. Rising interest rates would decrease the activity, which could act as a price dampener. The recent rise in inflation and bust in real estate prices is comparable to the housing market bust in the Nordics during the start of the 1980s. Inflation reached heights well above 10 percent for all the Nordic countries, leading to the largest isolated real estate bust since the first world war(Jeppesen, 2021). Interestingly, the real estate bust of 2022 has been even more severe than the 1980s, displaying the magnitude of the descent. As of November 2022, the CPI (Consumer Price Index) increase reached 7.5 percent in Norway, 10.1 percent in Denmark, and 10.5 percent for Sweden, as displayed in 2.6.

Figure 2.6: CPI Percent Nordics



Note: *CPI percent year-on-year ifor Norway, Sweden and Denmark Q1 2006 - Q3 2022: IMF, Refinitiv.*

As a result of rising inflation and interest rates, decreasing GDP, and diminishing deal

flow, the real estate sector is moving beyond what it regards as cyclical headwinds. A combination of higher interest rates and wider credit spreads in the bond market, combined with less available capital, has led the transaction market to dry up and placed pressure on key credit measures. The Swedish key policy interest rate was raised by 2.5 percent from May 2022 until the year end. The increase is the largest since the period leading up to the financial crisis(Melnikova, 2022). To highlight the shift in the market, the yield to maturity of the S&P Sweden IG Corporate bond index has increased by 2.2 percentage points, from 0.9 percent at the end of 2021 to 3.1 percent at the end of 2022. Numerous notable real estate investors contend that the market's primary concern has shifted from interest rate risk to refinancing risk (Melnikova, 2022; Wetterling, 2022; Johannson, 2022). Rising bond spreads offer a risk of refinancing for those with considerable bond exposure. The average exposure of the industry to bonds, as a percentage of interest-bearing obligations, is 35 percent.

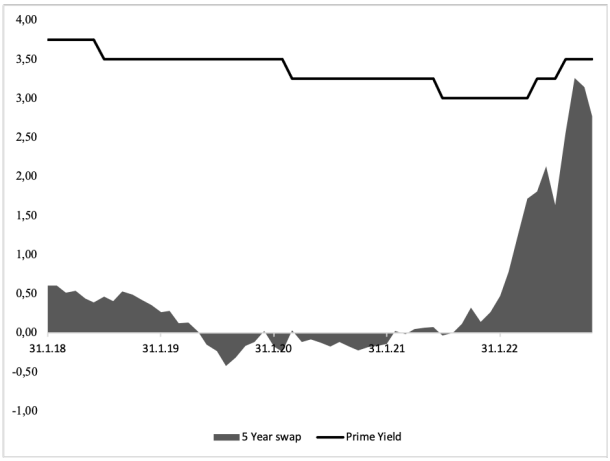
2.6 Rising Capital Costs and its Implications

As a result of the falling swap rates, real estate firms have experienced falling capital costs since the end of the financial crisis and until the start of the pandemic of 2020. Since then, the capital cost has been rising, driven by higher key policy interest rates and bank margins. The capital cost is as of December 2022 at the same level as in 2011, when repercussions from the financial crisis still influenced the capital market. Figure d of 2.7 displays the capital cost level. The increase in capital cost since the start of 2020 represents a 1.5 percent rise in yield, directly impacting the viewed value of real estate assets, with an average drop of 25 percent (Johannson, 2022). Historically, the yield in the Nordics has been around 4-5 percent for the last decade, fluctuating approximately 1.5-2.0 percentage points above the risk-free interest rate based on the country of origin. Because of the increase in interest rates during the last year, real estate companies that have not fixed interest for their debt covenants are now operating with a lower yield than their debt rate for their asset. At the end of 2022, the sector is dealing with a refinancing risk, as Prime yield in the Nordics now is on the approximately same level as Five-year Swap rates, displayed in figure 2.7.

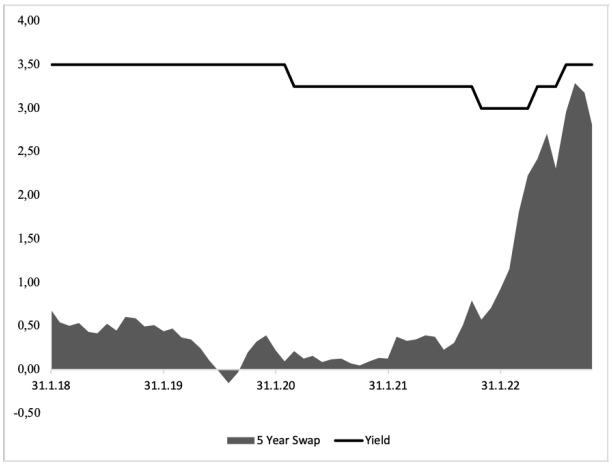
Compared to 2021, when the industry was valued at a 73 percent premium on average

Figure 2.7: Capital Cost and Prime Yield Nordics

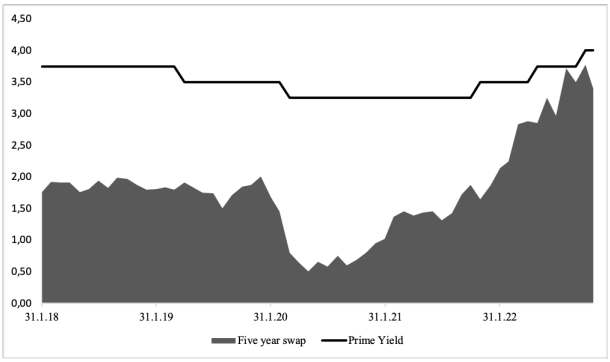
(a) Prime Yield and 5 Year Swap Denmark



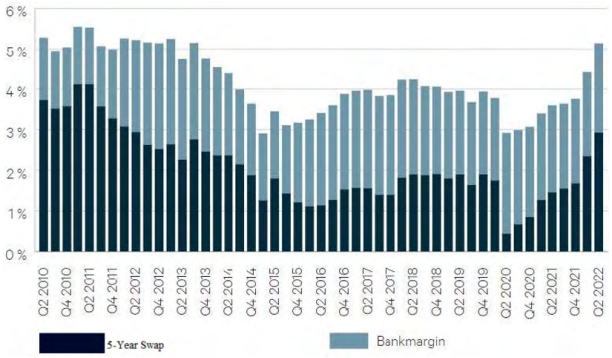
(b) Prime Yield and 5 Year Swap Sweden



(c) Prime Yield and 5 Year Swap Norway



(d) Bank Margin and 5 Year Swap Norway



Note:*Five year Swap and Prime Yield for Denmark, Sweden and Norway in figures a, b and c. Q1 2018 - Q3 2022. Five year Swap and Bankmargin Norway Q2 2010 - Q4 2022 in figure d. Sources: Union, DNB Markets.*

in the Nordics, a 43 percent discount is observed as of November 2022. From a period with a clear trend of real estate firms being net buyers on the market, several analyses indicate that the tide has turned, and real estate firms have become net sellers on the market (Johannson, 2022; Mortensen, 2022).

The decrease posted in property shares is the most significant decline since the First World War, reaching lower relative levels than both the oil and inflation crisis of the 1980s and the financial crisis of 2008, displaying the magnitude of the recent decline of the Nordic Real Estate Market.

3 Theory

3.1 Capital Structure Theory

3.1.1 Miller & Modigliani Theorem

Modigliani and Miller's (MM) two proposals on a firm's financing decisions are pillars of current capital structure theories. According to their "Irrelevance Proposition," a firm's debt-to-equity ratio has no effect on its total value under perfect capital market conditions (Berk and DeMarzo, 2011).

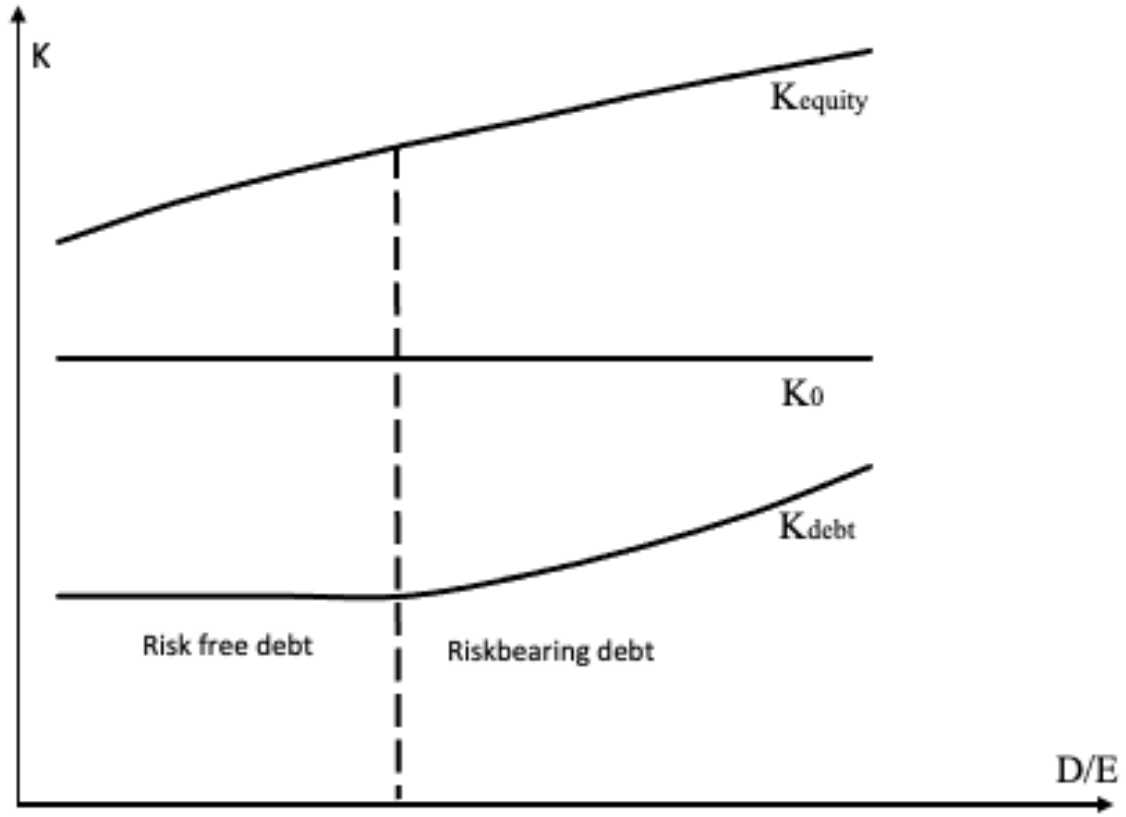
MM's first suggestion is that a company's capital structure has no influence on firm value. The value created by assets is unrelated to the combination of debt and equity used to finance them. Therefore, there is no optimal debt-to-equity ratio, and an optimal leverage strategy is unnecessary.

Even in a perfect capital market, capital costs vary among securities. A corporation must decide between debt and equity financing when determining its financial structure. Suppose they elect to fund a proposed project entirely with equity. In that case, the equity investors will require a higher expected return than the firm's risk-free rate because equity involves high risk. Therefore, debt may appear to be a more affordable and rational source of funding (Berk and DeMarzo, 2011).

MM Proposition II reconsiders the independence of a firm's leverage's impact on firm value because a firm's debt enhances the financial risk for the firm's equity cost of capital by demanding a premium for the added risk (Modiglian and Miller, 1963). In Modigliani and Miller's paper from 1963, they added taxes into their theoretical model. Due to tax shields, the value of a firm would increase with the present value of the additional tax benefit. As a result, leveraged enterprises would be more valuable and perform better, as debt financing results in higher net returns, displayed in figure 3.1. However, this entails that a company should aim for 100 percent debt financing, which is impractical due to other market costs.

Robicheck and Myers (1966) and (Stiglitz, 1969) also reflected on the fact that there are additional expenses in their analyses of the Modigliani and Miller arguments. They

Figure 3.1: Miller & Mogligani proposition II



Note: *Kequity is cost of equity, while Kdebt is the cost of debt. The figure illustrated the Proposition II with and without riskbearing debt. As leverage (D/E) increases, the WACC (k0) remains constant. Sources: Miller & Modligani(1963).)*

argued to consider the costs associated with bankruptcy. Robicheck and Myers (1966) suggested that bankruptcy costs could partially or neutralize the tax advantages of using leverage. The optimal debt ratio of a company is typically established by a *trade-off* between the costs and benefits of borrowing while retaining the company's assets and investment plans.

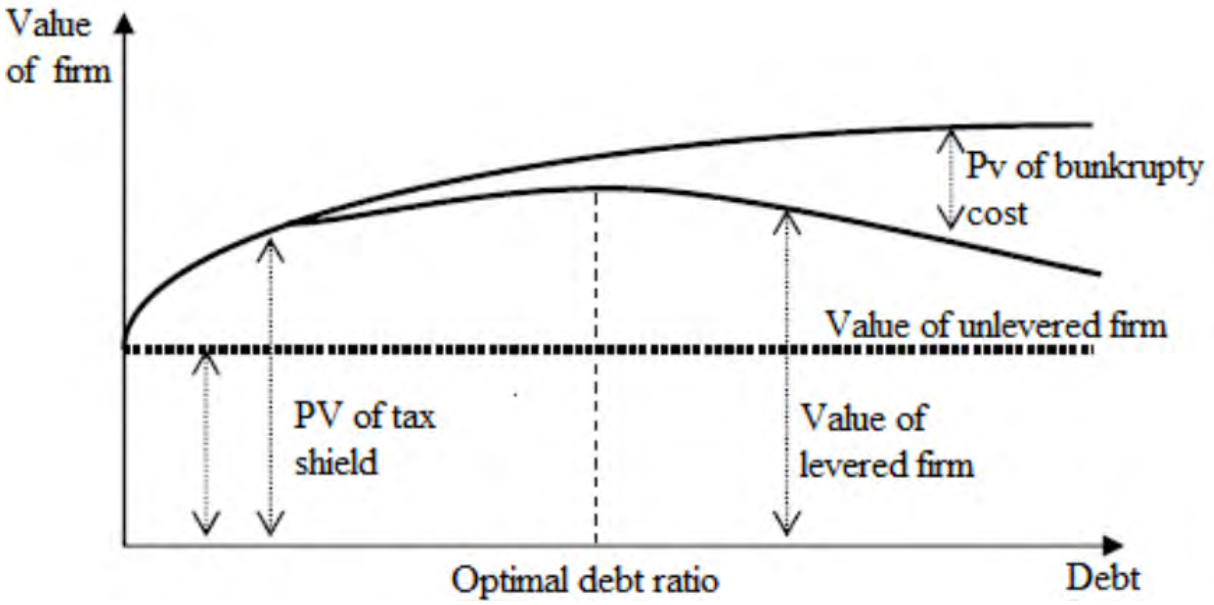
3.1.2 Trade-off Theory

Kraus and Litzenberger (1973) was the first to propose the Trade-off hypothesis. The hypothesis considers how bankruptcy costs affect the company's capital structure choice. According to their findings, a corporation's optimal capital structure may be determined by the benefits and drawbacks of debt converge. In other words, the corporation would have to determine its debt-equity balance depending on the trade-off between the benefits of the interest tax shield and the costs of financial distress. When taking on additional

debt, the risk of defaulting on debt obligations increases, leading to these financial distress costs.

