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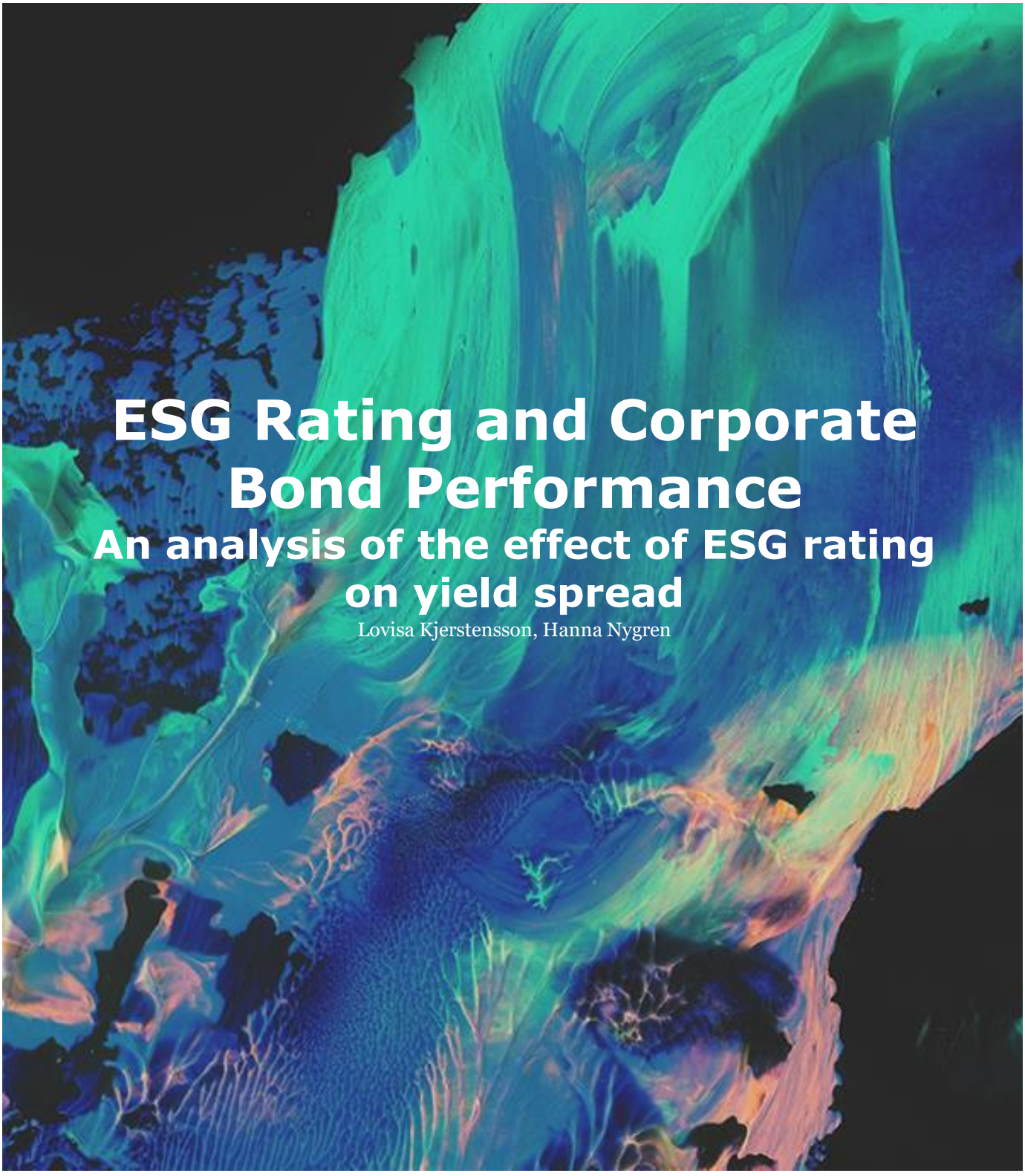

ESG Rating and Corporate Bond Performance

An analysis of the effect of ESG rating on yield spread

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Degree Project, 30 Credits, Spring 2019
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Abstract

This research evaluates the relationship between ESG score of the firm and its effect on the performance of their bonds. The study looks at listed companies on the Nordic countries' stock exchanges and tries to establish a relationship between ESG score and corporate bond yield spread. The study finds that no such relationship can be established and therefore that a high ESG score does not imply a decreased level of required risk premium by bond investors and a decreased or stabilized cost of debt for companies in the Nordic countries. Further, the study will contribute to a theoretical discussion by using the Stakeholder Theory, Legitimacy Theory, The Resource-Based View and finally the Agency theory in order to further analyze the underlying dynamics of this proposed relationship.

Keywords: ESG score, corporate bond yield spread, cost of debt, Nordic countries, Stakeholder Theory, Legitimacy Theory, Resource -Based View, Agency Theory

Acknowledgements

We would like to thank our supervisor Catherine Lions, Senior lecturer (Associate Professor) at Umeå School of Business and Economics, for all her support and constructive feedback throughout the entire process. With her expertise and willingness to help us whenever needed during the day's 24 hours, we have managed to complete this degree project and been able to contribute to the research on sustainability within finance.

We would also like to thank each other for the outstanding teamwork which has made the writing of this thesis possible. The final result and the rewarding research process would not have been possible without the engagement and support from each other.

We would also like to express gratitude to our friend Elin Noring that have been very helpful in our data collection.

Stockholm, May 16, 2019

Lovisa Kjerstensson & Hanna Nygren

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Key Theoretical Concepts

ESG - Environmental, Social, Governance

GRI – Global Reporting Initiative

PRI - Principles for Responsible Investing

SDG – Sustainable Development Goals

SRI – Socially Responsible Investing

CSR – Corporate Social Responsibility

CSP – Corporate Social Performance

COB – Cost of Bonds

EMU – European Monetary Union

Refinitiv - Eikon Datastream, previously Thomson Reuters (Eikon) Database

Z-Spread – Zero-Volatility Spread

1. Introduction

In this chapter we will introduce our research topic. We will start by describing the background of the intended study and then proceed with a discussion of the chosen area. In the following sections we will define our research purpose, question and finish with our motivation for the research topic along with the delimitations to our study.

1.1 Problem Background

The Global Reporting Initiative (GRI), the Principles for Responsible Investment (PRI), the Paris Agreement as well as the Sustainable Development Goals (SDG) are all indicators of the rising trend of addressing sustainability issues in the private, financial and public sectors. The European Commission are dedicated to make Europe address sustainability aspects in the financial sector and have created several expert groups to work with sustainable finance, in order to create a common ground for carbon disclosure and Environmental, Social and Governance (ESG) practices (European Commission, 2018). This makes it more important than ever for investors and other actors in the financial sector to address sustainability in their operations. These different commission initiatives all have the aim to create legislation and will in the future change the rules of the game in the financial sector.

The increasing trend in Socially Responsible Investing (SRI) already shows that investors consider environmental, social and governance factors important for long-term returns. Today there are no common standards for what is considered as sustainable or not. Standardized data to evaluate ESG risks and opportunities are also not available to investors yet. However, standardized taxonomy and measures for sustainable finance is under development in the EU (European Commission, 2018). Financial institutions currently address ESG and other sustainability aspects in their processes and products/services will most likely have to implement some changes to adjust to new EU legislation within a short future.

Even if there is no standardization or common taxonomy yet, ESG factors have proven to be material for financial performance, especially from a risk perspective. Repeated times we have seen how corporations that violate regulations and norms related to ESG suffer from substantial financial effects. As a result of violations of regulation, corporations pay substantial legal penalties resulting in market loss, lawsuits and other fines, like what happened to British Petroleum (BP) after the oil spill in the Gulf of Mexico, resulting in a loss of more than $50 billion in fines and damages (Fernando et al, 2017, p. 2024). The same effects follow violations of social factors and human rights for example when Facebook's share price fell by 19% and $91 billion in market capitalization overnight and it was revealed that 3 million users abandoned the network after the Cambridge Analytica scandal (Neate, 2018). Bad governance practices can have severe effects like in the case of Volkswagen's emission cheating scandal, where they lost almost a quarter of their market value with a drop of 23% in stock price (Kresge & Weiss, 2015).

The financial sector has a huge responsibility when it comes to financing the investment gap and the transition towards a low carbon economy. The EU expert group on sustainable finance identified an investment gap of €180 billion annually only in the EU (European commission, 2018). This makes it important that sustainable corporations are being prioritized and that the "right" projects are financed. Since these ESG concerns have shown to have a material effect on financial performance, it is reasonable to assume that ESG factors also can affect default risk. If debt holders account for ESG risks in their evaluation of bonds, they would require a higher rate of return for holding debt for companies with lower ESG performance. Since bonds are debt, the investor (debtholder) is only concerned about the issuer's ability to pay back, in other words they do not share the same interests as the shareholders. Debtholders only benefit from the risk management related to ESG factors while shareholders also can benefit from the opportunities related to engaging in sustainability. Since their interests are a bit different it is interesting to evaluate ESG ratings' effect on the cost of debt in the capital market.

Previous research clearly shows that sustainability factors have effects on stock performance. However, less attention has been put on the effects of ESG score on credit risk and cost of debt, i.e. the risk of default. It is interesting to evaluate how ESG factors are affecting firms' cost of debt in the capital market, in a time when sustainability is at the top of the global agenda but still have not been standardized. Since previous research on financial performance have proven that sustainability measures have an impact (especially on cost of equity) further research is needed on the other parts that contribute to the firm's cost of capital. Looking closer into cost of debt is highly relevant as this is a core issue in a company's financing ability. A part of the cost of debt is thus its cost of bonds as this is a common way for the company to receive financing. A stable and secure cost of debt is key for any company and its financial performance; therefore, research has to keep up with changing investor preferences to try and establish what stabilizes the ability to finance the firm.

1.2 Problematization

As described, sustainability is becoming an increasingly important issue especially in the financial area. Development of new regulations, values and demands from investors are changing the ways companies need to operate today. For example, initiatives such as Principles for Responsible Investments (PRI) issued with the help of the United Nations in 2006 (Farrarese & Hanmer, 2018, P. 2) require ESG integration in companies' operations. As Environmental, Social and Governance factors are now a more integrated part of companies' businesses and something they need to consider, it is reasonable to assume that this might affect their financial performance. There is already a vast amount of research in the area, with contradicting results and especially research that investigates the resulting financial performance in the market from ESG investing. However, the investment landscape is changing rapidly with new products, new demands and priorities coming from investors. Therefore, further research is needed in order to assess which measures companies seeking funding must take to respond to this changing investment culture and where more research is suggesting that pure financial performance is not the sole explanation for investment

decisions (Bassen et al. 2015, P. 226-227). New research is needed for companies in order to secure fundraising and cost of capital.

An important part of a company's financial performance lies in the way they acquire capital. There are many ways for companies to do so and a common way is by issuing bonds. By investigating what actually affects the cost of corporate bonds is therefore highly relevant and in need of further research as there are now more factors that could have a potential effect; for example, incorporation of ESG factors. A way to assess bonds is to look at yield spreads in order to see the difference in required rate of return of different bonds, thus indicating the perceived risk of investing in that specific bond. Previous research such as the one by Agrawal et al. (2001) prove that the yield spread between government and corporate bonds can be explained by 3 parts; Loss from expected default, taxes that needs to be paid for corporate and not government bonds; and a risk premium for bearing systematic risk (p. 272-273). As the investment landscape is changing, it is possible that new influences are affecting the required risk premium. Trends in the financial sector shows the ESG integration in equity investment have become very developed and advanced while ESG integration in fixed income on the other hand is not as developed (Allen et al., 2018, p. 12) nut possibly will be in the future.

By establishing what affects the cost of bonds, companies will be given a deeper understanding of their cost of debt and thus also their general cost of capital. Another way to finance through debt is of course bank loans. Goss and Roberts (2011) found that companies with good CSR were rewarded with 7-18 basis points lower interest rates than companies with CSR concerns (p. 1807). However, other studies point out the increasing importance of regulations when it comes to bank loans as this might reduce the benefit for low-carbon projects in the cost of bank loans (Campiglio, 2016, p. 225). As previous studies indicate, CSR measures may have an effect on cost of debt. Analyzing CSR's effect on the cost of debt is therefore highly relevant for companies' cost of capital and financial performance and thus there is also need for extending the research on what affects the performance and cost of bonds.

Other research has been carried out by financial institutions such as the studies "The impact of ESG investing in Corporate Bonds" by Fidelity International (2018) and "Sustainable Investing and Bond Returns" done by Barclays (2018). As these are also profit driven companies there is the prevailing risk of bias for selling products, such as green bonds. The conclusion of these reports tends to suggest that higher ESG ratings positively affect bond performance by e.g. decreasing yield spread towards government bonds. However, we find the need to continue the research and further investigate if higher ESG rating affects the yield spread of corporate bonds by looking at other ways of measuring bond performance (yield spread) and investigating other geographical regions that have not been properly considered.

There is some research on the effect of ESG rating and corporate bond performance. For example, research has been conducted upon ESG rating and its effect on sovereign bond yield spreads e.g. Capelle-Blanchard et al. (2018). There are studies evaluating sustainability measures and the performance of bonds that have focused on different geographical regions e.g. the US with Oikonomou (2014) and the Eurozone by Stellner et al. (2015). Especially studies on the Eurozone is interesting due to emergence of the EMU and the growth of

corporate bond issuance (Stellner et al., 2015). However, no such study has been conducted in only the Nordic countries. Due to lack of research in the region and the outstanding ESG rating of these countries, there is an unparalleled opportunity to produce a good study that can contribute to existing knowledge and expand the geographical regions under study. However, the Nordic country Iceland as of in the time of writing this thesis do not possess a country ESG score and is not comparable to the other countries in the Nordic region (RobecoSAM, 2018).