When debt levels approach the optimal debt-to-equity ratio, the marginal benefit of the interest tax shield is positively correlated with market value. When debt levels reach the optimal debt-to-equity ratio, the marginal benefit of the interest tax shield rises in proportion to market value. The benefits of tax shields outweigh the drawbacks of financial difficulty. A firm's market value would decrease due to more significant financial costs of distress caused by exceeding the optimal level of leverage. When leverage reaches optimal debt, the marginal benefit of tax shields turns negative, according to figure 3.2.

Figure 3.2: Trade-Off Visual



Note: *Trade-off theory visualised by Myers, the trade-off for debt levels between the present value of a tax shield and the present value of bankruptcy cost. Sources: Myers (1984).*

For real estate literature on Trade-off theory, Allen Hammes and Chen (2000) concludes that American REITs generate more leverage than other industries because of reduced agency and bankruptcy costs. When investigating the public security offers of American REITs, Riddiough and Steiner (2003) found evidence of corporations aiming for a predetermined debt ratio. These two empirical findings support the Trade-off theory, its optimal capital structure, and the concepts of target levels.

As the bankruptcy cost relates to the risk of higher debt ratios, it is important to view

this in line with the real estate market. Since real estate firms' main asset is tangible assets, the company can sell off their assets in times of financial distress. Thereby, the balance of the *trade-off* is different for real estate companies than an average company on the stock market, reflecting fewer companies going bankrupt.

3.1.3 Pecking Order Theory

Despite remaining the dominant theory of capital structure, the Trade-off theory has failed to explain observed corporate behavior, notably the equity market reaction to leverage-increasing and -decreasing transactions, which routinely result in increases and decreases in equity value (Hammes and Chen, 2000). As a result, asymmetric information theories have emerged. Asymmetric information, also known as information failure, arises when one party has better knowledge than another, resulting in an imbalance of transaction power. This line of thought assumes that companies have a preference regarding financing decisions, given that corporate managers have access to valuable inside information regarding firm characteristics. Therefore, the Pecking order theory refers to a company's capital structure and explains why corporations finance investment using internal financing firsthand, proceeding to debt, and finally to equity displayed in table 3.1.

Naturally, insiders have superior knowledge of a company's financial position, especially its assets and future possibly profitable expenditures, and thus the value of their risky securities. The market should therefore support policies that promote internal financing over external financing and debt over equity (Bharath et al., 2008). According to Myers, external investors would interpret equity issuance as management's belief that the firm's equity is overvalued. Myers argued that by issuing overpriced shares, the company would raise more capital than the true worth of the issued equity, hence increasing the firm's value.

Table 3.1: Pecking order

Priority	
1	Internal financing through firm generated profits
2	External financing through debt issuance
3	External financing through Equity issuance

Note: *Pecking order with the priorities in financing.*

Within real estate literature on the pecking order, Ghosh et al. (2011) discover a strong adverse stock price reaction to equity offers when investigating several American REITs and the market's response to their security offerings. The reaction is evidence of information asymmetries consistent with the pecking order concept. Furthermore, Jaffe (1991) conducted a study on the listed real estate market in the United Kingdom and concluded that debt is the most typical security issued when external financing is required. They also observe that debt issuance appears to track the financing shortfall closely.

For various reasons, information asymmetry is less significant in the real estate market than in other industries: (I) Real estate operations are straightforward to comprehend. (II) They typically purchase real estate to rent out. (III) Experts are required by IAS 40 to evaluate real estate using a fair value model, which is the price that would be received to sell an asset today and to standardize the evaluation.(IV) Disclosure by the stock exchanges of the separate nations facilitates the analysis and comparison of financial accounts. (V) The fact that each fund specializes on a single asset class makes it simpler for the outside world to comprehend the underlying risks.

3.2 Literature Review

As a firm's performance displays its success in the capital market, optimizing performance is paramount for every company. Various research has displayed the factors affecting a firm's performance, and capital structure is shown to be one of the most significant explanatory factors among them (Aimagh and Larsson, 2018; Amjed, 2007; Arbor, 2005; Weill, 2008). Given the importance of firm performance, findings yielded by studies examining specific market conditions often serve as baselines for companies operating in them. The prominent way to display the relationship between firm performance and

capital structure is by focusing on a single market sector, stock exchange or a broader view between more countries, and thereafter limiting the analysis for a time frame between three and ten years, as shown in table 3.2.

Table 3.2: Description Literature

Author	Published	Country	Years	Segment
Aimagh & Larsson	2018	Norway	2006-2004	Stock Exchange
Sohail Amjed	2007	Pakistan	1999-2016	Stock Exchange
Gill, Birger & Mathur	2011	U.S	2005-2007	Stock Exchange
Gleason, Mathur & Mathur	2000	Europe	1995-1998	Stock Exchange
Haavi & Torgersen	2018	Nordics	2006-2016	Stock Exchange
A. Khan	2012	Pakistan	2003-2009	Stock Exchange
N. Le	2017	Vietnam	2010-2015	Stock Exchange
Moradi & Salehi	2011	Tehran	2002-2009	Stock Exchange
Ong & Hong	2012	Malaysia	2005-2008	Stock Exchange
Patrisia	2020	Indonesia	2014-2018	Stock Exchange
Qayyum & Noreen	2019	Pakistan	2006-2016	Manufactoring
Salim & Yadav	2012	Malayisia	1995-2011	Stock Exchange
H.S.Song	2005	Sweden	1998-2004	Stock Exchange
Tifow & Sayilir	2015	Turkey	2008-2013	Manufactoring
Yazadanfar & Ohman	2015	Sweden	2009-2012	Stock Exchange
Zeitun et al.	2007	Jordan	1989-2003	Stock Exchange

Note: *An overview of prior literature on Capital structure with the attributes of Author, Published, Country observed, Years conducted and segment analysed.*

Gleason et al. (2000) conducted a study on the relationship between capital structure and performance. The study collected data from 198 retail businesses in 14 European countries, divided into four research clusters. Return on Assets (ROA) was the dependent variable, whereas debt-to-assets, long-term debt to total assets (LTD), firm size, age, and growth were the independent variables. The result demonstrates that debt to total assets and LTD had a negative impact on ROA. Moreover, the study reveals a significant positive impact between age, firm size, growth and performance.

Supporting Gleason et al. (2000)s thesis, the clear majority of studies support the negative relationship between ROA and leverage measures (Le and Phan, 2017; Qayyum and Noreen, 2019; Zeitun et al., 2007). However, a handful of researchers discovered a positive relationship between ROA and LTD (Tifow and Sayilir, 2015; Aimagh and Larsson, 2018; Eikanger and Sogn, 2021). Interestingly, Aimagh and Larsson (2018) focuses on the Norwegian stock market, while Eikanger and Sogn (2021), focuses on the Nordic real

estate market. Moreover, there is an agreement with Gleason et al. (2000) that the factors of age, growth and company size enhance the performance of the firm (Yazdanfar and Öhman, 2015; Ong and Heng, 2013; Aimagh and Larsson, 2018).

Arbor (2005) investigated the influence of capital structure using ROE as a dependent variable when conducting a study on twenty Ghana Stock Exchange-listed firms. The study employs Tangibility, STD and LTD as independent variables. Findings indicate that both tangibility and STD have a positive effect on ROE. However, LTD had a negative relationship with ROE.

Following previous research (Salim and Yadav, 2012; Arbor, 2005; Amjed, 2007; Gill et al., 2010; Tifow and Sayilir, 2015), there is a negative relationship between leverage measures and ROE. In contrast to the majority of research conducted on leverage and ROE, it is more divided when focusing on firm controls. The majority of studies indicate a positive relationship between ROE and firm controls and negative for tangibility (Tifow and Sayilir, 2015; Amjed, 2007; Qayyum and Noreen, 2019; Gill et al., 2010). However, Salim and Yadav (2012) study examines the capital structure of Malaysian-listed firms, which indicated a positive relationship between growth and ROE, whereas the company's age had a negative effect. This is in line with the negative relationship discovered by Aimagh and Larsson (2018), who examined the Oslo Stock Exchange for the period 2006-2017. Furthermore, Zeitun et al. (2007) found that unanticipated changes in interest rates have a negative and significant impact on enterprises' performance as measured by ROA and Tobin q. The negative impact indicates that an increase in the interest rate raises the cost of borrowing and thus reduces a firm performance.

Zeitun et al. (2007) examined the relationship between capital structure and business performance for 167 Jordanian companies between 1989 and 2003. The dependent variables consist of ROA, ROE, and Tobin's Q. LTD, tangibility, size and growth were the independent variables. The ratios of LTD and tangibility show negative relationships with firm performance through Tobin's Q. Growth is also displayed as a negative factor for firm performance. At the same time, size is displayed as a negative significant relationship with Tobin's Q. Their research also demonstrates that unforeseen changes in interest rates have a negative and significant impact on enterprises' performance as assessed by ROA, indicating that an increase in the interest rate raises the cost of borrowing and further

reduces a firms performance. Most studies support Zeitun et al. (2007) and find a negative relationship with financial leverage (Tifow and Sayilir, 2015) While the research on firm size is contradicted by (Aimagh and Larsson, 2018).

Several articles have demonstrated that firm size is empirically relevant in determining a company's capital structure. In the United States, large enterprises have larger leverage ratios than smaller companies (Fama and French, 2002). Hammes and Chen (2000) utilized simultaneous equation estimates to examine private real estate enterprises in thirteen European nations from 1990 to 2003. The findings revealed a positive relationship between profitability and size. The data demonstrated a substantial and positive correlation between profitability and size for all Nordic nations besides Sweden.

The findings of the majority of research conducted on the overall relationship between capital structure and firm performance are negative. For the variables of ROA and Tobins Q, only negative relations are displayed through studies (Yazdanfar and Öhman, 2015; Salim and Yadav, 2012). While for studies employing ROE as the dependent variable, the results are divided. Here, half of the studies reveal a substantial positive relationship (Arbor, 2005; Gill et al., 2010; Qayyum and Noreen, 2019), while the other half indicate a significant negative relationship (Le and Phan, 2017; Salim and Yadav, 2012; Zeitun et al., 2007).

Table 3.3: Table Literature Review of Variables

Author	Published	Dependent variables	Independent variables	ROE***	ROA***	Tobins Q***
Aimagh Larsson	2018	ROE, ROA, Tobins Q	LTDTA, STDTA, TD/TA, Size, Age, Profitabiliy and Non – debt tax shield.	- LTDTA	+STDTA, +LTDTA	+STDTA, -LTDTA
Amjed	2007	ROE	STDTA, LTDTA, TD.	-STDTA, +LTDTA		
Arbor	2005	ROE	STDTA, LTDTA, TD/TA	+STDTA, -LTDTA, +CS		
Gill, Birger & Mathur	2011	ROE	STDTA, LTDTA, TD/TA,	-LTDTA, +CS		
Gleason, Mathur and Mathur	2000	ROA	STDTA, LTDTA, TD/TA, Size, Growth		+Growth	
Haavi & Torgersen	2018	ROA, ROE, ROCE	STDTA, LTDTA, Growth, Total Assets, Age, Financial Crisis.	-STDTA, +LTDTA, +Size		
Khan	2012	ROA, EPS, Tobins Q	STDTA, LTDTA, Size, Growth	+Size	-STDTA, -LTDTA	
Le	2017	ROA, ROE, Tobins Q	STDTA, LTDTA, Size, Solvency, Asset structure, Growth	-CS	-CS	-CS
Moradi & Salehi	2011	ROA, ROE, EPS, Tobins Q	STDTA, LTDTA, TD/TA		-CS	+CS
Ong & Hong	2012	ROA	LTDTA, TD/TA, Size, Growth		+CS, +Size (Large), -Size (Small)	
Patrisia	2020	ROA	STDTA, LTDTA, TDTA, Size, Growth		-STDTA, +Size, +Growth	
Qayyum & Noreen	2019	ROA, ROE	STDTA, LTDTA, Size, Growth	+CS	-CS	
Salim & Yadav	2012	ROA, ROE, EPS	STDTA, LTDTA, TD/TA, growth	-STDTA, - LTDTA,	-STDTA, - LTDTA,	+STDTA, +LTDTA,
Tifow and Sayilir	2015	ROE, ROA, EPS & Tobins Q	STDTA, LTDTA, Growth, Size	-LTDTA	+STDTA, +LTDTA	+STDTA, - LTDTA
Yazdanfar & Ohman	2015	ROA	Trade credit, STDTA, LTDTA.		-STDTA, - LTDTA, +AGE	
Zeitun, Tian, and Keen	2007	ROA, ROE, Tobins Q	STDTA, LTDTA, TD/TA.	-CS	-CS	-STDTA, - LTDTA

Note: *An overview of the findings for prior literature on capital structure with the attributes of Author, Published Dependent variables, Independent variables, ROE, ROA and Tobins Q. The findings for the dependent variables on a 1 percent significance level*

3.3 Variables Explanation

In the subsequent part of the thesis, we will provide the variable ratios for the different dependent and independent variables. There will be a summary table of the different ratios at the end of this subchapter, displayed in table 3.4. Furthermore, how the variables and authors align with each other, displayed in A0.4.

3.3.1 Return on Assets

This thesis´s first performance indicator is return on assets (ROA), which is computed by dividing net income by total assets. The ratio has also been utilized in a number of studies, and it measures a company's profitability and asset utilization efficiency. A high ROA shows that the firm has effectively converted assets into earnings. In general, there are two ways a company can increase their ROA. First, by increasing the net income, second, by becoming more effective in the use of the existing assets. Hence, the ratio is also often referred to as the profitability ratio or productivity ratio.

During our study, we are using the same definition of ROA as (Song, 2005).

$$Return\ On\ Assets\ (ROA) = \frac{Net\ Income}{Total\ Assets} \tag{3.1}$$

3.3.2 Return on Equity

One of the most commonly employed performance measures in the literature on capital structure and firm performance has been the use of value creation of the shareholders through the proxy of return on equity (ROE). This metric measures the effectiveness of the management by evaluating their effort of generating profits with shareholder cash. In addition, it is popular since it implements the balance sheet and income statement. In line with the majority of previous research, we have chosen to calculate ROE through Net Income over Total Assets.

$$Return\ On\ Equity\ (ROE) = \frac{Net\ Income}{Total\ Equity} \tag{3.2}$$

3.3.3 Tobins Q

Throughout our research, Tobin's Q represents a company's market performance. This ratio compares the market worth of a company to the cost of replacing its assets. According to the ratio's interpretation, a low Q-value (between 0 and 1) suggests that the cost of replacing the firm's assets exceeds the value of its stock. Consequently, this would indicate that the stock is undervalued. A high Q-value would suggest that the stock is overpriced.

Typically, one calculates the Q-value by dividing the market value + debt covenants of a company by the book value of its assets.

$$Tobins\ Q = \frac{Market\ Value\ of\ Equity\ +\ Book\ value\ of\ debt}{Total\ Assets} \tag{3.3}$$

3.3.4 Finanacial leverage

Consistent with prior research by Arbor (2005), this study calculates leverage based on two ratios: long-term debt (LTD) and short-term debt (STD) divided by the book value of total assets.

LTD gives information on the proportion of total assets funded by long-term debt. It primarily covers investments or purchases with a typical payback period of more than one year, such as equipment and material necessary for the development of buildings. Utilizing long-term debt financing to support long-term asset investments helps real estate companies to maintain cash and liquid assets for operational processes, such as the maintenance of buildings. In contrast, short-term debt is often referred to as current liabilities and mostly funds short-term commitments, such as wages, or recurrent bills, such as rent and utilities. Therefore, the debt ratio assesses the company's capacity to meet its short-term financial commitments.