Many researchers have with different methods calculated the yield spread for different types of bonds to try and assess what are better performing bonds (Oikonomou, 2014; Stellner et al., 2015) if these are the best measures to evaluate bonds is still not verified and therefore studies with new ways of calculating the bond yield spread would be a contribution to research where the effect of different measures is established.

1.3 Research Purpose

The primary purpose of this thesis is to see how ESG rating affect companies cost of debt in the capital market in the Nordic countries. We will do this by looking through the company perspective on corporate bond yield spreads in order to analyze how to control cost of debt for the firm through bonds and how to decrease volatility in their fundraising ability and cost of capital.

Secondly, we will look at different theories in order to examine the effect of ESG rating on the corporate bond yield spread. We will look at Stakeholder Theory in order to assess if it is beneficial for firms in regard to cost of debt to look at all stakeholders concerned with the companies' operations. The Legitimacy Theory will be used for us to understand if ESG rating can provide legitimacy for a company in the view of stakeholders and if that might affect its cost of debt. The Resource-Based View will help us determine if working with sustainability and enhance ESG rating can be a strategic resource a company can use to gain competitive advantage as bond issuers. Finally, we want to investigate if efforts in ESG factors leads to agency costs, following the Agency Theory.

We hope that by answering our research question we will be able to know more regarding what impacts the cost of corporate bonds. It is possible that a high ESG rating would result in lower yield spreads as it would decrease the perceived risk and require a lower risk premium from investors. It is therefore reasonable to assume that corporations with higher ESG score are less exposed to ESG related risks and therefore are considered a safer investment and thus also can decrease their cost of debt through bonds. By investigating this research question, we wish to gain further understanding regarding the dynamics of the ESG score – bond performance relationship and be able to make reliable conclusions that can help companies secure their cost of debt and fundraising ability.

1.4 Research Question

We will investigate the ESG rating - bond performance relationship through the following research question:

Does ESG rating affect yield spreads of corporate bonds in the Nordic countries?

1.5 Theoretical Contributions

With this thesis we aim to contribute to a theoretical discussion regarding a framework of theories which we have built in order to analyze the ESG score – bond performance relationship. We wish to further build knowledge regarding which stakeholders should be considered in a company's operations and how these could potentially affect the firm's financial performance. We will offer input on the discussion and further understanding on what contributes to a company's legitimacy in the eyes of bondholders. Relating ESG score and investments in ESG factors will build on the concept of competitive advantage. There are now new aspects that could have an effect on a company's position and other parts of the firm that did not exist before but now could become a strategic resource. Managers and owners of a company can potentially possess different views on how ESG factors should be considered and invested in, there are also reasons for bondholders to be considered in the equation leading up to costs for the firm. As there are new priorities affecting companies, their financial performance and investment decision today, there is need for development of theories and new contributions to research. We have stakeholders who both are new and with different priorities than before that needs to be considered. These could potentially affect the theoretical discussion which has not been properly analyzed without these new influences and stakeholders. Both companies and investors need to consider that there might be new mechanisms that determine the dynamics of both company operations and investments. If these relationships regarding stakeholders, legitimacy, resources and agents connected to the firm are not properly analyzed, both operational and investment decisions are lacking information which could be established with a proper theoretical discussion within which a new theoretical base offers a foundation.

By building upon theoretical knowledge regarding the ESG score – bond performance relationship we hope to offer a better explanation on what contributes to value creation for a company. Hopefully we will be able to prove a significant relationship that has an impact on the performance of bonds and by that we will be able to help the theoretical discussion. By using a new set of theories compiling our theoretical framework, we will be able to analyze and explain the dynamics of this relationship which will not only contribute to the discussion on sustainability but also offer companies guidance in their operations. This could hopefully increase their understanding of what creates value, produces costs and how investors come to decisions which determine the companies fundraising ability.

1.6 Practical Contributions

As sustainability is becoming an increasingly important issue further research in the area is highly relevant. Like many studies have concluded; sustainability measures do have an impact on financial performance. All aspects of a company's operations that could explain financial performance definitely has practical implications for the firm and therefore these aspects are important to further investigate and offers significant contributions for all stakeholders in the financial arena.

There are still many ways of measuring sustainability and there is no standardization of different measures. Many ESG ratings are based upon the companies' own reporting of CSR measures. As there is no standardization, there is still a need to extend research on the impact of different ratings to further understand their dynamic, how they are perceived by the public and how companies are affected by them.

The practical implications of this study will be to offer companies a guide on the effects of their own ESG score. As companies usually put a lot of time and effort into achieving these scores it is certainly relevant to know its practical implications. Companies need to know what effect their ESG score actually has in order to know how these investments in sustainability are creating value for the firm and its stakeholders.

Through this thesis we hope to provide an answer on how companies can lower and/or stabilize their cost of capital through the cost of debt and what is there made out of the cost of issuing corporate bonds. By measuring the relationship between ESG rating and the bond yield spread we can draw conclusions regarding if a high ESG rating could contribute to a decreased yield spread and thus lower cost of capital for the firm. By going beyond the impact on reputation and stock performance, we will also be able to gain further understanding of what investors consider to be less risky investments which then will give companies a way to further understand their financing possibilities.

1.7 Choice of Subject and Preconceptions

This is research done by two students in the International Business Program at Umeå University as a final degree project thesis. Both of us are on the level of first year master students with a major in finance. Our background consists of a wide effort in business administration with accounting and finance courses on both bachelor and master level. We both possess a high degree of international experience both within Europe and in Asia which we imagine will provide a widened perspective in conducting our research. Our work experiences in European banking also provide us with useful insights in the financial sector. We are also well aware of the impact of sustainability in our everyday life and during the course of our studies in finance we have realized that more research is needed on the financial impact of sustainability measures. As a part of the Millennial generation and having worked in finance, we possess a great interest in sustainable investing and financing. We are convinced that it is possible to both make an economic profit and at the same time do good,

something that our generation are gaining interest for and also demand from their investments (The Economist, 2017).

If we find that sustainability measures as seen through ESG rating has a minimizing effect on yield spread, we hope to encourage companies to work even harder to achieve a better ESG rating and become more conscious in their business models. We believe that companies have a significant impact on environment, social and governance issues and we hope that more effort will be put into ESG factors in the future in order to create a more sustainable corporate landscape and future. In a similar way as businesses have the power to affect our future when it comes to sustainability, the investor and saver has the possibility to choose where to place their money. By choosing sustainable investments we can encourage companies that perform well regarding ESG factors, therefore we hope to further find evidence for what are sustainable and safe investments both for the firm, the investor and ourselves as citizens hoping to contribute to a sustainable future.

1.8 Delimitations

Below we have specified the delimitations to this research and degree project thesis. All below listed measures have been taken in order to produce a solid and reliable study where conclusions are based on a clearly specified framework that has been carefully designed to examine the relationship between ESG rating and yield spreads of corporate bonds.

We are not investigating the entire world but choose to focus on a specific region, namely the Nordic countries excluding Iceland. The Nordic countries possess the highest ESG scores in the world except for Iceland that is not listed with a country ESG score (RobecoSAM, 2018, p. 3) and are unexplored when it comes to sustainability measures effect on bond performance. Therefore, we have decided to focus on the Nordic countries for this study, but we choose to exclude Iceland as we do not believe it is comparable to the other Nordic countries in regard to ESG factors. Our selection of population and sample will be described in chapter 5.

We will retrieve our data on ESG rating and yield spreads along with control variables on corporate bonds from the Refinitiv database. There are however other databases providing ESG rating which could have been used. There are many ways to assess ESG factors and different organizations and sources use different ways to look at the Environmental, Social and Governance factors. We intend to use Refinitiv as source for our variables. Using another database would possibly lead to different results. However, our source of data is a well-known and trusted source and therefore we are not worried about the credibility in our conclusions but simply acknowledge the fact of the different assessment methods. Our data collection method will be further explained in chapter 6.

In this study we are looking at bonds that have been active during the last ten years, meaning that the observations in our sample are active bonds between 2009-2019. This is for us to be able to produce a large enough sample and be able to draw valid conclusions but at the same

time not need to remove too many observations due to lack of ESG score which is less common longer back in time. See chapter 6 for a more conclusive explanation.

This study has been conducted during a period of 4-5 months. Therefore, some limitations have been made in order to fit this time frame. Conducting the study over a longer period would give more possibilities to deeper investigate the relationship between our variables.

We have in accordance with other researchers removed financial institutions from this study, this is because they possess different company characteristics and have represented outliers in earlier studies (Bassen et al. 2015, p.220). Especially when it comes to corporate bonds, we do not believe financial institutions are comparable to other corporate bond issuers due to their different business models and financial institutions role in the financial landscape.

2. Theoretical Point of Reference

In this part of the thesis we will give an overview of previous research related to our study. This will form a base for us in conducting our research and give us the ability to identify a research gap which we intend to fill with our study. This is the research we hope to build upon in order to increase knowledge within the area.

2.1 ESG Factors & Rating

As mentioned in previous chapters, up until this thesis' publication, there is no standardized definition of what factors should be included in ESG scores nor how these factors should be measured and weighted. Hence in the following section we will provide a detailed explanation of the Refinitiv's combined ESG score, the variable used in this paper to examine ESG ranking. This section is based on information from Refinitiv's "Thomson Reuters ESG Scores" (2019).

In this paper Refinitiv's (previously Thomson Reuters) aggregated ESG score have been used. The combined ESG score measures a company's relative commitment, performance and effectiveness covering 10 main themes and is discounted for materially important ESG controversies. The score is based on the companies' own reported data. Refinitiv argues that their measures are *"granular enough to differentiate effectively between companies that have limited reporting and are not transparent or deliver minimal implementation and execution, versus companies that 'walk the talk' and emerge as leaders in their respective industries or regions"* (Refinitiv, 2019, p.6).

2.1.1 The Environmental Score

The factors covered by the 'E' (Environmental) in the ESG score is the company's resource use, emission reduction and innovation level. The resource part measures the capacity and ability to decrease their use of energy, water or other materials. It also includes the firm's ability to implement more environmentally friendly solutions and ability to improve supply chain management. The emission part of the score measures the company's effectiveness in implementing changes in their production and operational processes to reduce emissions that harm the environment. Innovation is reflecting how innovative the company is at creating new opportunities in the market and their capacity in reducing environment-related costs for its customers. This could be done by creating eco-friendly products or adapting new environmental technologies (Refinitiv, 2019 p.16).

2.1.2 The Social Score

The factors covered by the 'S' (Social) in the ESG score is the company's workforce conditions, human rights management, community involvement and their product responsibility. The score measures how well the firm manage to accomplish a workplace that is safe, healthy, with equal opportunities and equality. It also considers the employees' job

satisfaction and development opportunities. The score also measures how well the company manage to respect conventions about fundamental human rights. The company's engagement toward protecting public health, respecting business ethics and being a good citizen is also covered by the social part of the ESG score. Another aspect of the social score is the firm's ability to offer goods and services of quality that respects the customer's integrity, data privacy, health and safety (Refinitiv, 2019, p.16).

2.1.3 The Governance Score

The factors covered by the 'G' (Governance) in the ESG score is the company's management quality, shareholder rights and CSR strategy. This part of the score measures the corporation's ability and effectiveness in following best practices regarding corporate governance principles. The effectiveness of treating all shareholders equal and their usage of anti-takeover devices are also included. Finally, the corporate CSR strategy is accounted for. It measures how the firm manage to communicate how they integrate economic, environmental and social aspects into its day-to-day processes for decision-making (Refinitiv, 2019, p.16).

2.2 Drivers of Corporate Sustainability

There are several drivers for firms to invest in ESG practices to enhance firm value. Dimson & Karakas (2015) argue that ESG measures can drive value creation in four channels: 1) More sustainable companies can get higher customer loyalty and greater product differentiation which can create price premiums. 2) Better workplace practices increase employee satisfaction, which in turn can make the firm outperform the market. 3) Successful interventions with investors (engagements) signals future improvements in governance. 4) Firms that have been through investor engagements can be introduced to improve other areas as well.

Bénabou & Tirole (2010) suggest three different perspectives on corporate social responsibility. The win-win scenario, delegated philanthropy and insider-initiated philanthropy (note that the word "philanthropy" is used as a synonym for CSR by Bénabou & Tirole and is not to be confused with only donations). These scenarios give insight to what might drive CSR related investments in firms (Goss and Roberts, 2011).

The win-win scenario implies that being a good corporate citizen can enhance firm performance and make the firm more profitable. This scenario implies that if firms has a long-term perspective, they can be more profitable. Making decisions that increase short-term profit for shareholders but could potentially compromise working conditions for employees can make it hard to attract talented labor in the future. The same reasoning is applicable for supply chain management, it is important to treat suppliers well in order to have valuable relations with suppliers in the long-run. The win-win scenario implies that firms with a long-term perspective will be able to be more profitable in the long-run. Another aspect of the win-win scenario is that acting responsible can enhance a firm's market position. By making strategic investments in CSR, the firm could enhance goodwill with regulators

and increase public opinion which in turn will make them more profitable in the long-run (Bénabou & Tirole, 2010, p. 9-10).

Delegated philanthropy implies that the firm engage in philanthropic activities on the investor's behalf. In this case the cost of CSR is transferred from the company to stakeholders through sacrifices in for example yield for investors, purchasing power for customers and wages for employees. Performing CSR on investor, customer and employee demand is consistent with general practices by large corporations that are financially sound and have NGOs as stakeholders and thereby engage in strategic CSR on their behalf. The drawback of this scenario is that it could cause greenwashing since it becomes important for corporations to address CSR due to image concerns instead of truly caring for CSR improvements and making valuable investments. This scenario is not related to any specific corporate governance issue since the firm is acting in accordance to the demand of stakeholders. This scenario is rather in line with the previous scenario and is consistent with CSR and profitability (Bénabou & Tirole, 2010, p. 10-11).