The ratios used in this thesis are determined by dividing long-term debt and short-term debt by total assets. Although Rajan and Zingales (1995) explore other measures of leverage, we utilize the book value of total assets following Arbor (2005) and Harrison and Widjaja (2014) to prevent more significant changes in the denominator of these ratios. Otherwise, it could lead to biased assessments of long-term and short-term debt, particularly during the financial crises when the market value of real estate assets dropped

significantly. This reasoning applies to all variables that use the book value of total assets. It is a reasoning for the choice of this variable when both market value and book value could be applicable.

$$LTD = \frac{Long\ term\ debt}{Total\ Asset} \tag{3.4}$$

$$STD = \frac{Short\ term\ debt}{Total\ Asset} \tag{3.5}$$

3.3.5 Tangibility

Two prominent financial theories, the trade-off and agency theories, demonstrated that tangibility is a significant driver of capital structure. Since fixed assets may be used as collateral, Rajan and Zingales (1995) concludes that enterprises with a high level of fixed assets find it simpler to get external funding. Theoretically, tangibility boosts a company's borrowing capacity as the collateral enhances the lender's likelihood of getting paid in the event of bankruptcy. The likeliness of repayment indicates that the large debt ratios in the real estate sector are driven by the fact that most real estate sector assets are tangible assets.

In accordance with most papers (Yazdanfar and Öhman, 2015; Salim and Yadav, 2012; Aimagh and Larsson, 2018) we will in this thesis deploy tangibility evaluated as property, plant, and equipment divided by the book value of total assets.

$$Tangibility = \frac{Property,\ plant\ and\ equipment}{Total\ Assets} \tag{3.6}$$

3.3.6 Size

The size variable used in this regression is the natural logarithm of size, as it lowers dispersion and reduces the effects of extreme outliers.

The size of a company is determined by its total assets and influences the degree of debt in several ways. In the event of default, debt can be secured with the firm's assets, meaning that larger businesses have a greater chance of collecting debt from creditors. Consequently, higher assets represent a lower risk for creditors, allowing larger businesses to reduce the

costs associated with long-term financing. Moreover, empirical studies indicate that the direct costs of bankruptcy are relatively low for large firms, which according to trade-off theory, would result in a positive relationship to leverage (Fama and French, 2002).

Previous literature defines size in several ways. Rajan and Zingales (1995) defines size as the logarithm of yearly sales, while Fama and French (2002) defined the factor as the logarithm of total asset book value. In this research paper, we define size as the logarithm of yearly net sales. Applying logarithm also lowers dispersion and reduces the effects of extreme outliers (Rajan and Zingales, 1995).

$$Size = \log(Net\ sales) \tag{3.7}$$

3.3.7 Crisis Variables

A Dummy variable or Indicator Variable is an artificial variable established to represent an attribute having two or more distinct categories/levels. We chose the financial crisis, different interest rates, and Corona crisis as dummy variables intended to control for a potential relationship to our explanatory variables.

We consider the financial crisis of 2008 to affect how investors evaluate real estate companies. As risk management at most bank institutions failed to enforce basic rules for safe business, there where an abnormal lack of dined capital allocation strategy and a disaggregated vision on the volatility of returns (Salim and Yadav, 2012). Furthermore, since the real estate market triggered the financial crisis and was one of the sectors that fell the most, we consider it to potentially impact our analysis unbiasedly. We expect the lesson to be learned, and that firms are more sensitive to information asymmetry (Fosu et al., 2016). In line with the trade-off theory, one could argue that investors would be more risk-averse, incorporating a higher bankruptcy cost when evaluating a real estate firm's post-crisis.

The explanation for why we have chosen a dummy variable for COVID-19, is that within this time-frame, the market conditions are different to the rest of the period, as restrictions and lock-downs could be of significant importance to real estate performance.

$$Financial\ Crisis = F08 \tag{3.8}$$

$$Covid19 = C19 \tag{3.9}$$

3.3.8 Interest Rates

Due to the high leverage of the real estate sector, it is typically highly affected by an adjustment in the interest rates and the investors' increasing demand for return. As the interest rate directly impacts the borrowing cost for real estate firms, an increase in interest rates raises the cost of debt. It also reduces investors' purchasing power and real estate prices. In theory, increasing interest rates increase borrowing costs that may reduce overall investment returns for real estate investors, either through increased interest expense or a lower level of maximum leverage. From a trade-off perspective, this would affect the bankruptcy cost.

Furthermore, higher interest rates across the board should indicate a higher opportunity cost of capital, resulting in higher capitalization rates in real estate transactions. Because capitalization rates and property prices are inversely related, this could reduce the value of many real estate assets. In any situation, each issue mentioned would put downward pressure on firm performance.

In this thesis, we calculate the interest rate at the end of each quarter for each of the countries.

$$Interest\ rate = Quaterly\ interest\ rate\ for\ each\ Country \tag{3.10}$$

3.3.9 Age

We divide the Age variable deployed in this regression into three parts, Age new, medium and old.

Older firms may be more able to finance their operations and investments with funds generated internally. From a pecking order standpoint, this would imply a negative connection between Age and leverage. According to the trade-off theory, a reduction in borrowing costs may affect the leverage ratio differently. The theory generally indicates that lower interest rates would result in higher leverage ratios. On the other hand, if a

mature company experiences financial difficulty, it might negatively affect the company's reputation and result in an increase in the cost of debt in the future. A higher interest rate would result in a decrease in the leverage ratio.

In our thesis, we have chosen two different casements new, medium, and old. New is below six years operating, Medium is below twenty years, while old are more mature companies than twenty years.

$$AGE = Age(New) = 2016-, Age(Medium) = 2002 - and\ Age(old) = all\ older\ firms \tag{3.11}$$

3.3.10 Growth

This thesis measures growth as the yearly percentage change in sales.

It is difficult to select the most applicable definition, however for the sake of our research, we have opted to adopt (Rajan and Zingales, 1995) and measure growth as the yearly percentage change in revenue.

$$Growth = Quarterly\ percentage\ change\ in\ revenue \tag{3.12}$$

Table 3.4: Variable Overview

Measure	Unit	Term	Definition
Dependent variables			
Return On Assets	percent	ROA	Net Income/Book value
Return On Equity	percent	ROE	Net Income / Book value of Equity
Tobins Q	percent	Tobins Q	(MV + Debt Covenant) / Total Assets
Leverage measures			
Short-term debt	percent	STD	Current Liabilities / Total Assets
Long term debt	percent	LTD	Non-Current Liabilities / Total Assets
Control variables			
Size	LogUSD	Size	LogSize
Tangibility	percent	Tangibility	Tangible assets / Total Assets
Growth	percent	Growth	Quarterly change in Revenue
Dummies			
Financial Crisis	1/0	F08	1 during crisis, 0 before and after
Covid-19	1/0	C19	1 during crisis, 0 before and after
Interest rate	percent	Polrate	Countries interest rate quarterly
Norway	1/0	Norway	1 for Norway, 0 if other country
Sweden	1/0	Sweden	1 for Sweden, 0 if other country
Denmark	1/0	Denmark	1 for Denmark, 0 if other country

Note: *An variable overview of the variables chosen in this thesis.*

Table 3.5: Trade-Off and Peaking Order

Variables	Author (Date)	Supporting	Peaking Order	Trade-Off
Tangibility	Aimagh and Larsson (2018)	Peaking Order	-	+
	Arbor (2005)	Trade-off	-	+
	Yazdanfar and Ohman (2015)	Peaking Order	-	+
	Salim and Yadav (2012)	Trade-off	-	+
Size	Haavi and Torgersen (2018)	Trade-off	-	+
	Khan (2012)	Trade-off	-	+
	Ong and Hong (2012)	Trade-off	-	+
Interest rate	Zeitun, Tian and Keen (2007)	Peaking Order	-	+
Growth	Gleason, Mathur and Mathur (2000)	Peaking Order	+	-
	Haavi & Torgersen (2018)	Peaking Order	+	-
	Patrisia(2020)	Peaking Order	+	-
	Salin & Yadav(2012)	Peaking Order	+	-
	Yazdanfar & Ohman(2015)	Peaking Order	+	-
Age	Frank & Goyal	Peaking Order	-	+/-

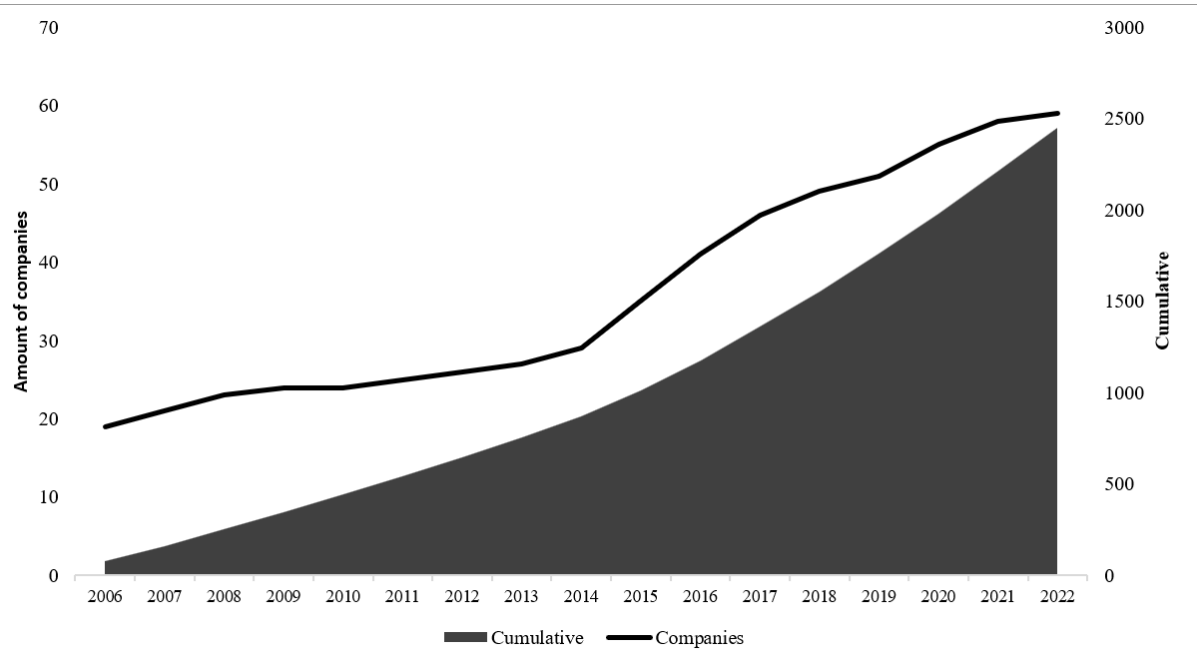
Note: *An overview of which theory earlier literature of capital structure suggests, including only significant findings on a 1 percent level.*

4 Data

4.1 Sample Selection

In our sample selection, we have unbalanced panel data containing a cross-sectional and time series dimension, with 59 listed real estate firms. Due to the listing of large real estate companies during the period, the number of observations gradually increased, as displayed in 4.1. All the relevant accounting and market information is retrieved from the company's public interim reports, Refinitiv Eikon, by Reuters and Bloomberg. We analyze the data using R, a statistical programming language. The information retrieved includes quarterly observations of financial statement data from the 59 publicly traded real estate firms listed on OSEBX, OMX Copenhagen and OMX Stockholm. Thereby converted to euros using the average appropriate exchange rate for the end of the quarter for the observations using Refinitivs Currency converter. Due to their incomparable size and reporting practices, real estate firms that are not listed on their respective domestic stock exchanges are not represented in the sample selection.

Figure 4.1: Observations



Note: *The observations and companies between Q1 06 and Q3 2022 Sources: Refinitiv.*

To capture the full impact of the financial crisis, the sample begins in Q1 2006. The samle

ends in Q3 2022, as these are the most recent available observations.

There is a varying degree of missing data points related to each variable. Therefore, this is more of an overview explaining how the N differs between variables. From data retrieval, the sample includes 95 Nordic real estate firms. After excluding firms with missing financial data and data errors, our final sample of 59 firms remains in the sample as shown in A0.5. Thereafter, we exclude quarters with a lack of vital data (NAs), such as data necessary for creating dependent variables.

Table 4.1: Data amount

Explanation	**Number of**
Total listed real estate firms in the respective countries	95
- Missing financial data, data errors	36
=Total Firms in Sample	**59**
Total company quarters in sample	2499
- Lack of data (NAs) (ROA/ROE)	227
= Total firm quarters (ROA/ROE)	**2272**

Note: *There is a varying degree of missing data points related to each of the variables, therefore this is more of an overview explaining how the N differs between variables. From data retrieval the sample includes 95 Nordic real estate firms, after excluding firms with missing financial data and data errors, our final sample of 59 firms remain in the sample. Thereafter we exclude quarters with a lack of vital data (NAs), such as data necessary for creating dependent variables.*

We have omitted those without interim financial reports from the 95 eligible real estate companies since their balance sheet is either absent or cannot be compared to the other firms in the sample. In other words, the quality of their data was inadequate for our study. In addition, our sample only contains observations from when the various real estate firms were publicly listed. From Q1 2006, we have 19 listed real estate businesses with comprehensive quarterly observations for our metrics and 40 companies listed after Q1 2006 that continue to meet the requirements above. As seen in the table 4.2, nine companies remain in Norway, eight in Denmark, and 42 in Sweden. Our thesis contains a large number of Swedish real estate businesses, and movements in the Swedish real estate market would have a significant impact on our conclusions.

Table 4.2: Companies per Country

Country	Number of Companies
Norway	9
Denmark	8
Sweden	42

Note: *This is an overview of how many companies per country included in our data sample. The list represents all the companies listed as of Q3 2022.*

4.2 Data Cleaning

As displayed in table 4.3, the data contains some extreme outliers, which can result from sampling error, data entry faults in the database, and natural variation. The table shows that the max ROE level of 240 indicates an error in the ratio. Either the Equity for the firm is minimal compared to its earnings, or the sales are immensely large. Either way, an ROE for a quarter at 240, is way too large for an average firm. This line of thought also includes the large extreme values of Tobin's Q. Ratios of STD at 1387 is not possible, as it is not possible for Short-term debt to be larger than one, as the ratio is divided by total debt. The line of thought is also evident when the median includes values at 0.055 and a mean of 1.067. As our dataset includes only 59 real estate companies in total, the risk of extreme outliers decreases the statistical power of our model is present. To overcome this challenge, we have utilized winsorizing for our data.

To handle extreme outliers in our data set, we utilize the winsorize function on our measures and ratios, which replaces the most extreme values with the closest that are not removed (Chambers et al., 2000). Bounded variables (LTD, STD, Tangibility) have to be within their natural interval. For example, tangibility has to be between 0 and 1, and STD between 0 and 1. The continuous variables are winsorized at 2.5 percent level at each end of the distribution.