However, the insider-initiated corporate philanthropy is not motivated by customer or stakeholder demand, it is driven by management's own desires. This could result in CSR investments with suppliers where management can gain some own, private, benefit or making donations to organizations where board members of the firm have a seat of their own. This scenario can be related to some corporate governance issues. When CSR is performed in this manner it is not synonymous with profit. When CSR is performed on the demand of stakeholders it is strategic with the aim to improve operations and increase reputation and profit as in the two previous scenarios. When CSR is performed in the insider-initiated scenario the goal is to achieve private benefits for the managers and hence is related to agency costs (Bénabou & Tirole, 2010, p. 11-12).

Previous research such as Bénabou & Tirole, (2010) and Goss & Roberts (2011) have shown that being a good corporate citizen and taking measures to increase CSR can enhance the firm's performance in the long run and thus decrease risk for investors in the firm e.g. bondholders. However, some part of the research also tends to suggest that such investments for sustainability may cause agency costs and deceitful behavior such as "greenwashing". This previous research will be taken into consideration when conducting this study in order to analyze the ESG score – bond performance relationship and its underlying dynamics.

2.3 Sustainability Factors and Cost of Bank Debt

If corporate social responsibility is value enhancing or value destroying have been a widespread debate for some time. Goss and Roberts (2011) found that banks reward sustainability responsible firms with lower cost of loans compared to irresponsible firms with between 7 to 18 basis points lower interest rates. The main differences could be observed in cases where there was absence of a security (stock). In their study they investigated effects of CSR strengths and weaknesses separately in order to evaluate what type of CSR management that is most material to banks when it comes to lending. They viewed banks as having a role of a quasi-insider since they have access to more information about firms

compared to the market and general public (Goss & Roberts, 2011, p. 1807). This makes it possible for banks to distinguish material CSR that adds value compared to "greenwashing" which only creates and image of being sustainable but in reality, lacks substance.

Banks have a risk perspective when evaluating the terms and conditions for their loans and focus on CSR related risks. Firms with high levels of sustainability related risks are given less attractive loan contract terms. However, under uncertain economic conditions as the ones following the latest financial crisis regulation on banks have increased and banks are now more interested in adjusting their balance sheets by securing safer assets and by constraining credits. Campiglio (2016) argue that new regulations to stabilize the economy might have a negative effect on bank loans to low-carbon projects. Basel III introduced stricter bank standards for both robustness of capital and the liquidity of their assets. The new standards force banks to adapt a more short-term perspective and when sustainable projects have weaker initial cash-flows it may make it hard to find financing by banks and sustainability might cause less attractive loan contract terms (Campiglio, 2016, p. 225).

The relationship between a firm's carbon risk and its cost of debt along with carbon awareness of the company has been investigated in previous research. Studies have found that proactive carbon management strategies are viewed favorably by lenders and that as a result cost of debt will increase for those companies with a historical carbon risk profile but those that demonstrate a carbon-related risk awareness are benefitted with lower cost of debt. A positive and significant relationship has been found between the cost of debt and firms that fail to demonstrate an awareness of their carbon risk exposure (Clarkson et al., 2018, p. 1168).

Previous research has clearly shown that CSR measures has an impact on the cost of debt in regard to bank loans. Therefore, it is only reasonable to assume that the same may apply to cost of debt in regard to cost of bonds, which is still in need of investigation.

2.4 The Effects of CSR on Corporate Bond Performance

Previous research has been conducted in order to assess the effect of CSR and sustainability measures on corporate bond performance. For example, Huang et al. (2018) perform a study of corporate social responsibility and the effect of cost of corporate bonds in China. They describe how bonds are interest bearing instruments of debt that companies use to gain financing and that the issuer on a later date will pay back a principal and interest to the bondholder. The authors of this paper explain the importance of the impact of Corporate Social Responsibility (CSR) on Cost of Bonds (COB) as it can both have the nominator effect of increasing income and the denominator effect of decreasing costs and expenses. Decreasing interest of bonds will lead to the denominator effect of reducing costs and expenses which is desirable for the firm's profit. They also claim that it is important to recognize the fact that debtholders and shareholders have different claims on firm profit. Debtholders have a fixed claim on interest and principal and therefore they do not benefit from extra earnings of the firm in the same way as shareholders that have residual claims on profit. This asymmetric payoff system causes debtholders to primarily be concerned

regarding downside risk which shareholders may not be as they rather seek profit and upside potential (Huang et al. 2018, p. 255-256).

Further, Huang et al., (2018) also explain the importance of looking at cost of bonds as they are a major form of external financing and the effect of CSR on this debt instrument remains poorly understood. Cost of capital is built from both cost of equity and cost of debt; therefore, it is important to dig deeper into the dynamics regarding cost of debt with the cost of bonds to give an idea of the general cost of capital (Huang et al., 2018, p. 255-256).

Huang et al., (2018) arrive at the conclusion that corporate social responsibility and cost of bonds measured by credit spreads has a negative relationship and that this effect is incorporated in the assessment of credit risk of the bond issuer by the bond investor. The practical implications of this study are that it provides support for policies that encourage or enforce firms to comply with CSR standards as the results point to the fact that it generates financial profit. It also gives proof that bond issuers should engage in social activities to increase strategic CSR initiatives to reduce their cost of financing (Huang et al., 2018, p. 266).

Other studies such as the one by Oikonomou et al. (2014) find that good CSR performance is rewarded by lower corporate bond yield spreads and that CSR transgressions are penalized through wider yield spreads. Their research was made on the US market and used synthetic sovereign bonds to measure the yield spread. Their research suggests that support for local communities, higher levels of marketed product safety and quality characteristics, and avoidance of controversies regarding the company's workforce can reduce the required risk premium and thus reduce the cost of financing for the firm. It appears that better Corporate Social Performance (CSP) can improve credit quality and decrease perceived credit risk. The findings of their study offer guidelines for strategic management and how to relate to certain stakeholder groups in order to draw benefit from reduced cost of funds from the fixed income market (Oikonomou et al., 2014, p. 73).

In order to assess the spread, the authors have according to definition taken the yield of a corporate bond minus the yield of a comparable sovereign bond (same maturity, coupon rate, frequency of payments per year) excluding credit risk. After that they have estimated a synthetic treasury yield curve with identical payments (adjusted for coupon rates and number of payments per year) and maturities matched to the nearest integer, thus eliminating effects from differences in duration and convexity between the corporate and the original sovereign bond. From this synthetic treasury yield curve, they can then subtract to calculate the spread (Oikonomou et al., 2014, p. 57).

Stellner et al., (2015) find that a country's ESG rating moderates the Corporate Social Performance (CSP) and credit risk relationship. Meaning that a superior CSP is perceived as risk reducing and connected to lower z-spreads (zero-volatility spreads) but only if the country (where the headquarters is located) also score above average in ESG rating. Meaning that bonds only benefit in rating and the z-spread setup in countries that recognize CSP efforts. However, companies that score below average also benefit from lower credit risk in countries that score below average in ESG factors (Stellner et al., 2015. p. 544). Being a high

performing company in ESG in countries that reward CSR investments and vice versa can reduce spreads by 7.7% (Stellner et al., 2015, p. 548).

A limited amount of research has looked at the effect of CSR performance on credit instruments. Due to the importance of debt financing for companies, research in this area is very important in order to know more regarding CSR's effects in the fixed income market. Due to the European Monetary Union (EMU) and the development of a single currency area, there has been an enormous growth of corporate bonds within Europe (Stellner et al., 2015, p. 538-539). Even though not all Nordic countries are part of the Eurozone, they are still members of the European Economic Area (European Commission, n.d.), therefore the expansion of the bond market is likely to have affected the Nordics as well which makes it an interesting region to further explore.

By evaluating z-spreads one can incorporate information on the entire yield curve. A conventional yield spread is simply defined as the size of the parallel shift of a certain benchmark spot rate curve to equal a fixed income instrument's discounted cash flow to its market prize. Stellner et al. (2015) have by taking a certain spread that is equal for all points of the underlying benchmark curve added this to the specific curve. The connected bond's cashflow is then discounted with the appropriate discount rate from the shifted benchmark curve. The equal spread above the benchmark curve is adapted until the sum of the discounted cashflows matches the market price of the bond. As a benchmark for the z-spreads the authors have used the Euro Swaps Curve. This research uses the ASSET4 ESG scores from Refinitiv as CSR measurement, reputed to be one of the most reliable ESG measurements. Data on ESG country rating is extracted from Bloomberg (Stellner et al., p. 542-543).

Using this previous research, we build a foundation upon which we can see proof for the relationship between sustainability measures made by the firm and its effect on bond yield spreads. The way these previous researchers have gathered information on sustainability measures offers us guidance on how to produce valid observations and what sustainability and bond performance measures that have not been thoroughly investigated. We are also provided with different methods to calculate the yield spread which will be considered in our study.

2.5 Yield Spread

As we intend to look at the relationship between ESG rating and corporate bond yield spread a clarification of the yield spread is made here. Agrawal et al. (2001) prove that the yield spread between government and corporate bonds can be explained by 3 parts; Loss from expected default, taxes that needs to be paid for corporate and not government bonds and a risk premium for bearing systematic risk (Agrawal et al., p. 272-273).

The conclusion of the study is that the spread can almost entirely be explained by these three factors. They also find that only a small part of the spread can be explained by the credit rating. Credit ratings and thus expected loss from default supplied by Moody's and S&P, e.g. for a 10-year A rated industrial bond can only explain 17.8% of the spread. A more important

influence is the effect generated by taxes which explain 36.1% of the spread on the same type of bond. These taxes are important as they are paid on the entire coupon and not only on the difference between corporate and treasury bonds. However, the biggest part of the yield spread can be explained as a required return for bearing systematic risk. As much as 39.2% can be explained by this risk premium required by investors for buying the bond (Agrawal et al., p. 272-273).

In this research we aim to look further into the effect of ESG score on the corporate bond yield spread. From how the yield spread has been described and established by previous research, we believe that the ESG score will show its effect on the required risk premium. By looking at characteristics of different bonds we hope to see if ESG score might have an effect on the risk premium required by investors thus further explaining the yield spread and provide a deeper understanding of the dynamics of the ESG score – bond performance relationship along with how investors determine the cost of bonds through yield spreads.

3. Theoretical Framework

In this chapter of the thesis we will focus on explaining existing theory that we intend to use in course of our research. We have examined previous literature to build a theoretical framework which will be used in conducting our study. The relevant theories that we have chosen are Stakeholder Theory, Legitimacy Theory, The Resource Based View and Agency Theory. These will all be explained in further detail with the help of existing research and how they are related to our study along with critique against these theories.

3.1 Stakeholder Theory

Stakeholder Theory arise from the idea that a company should not single-mindedly concern themselves with the maximization of benefits for the shareholders (Wijnberg, 2000, p. 329). Research on this theory such as the one by Wijnberg (2000) tries to show how an Aristotelian approach to the organization and its members may help to deepen the understanding of organizational politics and the interaction between organizations and society. Decision makers need to make use of practical wisdom in organizational politics and ethics (Wijnberg, 2000, p. 330).

In the 1980s and 1990s, Freeman with the help of other scholars shaped the Stakeholder Theory vocabulary to address three interconnected problems relating to business. These were: the problem of value creation and trade, the problem of the ethics of capitalism and the problem of the managerial mindset. The Stakeholder Theory suggests that if we would analyze the relationship between a business and its stakeholders, meaning groups and individuals who can be affected by the business, then it would be easier to deal with these three problems (De Colle et.al, 2010, p. 405). It is about how stakeholders of the firm (customers, suppliers, employees, financiers e.g. bondholders, communities, managers etc.) interact to create value for the firm. To understand the business, one needs to understand these relationships and how they change over time. It is up to the executive to manage these relationships in order to create value (Freeman 1984, cited in De Colle et.al, 2010, p. 406).

Financial market participants are not the only stakeholders that have the power to affect financial outcomes. By looking through the stakeholder perspective researchers could help to explain why for example some Initial Public Offerings (IPOs) are more successful than others, why firms with similar financial structure receive different interest rates from banks and how residual returns are influenced by stakeholders bargaining power (De Colle et al., 2010, p.422). Since these stakeholder relationships defines a business, Stakeholder Theory needs to be moved to the center of thinking about business and management, this is the core of starting, managing and leading a business. Stakeholder Theory is constantly evolving and especially in the 20th century, these ideas have gained importance. In the Millennial generation we are thinking about business and capitalism in another way and giving ethics a more central role by giving business a more prominent role in ethics (De Colle et al., 2010, p.433). In our minds business and ethics are interconnected.

The Stakeholder Theory relates to sustainability in the sense that if one were to prove that e.g. a better ESG rating would increase bond performance, companies will know that there are more objectives to pursue than simply profit maximization in favor of the shareholders. This would show that more stakeholders should be considered in the company's operations and that these stakeholder relationships should be evaluated based on ESG factors in order to decrease cost of capital which then would be beneficial not only to shareholders but to all stakeholders of the firm and its value creation.

Critique on Stakeholder Theory

Even though Stakeholder Theory is highly appealing in the way it addresses two core issues of the business; 1) How to manage people fairly and 2) Corporate Social Responsibility (CSR), meaning what good things can and should a firm do. The theory still fails in its guidance as it is not comprehensive enough (Orts & Strudler, 2009, p. 612).