It is important to keep in mind the effect an application of winsorizing has on the variables for our data set. For our data set, it would only be rational to winsorize some of the variables, especially considering the fluctuating revenues for an average real estate firm. For an average real estate firm, revenues vary largely depending on the proportion of property sales within the observation period. In contrast to their relatively stable rent

Table 4.3: Expoloratory data analysis before Winzoring and manual inspection

Varibles	N	Mean	Sd	Min	Median	Max
Dependent variables						
ROA	2272	0.032	0.061	-0.379	0.017	1.133
ROE	2272	0.19	5.046	-2.963	0.048	240.35
Tobins Q	2253	1.896	35.944	0.073	0.877	1628.429
Leverage measures						
STD	1886	1.067	33.363	0	0.055	1387
LTD	2224	0.375	0.206	0	0.409	0.985
Firm Controls						
Size	2262	-inf	NaN	-Inf	9.631	13.487
Tangibility	2191	0.753	0.344	0	0.928	0.999
Dummies						
F08	2499	0.047	-	0	0	1
C19	2499	0.182	-	0	0	1
Denmark	2499	0.197	-	0	0	1
Norway	2499	0.146	-	0	0	1
Denmark	2499	0.657	-	0	1	1

Note: *Exploratory data analysis before winsorizing. Focusing on the measures N, Mean, Sd, Min, Median and Max. For our analysis dependent variables, leverage measures, firm controls and dummies.*

income, there would be quarters where larger or smaller scales of properties would occur, affecting the revenue of the company. Therefore, when real estate firms sell their properties, an extreme value for the data set could occur. In other sectors than real estate the large deviations would indicate an outsider and be excluded as the observation would not provide valuable information for the analysis. However, as sales of the property could be considered the most significant revenue gains for the market throughout the last decade, their value would prove essential for the validity of the data set.

As both ROE and ROE include the values for revenues, our dependent variables largely depend on the correct incorporation of the revenue deviations within the real estate markets. If we used winsorizing for this variable, our finding would include lower mean levels of ROA and ROE than what the reality of the market displays. Therefore, we manually change the revenue variable to incorporate this sector's characteristics, excluding observations proving wrong extreme values but including the large natural variations for an average real estate company.

4.3 Descriptive statistics

In order to grasp the extent of the results of our regression analysis, we find it necessary to describe the core insights of our data. We will mainly use the descriptive statistics of Song (2005) to compare with our findings, as the study is focused on the Nordic market and includes similar dependent and independent variables. This thesis's descriptive statics is shown in Figure 4.4. For the comparement to gain the best effect, keep in mind that this paper focuses on real estate firms specifically, while Song uses a broad sample of Swedish firms as the segment of analysis. Therefore, the characteristics of the statistics may deviate from our data sample.

Table 4.4: Expoloratory Data Analysis

Varibles	N	Mean	Sd	Min	Median	Max
Dependent variables						
ROA	2272	0.029	0.039	0	0.017	0.199
ROE	0.075	0.097	0.097	-0.072	0.048	0.482
Tobins Q	2253	0.921	0.318	0.341	0.877	2.153
Leverage measures						
STD	1886	0.107	0.133	0	0.055	0.543
LTD	2224	0.374	0.203	0	0.409	0.689
Firm Controls						
Size	2262	9.126	2.282	0.693	9.631	12.081
Tangibility	2191	0.753	0.344	0	0.928	0.058
Dummies						
F08	2499	0.047	-	0	0	1
C19	2499	0.182	-	0	0	1
Denmark	2499	0.197	-	0	0	1
Norway	2499	0.146	-	0	0	1
Denmark	2499	0.657	-	0	1	1

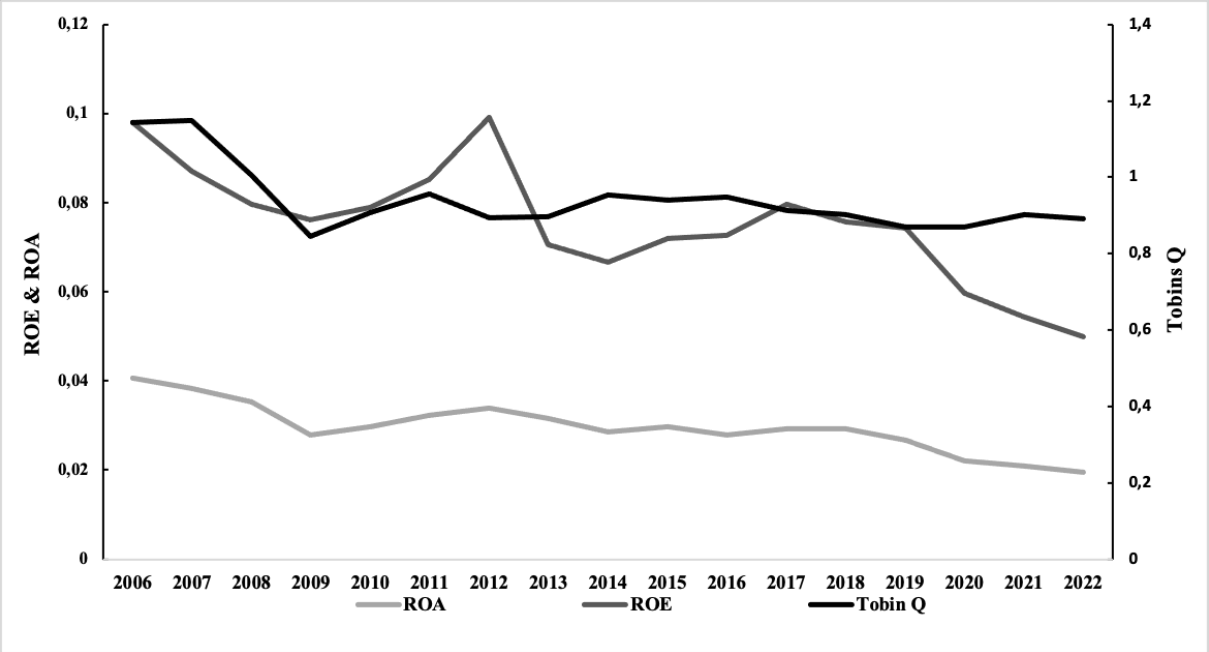
Note: *The exploratory data of our thesis. Focusing on the measures N, Mean, Sd, Min, Median and Max. For our analysis dependent variables, leverage measures, firm controls and dummies.*

Table 4.4 presents the summary statistics of our dependent and independent variables used in our regression. Our statistics include N: number of firm-quarter observations, mean, standard deviation, minimum value and maximum values. Because we are working with unbalanced panel data, it is important to explain how the variables should be interpreted. As real estate businesses go public, the number of observable enterprises has increased

throughout the observed period. Nonetheless, the means are computed based on the total number of observations, providing the firms with the biggest impact on the mean with the most observations.

The average multiples for the 1,748 observations of the dependent variables of ROA, Tobins Q and ROE are 0.029 (0.039), 0.921 (0.318), and 0.075 (0.097), respectively. Firstly, the value for ROA indicates that on average, the return on asset was 2.9 percent. The ROE value indicates an average return of equity of 7.5 percent. Tobins Q, which displays the market value divided by total assets, had an average of 0.921, indicating that the market value of real estate companies on average was lower than the total assets asserted in their balance sheets. This performance measure also had the largest standard deviation. The higher standard deviation is expected as Tobin's Q is based on a higher relative ratio than the other performance measures. The standard deviation for ROA and ROE also indicates a wide gap in performance ratios between the companies in our sample.

Figure 4.2: Average mean dependent variables



Note: *Averge mean for ROE, ROA and Tobins Q in the periode Q1 2006 - Q3 2022. Displayed is a falling value of ROE and ROA during the timeframe, while an relative stable Tobins Q after the financial crisis. Sources: Refinitiv.*

In comparison with Song (2005), the mean variables in our sample are higher relative to Tobin's Q. In his thesis, ROA, ROE and Tobin's Q have means of 0.035, 0.0300 and 0.78. Given the tremendous increase the Nordic real estate market has had during the

last decade, we find it reasonable that our sample includes higher ROA and ROE average values.

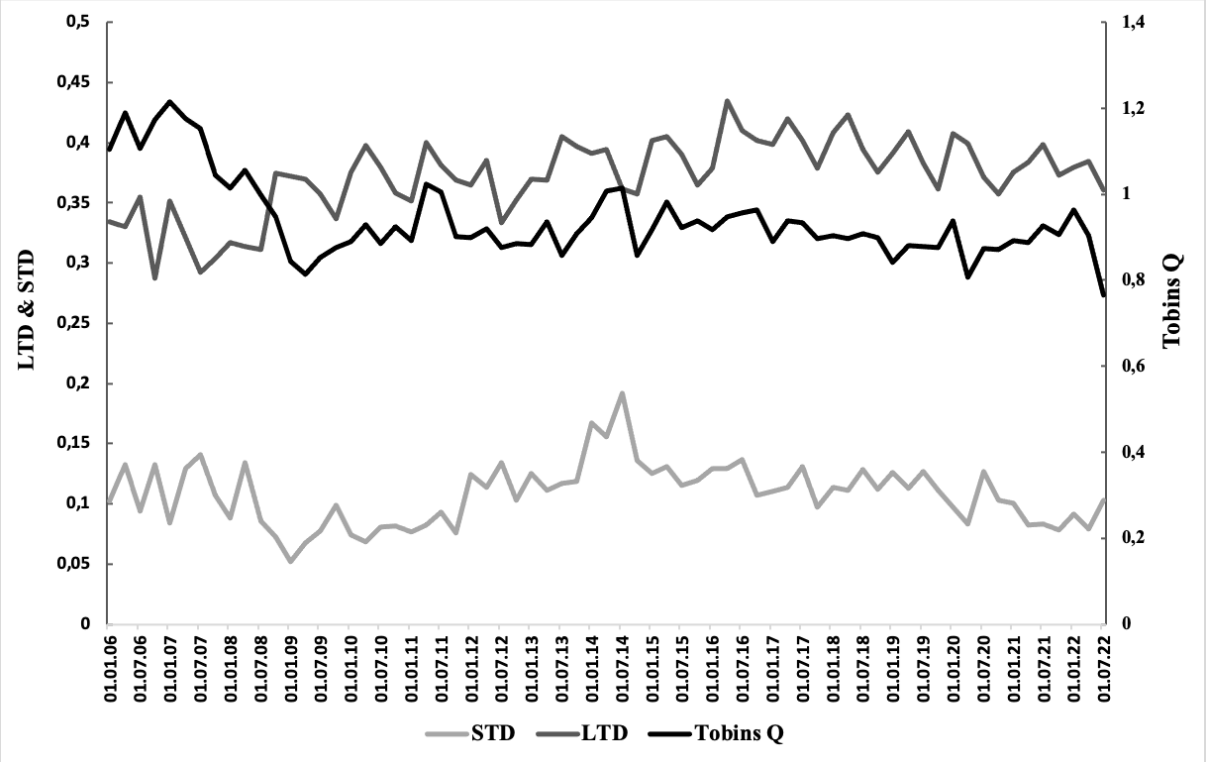
As displayed in the figure 4.2, ROE and ROA performance measures are falling during the period. In sectors where assets are the primary source of value in firms, an increase in asset value could decrease these performance measures as the denominator enlarges and their primary source of income is through stable rent agreements. Furthermore, there seems to be a spike in ROE in 2010. The spike is probably connected to the fall of real estate values during the financial crisis. At this period, the rent income in the Nordics had picked up to normal levels (Anundsen, 2021), and the equity steadily declined for the Nordic real estate market during the crisis as asset values had plummeted. These metrics can also be seen for Tobin's Q. In Q1 2006 Tobin's Q starts at a level of 1.2 but falls during the financial crisis to around 1 and stays here throughout the time frame. After the real estate turmoil during the financial crisis, the market value of equity was neutralized as the real estate assets no longer are overvalued after the crisis and remained relatively stable at around 1. These findings are also supported by Anundsen (2021), who estimated the real estate value for Nordic countries from 2021. His thesis suggests that real estate prices were overvalued, leading to the financial crisis, while prices quickly returned to equilibrium following the housing market bust.

The average short-term debt to total assets ratio for our thesis is equal to 0.107. It has a slightly lower median, indicating a positive skewness in the distribution of the STD ratios. Minimum and maximum values are 0.054 and 0.543, respectively, and the 75 percentile of 0.0133 implies that short-term debt will constitute a small part of the total assets, with a few instances with higher short-term debt financing, shown in appendix A0.1. The STD ratio is substantially lower than the findings of Song (2005), who studied small, medium, and big enterprises in Sweden between 1992 and 2000. According to the study, Swedish enterprises' average short-term debt ratio was 49 percent. The mean of our theory sample indicates a mean STD of 0.107, shown in figure 4.3. Though these theses describe different sectors in different market conditions and regions, they can serve as a proxy that there is a low amount of short-term debt in our sample data.

As short-term debt is associated with refinancing risk and day-to-day operation, and real estate's main operation and value are tangible assets, the low mean of the STD is natural.

Furthermore, because real estate firms have very predictable cash flows, risk management in balancing liquidity- and refinancing risk is easier to understand than in other significant Nordic industries with less predictable future cash flows. For an average real estate firm, it would nonetheless be natural to use short-term debt to cover maintenance of the properties and rental complications, thereby the mean of 10.7 percent. As displayed in figure 4.3, the STD is generally steady and fluctuates between values of 0.2 and 0.05. The average STD decreased by five percent from Q1 2006 to the all-time low of Q3 2008 of 0.054. The increase from 08 until 2014 could be explained by lower liquidity and refinancing risk after the financial crisis in 2008. As the interest rates fell in the backlash of the financial crisis, real estate firms probably gained more liquidity, turning the tide from refinancing risk, and therefore in less need of short-term loans. Notably, the STD levels remain the same as at the start of the sample period.

Figure 4.3: STD, LTD and Tobins Q



Note: *Averge mean for STD, LTD and Tobins Q in the periode Q1 2006 - Q3 2022. Sources: Refinitiv.*

The long-term debt to total assets ratio is 0.374, the same as its median, indicating a symmetric distribution A0.2. The symmetric distribution is further substantiated by the min and max values 0 and 0.697, displayed in 4.4. We are implying that the total assets

are financed on average by 35.8 percent long-term debt. In comparison to the mean LTD 0f 0.25 computed by Song(2005), the LTD ratio for our sample is substantially higher. The mean of our theory sample on capital structure and firm performance also indicates that our ratio is large, with a mean LTD of 0.199, as depicted in figure 4.3. Our sample's high LTD ratio is expected since estate firms' has a large number of tangible assets, increasing their ability to acquire loans. This is because tangible assets boost the borrowing capacity by enabling creditors to reclaim assets more safely, enabling cheap corporate borrowing with long-term debt secured in their real estate assets. Furthermore, the possibility of hedging interest risk by setting fixed interest rates for debt increases the willingness to take on long-term debt for Nordic real estate firms.

From figure 4.3, we can see that the LTD has been relatively stable, fluctuating mainly at 30-40 percent long-term debt ratio. There has been a clear positive trend in LTD, as companies are taking on partly more LTD during the period. This could be explained by the economic environment of the last decade, with increasing property values and falling interest rates during the period, as the capital cost decreases and the appetite for debt increases.

The financial leverage in this thesis has to be interpreted in line with the increased issuance of hybrid debt for the last decade (Melnikova, 2022). Hybrids enable firms to obtain capital without jeopardizing their credit rating or reducing shareholder ownership. Their adaptability also gives them more significant returns than conventional loans, which is attractive to investors. In the past decade, real estate companies have frequently utilized them to strengthen their balance sheets without affecting their credit ratings. Therefore, this thesis's total quantity of long-term and short-term debt may be greater than the data retrieved displays.

The logarithm of net revenues indicates the size of the sample selection, displayed in 4.4. The average is 9.126, and the median is slightly higher, implying a negatively skewed distribution, displayed in A0.4. It is important to note that more prominent companies can significantly impact this measure. Therefore we adjusted it with a logarithm. Since the variable is adjusted with an algorithm, we find it harder to evaluate, even though a standard deviation of 2.282 indicates significant differences in size between the companies in this sample.

The average value of tangibility is 0.753, meaning that on average, 75.3 percent of total assets consist of property, plant and equipment. The median is also higher at 0.909, indicating a slightly negatively skewed distribution, displayed in A0.4. Our average tangibility ratio is substantially higher than Song 2005, displaying a tangibility ratio of 0.288, which is over 0.42 lower than this sample. The significant differences can be explained by the fact that real estate firms, on average, have a more significant proportion of fixed assets on their balance sheet, compared to most companies. As our sample is based on real estate, the majority of their assets are placed in property, thereby increasing the mean of the independent variable. This ratio also has the lowest standard deviation relative to the mean, indicating a relatively minor spread in the ratio. It is natural that real estate firms keep a small retainer in cash reserves for unexpected events and paying covenants. Furthermore, the real estate rent will also lead to cash reserves for the companies.

The average interest rate for all countries is 0.01, meaning an average of 1 percent in key policy interest rate during the period between Q1 2006 - Q4 2022 in Denmark, Norway and Sweden. However, there have been large variations both within and between the Nordic countries during the period, ranging from values of 5.8 percent before the financial crisis in 2008 and even below zero bound during the last years of the 2010-decade for Sweden and Denmark.

4.4 Test Statistics

To test whether the regression coefficient is BLUE (Best Linear Unbiased Estimators), the tests for the 5 Gauss-Markov assumptions must be satisfied. The five assumptions are 1) Linearity 2) no perfect collinearity 3) zero conditional mean 4) homoscedasticity, and 5) no autocorrelation (Hallin, 2014). Furthermore, we need to test for normality to be able to use the t-statistics and F-statistics.

Linearity means that the relationship between the DV and IVs is linear. This is tested by plotting the DVs against the independent variables and is shown as a scatterplot. The results indicate that this assumption is met.

Random sampling states that the units must be picked randomly. Since we have disregarded several of the companies in the Nordics, based on either lack of financial information or

data-gathering errors, we assume that our sample is a fair representation of the target population. Thus we assume this assumption to be satisfied.

Table 4.5: VIF test

Varibles	VIF	1/VIF
STD	1.49	0.6711
LTD	1.68	0.5952
Size	1.33	0.7518
Tangibility	1.61	0.6211
AgeGroup	1.28	0.7812
F08	1.51	0.6622
C19	1.12	0.8928
Polrate	1.72	0.5813
Country	1.59	0.6289

Note: *The VIF-test for our data sample. With the variables of STD, LTD, Size, Tangibility, AgeGroup, F08, C19, Polrate, Country.*

We used a correlation matrix and performed a variance inflation factor (VIF) test to test for no perfect collinearity. In line with Ratner (2009), we view values over 0.7 for the correlation matrix as signs of multicollinearity. Since the only correlation over that values is between two dependent variables, ROA and ROE, we conclude that there are no signs of multicollinearity in our data. This is further substantiated by the results of the VIF-test, where a number above 5 indicates a multicollinearity problem and again indicates that there are no multicollinearity problems.

Table 4.6: Correlation Matrix

	ROA	ROE	Tobinq	STD	LTD	Size	Tangibility	Polrate
ROA	1	0.871	0.139	0.103	-0.302	0.077	-0.466	0.115
ROE	0.871	1	0.052	0.161	-0.136	0.153	-0.356	0.075
Tobinq	0.139	0.052	1	-0.017	0.040	-0.055	-0.133	0.177
STD	0.103	0.161	-0.017	1	-0.385	0.099	-0.114	-0.051
LTD	-0.302	-0.136	0.040	-0.385	1	0.215	0.426	-0.085
Size	0.077	0.153	-0.055	0.099	0.215	1	0.358	-0.028
Tangibility	-0.466	-0.356	-0.133	-0.114	0.426	0.358	1	-0.093
Polrate	0.115	0.075	0.177	-0.051	-0.085	-0.028	-0.093	1

Note: *The correlation matrix for the correlation between our variables.*

Zero conditional mean indicates that the regression error for any of the independent

variables is expected to be zero. We will use the Hausmanstest to check which model is more suitable for our data.

Testing for normality we check whether the residuals are normally distributed. To test this assumption, we plot the residual kernel density estimation for the regressions. These results indicates that we satisfied the normality assumption, and the results can be found in appendix A0.5, A0.7 and A0.8.

Autocorrelation and heteroscedasticity can also result in ineffective model coefficients. We conduct tests to determine if it exists in our database. We execute a Breusch-Godfrey test using the null hypothesis that autocorrelation does not exist in our data to test for autocorrelation. The data shown in the table

Table 4.7: Autocorrelation & Heteroscedasticity

	Autocorrelation	**Heteroscedasticity**
Variables	bgtest()	bptest()
ROA	0	0
Tobins Q	0	0
ROE	0	0

Note: *Bg- and bptests to review autocorrelation and heteroscedasticity in our data sample, with values of 0 for all our dependent variables of ROA, Tobins Q and ROE indicating no autocorrelation nor heteroscedasticity in our sample.*

5 Methodology

5.1 Pooled OLS

OLS regressions aim to minimize the residual sum of squares, which is the difference between the residuals and the fitted values. The pooled OLS approach, just a conventional OLS model, applied to a panel data set, is the simplest estimating method used on panel data. This method has limitations since it considers each observation equally. That is, it ignores effects that are fixed across time or for the entity. As stated previously, our dataset includes cross-sectional units i at period t. As a result, while estimating the Yit for any explanatory variable, we must keep in mind that we are estimating unobserved factors (error terms) of two types: The unobserved effect, which changes by each panel unit, i.e. by firm but not by time, consists of a component that does not change over time, ai, and a component that does vary over time, Uit. This might be capturing corporate attributes such as professional expertise. The Uit is the idiosyncratic error term and while it is distinct from unit i it will fluctuate over time, impacting the output Yit. Wooldridge (2014) illustrates this in a regression model. In this thesis, we will adjust the regression model to fit our variables:

$$DV_{it} = \beta_1 STD_{it} + \beta_2 LTD_{it} + \beta_3 Size_{it} + \beta_4 Tangibility_{it} + \beta_5 Age_{it} + \beta_6 Polrate_{it} + \beta_7 F08_{it} + \beta_8 C19_{it} + \beta_9 Country_{it} + \beta_1 0 Growth_{it} + \alpha_i + \mu_{it} \quad (5.1)$$

Where DVit is equal to our dependent variables of ROA, ROE and Tobins Q, i is a the variable of out companies and t explains the different quarters in our thesis from Q1 06 until Q3 2022. The Uit and ait are equal to a standard pooled regression model.

Pooled OLS is biased and inconsistent if the unobservable effect corresponds with the explanatory variables. Furthermore, because entities are seen over several periods but ai remains constant, panel data frequently suffer from heteroscedasticity and autocorrelation. Pooled OLS ignores that the error term is made up of two parts: the unobservable effect and the idiosyncratic error term (vit = ai + uit). As a result, the error term is predicted

to be serially correlated, leaving standard errors and test statistics invalid. As a result, complex panel data methods like fixed effects (FE) may be more suitable.

5.2 Fixed Effects

Another method for estimating the model is to use fixed effects estimates. In fixed effects estimation, the distinctiveness of each entity is considered by allowing the intercept to vary for each entity, while assuming a constant slope of the coefficients across the entities. We obtain a time-invariant model by varying the intercept of each entity while maintaining the slope constant (Gujarati, 2004). Because we adjust for time-constant fixed effects and estimate them, the model is less rigid than POLS and allows us to interpret the findings more often. In a regression sense, the variable is redundant because it is no longer a variable but rather pre-determined.

Because a significant portion of the companies lacks data for some years within the sample period, the dataset is an unbalanced panel. The FE method can handle both balanced and unbalanced panels, although biased estimators may occur if the reason a firm leaves the sample is correlated with the idiosyncratic error term uit. However, this is not of concern if the exit correlates with ai. Equation 2 lays the foundation for the fixed effect approach:

$$DV_{it} = \beta_1 STD_{it} + \beta_2 LTD_{it} + \beta_3 Size_{it} + \beta_4 Tangibility_{it} + \beta_5 Age_{it} + \beta_6 Polrate_{it} + \beta_7 F08_{it} + \beta_8 C19_{it} + \beta_9 Country_{it} + \beta_1 0 Growth_{it} + \epsilon_i + \mu_{it} \quad (5.2)$$

Where DVit is equal to our dependent variables of ROA, ROE and Tobins Q, i is a the variable of out companies and t explains the different quarters in our thesis from Q1 06 until Q3 2022. Over time, the FE model averages equation 5.2 for each unique business. This enables arbitrary correlation between the unobserved component ei and all of the independent variables (Wooldridge, 2014). Furthermore, because of this possible link, the FE model aims to entirely remove the unobserved element ei By doing so, we remove the unobserved effect and control for heterogeneity in individual entity attributes.

Pooled OLS and FE estimators can be useful, and we will utilize both in applications. If OLS differs from FE, it suggests that explanatory variables are connected to ai.

5.3 Random Effects

The random effects model (RE) is of the alternatives to the fixed effect estimator. This model is based on a random draw in a large sample with a constant average for the intercepts of each unit. This model is estimating the coefficient on the basis that the firms' individual or group effects are uncorrelated. This allows the intercept to variate for the individual units randomly.

The RE model has an advantage over the FE model in that we do not have to estimate N cross-sectional intercepts. It is just necessary to estimate the intercept's mean value and variance. When the intercept of each cross-sectional unit is uncorrelated with the independent variables, a RE model is applicable (Gujarati, 2004). The model may be expressed in the following manner:

$$Y_{it} = \beta_1 STD_{it} + \beta_2 LTD_{it} + \beta_3 Size_{it} + \beta_4 Tangibility_{it} + \beta_5 Age_{it} + \beta_6 Polrate_{it} + \beta_7 F08_{it} + \beta_8 C19_{it} + \beta_9 country_{it} + \beta_1 0 Growth_{it} + \alpha + \beta_1 \chi_{it} + u_{it} + \epsilon_{it} \quad (5.3)$$

Where DVit is equal to our dependent variables of ROA, ROE and Tobins Q, i is a the variable of out companies and t explains the different quarters in our thesis from Q1 06 until Q3 2022. The a is the regression model's constant, and uit is also here the error term between entities and eit is the error term within entities.

5.4 Breusch Pagan LM-test and F-test

Breusch Pagan test is used to indicate whether the OLS, Random effects model and fixed effects model is most suitable to use Breusch and Pagan (1980). Moreover, to determine the difference between the OLS and the fixed effect model, one performs a F-test. To determine the difference between the OLS and Random effects model, one conducts a

Lagrange Multiplier (LM) test. The null hypothesis for both of these tests is that the OLS is more suitable, and naturally the alternative hypothesis is that either random or fixed effects model is preferred respectively.

Table 5.1: LM and F-test

Variables	LM test	F-test	Appropriate model
ROA	0	0	Random & Fixed effects model
Tobins Q	0	0	Random & Fixed effects model
ROE	0	0	Random & Fixed effects model

Note: *The LM and F-test test in order to find the regression model best suited for our dataset. The test indicated that random & fixed effect model is best applicable for ROA in our thesis, while for Tobins Q & ROE the best appropriate model is the fixed effects model.*

To establish whether model is suitable for usage, we conduct a Breusch pagan test. The initial step is to determine whether to utilize the random effect or pooled OLS model. The null hypothesis asserts that the pooled OLS model is the preferable alternative. The test results are displayed in the table 5.2, where it is evident that all p-values are less than 5 percent. Therefore, the null hypothesis is rejected.

In addition, we investigate if the fixed effect or pooled OLS model is preferable. In this situation, the null hypothesis is the same as in the prior test. The results of the tests presented in the table below indicate that all p-values are less than the 5 percent significance level; hence, we reject the null hypothesis that Pooled OLS is superior. Therefore, the fixed effect model and random effect model are more applicable in this instance.

5.5 Choice of models

The previous tests indicated that the fixed and random effects models are more suitable than pooled OLS. Therefore, we need to investigate which of these is the best model for our data set. This is solved by performing a Hausmanstest. The Hausman's test is a valuable tool for comparing two different estimates (Hausman et al., 1987) and, in this case, has a null hypothesis that the random effects model is most suitable. The test results shown in table 5.2, indicate that the FE is the most suitable to estimate the effect of leverage on the firm performance measures.

Table 5.2: Hausmanstest

Varibles	**P-values**	**Appropriate** model
ROA	0	Fixed effects model
Tobins Q	0.0298	Fixed effects model
ROE	0	Fixed effects model

Note: *The p-value test in order to find the regression model best suited for our dataset. With values below 0.05 for all our dependent variables, the test indicated that the fixed effect model is best applicable to our thesis.*

To summarize, based on our findings, we apply an FE estimation using cluster-robust errors for the regression model below:

$$DV_{it} = \beta_1 STD_{it} + \beta_2 LTD_{it} + \beta_3 Size_{it} + \beta_4 Tangibility_{it} + \beta_5 Age_{it} + \beta_6 Polrate_{it} + \beta_7 F08_{it} + \beta_8 C19_{it} + \beta_9 country_{it} + \beta_1 0 Growth_{it} + \epsilon_i + \mu_{it} \quad (5.4)$$

Where DVit is equal to our dependent variables of ROA, ROE and Tobins Q, i is the variable of out companies, and t explains the different quarters in our thesis from Q1 06 until Q3 2022. The following chapter will cover the empirical analysis of our study. Initially, we will present the descriptive statistics, briefly discussing the underlying variables in comparison with historical trends.

6 Analysis

6.1 Results

In this chapter, we will first present our results from the fixed effect estimation using a cluster-robust errors regression model. We will compare models with alternative specifications to test their robustness. Moreover, we will include a random effect regression to look at group-level effects.

The results from the fixed-effect estimation using cluster-robust errors are visualized in table 6.1 and include the dependant variables ROA, Tobins Q and ROE, and the independent variables STD LTD, Size, Tangibility, Agegroup, F08, C19, Polrate and Country. The following section will elaborate on each variable's findings and interpretation. The findings show that the ROA has the most substantial explanation power, with an R2 of 0.277, Tobins Q with 0.112 and ROE with 0.140.