Some claim that the usefulness of the Stakeholder Theory has been exaggerated and used in too wide proportions. It may be useful in some instances e.g. in purely strategic scenarios but it fails to explain matters of the larger moral thinking and business ethics. Some critics mean that the theory is not very good, reliable nor persuading in its philosophical approach when trying to describe difficult ethical problems in business. It may prove useful in identifying certain interests that should be acknowledged in business decisions, but it fails in discussions regarding business ethics and that the theory today has taken unsuitable proportions in its application when analyzing ethical issues (Orts & Strudler, 2009, p. 605).

Further, many critics of the theory claim that the term "Stakeholder" is too vague and does not explain who these players are. Without a clear definition of this term, the entire theory collapses due to the evanescence of the concept of "stakeholder". This is according to the studies by Orts & Strudler, (2009), Stoney & Winstanley (2001), Weyer (1996, Cited in Orts & Strudler, 2009 p. 35) and Donaldson & Preston (1995).

3.2 Legitimacy Theory

Legitimacy Theory builds on the belief that there are socially constructed understandings of what is legitimate behavior of a business or entity. It can be seen as a perception by the observers of the organization that results in a reaction and it reflects a congruence between behaviors of the entity and the shared belief-system of some social group. To describe a legitimate business, one could say that its behavioral pattern is in line with what a group of observers accepts or supports as a behavioral pattern. This means that it is possible to deviate from this pattern but only if it does not change the pattern (Suchman, 1995, p. 574). Legitimation can also be seen as a process where an organization or company justifies to a peer group or audience its right to exist (Maurer, 1971, p. 361, cited in Hybels 1995, p.241). Legitimacy of a business is built on social contracts between the business and observers of the business. Legitimacy have been described by previous researchers as below, which we intend to use in our perception of legitimacy:

"Legitimacy is a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, and beliefs" (Suchman, 1995, p. 574).

"Appraisal of action in terms of shared or common values in the context of the involvement of the action in the social system" (Parsons, 1960, p. 175, Cited in Hybels, 1992, p. 241).

Legitimacy can be divided into three categories; pragmatic, moral and cognitive. Pragmatic legitimacy rests on the audience's self-interest and they base it primarily on self-regarding utility calculations. Therefore, organizations can by directing tangible rewards to specific constituencies purchase pragmatic legitimacy. Moral and cognitive legitimacy do not rest of self-regarding interests but rather on larger cultural rules (Suchman, 1995, p. 584-585). Moral legitimacy is based on normative approval and what is "the right thing to do" and acts more pro-social (Schuman 1995, p.579). Finally, cognitive legitimacy comes down to comprehensibility, meaning that legitimacy is drawn from the availability of cultural models that provide explanations for the organization and its operations. With these models in action, organizational activity will prove predictable, meaningful and inviting. In the opposite situation, activity will crumble due to mistakes, oversights and distractions (Schuman 1995, p.582).

Taken-for-grantedness is a concept that represents the most subtle and powerful source of legitimacy and can be explained as *"for things to be otherwise is literally unthinkable"* (Schuman, 1995, p. 583). Both pragmatic and moral legitimacy rests on the disjointed evaluation of legitimate behavior and audiences arrive at cost-benefit appraisal and ethical judgment based on public discussion, therefore organizations can win legitimacy by participating in these public discussions. Cognitive legitimacy is not based on this kind of evaluation but rather on the cultural environment (Suchman, 1995, p. 584-585).

Connecting the Legitimacy Theory to matters of sustainability is a way of trying to assess what provides legitimacy in society and what is considered to be a legitimate business. By measuring the effect of ESG rating on bond yield spread one can make conclusions regarding if this rating provides legitimacy for the firm in the eye of bond investors and thus decreases the required risk premium.

Critique on Legitimacy Theory

Similar to critique on Stakeholder Theory, critics claim that the theory is vague and lacks in formal models that both capture the abstract and well-defined. Therefore, the theory can only be used in detailed observations of human activity and not be used to describe legitimacy in a larger scope as it has been by many researchers in previous studies (Hybels, 1995, p. 241). No organization can completely satisfy all audiences, so from who is actually legitimacy given and what audiences (stakeholders) are significant in gaining legitimacy? Challenges lies in gaining, maintaining and repairing legitimacy in the eyes of significant stakeholders (Suchman, 1995, p. 585-587). However, this cannot be done without a clear explanation of who the significant stakeholders are in the sense of providing legitimacy for the firm.

3.3 The Resource Based View

The Resource-Based View emerged with the help of Barney (1991) as a critique on Porter (1985) and his lack of focus on the individual firm's attributes and how it affects their competitive position since Porter assumes that all firms in one industry have access to the same resources. The major difference between Barney and Porter is that Barney assumes that firms are heterogeneous regarding the strategic resources that they control, that resources may not be fully mobile and therefore heterogeneity can be long lasting (Barney, 1991, p. 100).

To create competitive advantage, firms need to use their resources in a strategic way that differs from their competitors. The Resource-Based View builds on the assumptions that resources are homogenous and heterogeneously distributed among firms and that the differences in distribution are stable over time. In order for firms to create a sustained competitive advantage they need to use their resources in a way that is imperfectly imitable, rare, valuable and not substitutable (Barney, 1991, p. 101-102).

Barney defines a sustained competitive advantage as a value creating strategy that is not implemented by competitors and that other firms cannot possibly duplicate (Barney, 1991, p. 102-103). This definition could imply that firms who manage to control risks and manage opportunities related to sustainability e.g. ESG factors in a strategic way, could be able to create a competitive advantage. This would then be appreciated by the market and be recognized in lower yield spreads for the higher scoring firm's corporate bonds.

In order to achieve this advantage in the market, the firm needs to have resources that are valuable in the sense that they are able to neutralize threats, e.g. environmental related risks. Or, it needs to be able to capture opportunities like changes in demand or be able to implement processes that increase effectiveness and efficiency, something that is favorable both from a cost and natural resource preserving perspective. It is important that the resources are imperfectly imitable. This could be created by having resources that are socially complex, like internal know-how that cannot be easily transferred and implemented elsewhere or a unique firm culture. In addition, resources also need to be rare and not substitutable, if all firms in the market are able to acquire the same resources they cannot create a competitive advantage for the specific firm (Barney, 1991, p. 105-109).

If firms manage to create or acquire resources related to ESG factors with the characteristics mentioned above, they will achieve a competitive advantage with their ESG score. It is reasonable to assume that it will be appreciated by the investors and hence generate a lower cost of debt in the capital market. That an ESG score could become a strategic resource that is difficult for other firms to replicate is reasonable to believe as these factors needs to be implemented into practically every part of the business model which is different for every company. Therefore, successful implementation of a high ESG score can be seen a valuable and imperfectly imitable resource as it is impossible for two companies to incorporate ESG measures in the same way. Thus, it generates a sustained competitive advantage.

Critique on The Resource Based View

Even though the RBV is a highly influential theory in management which has gained great recognition given its simplicity and immediate face validity, there are some concerns and critiques against its ideas. Especially three critiques threaten the core of the theory; the indeterminate nature of the central concepts "resource" and "value"; the narrow explanation of competitive advantage; and that the theory clings to an inappropriately narrow neoclassical economic rationality that has diminished the possibility of theoretical progress (Kraaijenbrink, 2010, p. 350). The theory puts overemphasis on the possession of individual resources and insufficient acknowledgements of the importance of bundling resources and the human involvement in assessing and creating value, therefore it does not capture the essence of competitive advantage (neither statically nor dynamically) (Kraaijenbrink, 2010, p. 359).

3.4 Agency Theory

Agency problems are associated both with the choice of capital structure as well as choice of level and strategy regarding sustainability. In a leveraged firm there can be a conflict between equity holders and debtholders. Jensen & Meckling (1976) define an agency relationship as *"a contract under which one or more persons (the principal(s)) engage another person (the agent) to perform some service on their behalf which involves delegating some decision-making authority to the agent."* Agency costs arise when maximizing utility is the main objective of both parties, because then it is reasonable to assume that their interests may not always align. Agency issues arises when managers (agents) make decisions that contradicts the wishes of the owners of the firm (principals) (Jensen & Meckling, 1976, p. 5).

Bondholders bear the risk of default of the loan. Hence, it is in the bondholder's best interest that the bond issuer does not engage in risky activities. To protect himself the bondholder can include covenants that would limit the behavior of the managers of the firm that could potentially decrease the value of the bond. For this to be successful the provision has to be extremely detailed and cover most operating aspects and would more or less make the bondholder the decisionmaker of the firm. In practice the bond holder is not the one bearing the cost of managerial behavior that could potentially be harming for the value of the bond. All the bondholder has to do is to recognize the risk of the behavior's existence and include it in the price of the debt claim (Jensen & Meckling, 1976, p. 46).

CSR can be viewed as a way of mitigating risks related to ESG or as a way of wasting money. The Risk Mitigation View states that investing in CSR is a way to mitigate risk. If firms with strong ESG scores has lower idiosyncratic risk, it would be shown in lower risk premiums. If investments in CSR leads to lower risk and higher financial performance, lenders will offer the firm more attractive contract terms (Goss and Roberts, 2011, p. 1075). Another view on CSR is that it takes resources away from the firm and its owners and is a waste of scarce resources, which in contrast could be connected to the Overinvestment View. One example when agency problems can arise is when CSR is insider-initiated, and managers may initiate CSR measures for their own personal profit which may not align with wishes of shareholders or benefit firm value (Bénabou & Triole, 2010, p. 11). Strategic CSR that is initiated by

stakeholders and/or with the ambition of enhancing firm value can therefore not be associated with agency problems as easily.

If managers succeed to integrate CSR in operations in an effective way and enhance corporate social performance (CSP), they may convince stake-, share- and debtholders of their trustworthiness and competence since CSP is a highly complex issue for managers to address and implement. The increased trust between agents and principals would minimize the potential hazards related to agency problems, which in turn potentially can decrease the firm's cost of both equity and debt (Oikonomou et al., 2014, p. 55).

Where the research needs to be extended is regarding whether investments in ESG factors may lead to agency costs. Previously, discussions regarding agency problems have been focused on owners vs. managers. We intend to introduce bondholders into the equation and analyze whether investments in sustainability could potentially lead to conflicts and costs. We will see the effect of management's implementation of sustainability measures through the ESG score and we will see how it is perceived and if it leads to any costs through the bond yield spread. We can also analyze if certain measures by management to please bondholders can lead to conflicts with shareholders, as these different types of investors have different objectives. An alignment between agents and principals of the firm in regard to ESG measures should lead to a decreased yield spread as priorities align between stakeholders. Using the Agency Theory in this sense is similar to the Risk-Mitigating and Overinvestment view. However, we find it interesting to evaluate the agent-principal relationship rather than the view on resources which will be evaluated through the Resource-Based View.

Critique on Agency Theory

Critics state that researchers with a positivist stance on Agency Theory tend to focus too much on the agent side of the "principal and agent problem", the consequence is neglect of the principal perspective. Principals might as well deceive, shirk and exploit agents; and agents may then be unknowingly dragged into work with dangerous working environment and without any scope for encroachment where the principals act as opportunistic (Panda & Leepsa, 2017, p. 78).

As an opposing view, the behavioral Agency Theory argue that standard Agency Theory only emphasizes the principal and agent conflict, agency cost and the realignment of both parties' interest to minimize the agency problem. The behavioral agency model recommends some modifications regarding agent motivation, risk awareness, time preference and equitable compensation to offer a more substantial view on the issue (Panda & Leepsa, 2017, p.79).

Some limitations that have been brought to attention are that the theory assumes a contractual agreement between the principal and agent for a limited or unlimited future which is uncertain. The theory assumes that contracting can eliminate the agency problem but practically becomes very difficult due to possible information asymmetry, rationality, fraud and transactions costs. Shareholder interest in the firm is to maximize profit but their role is limited to the firm. The role of directors is not clearly defined more than to supervise managers. The theory considers managers as opportunistic and ignores their competence (Panda & Leepsa, 2017, p.79).

4. Scientific Method

In this section we will describe our scientific method and the decisions taken in our research philosophy, design and approach. We will also explain our method for searching existing literature, the possible criticism for the information sources used and finish with relevant societal and ethical considerations regarding the study.

4.1 Research Philosophy

According to Collis & Hussey (2014) one must start a research philosophy by identifying your paradigm. This is a philosophical framework that will guide the author in how the scientific research should be conducted. By identifying this paradigm, you can establish your idea about reality and what knowledge is. One of the main paradigms is positivism, which could be considered to lean more on natural sciences and describe social reality as singular, objective and not affected by investigating it. This paradigm would result in a deductive process with the aim of providing explanatory theory to understand a social phenomenon (Collis & Hussey, 2014, p.43). A positivist paradigm further tries to explain theory based on empirical research. It focuses on theories that tries to clarify or predict a social phenomenon, it applies logical reasoning in order to not be interpretative and subjective in its reasoning. Further, it tries to establish a causal relationship between variables by establishing causal laws and linking them to deductive or integrated theory associated with quantitative studies (Collis & Hussey, 2014, p. 44).

An alternative to positivism is interpretivism which emerged as a criticism towards positivism. Here the assumptions are that social reality is in our minds, meaning that it is subjective and multiple. Therefore, social reality is affected by investigating it. Research in this paradigm would result in an inductive process with the aim of providing an interpretive understanding of a social phenomenon within a particular context. (Collis & Hussey, 2014, p. 44). Here the researcher interacts with what is being researched and therefore is also affecting the social reality of the researched. The interpretivist seeks to describe rather than measure in order to explore the complexity of a social phenomenon and gain interpretative understanding by using a qualitative approach (Collis & Hussey, 2014, p. 45). With this process the aim is to generate new theory rather than testing already existing theories as is the purpose of the deductive research process.