Table 6.1: Fixed Effect estimation using cluster-robust errors

	Dependent variable:		
	ROA	Tobinq	ROE
	(1)	(2)	(3)
STD	-0.032^{*} (0.017)	0.344^{*} (0.197)	-0.008 (0.056)
LTD	-0.033^{**} (0.015)	0.227 (0.138)	0.018 (0.039)
Size	0.013^{***} (0.004)	-0.012 (0.018)	0.026^{**} (0.012)
Tangibility	-0.021 (0.016)	-0.407^{***} (0.128)	-0.035 (0.038)
F08	0.001 (0.002)	-0.040 (0.029)	0.0004 (0.008)
C19	-0.010^{***} (0.002)	-0.029 (0.025)	-0.024^{***} (0.006)
Polrate	0.314^{***} (0.117)	2.840^{**} (1.285)	0.738^{**} (0.321)
Observations	1,752	1,752	1,752
R^2	0.277	0.112	0.140
Adjusted R^2	0.250	0.079	0.107
F Statistic (df = 7; 1687)	92.448^{***}	30.456^{***}	39.228^{***}

Note: *p<0.1; **p<0.05; ***p<0.01

Note: *The findings from the Fixed-effects estimation using cluster robust errors with the dependent variables ROA, Tobins Q and ROE.*

The independent variable STD displays a negative relationship with ROA and ROE, and a positive relationship with Tobins Q. The coefficients are -0.032, 0.344 and 0.008,

respectively. For ROA the coefficient is significant to a 10 percent significance level and is neither significant for ROE nor Tobin's Q. The economic impact of STD on the measures of firm performance indicates that a one percent increase in STD would cause a decrease in ROA of 0.032 percent and 0.008 for ROE. While an 0.344 increase for Tobins Q. For ROA and ROE this is in line with Salim & Yadav 2012, and the clear majority of studies conducted on the topic (Le and Phan, 2017; Qayyum and Noreen, 2019; Zeitun et al., 2007). The positive relationship with Tobins Q, is in line with Aimagh & Larsson 2018, Salim & Yadav 2012 and Tifow and Savilir 2015.

The LTD variable also displays a negative relationship with ROA, while having a positive relationship with Tobin Q and ROE. The coefficients are -0.033, 0.227 and 0.018, respectively. The values of ROA and Tobin's Q are significant to a 1 percent significance level, in contrast to ROE. The economic impact of LTD on the measures of firm performance indicated that a one percent increase in LTD would decrease ROA by 0.033 percent and an increase of 0.018 for ROE.

The significant negative relationship between the leverage measures and ROA is in line with Gleason et al. (2000), and the clear majority of studies conducted on the topic (Le and Phan, 2017; Qayyum and Noreen, 2019; Zeitun et al., 2007). However, this contradicts the studies on capital structure conducted regarding the Nordics in the past (Aimagh and Larsson, 2018; Eikanger and Sogn, 2021). As Aimagh and Larsson (2018) described the capital structure of Oslo Stock Exchange, the specificity of real estate as a sector might serve different results than the complete stock exchange. Furthermore, the thesis of Eikanger and Sogn (2021) focused on fewer firms (N=32), and only included companies with complete observations for all the quarters from 2006-2020. The different methodologies could serve other results and be the reason for the significant negative relationship found in our analysis.

As LTD is deployed as a necessary source of capital to fuel growth strategies in capital-intensive sectors such as real estate, long-term debt is easily accessible, creating possibilities for synthetic growth (Melnikova, 2022). When a real estate company uses long-term debt as funding for its operations, they gain the advantage of buying more real estate. Therefore, an increase in the leverage measures could, in line with Tobin's Q, increase their relative overvaluations of property prices in the Nordics. This finding is in line with

(Zeitun et al., 2007; Tifow and Sayilir, 2015), but contradicts (Salim and Yadav, 2012).

In line with previous research Leary and Michael R (2004), we find a positive and significant relationship between size and all firm performance measures, indicating that larger firms, on average are more likely to have higher firm performance. As the size measure is defined as the natural logarithm of total assets, the coefficients are hard to describe concretely, with coefficients of 0.013, -0.012 and 0.026. There are several reasons why factor size affects profitability significantly, as shown by the positive impact on ROA and ROE. Leary and Michael R (2004) contends that larger businesses have access to better terms and cheaper funding than smaller companies, as a lower probability of default displays an inverse relationship between size and expected bankruptcy expenditures, indicating a positive relationship between size and debt level, in line with trade-off theory. Furthermore, according to trade-off theory, large corporations are often more diversified and have a lower probability of default as it has a larger range of collateral options (Rajan and Zingales, 1995).

Larger real estate firms must also have a larger degree of debt to benefit from the tax shield fully. According to the pecking order hierarchy, there is a relationship between size and debt. The firms´ size may be used as a proxy for the information asymmetry between insiders and outsiders. The larger the firm, the more information is available to outside investors. Consequently, information asymmetry is reduced in larger real estate firms. This suggests that larger organizations have greater access to debt financing and that the cost of debt falls relative to cash generated internally, making debt financing more appealing.

On the other hand, size is negatively related to Tobin Q and could be explained by the findings of Hammes and Chen (2000), focusing on the capital structure of thirteen European countries. They found that all the Nordic countries, including Iceland and Finland, had a positive relationship between the two measures, apart from Sweden. As 87 percent of our sample is retrieved from Swedish real estate firms, the finding could explain the negative relationship.

The independent variable of tangibility negatively impacts firm performance for all our selected dependent variables. For Tobin's Q the relationship is significantly negative with a coefficient of -0.408. Since real estate companies' total assets mainly consist of fixed

assets, the tangibility ratio would be expected to be very high and close to 1. There are instances where the fixed assets do not comprise the majority. These instances can be when a company has sold an asset and increased its cash reserves.

In line with studies conducted on tangibility, the majority indicate a negative impact on performance at lower ratios of tangibles to assets and a positive impact at higher ratios (Yazdanfar and Öhman, 2015; Salim and Yadav, 2012). The main explanation is provided by Margaritis and Psillaki (2001), as they claim that a high share of physical assets reduces the range of development prospects and results in the agency costs of managerial discretion. On the other hand, Morellec (2001) argues that there may be a negative relationship between physical assets and leverage, as there is a danger for enterprises with a high level of access to liquid tangible assets. In further detail, this risk is that management may misuse debt and shareholders by selling below-market, unsecured physical assets for short-term cash (Morellec, 2001).

The polrate displays a significant positive relationship on a five percent level for key policy interest rates for all our performance measures. It is important to note that the polrate is measured in percent. Therefore, a rise in the interest rate affects the ROA by 0.286 percent, Tobin's Q by 2.7 percent and 0.7031 percent for ROE. When interest rates increase, it will increase the ROA and ROE. When key policy interest rises, the investors in the market need a higher yield to compensate for the increased interest expenses. Moreover, since properties usually are sold with long-term contracts, it takes tie to adjust the margins to large extents. Therefore, the value of properties on the market will decrease, and as ROA and ROE have total assets in their denominator, their value will increase. In an economic environment, an increase in key policy interest rate creates higher capital cost, thereby decreasing the performance of real estate firms. Therefore, the findings display the challenges of deploying the three most used dependent variables in the capital structure for asset dependable sectors.

The period deals with two major events: the financial and corona crises. As displayed in 6.1, the dummies of the financial crisis do not have any significance to the firm performance for real estate companies. As the Nordic real estate index did not fall to the same lows as in the US, this finding could be in line with reality. Nevertheless, the Nordic real estate market also had a substantial decline, and there could have been a negative relationship

between the measures. However, as the financial crisis are not significant for the regression, we will not put much weight on the coefficients.

For the Covid pandemic, we have a negative relationship with ROA, Tobin Q and ROE. ROA and ROE are significant to the 5 percent level, while Tobins Q is insignificant. We find that this negative relationship is very natural for ROA, and can be explained by the very nature of the measure components. Since ROA is net revenues divided by Total assets, a negative relationship indicates that either the net revenues have decreased or there has been an increase in total assets. Since the real estate market grew during Covid, total assets' value would increase, thereby decreasing the firm performance measures as discussed earlier.

6.2 Variations in results

Furthermore, we ran several variations of regressions to check if the relationships remain unchanged with other variables and other important factors to investigate. In table 6.2, we included growth as an IV and removed the crisis variables to compare against 6.1. The statistically significant results align with table 6.1, while the significance of the different independent variables fluctuates in a small manner, their relationship is almost identical. A negative STD and LTD display the only notable difference in a relationship for Tobin's Q. For ROE the relationship is negative for LTD. However, these are not statistically significant, and we do not have enough evidence to conclude. As certain variables are removed and included in the two regressions, it is reasonable for the importance of each variable to fluctuate slightly. The second regression 6.2, indicates mainly significant results of the impact growth has on the dependent variables and contradicts the trade-off theory. According to Murray Z and Vidhan K (2007), growing companies tend to lose more value during financial difficulties, raising the anticipated bankruptcy costs. The boom and bust of Nordic real estate firms could be viewed in line with this reasoning.

In line with the pecking order principle, enterprises with more significant growth prospects should gradually issue more debt. Consequently, external sources, such as debt and equity, must be utilized (Jensen, 1976). As the last decade has been favorable for Nordic real estate companies with low-interest rates and stable loan conditions, a positive sign of independent value is expected. As the independent variable of growth is the logarithm

of sales, more significant amounts would lead to higher ROA, ROE and Tobin's Q. This could explain the significant positive relationships between the variables.

Table 6.2: Variations of Fixed Effects model

	Dependent variable:		
	ROA	Tobinq	ROE
	(1)	(2)	(3)
STD	-0.058^{**}	-0.034	-0.051
	(0.027)	(0.254)	(0.051)
LTD	-0.067^{***}	-0.188	-0.021
	(0.024)	(0.216)	(0.042)
Size	0.006	-0.074^{**}	0.014
	(0.007)	(0.038)	(0.014)
Growth	0.053^{***}	0.103^{**}	0.072^{***}
	(0.012)	(0.050)	(0.024)
Observations	1,756	1,756	1,756
R^2	0.171	0.080	0.076
Adjusted R^2	0.141	0.047	0.043
F Statistic (df = 4; 1694)	87.132^{***}	36.930^{***}	34.843^{***}

Note:
*p<0.1; **p<0.05; ***p<0.01

Note: *Different variation of our findings employing the Fixed-effects estimation using cluster robust errors with the dependent variables ROA, Tobins Q and ROE.*

In order to account for group-level differences, such as differences between the countries being studied, we decided to include the random effects regressions in our regression analysis. Fixed effects controlled for individual-level differences, while random effects controlled for group-level differences. This allows us to provide a more accurate and precise estimate of the relationship between leverage and firm performance in the Nordic real estate industry. The results can be seen in appendix Table A0.3. The only group-level difference that is statistically significant is the age group. It is statistically significant for ROA and ROE with a negative relationship for Old companies, indicating that older companies tend to lower firm performance. This could be due to an increase in management costs or an increase in property prices. Furthermore, newer companies seem to have a positive relationship with Tobins Q. Indicating that newer companies are more overvalued.

From a pecking order standpoint, this would imply a negative connection between age and leverage. Murray Z and Vidhan K (2007), who studied the variables impacting the

capital structure of publicly listed American firms between 1950 and 2003, confirm the link presented by the pecking order. They determined that more established and mature companies were able to pay the majority of their capital expenditures using internally produced funds, such as retained earnings. Their data also imply that startups would rely more on loan funding while establishing their firms, as seen by a higher proportion of loans for the newly listed firms in Nordic real estate. Majumdar and Chhibber (1999) asserted that older organizations are more competent and therefore, should have a relatively better firm performance than new firms; However, their empirical investigation indicated that age has a significant negative impact on performance (Majumdar and Chhibber, 1999). Other researchers have also displayed a significant link between age and performance, but their evidence displays positive relationships (Yazdanfar and Öhman, 2015; Aimagh and Larsson, 2018).

7 Conclusion

This research investigates if the capital structure can explain the performance of Nordic real estate firms. As the focus of performance in real estate is not an area of vast literature, we found it interesting to investigate. Previous research primarily focuses on the differences in corporate governance and owner structure as the source of the performance variation. When focusing on capital structure and performance, the majority of literature focuses on the Stock exchange within a particular country. Thereafter, it limits the analysis to a time frame between three and ten years. For the Nordics, the majority of research on the topic surrounds a view of trade-off and pecking order on the stock exchange. We have chosen to theoretically and empirically test the relationship between capital structure and firm performance within a single sector, using 59 Nordic firms between Q1 2006 and Q3 2022.

Our findings suggest that Nordic real estate assets were overvalued before the financial crisis, with the Tobins Q dropping below 1 from 1.2 indicating a shift from overvaluation to undervaluation. During the crisis, the performance measure falls and remains stable at around 1, as the real estate assets are neither over- nor undervalued. We further found a falling trend in ROE and ROA performance measures. From Q1 2006 to Q3 2022 ROE decreased from an average of 0.098 to levels of 0.058, and ROA decreased from 0.041 to 0.02. As the real estate sectors have assets as the primary source of value in the firms, an increase in asset value could decrease the performance measures as the denominator enlarges and their primary source of income is through stable rent agreements. Our findings suggest that ROA, ROE and Tobins Q do not explain the fluctuations in the Nordic real estate market during the last decade.

Furthermore, the average long-term debt to total assets (LTD) has increased from 0.33 in Q1 2006 to 0.39 in Q3 2021. This could be explained by the economic environment of the last decade, with increasing property values and falling interest rates during the period, as the capital cost decreases and the appetite for debt increases.

We find that some of the selected firm-specific variables are significantly related to firm performance for Nordic real estate firms. For our results regarding the relationship between capital structure and firm value, our empirical findings suggest the following. Financial leverage decreases return on assets (ROA) and increase Tobin's Q for the companies.

Investors discount small real estate companies at a higher rate than larger ones, displayed by significantly positive ROA and ROE. Higher asset tangibility ratios decrease real estate valuation in the Nordics, indicating that firms with more significant amounts of real estate than retained earnings underperform. The covid pandemic has decreased firm performance displayed by ROA and ROE. In contrast, an increase in interest rates increases our firms´ performance during the period. Our findings suggest that key policy interest rate has a significantly positive impact on firm performance for Nordic real estate companies. In an economic environment, an increase in key policy interest rate creates higher capital costs, thereby decreasing the performance of real estate firms. Therefore, the findings display the challenges of deploying the ROA, ROE and Tobins Q as dependent variables for asset dependable sectors.

Based on these findings, capital structure can only partially predict fluctuations in firm performance, and that ROA, ROE and Tobins Q do not explain the Nordic real estate market fluctuations during the last decade. In summary, the empirical findings and discussions on theories contribute to literature regarding capital structure and firm performance in Nordic real estate firms.

7.1 Limitations and Further Research

We want to provide a few suggestions for further research on this topic. Firstly, we suggest a comparative analysis to view whether the relationship between leverage and firm performance in the Nordic is different from other markets like Europe and Asia. Secondly, it would be interesting to analyze how the effect of government policies on tax incentives affects this relationship. Thirdly, a more focused analysis of the role of the different financing types (bank, bonds, equity) has on the leverage and firm performance relationship.

For our crisis parameter for Covid-19 it would be interesting to observe how changes in where people work and changes in the supply chain have had a long-term influence on subsectors such as office and industrial, decreasing the value of these real estate sectors.

Further research could include the difference in financial leverage for long-term debt considered between different types of loans and firm performance. An example could be to divide long-term debt to view the performance impact of obligation loans and bank

loans, as these types of loans also fluctuate between market tides. This could provide the thesis with more debt, and contribute to further research on capital structure.

Titman and Wessels (1988) identifies the challenge of locating relevant proxies that are uncorrelated with other relevant proxies as the most challenging aspect of using proxies in capital structure research. In addition, Fama and French (2002) contends that the use of panel regressions disregards the bias in the standard errors since they are associated over the years. The findings of the correlation matrix suggest that the correlation between the independent variables is often relatively low, indicating a low degree of first-order collinearity.

Firstly, the study may be limited by its use of regression analysis to examine the relationship between leverage and firm performance. This method may not capture the full complexity of the relationship and could produce oversimplified or incomplete results. Secondly, the study may be limited by its focus on the macroeconomic environment influencing the relationship between leverage and firm performance. Other factors, such as firm-level characteristics or industry-specific trends, may play a role and be worth examining in future research. Lastly, the availability and quality of quarterly financial data on real estate firms in the Nordic region may limit the study. This makes it challenging to accurately measure firm performance and leverage, potentially impacting the study results.

The study may be limited by its focus on the Nordic real estate market. The study's results may not apply to segments without asset-dependable operations or industries. Furthermore, it may not provide a comprehensive view of the relationship between leverage and firm performance.

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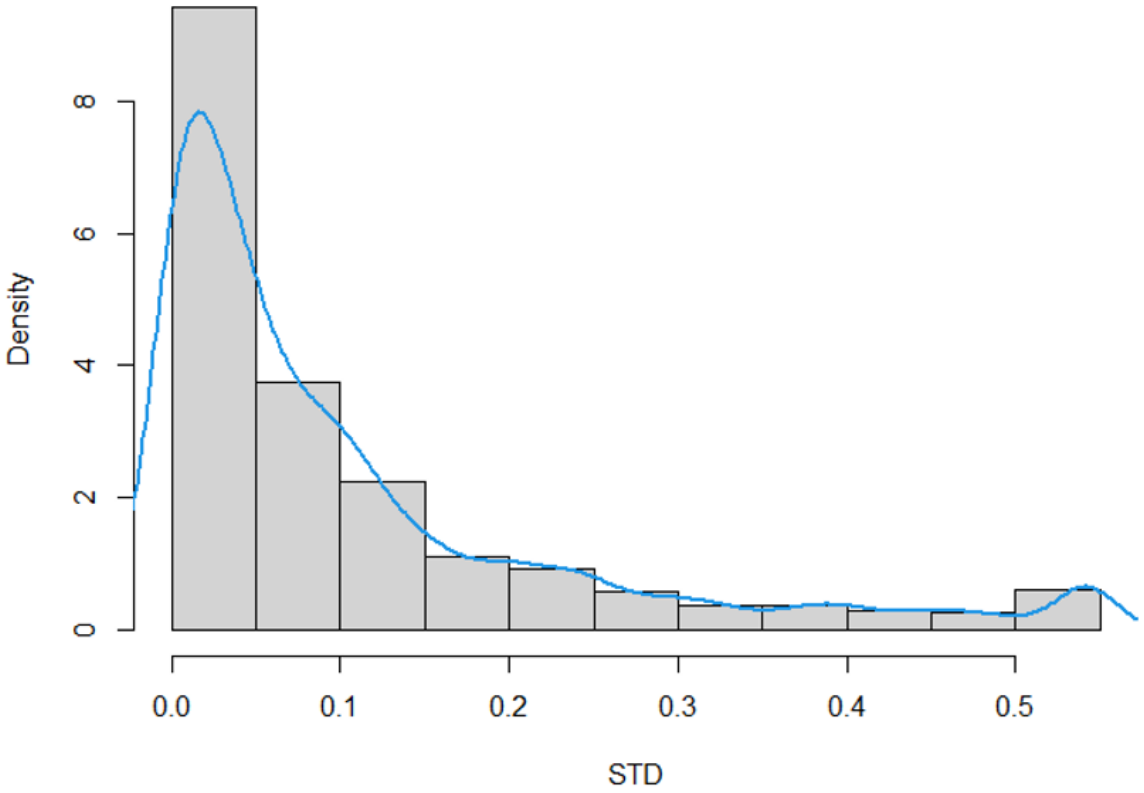
Appendix

Figure A0.1: Histogram STD



Note: *Histogram for STD with distribution of values. Sources: Refinitiv*

Table A0.1: Pooled

	Dependent variable:		
	ROA	Tobinq	ROE
	(1)	(2)	(3)
STD	−0.032 (0.040)	0.098 (0.192)	0.045 (0.072)
LTD	−0.044 (0.028)	0.322 (0.206)	0.009 (0.049)
Size	0.007** (0.003)	−0.005 (0.012)	0.014** (0.006)
Tangibility	−0.057*** (0.015)	−0.117 (0.088)	−0.112*** (0.037)
Age_GroupNew	−0.001 (0.007)	0.267*** (0.067)	−0.013 (0.015)
Age_GroupOld	−0.006 (0.008)	0.093 (0.081)	−0.017 (0.017)
F08	0.003 (0.005)	−0.012 (0.037)	0.003 (0.010)
C19	−0.006*** (0.002)	−0.021 (0.022)	−0.017*** (0.006)
Polrate	0.207 (0.130)	3.083** (1.371)	0.423 (0.309)
factor(Country)Norway	−0.015 (0.019)	0.147 (0.178)	−0.023 (0.036)
factor(Country)Sweden	−0.011 (0.017)	0.001 (0.075)	−0.022 (0.031)
Constant	0.036 (0.026)	0.837*** (0.117)	0.041 (0.046)
Observations	1,752	1,752	1,752
R^2	0.342	0.154	0.263
Adjusted R^2	0.338	0.149	0.259
F Statistic (df = 11; 1740)	82.098***	28.768***	56.501***

Note: *p<0.1; **p<0.05; ***p<0.01

Note: *The findings employing the Pooled-effects estimation using cluster robust errors with the dependent variables ROA, Tobins Q and ROE*

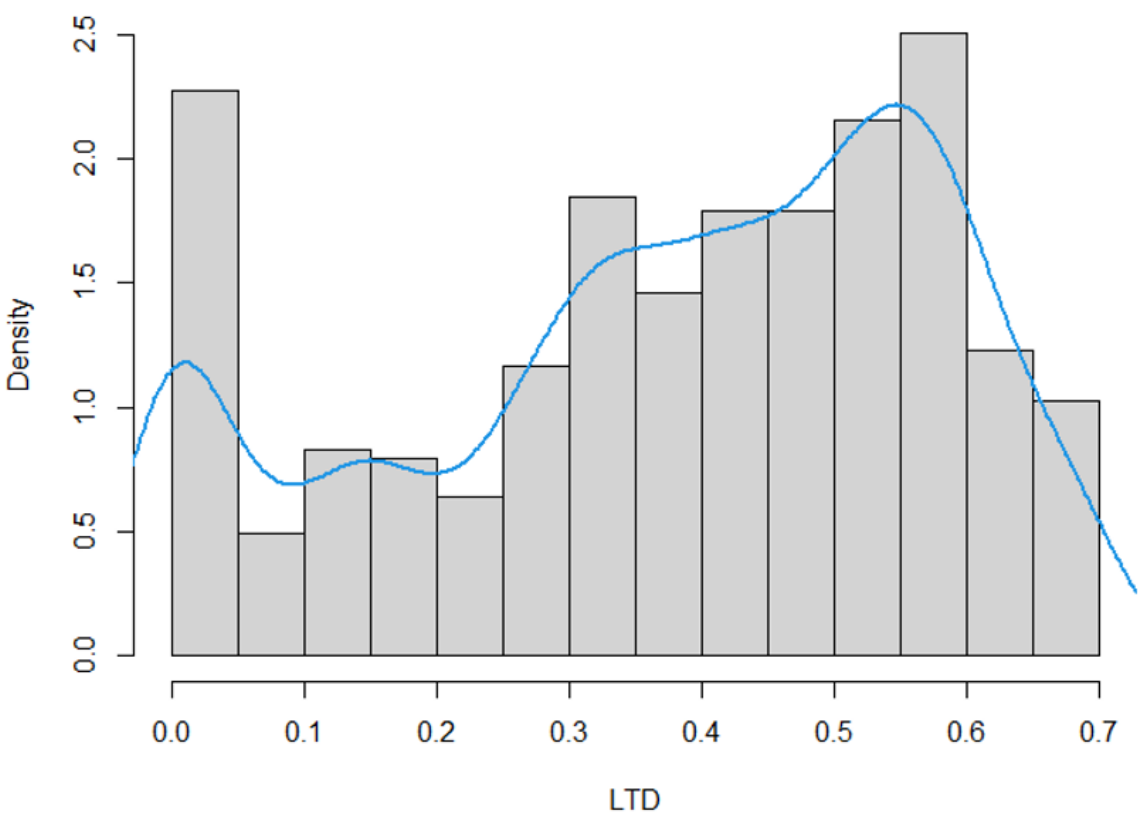
Table A0.2: Random Effects

	Dependent variable:		
	ROA	Tobinq	ROE
	(1)	(2)	(3)
STD	−0.033 (0.020)	0.323* (0.191)	0.005 (0.057)
LTD	−0.028* (0.015)	0.214* (0.129)	0.032 (0.035)
Size	0.017*** (0.005)	−0.012 (0.018)	0.030*** (0.011)
Tangibility	−0.032** (0.015)	−0.368*** (0.118)	−0.055 (0.034)
Age_GroupNew	−0.002 (0.010)	0.232*** (0.068)	−0.014 (0.019)
Age_GroupOld	−0.026** (0.013)	0.096 (0.070)	−0.048* (0.026)
F08	0.003 (0.003)	−0.039 (0.029)	0.002 (0.007)
C19	−0.010*** (0.002)	−0.029 (0.025)	−0.024*** (0.006)
Polrate	0.403*** (0.152)	2.836** (1.304)	0.755** (0.295)
factor(Country)Norway	−0.029 (0.021)	0.177 (0.138)	−0.049 (0.040)
factor(Country)Sweden	−0.021 (0.019)	0.159 (0.099)	−0.042 (0.034)
Constant	−0.062** (0.032)	0.985*** (0.152)	−0.114 (0.071)
Observations	1,752	1,752	1,752
R^2	0.284	0.161	0.172
Adjusted R^2	0.280	0.156	0.167
F Statistic	680.552***	208.821***	350.680***

Note: *p<0.1; **p<0.05; ***p<0.01

Note: *The findings employing the Random-effects estimation using cluster robust errors with the dependent variables ROA, Tobins Q and ROE*

Figure A0.2: Histogram LTD



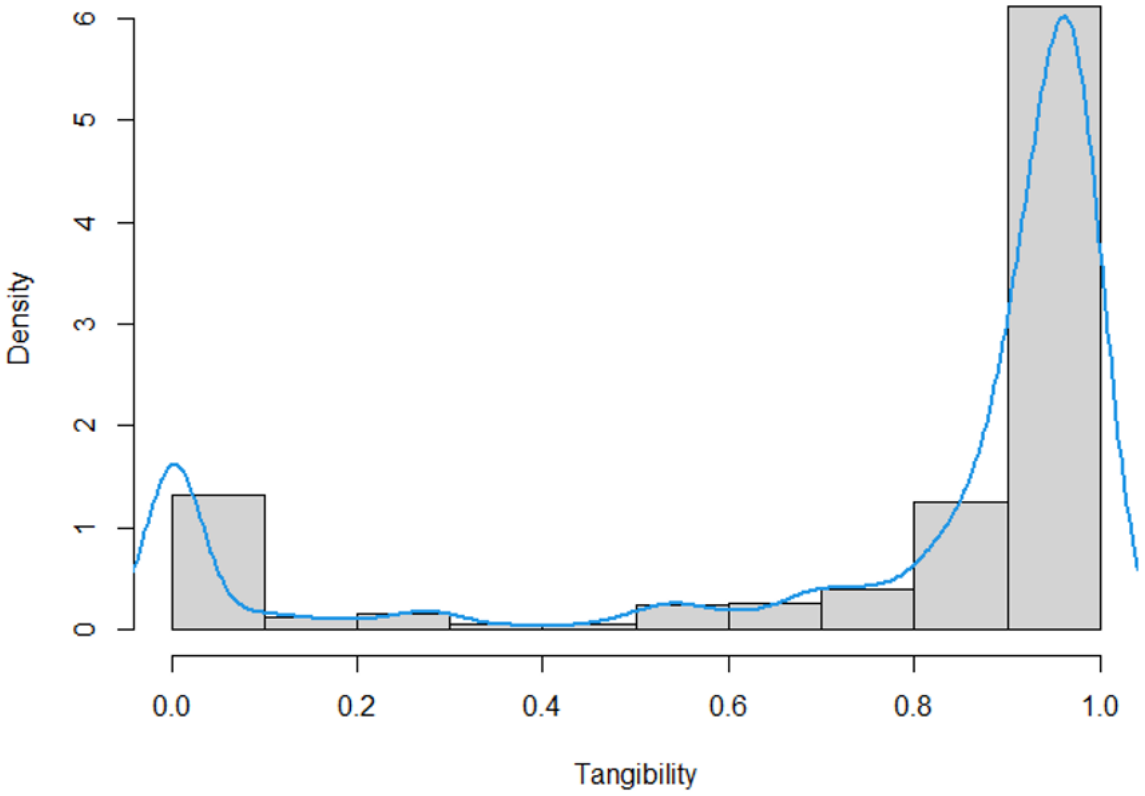
Note: *Histogram for LTD with distribution of values. Sources: Refinitiv*

Table A0.3: Expoloratory data analysis before Winzoring

Varibles	N	Mean	Sd	Min	Median	Max
Dependent variables						
ROA	2272	0.032	0.061	-0.379	0.017	1.133
ROE	2272	0.19	5.046	-2.963	0.048	240.35
Tobins Q	2253	1.896	35.944	0.073	0.877	1628.429
Leverage measures						
STD	1886	1.067	33.363	0	0.055	1387
LTD	2224	0.375	0.206	0	0.409	0.985
Firm Controls						
Size	2262	-inf	NaN	-Inf	9.631	13.487
Tangibility	2191	0.753	0.344	0	0.928	0.999
Dummies						
F08	2499	0.047	-	0	0	1
C19	2499	0.182	-	0	0	1
Denmark	2499	0.197	-	0	0	1
Norway	2499	0.146	-	0	0	1
Denmark	2499	0.657	-	0	1	1

Note: *Exploratory data analysis before Winzoring. Focusing on the measures N, Mean, Sd, Min, Median and Max. For our analysis dependent variables, leverage measures, firm controls and dummies.*