Bryman & Bell (2011) describe the same sort of paradigms as *Objectivism* and *Subjectivism* (positivism and interpretivism respectively). However, one should be aware that there are many variations of research paradigms drawing on the scale between Positivism/Objectivism and Interpretivism/Subjectivism (Collis & Hussey, 2014, p. 45).

4.1.1 Ontology

Ontological assumptions are concerned with the nature of reality where positivists believe that social reality is observable and external to the researcher and that there is only one reality.

Interpretivists consider social reality to be subjective and socially constructed and that there are multiple realities (Collis & Hussey, 2014, p. 46). Ontological considerations discuss whether social entities can and should be seen as objective entities with a reality external to social actors or if they can or should be considered social constructions built by the perceptions and actions of social actors. The respective stand points are referred to as objectivism and constructionism. Objectivism states that social phenomena confront us as external facts beyond our reach and influence. Culture can be seen as repositories of widely shared values and customs into which people are socialized so that they function as good citizens, these cultures constrain us as we internalize their beliefs and values. Here the social entity comes across as something external to the actor and having a reality of its own. Constructionism however, challenges this view of organizations and culture being pre-given and therefore also confronts the idea of social actors as external realities, meaning that these are constructed in and through interaction (Bryman & Bell 2011, p. 20-22).

We will take a positivist paradigm or an objectivist stand-point in our research as we will try to draw conclusions about the general public and what we consider to be an existing social reality which we can observe and that is external both to us as researchers and what is being researched. We see social reality in this way as we are able to observe characteristics related to our research through objective secondary data upon which we believe it to be possible to build knowledge and draw conclusions. We will not take an interpretivist paradigm or have a constructionist approach as that would mean that social reality is subjective and that every person inhabits their own reality, meaning that we would not be able to draw any conclusions from our statistical tests but that we would rather need to deeper investigate and analyze the specific observations.

4.1.2 Epistemology

Epistemology is concerned with what is considered as valid knowledge. Positivists believe that only phenomena that are observable and measurable can be regarded as valid knowledge, therefore researchers try to stay independent and objective (Collis & Hussey, 2014, p. 47). Relating what is considered as valid knowledge to natural sciences is considered having a positivist paradigm. Here the role of research is considered to be testing of theories and provide material for the development of laws (Bryman & Bell, 2011, p. 15). For example, the task of research is collection of data upon which to base generalizable propositions that can be tested (Pugh, 1983, cited in Bryman & Bell, 2011, p.15).

Interpretivists try to minimize the distance between themselves and what is being researched. Therefore, different forms of participative inquiry are often used (Collis & Hussey, 2014, p. 47). They share a view that the subject matter of the social sciences (people and their institutions) is fundamentally different from that of natural sciences. Studying the social world therefore requires a distinctiveness of humans which differs from the approach of natural sciences. It is about empathic understanding of the human behavior and requires the researcher to grasp the subjective meaning of social action (Bryman & Bell, 2011, p. 16-17). An interpretivist would try to more deeply understand the act and behavior of the human being with a qualitative research method (MacIntosh & O'Gorman, 2015, p. 60).

Conclusions in this study will be based on gathered data and statistical tests in order to know whether there is a relationship between ESG rating and corporate bond yield spreads. We believe this to be the best way to establish valid knowledge as we are seeking a cause-and-effect relationship and not a deeper understanding of the human behavior. However, we will not investigate the question of causality between these variables as our aim is to simply see if there is a cause and effect relationship. Therefore, our epistemological approach is that of a positivist paradigm where we aim to build knowledge upon the observable and measurable. To try and establish a relationship through an interpretivist view would not let us establish a possible cause-and-effect relationship as it would rather become an analysis of the relationship not building concrete knowledge which we intend to do.

4.2 Research Approach

When establishing the relationship between theory and research there are two approaches which can be used; deductive or inductive approach. Deductive research is conducted through studies where conceptual and theoretical structure is developed and tested through empirical observation and therefore particular instances are deduced from generalized conclusions (Collis & Hussey, 2014, p. 7). The researcher investigates what is already known on a certain issue or problem that he/she wishes to investigate; from this knowledge the researcher can deduce hypotheses which are then subject to empirical scrutiny. From theory, a hypothesis is deduced which then drives the process of gathering data (Bryman & Bell, 2011, p. 6). The deductive approach can be represented as a linear process. However, this is not always the case as the process may not happen step-by-step but rather that several stages work continuously through the entire research and does not have a clear beginning and end.

Figure 1 The Deductive Process (Bryman & Bell, 2011, p. 11)

Inductive research is when the aim is to generate new theory which is done through observations of the empirical reality and where general inferences are induced from particular instances. Thus, being the opposite of the deductive process. It moves from individual observations to form statements of general patterns or laws, from the specific to the general (Collis & Hussey, 2014, p. 7). With an inductive stance, theory is the outcome of research (Bryman & Bell, 2011, p.7).

The purpose of our thesis is not to build new theory. Therefore, an inductive approach is not suitable for this study. We hope to draw conclusions regarding the relationship between ESG rating and the cost of corporate debt which we intend to do based on existing research resulting in a hypothesis. We hope that our findings will give us the possibility to either confirm or reject our hypothesis and through a conclusion based upon our findings we hope to contribute to previous research and knowledge by establishing a certain relationship.

4.3 Research design

According to Collis & Hussey (2014) there are four types of research; Exploratory, descriptive, analytical (explanatory) and predictive. An *exploratory* research method is used when there are no or very few earlier studies that can be used for information gathering and therefore one tries to develop rather than test new hypotheses. *Descriptive* research is an approach to try and describe a phenomenon. This is done by trying to identify and obtain information on characteristics of a certain issue. *Analytical or explanatory* research is a continuation of descriptive research where the study aims to go beyond simply describing an issue to try to determine why or how the studied phenomenon is occurring. This is done by discovering and measuring a causal relationship (cause and effect). An important part is to identify and possibly control the variables in the research activities. A variable is a characteristic of the phenomenon that can be measured or observed. A *predictive* research goes beyond explanatory research to try and establish an explanation for what is happening in a particular situation. It tries to generalize from the analysis by predicting a certain phenomenon on the basis of hypothesized and general relationship (Collis & Hussey, 2014, p. 4-5).

When trying to test theories, the only suitable way is to conduct an explanatory research (MacIntosh & O'Gorman, 2015, p. 82). As we are trying to determine whether there is a relationship between ESG rating and the cost of corporate bonds measured by yield spread, an explanatory research is the best way to conduct this research. Our aim is not to generate any new theories or describe characteristics of a certain issue as we simply wish to find a cause and effect relationship among variables that may affect the cost of bonds. As we do also take a positivist stance in both our ontological and epistemological assumptions, an explanatory design is consistent with the methodological assumptions of a positivist paradigm (Collis & Hussey, 2014, p. 48-49). We are concerned with trying to ensure that concepts can be operationalized and described in a way that is measurable. We will focus on what we regard as objective facts to try and formulate hypotheses as we intend to look for associations between variables.

4.4 Research Strategy

When conducting research, there are two methods or strategies one can use, these are quantitative or qualitative studies. The quantitative study collects data and analyze it using statistical methods (Collis & Hussey, 2014, p. 5-6). The researchers try to quantify the problem or research question to try and establish the mechanisms through which one or more quantitative variables may affect another dependent variable (MacIntosh & O'Gorman, 2015, p. 155). The strategy is connected to looking at the relationship between theory and research in deductive approach and looking at the social reality objectively (Bryman & Bell, 2011, p. 150). Objectivity is gained through enumeration, aggregation and causation; meaning that knowledge requires measurement. The strategy uses techniques such as to thoroughly design predetermined hypotheses which are tested using statistical means from a representative sample in order to be able to generalize and draw conclusions regarding a population (Abusabha & Woelfel, 2003, p. 566). Quantitative research can be described as theory validation; it starts in theory and ends in theory. In the process, theories are either validated, refined or invalidated (Nenty, 2009, p. 21).

Qualitative studies gather data that then is interpreted and analyzed (Collis & Hussey, 2014, p. 5-6). The approach is more concerned with words rather than numbers and tries to interpret the social world of the researched participants. The research is connected to an inductive approach where the aim is to generate new theory from research. The epistemological position is interpretivist and stresses that understanding the social world should be done through examination of the interpretation of that world by its participants. The ontological stance connected to qualitative studies is that of a constructionist view meaning that social properties are outcomes of the interactions between individuals rather than what exists separately and outside the participants (Bryman & Bell, 2011, p. 386-387).

In our thesis, a quantitative study will be used as we possess an objective ontological and positivist epistemological approach. We will use secondary data from the Refinitiv database on corporate bonds in the Nordic countries which we will conduct statistical tests upon. From this sample we aim to draw conclusions about the general population. We could have conducted a qualitative study to try and establish a deeper understanding of the relationship through e.g. interviews with firm representatives or investors in order to draw conclusion about the effects of ESG rating on the cost of debt for companies. However, this would not be in line with our research philosophy, methodological assumptions and the way we aim to build knowledge. We wish to investigate the relationship on a larger scale in order for us to be able to draw generalizable conclusions based upon a larger amount of data and therefore we believe a quantitative approach is preferable in our study and gives us the possibility to draw conclusions regarding the relationship between the variables in our model.

Some authors claim that the best research design is to combine the quantitative and qualitative approach (Abusabha & Woelfel, 2003). However, we believe that this is beyond the scope of this thesis and as our purpose is not to gain a deeper understanding of the social reality connected to our results but rather make an analysis of previous theories and literature in connection to our study, we have chosen a stricter quantitative strategy. Other researchers endorse the use of secondary information such as the one provided by Refinitiv due to its

availability and cost efficiency. On the other hand, some have also criticized its use due to the limitation of this kind of data as it is constructed on a macro level regarding each company as a single entity. We believe (similar to other quantitative researchers; Cowton, 1998, p. 425) that the possibility to find detailed information of the whole company and data that can also be divided into geographical or business segments is very beneficial for our research and when trying to make conclusions regarding a specific geographical region. Refinitiv is also a widely used and trusted source within financial research and therefore we believe that gathering data from this database is suitable.

Having a positivist paradigm and conducting research with this philosophy a survey methodology will be used to collect secondary data which is statistically analyzed. As we intend to analyze secondary data we will describe our research as an archival study of the data we have accessed through the Refinitiv database and thus conduct an empirical study using publicly available data (Collis & Hussey, 2014, p.63). This follows the chosen strategy of a quantitative research.

4.5 Literature Search

In quantitative research, a core issue is building on already existing theory through reviewing literature which can be used in the research. The reviewed literature is considered to be important as input throughout the research process, and it provides a source of material where the researcher can revise a problem, topic and hypotheses that also provide an informed source on how to write methodology (Nenty, 2009, p. 25). We have conducted our literature search through databases such as the ones provided by the Umeå University Library, University of Groningen Library, Google Scholar and DiVa. We have used many sources recommended from supervisors and Umeå University's Thesis Manual to find authoritative sources upon which we have based our research. As we have reviewed the literature, we have also looked into the referenced material in articles that we have found relevant for our study. Material introduced in courses related to sustainable finance and investment at University of Groningen have also been included. Thus, we have found an easy way to access good literature that also have been assessed by previous researchers and therefore provides us with a solid literary base.

The aim of the literature search is to identify the existing body of knowledge on the topic we intend to study, and this process will be continuous throughout the research process. During our research we will learn about the subject and previous studies' methodology which is necessary for us in order to write a critical review of the literature and for us to single out how our research can contribute to existing knowledge (Collis& Hussey, 2014, p. 76).

In this thesis we will mostly use data from so called secondary sources. These are sources of secondary data which are collected from already existing sources which can be for example e-sources (academic journal databases); research reported in books, articles, conference papers, reports; books on the topic and methodology; professional journals, newspapers, broadcast media; government/commercially produced statistics and industry data; archives,

statutory and voluntary corporate reports; internal documents and records of organizations (Collis & Hussey, 2014, p. 76-77).

The use of secondary sources in both literature review and data collection is justified as we intend to perform our statistical tests on historical data ranging from ten years ago up until today. Producing the same data through primary sources would not be possible and most likely not produce as many good observations as can be provided by professional databases such as Refinitiv.

Table 1 is an excerpt from our list of keywords used in the literature search which has been conducted in various databases. In Appendix 2 a more extensive list of keywords can be retrieved.

Table 1 Keywords

Keywords		
General	**RQ**	**Theory**
ESG	Corporate Bonds	Legitimacy Theory
Environment	Nordic Bonds	Agency theory
Social	Volatility	Stakeholder Theory
Governance	Risk	The Resource Based View (RBV)
CSR	Bond Performance	
Corporate	Bond Spread	
Social	Bond Yield	
Responsibility	Bond Return	
Financial Performance	Maturity	
Corporate Bonds	Redemption	
Cost of Bonds	Features	
Cost of Debt	Price	
Cost of Capital	Interest Rate	

4.6 Source criticism

When using secondary sources there are advantages and disadvantages. For example, the cost is significantly lower in the use of secondary sources. However, there is the risk of losing control of your data as you are not in charge of collection. This might produce the problem of the data not completely fitting to your theoretical concerns. There is a prevailing risk of bias and misinterpreting the data of different sources which must be carefully evaluated and sometimes data needs to be processed to become suitable for the intended study. Being aware of advantages and disadvantages of using secondary sources makes us as researchers considerate and careful in the use of their information. Using secondary data could also provide the benefit of us focusing more on using even more reliable and suitable sources from relevant and well-performed previous studies and sources which gives us the possibility to put more time and focus on conducting statistical tests and analyzing the results as in comparison to the use of primary sources (Cowton, 1998, p. 427-429).