Figure A0.3: Histogram Tangibility



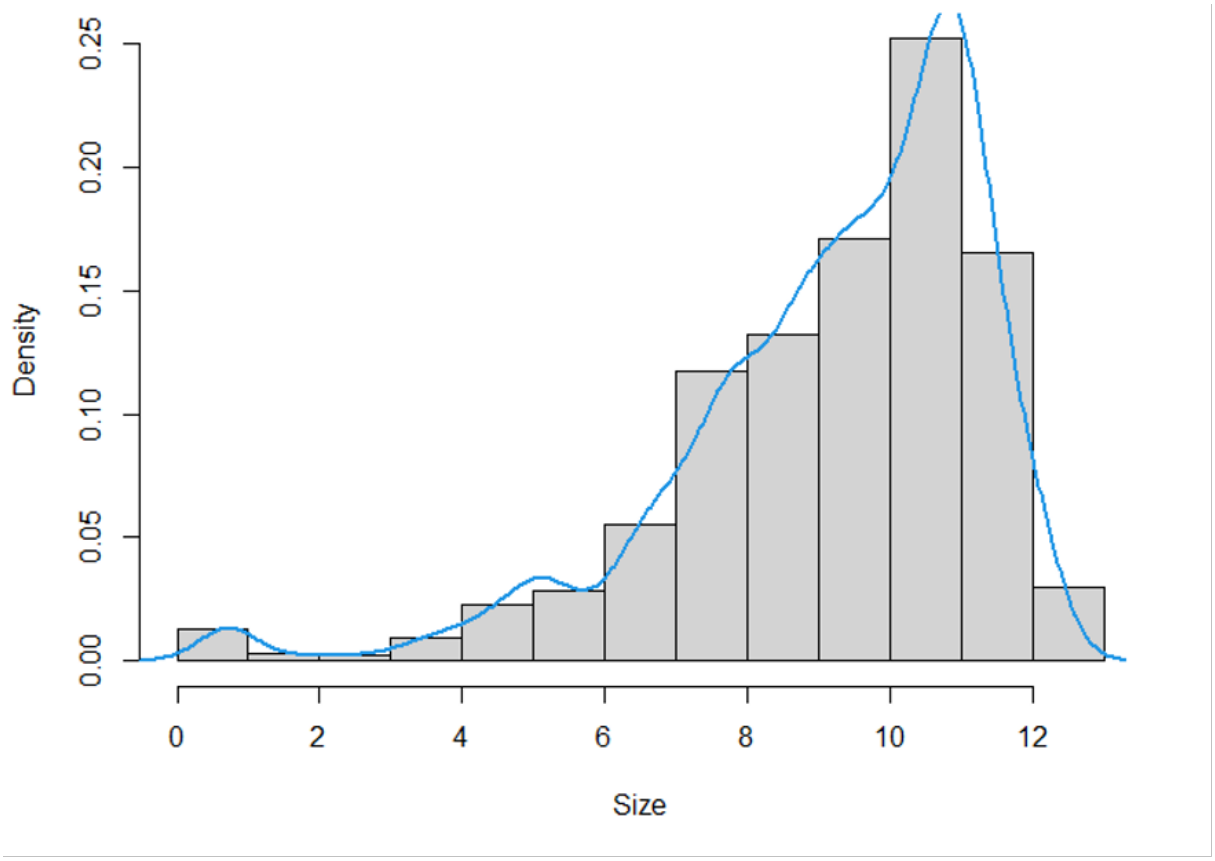
Note: *Histogram for Tangibility with distribution of values. Sources: Refinitiv*

Table A0.4: Trade-Off and Peaking Order

Variables	Author (Date)	Supporting	Peaking Order	Trade-Off
Tangibility	Aimagh and Larsson (2018)	Peaking Order	-	+
	Arbor (2005)	Trade-off	-	+
	Yazdanfar and Ohman (2015)	Peaking Order	-	+
	Salim and Yadav (2012)	Trade-off	-	+
Size	Haavi and Torgersen (2018)	Trade-off	-	+
	Khan (2012)	Trade-off	-	+
	Ong and Hong (2012)	Trade-off	-	+
Interest rate	Zeitun, Tian and Keen (2007)	Peaking Order	-	+
Growth	Gleason, Mathur and Mathur (2000)	Peaking Order	+	-
Growth	Haavi & Torgersen (2018)	Peaking Order	+	-
Growth	Patrisia(2020)	Peaking Order	+	-
Growth	Salin & Yadav(2012)	Peaking Order	+	-
Growth	Yazdanfar & Ohman(2015)	Peaking Order	+	-
Age	Frank & Goyal	Peaking Order	-	+/-

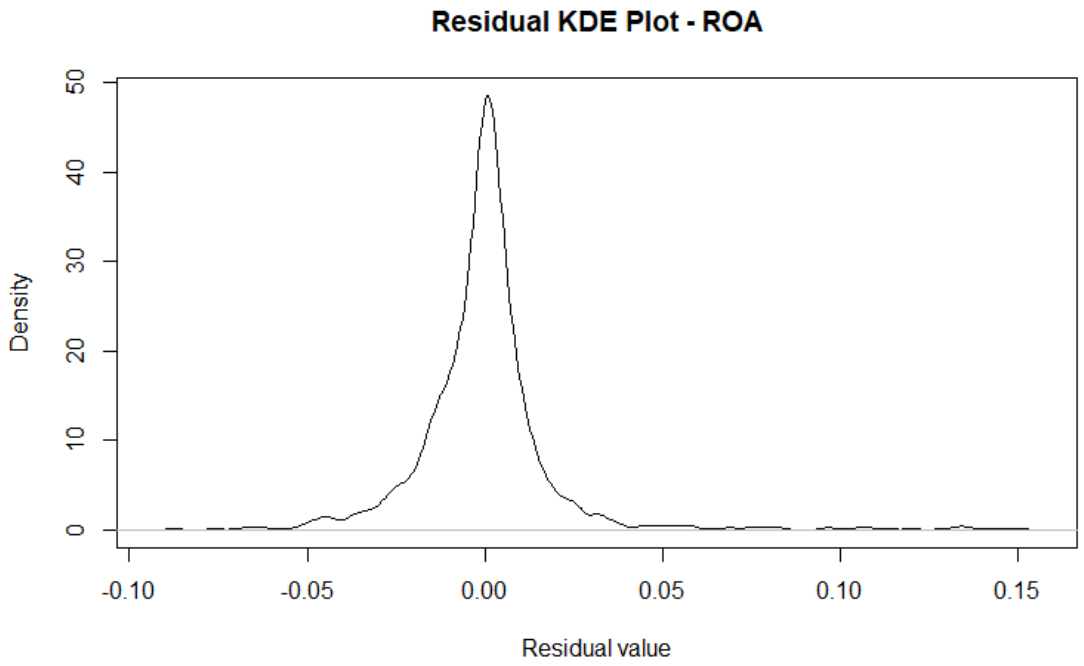
Note: *An overview of which theory earlier literature of capital structure suggests, including only significant findings on a 1 percent level.*

Figure A0.4: Histogram Size



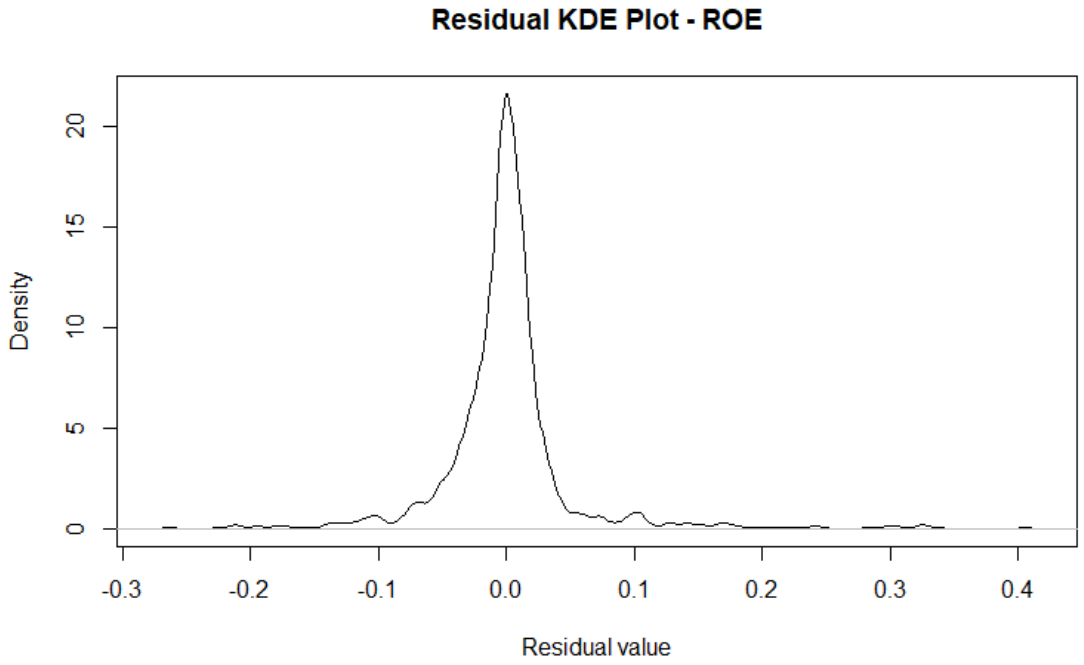
Note: *Histogram for Tangibility with distribution of values. Sources: Refinitiv*

Figure A0.5: Normality ROA



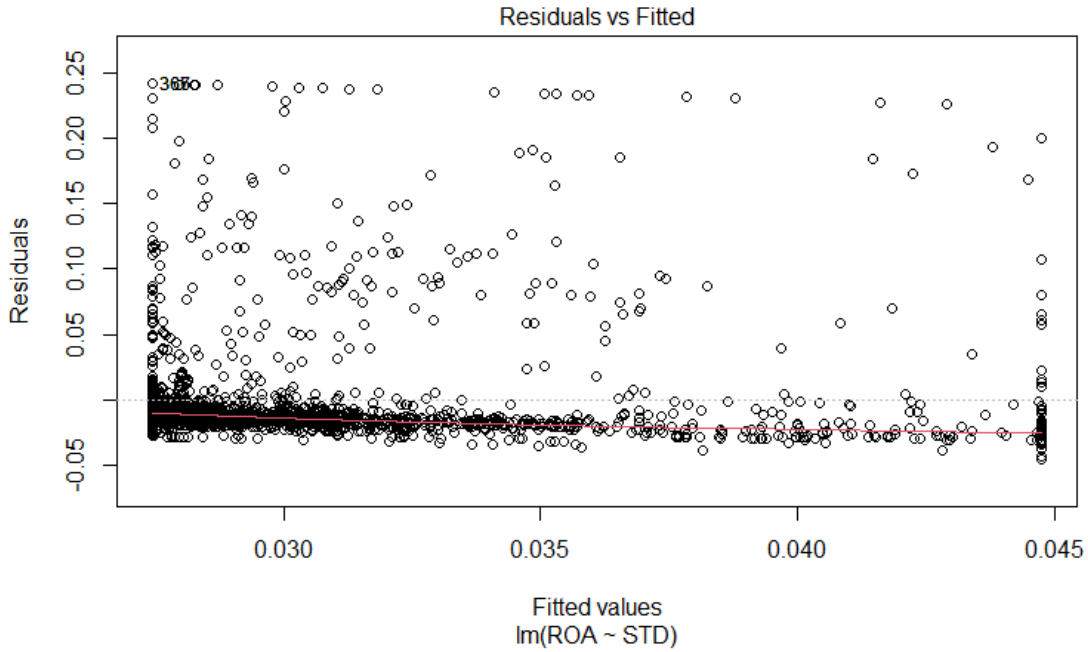
Note: *Normality test using Kernal density estimation. Sources: Refinitiv,R-studios*

Figure A0.6: Normality ROE



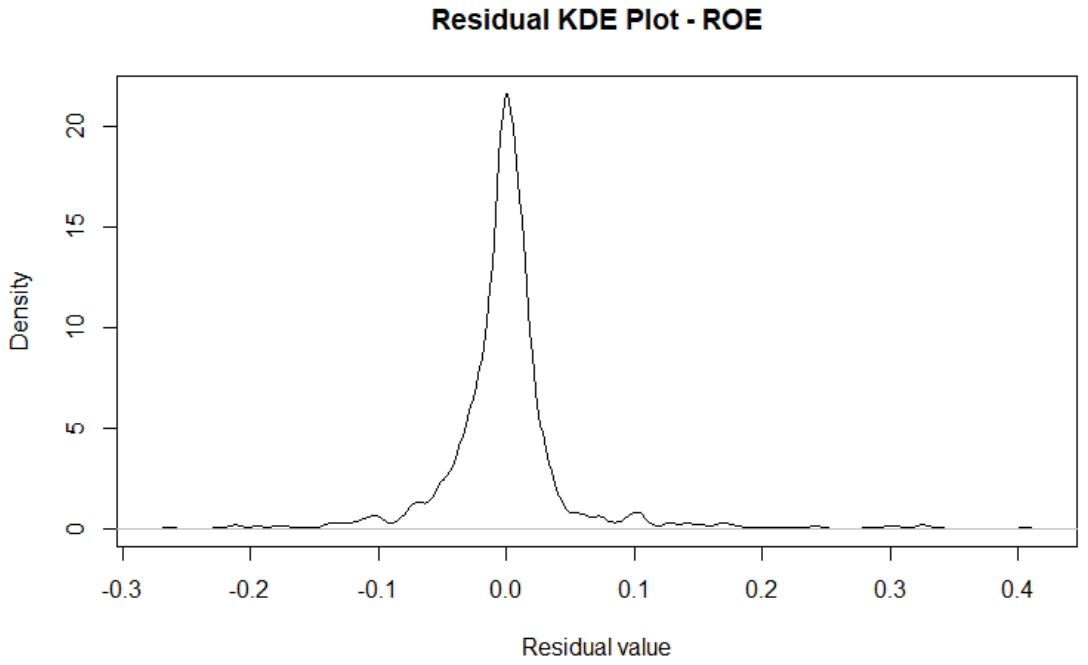
Note: *Normality test using Kernal density estimation. Sources: Refinitiv,R-studios*

Figure A0.7: Linearity



Note: *This residual plot suggest a linear relationship, and the other DVs and IVs saw a similar pattern. Sources: Refinitiv, R-studios*

Figure A0.8: Normality Tobins Q



Note: *Normality test using Kernal density estimation. Sources: Refinitiv,R-studios*

Table A0.5: Companies and Country

Company	Country
JEUDAN A/S	Denmark
PRIME OFFICE A/S	Denmark
Copenhagen Capital A/S	Denmark
Fast Ejendom Danmark A/S	Denmark
Agat Ejendomme A/S	Denmark
Park Street A/S	Denmark
Cemat A/S	Denmark
Blue Vision A/S	Denmark
Entra ASA	Norway
Olav Thon Eiendomsselskap ASA	Norway
Eiendomsspar AS	Norway
Victoria Eiendom AS	Norway
Selvaag Bolig ASA	Norway
Self Storage Group ASA	Norway
Kmc Properties ASA	Norway
Pioneer Property Group ASA	Norway
Baltic Sea Properties AS	Norway
Sagax AB	Sweden
Fastighets AB Balder	Sweden
Castellum AB	Sweden
Hufvudstaden AB	Sweden
Fabege AB	Sweden
Wallenstam AB	Sweden
Wihlborgs Fastigheter AB	Sweden
Samhallsbyggnadsbolaget I Norden AB	Sweden
Atrium Ljungberg AB	Sweden
Catena AB	Sweden
Corem Property Group AB	Sweden
Nyfosa AB	Sweden
Dios Fastigheter AB	Sweden
NP3 Fastigheter AB	Sweden
Cibus Nordic Real Estate AB (publ)	Sweden
Platzer Fastigheter Holding AB (publ)	Sweden
HEBA Fastighets AB	Sweden
Stendorren Fastigheter AB	Sweden
K-Fast Holding AB	Sweden
Stenhus Fastigheter I Norden AB (publ)	Sweden
Bonava AB (publ)	Sweden
John Mattson Fastighetsforetagen publ AB	Sweden
Eastnine AB (publ)	Sweden
Train Alliance Sweden AB (publ)	Sweden
KlaraBo Sverige AB	Sweden
K2A Knaust & Andersson Fastigheter AB (publ)	Sweden
Heimstaden AB	Sweden
Fortinova Fastigheter AB (publ)	Sweden
Torslanda Property Investment AB (publ)	Sweden
Kalleback Property Invest AB	Sweden
Logistri Fastighets AB (publ)	Sweden
Studentbostader I Norden AB (publ)	Sweden
Tingsvalvet Fastighets AB (publ)	Sweden
Oscar Properties Holding AB	Sweden
Sydsvenska Hem AB (publ)	Sweden
Mofast AB (Publ)	Sweden