Our way of finding articles and relevant literature have mainly been conducted through the databases of the Umeå University and the University of Groningen libraries. Here we can access articles from many highly rated publishing houses which gives us confidence

regarding the quality of the reviewed literature. We have used articles from the following academic journals listed along with their rating in Table 2 in order to assess their quality.

Table 2 Journals & Ratings (Source Association of Business Schools, 2015)

Journal Title	**Rating**
Journal of Finance	4*
Journal of Management	4*
British Journal of Management	4
Economica	3
Ecological Economics	3
Journal of Business Ethics	3
Academy of Management Review	4*
Review of Financial Studies	4*
Journal of Financial and Quantitative Analysis	4
Review of Financial Studies	4*
Journal of Banking & Finance	3
Academy of Management Journal	4*
Journal of Financial Economics	4*
Journal of Management Studies	4
Journal of Management	4*
Financial Review	3

Explanation of Ratings:

4*: *Journals of Distinction. Within the business and management field including economics, there are a small number of grade 4 journals that are recognised world-wide as exemplars of excellence. Their high status is acknowledged by their inclusion in a number of well-regarded international journal quality lists. The Guide normally rates a journal 4* if they are rated in the highest category by at least three out of the five non-university based listings – Financial Times 45, Dallas List, VHB, Australian Deans' List, CNRS. In addition, journals from core social sciences disciplines that do not appear in those listings may also be rated 4* on the grounds that they are clearly of the finest quality and of undisputed relevance to business and management. In the Guide of 2015, this applies to three journals from the fields of sociology and psychology.*

4: *All journals rated 4, whether included in the Journal of Distinction category or not, publish the most original and best-executed research. As top journals in their field, these journals typically have high submission and low acceptance rates. Papers are heavily refereed. Top journals generally have the highest citation impact factors within their field.*

3: *3 rated journals publish original and well executed research papers and are highly regarded. These journals typically have good submission rates and are very selective in what they publish. Papers are heavily refereed. Highly regarded journals generally have good to excellent journal metrics relative to others in their field, although at present not all journals in this category carry a citation impact factor.*

2: *Journals in this category publish original research of an acceptable standard. A well regarded journal in its field, papers are fully refereed according to accepted standards and conventions. Citation impact factors are somewhat more modest in certain cases. Many excellent practitioner-oriented articles are published in 2-rated journals.*

1: *These journals, in general, publish research of a recognised, but more modest standard in their field. Papers are in many instances refereed relatively lightly according to accepted conventions. Few journals in this category carry a citation impact factor*.

(Association of Business Schools, 2015, p.7)

As established earlier, the use of a deductive approach entails using previous literature as basis for continued studies on the research topic. It is therefore crucial that we use reliable sources as basis for our study. In order to determine if a source is good to use and can be considered reliable in the use of research, there are four criteria to look at according to Scott (1990, cited in Bryman & Bell 2011, p. 545). These are: *authenticity* (that the document is what it purports to be); *credibility* (whether there are grounds for thinking that the contents of the document have been or are distorted in some way); *representativeness* (whether or not the documents examined are representative of all possible and relevant documents, as, if certain kinds of documents are unavailable or no longer exist, generalizability will be jeopardized); and *meaning* (is the evidence clear and comprehensible?). In our research we have continuously used our judgement regarding these criteria in order to establish the use of reliable secondary sources.

When retrieving ESG ratings we have used the Refinitiv Database, this is considered to be a reliable source and is frequently used in the industry. We have searched for companies with issued corporate bonds in the Nordic countries to find data regarding the dependent and independent variables we aim to test. Regarding bond characteristics there is much information to be found via the Datastream tool of the Refinitiv database. There are however many other databases that provides both ESG score and data on bond characteristics, e.g. Bloomberg, MSCI, FTSE Russell. We have used the Refinitiv database as it is accessible via the Umeå University Library and due to its usability with the help of the Datastream tool in order to easily access the data and export it to various statistical programs in which we will perform our tests. We consider the Refinitiv database to be reliable and possess high quality in assessment of ESG factors along with data regarding bond characteristics. Other researchers in the area have used both Refinitiv/Thomson Reuters Eikon and different sources for their sustainability measures. This gives us further proof that Refinitiv is a reliable source but that the measure still needs to be investigated due to the different measures used for sustainability.

4.7 Social and Ethical Considerations

Research ethics is certainly a core issue in conducting any form of scientific study. It concerns the moral values and principles that form the basis of a code of conduct and how results are reported in research (Collis & Hussey, 2015, p. 30). According to Bryman & Bell (2007) there are ethical guidelines that the research should follow during the course of the study. Below we have listed the principles that depict the guidelines and how we intend to follow them:

- Harm to participants – the potential to cause harm through the research process and the need to ensure physical and psychological wellbeing either of research participants, the researcher, or others. – *This will not be a concern as we do not have any participants.*
- Dignity – the requirement to respect the dignity of research participants, researchers or others and avoid causing discomfort or anxiety. – *See above.*
- Informed consent – the need to ensure the fully informed consent of research participants. – *See Above.*
- Privacy – the need to protect privacy of research subjects or avoid invasions of privacy. – *See above.*
- Confidentiality – the requirement to ensure confidentiality of research data whether relating to individuals, groups or organizations. – *We do not include any participants in our study. We will use data from resources available via our university library website, thus we do not run any risk of publicizing confidential data.*
- Anonymity – the protection of anonymity of individuals or organizations. – We *only use publicly available information through databases provided by the university for which the university possess a license, therefore we will not run any risk of breaking anonymity.*
- Deception – the potential for deception through the research process, either through lies or behavior that is misleading. – *We will take every step possible to be transparent in our research process and use of data through secondary sources in order to not deceive. Our results will be presented as clear as possible for readers of this study not to misinterpret the findings.*
- Affiliation – the need to declare any professional or personal affiliations that may have influenced the research, including conflicts of interest and sponsorship, including information about where funding for the research has come from. – *There are no professional nor personal affiliations connected to this research. We are students conducting this research as a degree project and have no connection that could have influence on our results or conclusions.*
- Honesty and transparency – the need for openness and honesty in communicating information about the research to all interested parties, including the need for trust. – *We have clearly described our research philosophy, method and other stand-points in relation to this study. Following this chapter, we will also explain more in detail how we intend to perform our research and statistical testing. We will through every step clearly describe our process and results, thus fulfilling the standards of honesty and transparency in the research.*
- Reciprocity – the idea that the research should be of mutual benefit to researcher and participants or that some form of collaboration or active participation should be involved. – *We do not have any research participants nor collaboration partners in this research. We hope that this study will be of mutual benefit for us as students and our university with the help of which this study has been conducted.*
- Misrepresentation – the need to avoid misleading, misunderstanding, misrepresenting or false reporting of research findings. – *By clearly defining our scientific and research method we aim to avoid any chance of misinterpretation and provide good explanations for every step taken in the process and how we choose to analyze our results.*

During our research we will follow these principles in order to establish that the societal and ethical guidelines are being followed. However, it seems unreasonable that we are at any risk

of going against any societal and ethical consideration in conducting our research as we base the study on publicly available sources and secondary information which will not put us at risk of breaking confidentiality. We will not use any participants in our data collection through e.g. surveys therefore it is unlikely that we will be able to cause any harm to or break confidentiality/anonymity of participants or fail to properly inform participants which is key in data collection with research participants. Our data collection method and our way of conducting statistical tests will be as transparent as possible in order for us to provide reliable findings and results which leave no doubt as to how we came to our conclusions. By conducting a study that follows high societal and ethical standards we hope to contribute with research that is beneficial both to us as students and our university.

Were we see some risk of encountering societal and ethical complications would be if we found that a high ESG score increases the bond yield spread. This would mean that companies with better sustainability considerations in their operations are penalized through a higher cost of debt. This is of course not a desirable outcome and we feel the need to point out that if such a relationship were to be established it is no reason for companies to act irresponsibly regarding ESG factors. Such a result would simply mean that there is no significant gain from acting ESG responsibly in regard to cost of bonds. However, previous research has still proved that responsible behavior is rewarded and therefore our results would simply continue the discussion on what effect ESG measures actually has.

5. Research Method

In this part of the thesis we will explain the method used in the examination of ESG rating – bond performance relationship. We will start by explaining our population and sample, then move on to describing our regressions analysis and regression models along with variables.

5.1 Statistical Hypothesis

As we have now established our theoretical point of reference, theoretical framework and scientific method we move on to the statistical part of this study. A hypothesis is an idea or proposition that is developed from theory which we aim to test using empirical evidence with the use of statistics. We aim to test whether there is a relationship between our variables according to our positivist paradigm and our deductive research approach (Collis & Hussey, 2014, p.51, 77, 104). The hypotheses in our study are:

H_0: There is no relationship between ESG rating and corporate bond yield spread

H_A: There is a relationship between ESG rating and corporate bond yield spread

5.2 Population & Sample

We have decided to focus this study on the Nordic countries. This is due to the fact that there is not much research that has been focused on this area previously, especially when it comes to CSR and the performance of corporate bonds. According to the Country Sustainability Ranking performed by RobecoSAM, the Nordic countries rank at the top of the list which also makes this a good region to perform our study as the high ESG scores provide us with good observations. On the list, Sweden rank #1, Denmark #2, Finland #4 and Norway #5. However, Iceland does not have a rating on the list and therefore we have decided to exclude the country due to the risk of insufficient ESG scores of the companies issuing bonds (RobecoSAM, 2018, p. 3).

Our population are companies that are listed on the Nordic stock Exchanges: Nasdaq OMX Stockholm, Nasdaq OMX Helsinki, Nasdaq OMX Copenhagen and Olso Børs; excluding Iceland. This is because only listed companies possess an ESG rating by Refinitiv and that unlisted companies possess very different company characteristics and responsibilities which is not representative for our population. We are confident that our choice of population will give us the ability to produce good observations of a sample that is representative for the entire population.

We have looked at all corporate bonds that are available in the Datastream tool provided by Refinitiv which have then been filtered to produce a representative sample including information on all variables we aim to take into our regression model. The time we have looked at range over a 10-year period 2009-2019, meaning that we have gathered information

on active bonds from present day and ten years back. We decided upon this time frame in order to produce a sample with enough observations to perform our statistical tests upon and with which we could see the long-term effects of ESG score on bond performance. We have not taken older observations as we believe that that might entail the risk of not finding proper ESG scores for the bond issuers as it is a relatively new concept to the financial market. Thomson Reuters have ESG rating from 2002, mainly US and European but it was first from 2008 that the rating started to become more widespread (Refintiv, 2019, p. 5-6). Taking a longer time span might also introduce some differences to the characteristics of the bond market and the financial landscape which might be difficult to know and incorporate into our model.

As mentioned in our delimitations we have removed financial institutions from our population and sample. This is due to the fact that other researchers commonly find them to represent outliers in their data collection and that we do not believe financial institutions are comparable to other companies as bond issuers (Bassen et al. 2015, p.220).

We found 313 active bonds during this period and 123 of these were issued by listed firms. We have excluded issuers who do not possess ESG scores. All bonds active during this period that possess ESG scores at the same point in time of the spread and also have observations of our control variables at the time, produce our sample of 123 bonds with 201 observations. The ESG score has been used with a lag of one year which will be more carefully explained in later sub-chapters. The sampling process will be more thoroughly described in chapter 6.

5.3 Regression Analysis

Econometricians use regression analysis to make quantitative estimates of economic relationships that previously only have been of a theoretical nature and in this way be able to make conclusions regarding a potential relationship. Using a regression analysis gives the possibility to "explain" movements in one variable (the dependent variable) as a function of movements in a set of other variables (the independent/explanatory variables) through a quantification of one or more equations. To produce a regression analysis, one needs to know previous economic theory and characteristics of the item to be investigated (Studenmund, 2017, p. 5).

As our aim is to find a cause and effect relationship (described in chapter 4) regression analysis is a suitable method to use in this study. Using regression analysis makes this possible and is widely used in economic and financial studies (e.g. Oikonomou, 2014). However, a regression analysis cannot prove a causal relationship, no matter how statistically significant the results may be. All the analysis can do is to test whether a significant quantitative relationship exist or not and to establish the strength and the direction of that quantitative relationship (Studenmund, 2017, p. 6). As this is exactly the aim of our study this is the method we will use in order to establish the potential relationship between our variables. The first step of the process is to identify the model which should be done with the help of appropriate economic theory (Newbold et al. 2014, p. 529). We have already identified the existing literature related to our research and the theories we intend to

incorporate into our analysis, therefore we can move on to establish the model and its variables.

The use of a multivariate regression model allows one to include more than just one independent variable in the linear regression model and works to isolate the impact on Y of a change in one variable from the impact on Y of changes in the other variables. It becomes possible because the multivariate regression takes the movement of the other variables into account when it estimates the coefficient of the variable measured. It is a great challenge to conduct controlled economic experiments as many factors tend to change simultaneously, often in opposite directions. With the multivariate regression analysis one can measure the impact of one variable on the dependent variable, holding constant the influence of the other variables in the equation (Studenmund, 2017, p. 12). This is truly an advantage in conducting research aiming at finding a cause and effect relationship and investigating a financial phenomenon such as this research where we aim to see if there is a relationship between ESG rating and corporate bond yield spread. To perform our analysis, it is relevant to include other independent variables as control variables in order to get a model that properly explains the movements in the dependent variable and for us to be able to draw any conclusions regarding a possible cause and effect relationship.

However, it is more or less impossible to get a model that completely explains the variations in the dependent variable with the help of the independent variables in a model and therefore a stochastic error term is incorporated in the model to account for the random errors that cannot be explained by our independent variables (Studenmund, 2017, p. 8). There are at least four sources of variation in the dependent variable other than the variation that is included with the help of our independent variables. These are: 1) That many minor influences on the dependent variable may be omitted from the equation and we cannot include ALL variables. 2) It is virtually impossible to avoid some sort of measurement error in the dependent variable. 3) The underlying theoretical equation might have a different functional form than the ones chosen in the equation, for example the underlying equation might not be linear. 4) All attempts to generalize human behavior must contain at least some amount of unpredictable variation (Studenmund, 2017, p. 9). Due to these imperfections of the regression model we have chosen to incorporate the error term in our model as well.

5.3.1. Ordinary Least Squares

The use of the Ordinary Least Squares (OLS) regression is mainly due to its simplicity and the very reasonable technique of trying to minimize the sum of squared residuals to get an estimated regression as close as possible to the observed data. OLS also have estimates with two useful properties; the sum of the residuals is exactly zero and that OLS can be shown to be the "best" estimator possible under a set of specific assumptions (Studenmund, 2017, p. 37).

It is very uncommon that a dependent variable can be single-handedly explained by only one independent variable. Therefore, it makes sense to include more independent variables to

describe the changes in Y with the help of X variables and create a multivariate regression model (Studenmund, 2017, p. 40-41).

For the OLS model to be the "best" estimator available for regression models there are some basic assumptions that needs to be fulfilled. The classical assumptions of the linear regression model are (Studenmund, 2017, p. 92-93):

I. The regression model is linear, is correctly specified, and has an additive error term
II. The error term has a zero population mean
III. All explanatory variables are uncorrelated with the error term
IV. Observations of the error term are uncorrelated with each other (no serial correlation)
V. The error term has constant variance (no heteroskedasticity)
VI. No explanatory variable is a perfect linear function of any other explanatory variable(s) (no perfect multicollinearity)
VII. The error term is normally distributed (this assumption is optional but usually invoked)

One of the most important jobs in a regression analysis is to decide whether the classical assumptions are met for the particular equation and its variables. Otherwise, pros and cons of needed alterations need to be considered and adjustments needs to be made to the OLS model for it to be able and produce reliable statistical results (Studenmund, 2017, p. 92-99).

5.3.2 Generalized Least Squares

If the model fails to meet the classical assumptions, other estimation techniques such as the Generalized Least Squares model (GLS) are more suitable. GLS is a common way to adjust an equation for first-order serial correlation and in the process restore the minimum variance property to its estimation. GLS starts with a flawed equation that does not meet the classical assumptions listed above and transforms it into an equation that meets the assumptions (Studenmund, 2017, p. 292). When you have applied the GLS, the model adjusts the original equation as it tries to eliminate the heteroskedasticity, the new model therefore assumes that heteroskedasticity is no longer a problem (DeFusco et al., 2004, p. 467).

Another technique to rid the model of these issues is to create robust standard errors, which corrects the standard of the linear regression model's estimated coefficients to account for the conditional heteroskedasticity (DeFusco et al., 2004, p. 467). In later chapters we will analyze our original regression model and see if there are some alterations like the ones mentioned here that needs to be made.

5.4 Theoretical Regression Model

In order to find a cause and effect relationship between the variables ESG rating and corporate bond yield spread, we have formed a regression model based on previous research

(e.g. Oikonomou, 2014) and our own view on what dependent and independent variables that should be used in estimating this relationship. Below we will describe our initial regression model along with the included variables.

$$SPRD_{it} = \alpha + \beta_1 ESG_{it} + \beta_2 DE_{it} + \beta_3 ICR_{it} + \beta_4 ROA_{it} + \beta_5 MtB_{it} + \beta_6 CR_{it} + \beta_7 IND_{it} + \beta_8 MAT_{it} + \beta_9 DUR_{it} + \beta_{10} CON_{it} + \beta_{11} NA_{it} + \beta_{12} BP_{it} + \beta_{13} MarCap_{it} + \varepsilon_{it}$$

Where,

SPRD = Yield spread
ESG = Combined ESG Score
DE = Debt to Equity Ratio
ICR = Interest Coverage Ratio
ROA = Return on Asset Ratio
MtB = Market to Book Ratio
CR = Current Ratio
IND = Industry Classification
MAT = Bond Maturity
DUR = Bond Duration
CON = Bond Convexity
NA = Nominal Amount Issued
BP = Bond Price
MarCap = Market Capitalization

5.5 Variables

In this section we will explain the variables that we have decided to include in our statistical model and testing.

Variables are attributes or characteristics of the phenomenon under study that can be observed or measured. Before beginning our data collection we made sure to thoroughly consider each variable and what connection it might have to the relationship we intend to investigate, this has been done with the help of previous research in order for us to be able to produce a good regression model and thus produce valid statistical tests which can be analyzed and give us the possibility to make conclusions regarding a potential relationship (Collis & Hussey, 2014, p. 201).

After consulting previous research, we have produced an initial regression model which we will then analyze to make sure that we produce a good model for evaluating if there is a cause and effect relationship. Each specific variable and the relationship between the variables will be investigated and considered. In that way, we intend to produce a valid model which we can use in our regression analysis.

5.5.1 Yield Spread (Dependent Variable)

In order to analyze the effect of ESG rating on bond performance we have looked at yield spreads as we, along with previous researchers consider this a good measure of the perceived quality of the bond and its cost (Kebewar & Shah, 2013, P. 2). Using the yield spread to assess bond performance have been done in several studies. Oikonomou et al. (2014) have looked at yield spreads by calculating a synthetic sovereign bond with which they could compare corporate bonds. Stellner et al. (2015) look at z-spreads which are defined as a parallel shift of a certain benchmark's spot rate curve to equal a fixed income instrument's discounted cash flows to its market prize, this allows the measure to incorporate information on the entire yield's curve (Stellner et al., 2015, p. 542). Huang et al., (2018) look at the credit spread which is the difference between corporate bond yield and the treasury bond yield with comparable maturity (Huang et al., 2018, p. 268).

There are many measures to use when looking at bond performance, but we have found yield spread to be the best measure in order to test and also achieve good results. We will evaluate the spread in comparison to German government bonds of the same maturity, as this is a good proxy for the risk-free rate due to Germany's very good credit rating. By using this measure and way of calculating the spread we will be able to assess the risk premium required by investors for investing in the specific bond and bearing the associated risk.

Refinitiv defines the interest yield as *"the ratio of a coupon of a security to its market price expressed as a percentage"*. It is calculated in the following way:

$$Interest\ yield = \frac{g * N * (1 - t_g)}{P * E - A * (1 - t_g) + Q}$$

Where,

g = Coupon
N = Nominal value
t_g = Income tax rate/100
P = Gross price
E = Expense factor
A = Accrued interest
Q = Amount to be paid, partly by stock

The principle Refinitiv have used in calculating the yield to redemption is to consider the amount of money paid for the stock (price including accrued interest and expenses) and relate this to the future dividend and capital payments, either or both of which may be paid net of tax. It is a net present value calculation, equating the amount of money paid for the bond to the discounted income and capital payments (the yield being the discount rate) which make the two equivalents to each other. It is calculated in the following way:

$$\left(1 + \frac{annual\ yield}{100}\right)$$

The yield spread used in this study has been calculated by subtracting the yield-to-maturity value for the matched German sovereign bond from the observed yield-to-maturity value for the corporate bond. The value for yield to maturity is retrieved from Refinitiv's variable "Yield to redemption".

5.5.2 Combined ESG Lagged (Independent Variable)

We have used Refinitiv's combined ESG (ESGC) score in order to account for environmental, social and governance factors as well as controversies. Several previous studies have used Refinitiv (previously Thomson Reuters, Eikon) as their source for the ESG score. For example, Stellner et al. (2015) uses the ASSET4 ESG Score which has now been replaced with the new Thomson Reuters ESG Scores. Refinitiv have one of the largest ESG databases in the industry and covers over 7000 public companies globally. They cover over 400 different aspects of ESG since 2002. Over 150 analysts are working with collecting and analyzing the data input that creates the ESG score. Refinitiv also uses several systems to check for errors in their processes (Refinitiv, 2019).

Refinitiv offers a wide range of different variables of the various components of the combined ESG score. However, controversies, like norm breaching actions or bad media reporting, is not provided as a separate variable. We could have created our own ESG score, with our own weights but then we would not be able to include controversies in our score, since Refinitiv does not offer any individual variable for the component of the score that accounts for controversies. We argue that the controversies are important to include since it gives an indication on whether the company is "walking the talk" or actually living up to their promise. Since the ESG score is mostly based on information provided by the companies themselves (corporate websites, sustainability reporting etc.) (Refinitiv, 2019 p. 4) it is hard to distinguish what is real and not, hence controversies are a very important part of the validity of the ESG score.

Refinitiv's combined ESG score have the following weights: Environmental 34%, Social 35,5% and Governance 30,5% (Refinitiv, 2019, p. 18). We can see that the three factors possess similar weights. However, the social score is the heaviest followed by the environmental and governance scores. A further detailed explanation of what is incorporated into the different factors and what contributes to the different weights can be seen in Appendix 1.

5.5.3 Control Variables

Duration

Duration is added to the model since it is the standard measure of interest rate risk of the bond and represents the bond volatility (Oikonomou et al. 2014, p 59). The modified duration

measures how sensitive the bond's price is to changes in its yield. The modified duration is calculated by Refinitiv in the following way:

$$MD = \frac{D}{(1+\frac{Y_h}{H*100})}$$

Where,

MD	= Modified duration in years
Y_h	= Yield compounded H times per annum
H	= Coupon frequency

Duration is a common way of assessing bond volatility and have been used in previous studies researching the yield spread (e.g. Oikonomou et al. 2014). A higher value for duration would indicate that payments of interest and principal will happen at a later date which should be connected to higher spreads (Stellner et al., 2015, p. 543). We believe this measure could have a significant impact on yield spread as interest rate risk and volatility of the bond most likely will affect the required risk premium of the bond and thus affect the yield spread.

Convexity

Convexity is the second derivative of a bond's price with respect to the bond's yield. Convexity, together with modified duration (described above), provide a more reliable estimation of the percentage price change resulting from a specified change in a bond's yield, compared to modified duration alone (Oikonomou et al. 2014, p. 59). The data was collected from the variable Convexity to Maturity from Refinitiv.

$$CX = \left[\left(\frac{100+Y}{100+Y_1}\right)^D + \left(\frac{100+Y}{100+Y_2}\right)^D - 2\right] \times 10^8$$

Where,

CX	= Convexity
Y	= Yield
Y_1	= Yield plus one basis point (1 basis point = 0,01%)
Y_2	= Yield minus one basis point
D	= Duration to maturity

We believe that this variable will further explain volatility of the bond. As described, it is a good complement to Duration and we hope that by including this variable in our model we can give it an even better explanatory power than inclusion of only one of the measures would.

Bond Price

Bond price is added because it represents the value of the bond. We have used Refinitiv's default price variable to get the most accurate measurement of the price in a way that is

comparable between bonds. Previous studies have used other measurements of price as an indication of liquidity of the bond with the bid-ask spread (Stellner et al., 2015, p. 543).

Since price of the bond reflects investor recognition and valuation due to the ability to see if the bond is trading at discount, par or premium we believe that this variable could also have a relationship with the yield spread. The spread is along with price highly dependent on the perception by investors of the bond and the bond issuer. Since Datastream use the default price as a comparison of bonds and how they are valued in the market we believe it can offer our model explanatory power and show how valuation of the bond also reflects required risk premium.

Maturity

Maturity is the time from the date of issue to the due date of redemption. Maturity is added in the model since it is likely that longer maturities will have higher premiums as the money is borrowed for a longer period of time. Hence, they have a higher default risk. In contrast, bonds with shorter maturities would potentially be considered as bearing less risk (Oikonomou et al. 2014, p. 59).

This would instinctively mean that bonds with longer maturities possess higher yield spreads and that bonds with shorter maturities have a lower yield spread. We therefore believe that this variable could have a connection to our dependent variable and offer explanatory power. The variable is collected from Refinitiv.

Nominal Amount Issued

Nominal Amount Issued represents the face value of the bond (exclusive of the premium). It is the face value that is used in the computation of the interest that is due on the security. It is added to the model to account for economies of scale in underwriting meaning the fee connected to bearing risk and is likely to have a negative relationship with spread and a positive effect on credit rating (Oikonomou et al. 2014, p. 59). Meaning that companies with the ability to issue larger amounts of bonds could be considered more reliable due to their size and should possess a better credit rating due to their ability to accumulate capital. If this capital is then used for sound and value creating investments it could also be relevant to bondholders. The information is collected from Refinitiv's Nominal Value variable.

Debt to Equity Ratio

The Debt to Equity Ratio is calculated by dividing the total debt with the total equity at year end. This ratio is commonly used to measure leverage of firms. A higher leverage ratio could be related to higher default risk since firms with a lot of debt might find it hard to cover its obligations in a later stage (Oikonomou et al. 2014, p.58). The ratio is provided and calculated by Refinitiv.

$$\frac{Debt}{Equity}$$

Some amount of leverage is usually considered good as it is required for value creating investments. However, too much leverage would lead to very high interest payments which is not in the bondholders' best interest. On the other hand, ability to accumulate a lot of debt might also indicate an entity's good credit rating and benefit of receiving good financing terms which should be well looked upon by bondholders. This is a common ratio to evaluate a company's finances as it is likely to have an effect on bond yield spread.

Interest Coverage Ratio

The Interest Coverage Ratio is calculated by dividing the earnings before interest and tax (EBIT) with the amount spent on interest payments incurred by debt. This variable is included in the model since it can give an indication of the default risk, similar to Debt to Equity Ratio. In theory, this variable should have a negative relationship with spread and positive relationship with credit rating as a high ratio would indicate good ability to pay interest to debtholders (Oikonomou et al., 2014, p.58; Stellner et al., 2015, p. 543). This ability should be highly relevant to bondholders as their primary concern is the bond issuer's ability to repay debt. Therefore, it makes a good component to our model and our attempt to increase its explanatory power. The ratio is provided and calculated by Refinitiv.

$$\frac{EBIT}{IntExp}$$

Current Ratio

The Current Ratio is calculated by dividing the book value of current assets with the book value of the current liabilities. This variable is included in the model to account for the firm's short-term solvency capacity and ability to respond to liabilities with the help of relatively liquid assets (Oikonomou et al., 2014, p.58).

$$\frac{Current\ assets}{Current\ liabilities}$$

Having a high current ratio should indicate good ability to respond to claims. On the other hand, a considered too high ratio would indicate that the company is not spending their assets wisely and not making the necessary investments for the company's profitable future. The Current Ratio is a common way to assess the firm's financial performance and bondholders should not be any different from other investors when choosing where to invest their money thus it is likely to affect the yield spread. The variable is provided and calculated by Refinitiv.

Market Capitalization

The Market Capitalization is calculated by multiplying the market price at year end with the common shares outstanding for the bond issuer. This variable is included in the model as a proxy of firm size. Larger firms have a tendency of being more stable and with a longer financial history, something that can affect the borrower-investor relationship and should have negative relationship with spread and a positive relationship with credit rating. Size might be an indication of economies of scale when it comes to issuance of bonds and a more solid financial history can prove the company's historical ability of answering on debt claims (Oikonomou et al. 2014, p.58;). The Market Capitalization variable is provided and calculated by Refinitiv.

Return on Assets Ratio

The Return on Assets Ratio (ROA) is calculated by dividing total sales with total assets at year end. It is a ratio used in accounting to measure how efficient the firm uses its resources and assets. It is also a measure of the firm's ability to produce profit to cover their debt obligations (Oikonomou et al. 2014, p.58). Higher profitability should also generate better credit ratings and lower spreads (Stellner et al., 2015, p. 543).

$$\frac{EBIT}{Total\ Assets}$$

As the ratio looks on the way acquired assets (which could be financed through bonds) can generate earnings which then can be used to repay debtholders, this should be a variable affecting the yield spread. It is yet another measure of the firm's profitability and ability to repay debt which is highly significant for bondholders and should affect the required risk premium. The ratio is provided and calculated by Refinitiv.

Market to Book Ratio

Market to book ratio is added in the model since it can be an indicator of potential financial distress of the firm (Oikonomou et al. 2014, p.58). It is calculated by dividing market capitalization with the total book value.

$$\frac{Market\ value}{Book\ vaule}$$

This ratio will therefore show the company's market value in relation to its accounting value. A ratio below one may indicate that the firm is undervalued in the market in relation to what is revealed through financial statements. On the opposite, a value above one might indicate that the company is overvalued. However, there might be other things leading to a higher market value than what is expected from the book value as there are companies who might possess other potentials such as valuable human capital or future possibilities that is not reflected in financial statements. The variable could again be an indication of how investors

perceive and value the company which determine the company's fundraising ability in the market. The variable is calculated and retrieved from Refinitiv.

Industry

The industry the company is operating in is included as a dummy variable. The industry information is retrieved from Refinitiv's general Industry Classification variable. The classification is representing the general industry which the company is operating in. It includes six different groups; industrial, utility, transportation, bank/savings and loans, insurance and other financial industry.

It is reasonable to assume that some industries are considered as bearing more risk than others and that bond investors prefer some industries to other when making their investments decisions. Previous research has also shown that certain industry sectors have a different risk premium in the bond market even though they possess the same credit rating (Longstaff & Schwartz, cited in Oikonomou et al. 2014, p. 59). Therefore, we choose to include this as a variable in our model.

6. Data & Results

In this chapter we intend to explain the way we have gathered and processed data. We will have an overview of our descriptive statistics to later move on the diagnosis of our regression model where we investigate the classical assumptions of the linear regression and how these have been tested and adjusted for. As a result, we will be able to formulate an adjusted theoretical model. Our empirical results will be based upon hypothesis testing with the help of that adjusted theoretical model.

6.1 Data Collection & Processing

We will retrieve our data on ESG rating and yield spread along with control variables on corporate bonds from the Refinitiv database via the Datastream tool in Microsoft Excel. A widely used and acknowledged database used in many previous studies (e.g. Oikonoumou, 2014). The Refinitiv Database is formerly known as the Financial and Risk business of Thomson Reuters. Refinitiv supply products for financial analysis such as the Eikon desktop and Datastream tools. In this thesis we have used the Datastream tool which is useful for trends, trading ideas and market viewpoints. Datastream is Refinitiv's historic financial database with over 35million individual instruments and indicators across all major asset classes including 8,5 million active economic indicators. The tool gives access to 65 years of data stretching over 175 countries with the information needed to interpret the market trends, economic cycles and the impact of world events. In this tool one can find information regarding bonds, bond indices, commodities, convertibles, derivatives, economics, energy, equities, equity indices, ESG factors, estimates, exchange rates, fixed income, funds, fundamentals, interest rates and investment trusts (Refinitiv, 2018). As this is a very diversified and reliable tool with good and easily accessible information regarding both bonds and ESG scores/factors, it is suitable to use in our archival study using secondary data.

We initially started by filtering bonds to the Nordic countries. We began with all bond maturities as well as in perpetuity. Bonds in perpetuity was later excluded from the sample since the characteristics are a bit different compared to bonds with a fixed maturity. Different bonds were filtered down to only corporate bonds as it is our intended study area. Then bonds with fixed coupons where chosen to be able to have a comparable sample and avoid the need to adjust for changing coupon rates. The time period chosen for the bonds was taking present date and stretching ten years back in time.

In the next step we needed to manually examine which bonds had issuers that were listed on the stock market and then removed the unlisted issuers to produce a sample with ESG scores, as ESG ratings are only given to listed companies. The search and matching of bonds with equities was based on "name of borrower" provided by Refinitiv, as the name of the bond and the name of the issuer might differ. After filtering and choosing our sample we found 123 bonds that we could connect to listed equity. We needed to remove 190 bonds from our sample because they were issued by unlisted companies which decreased the number of observations. The bond data was collected on an annual basis meaning that one bond could

produce several observations (one observation for each year the bond was active during the timespan). The data of the 123 specific bonds therefore produced 1 117 observations. Using bonds as a way of raising funds is more relevant for unlisted firms than listed firms which also have the option to issue stock, this could be a reason why so many of the bonds in our initial screening were issued by unlisted companies.

After manually reviewing the observations we chose to exclude bonds that were listed on stock exchanges in countries outside the Nordics and in other currencies than those in the respective countries (SEK, NOK, DKK & EUR) as we did not believe these observations were representative for our population of companies listed in the Nordic countries. Our data collection and processing finally resulted in 201 observations from 30 different bond issuers (a full list of bond issuers can be found in Appendix 3).

In our selection process and production of sample we moved from the six different industries listed in Datastream, to a sample only represented by two general industries; Industrial and Transportation. This is somewhat unfortunate as with such a low representation of industries it might become difficult to draw any conclusions regarding the impact of industry.

All information on our control variables (Maturity, Amount Issued, Duration, Bond Price, Debt to Equity Ratio, Interest Coverage Ratio, Return on Asset Ratio, Current Ratio, Market Capitalization, Industry, Market to Book Ratio) were as well retrieved from the Refinitiv Datastream tool. All currencies for the control variables were converted to EUR.

Then we collected data for German sovereign bonds with zero coupons (as the risk-free rate is assumed to pay no coupon). We used the Yield to Maturity for the corporate bonds and subtracted the Yield to Maturity for the sovereign bond (with matching maturity) to calculate the yield spread
This calculation of the spread was conducted in a similar way as in the study by Oikonomou (2014) but we have used real German sovereign bonds as a comparison to calculate the spread instead of a synthetic risk-free bond.

All data was gathered with the Datastream plug-in tool using Microsoft Excel which was then compiled to one excel master file containing all our data where we also matched all variables to produce our observations. This data was later imported to Stata 15.1 where we ran our regression models and did all our statistical tests which will be described in the following sub-chapters. After producing the observations and importing them to Stata we could identify two extreme outliers, that inhibited very large spreads and extreme values for Return on Assets which then were eliminated from the sample and statistical tests.

6.2 Descriptive Statistics

As an initial step in our regression analysis we produced descriptive statistics for our original model with all initially chosen variables. This was to gain understanding of our model and its variables. This model will then be analyzed through testing of the classical assumptions

of the Ordinary Least Squares Regression and then the necessary modifications will be made to our model in order for us to produce valid statistical test and results.

In table 3 below we show the descriptive statistics of our regression model:

Table 3 Descriptive Statistics

Variable	Observations	Mean	Std. Dev.	Min	Max
SPRD	201	2.192581	1.585323	.5638	13.6341
ESG	201	54.23388	17.11375	11.18	85.38
MAT	201	6.256219	1.822162	2	11
NA	201	217433	313096.9	9591	1250000
DUR	201	3.64458	1.791401	0.1917	8.3137
CON	201	16.62004	14.61501	.5342	67.1919
Bond Price	201	103.088	4.04761	89.75	119.83
DE	201	55.84507	28.0222	8.16	156.46
ICR	201	14.3627	13.13245	-4.442	67.149
ROA	201	0.0807784	0.0572975	-0.0534542	0.3633395
CR	201	1.580945	0.81318572	0.52	6.84
MarCap	201	5978764	4585357	558718	1.73e+07
IND	201	0.9253731	0.2634445	0	1
MtB	201	2.896269	1.660828	0.53	10.14

In our analysis we use a sample of 201 observed bonds with maturities ranging between 2 and 11 years which represent the population of listed companies in the Nordic countries.

We can see that the minimum ESG Score is 11.18 and the highest is 85.38 which represents a wide spread between the lowest and highest scoring companies, with the lowest ESG grade being D and the highest being A. The mean ESG Score in 54.23388 which is equivalent to a B- grade. A full list with ESG score intervals and its connected grade can be seen in Appendix 4. We can also see the minimum level of yield spread is 0.5638% and the highest spread is at 13.6341%.

Our model shares many characteristics with the model used by Oikonomou et al. (2014). However, our descriptive values are a bit different, this could possibly be explained by the differences in markets and time. Compared to Oikonomou et al. (2014) we find lower values for the variable Nominal Amount Issued meaning that the companies in our study in general possess lower face values for issued bonds than the companies in Oikonomou et al.'s study. This is probably due to our study being done on companies in the Nordic countries while Oikonomou et al.'s study is on US corporations with a larger sample and also larger corporate sizes. As mentioned before a lower Nominal Amount Issued could potentially have an increasing effect on yield spread due to lack of economies of scale and also a negative effect on credit rating.

We can also see that our observations have lower values for Duration, Interest Coverage Ratio and Return on Asset Ratio. In Table 3 we can see that the companies in our sample take on Market to Book Ratios (MtB) between 0.53 and 10.14 where values below 1 would indicate that the company is undervalued and values above 1 would indicate overvalued companies, which means that our sample includes companies that are both under- and overvalued. The mean MtB is however 2.896269 which indicates that most companies in our sample could be considered overvalued or possess other valuable attributes that does not show in financial statements.

In Table 4 is a correlation matrix with the variables used in our regression model. Correlations that are above 0.5 have been highlighted to clarify which variables might possess some similar attributes and thus generates correlation between them. In this original model correlation matrix, we were primarily concerned regarding the correlation between Duration and Convexity (0.9349). Therefore, these variables will be further investigated in the following chapter Model Diagnostics.

Table 4 Correlation Matrix of Theoretical Model

	SPRD	ESG	MAT	NA	DUR	CON	BP	DE	ICR	ROA	CR	MtB	MarCap	IND
SPRD	1.000													
ESG	0.2365	1.0000												
MAT	0.0767	0.2499	1.0000											
NA	0.0889	-0.3455	0.1753	1.0000										
DUR	0.1053	0.1386	0.5848	0.1416	1.0000									
CON	0.0874	0.0957	0.5902	0.1772	0.9349	1.0000								
BP	-0.1817	0.2589	0.4256	-0.0293	0.0579	-0.0340	1.0000							
DE	0.1519	0.0674	-0.1918	-0.0985	-0.1340	-0.1939	-0.0444	1.0000						
ICR	-0.2549	-0.1317	-0.0671	0.2958	-0.1359	-0.1394	0.0092	-0.4273	1.0000					
ROA	0.0425	0.0699	0.0409	0.1564	-0.0738	-0.0838	0.1075	-0.2998	0.6182	1.0000				
CR	0.4703	-0.1048	-0.0271	-0.0880	-0.0660	-0.0673	-0.0459	-0.0916	0.0475	0.5023	1.0000			
MtB	-0.2814	0.1102	0.1265	0.2113	-0.0719	-0.0865	0.2585	-0.0196	0.4760	0.5291	0.0147	1.0000		
MarCap	-0.2387	-0.1540	0.2123	0.4095	0.0702	0.0515	0.1294	-0.4192	0.2806	0.2820	0.0138	0.1725	1.0000	
IND	0.0288	-0.1106	-0.1266	-0.4437	-0.0705	-0.0400	-0.1811	-0.0996	0.0680	-0.1644	0.1456	-0.3109	-0.1267	1.0000

Duration (DUR) and Convexity (CON) also showed high correlation in relation to Maturity (MAT) (0.5848 and 0.5902 respectively), which is no surprise as both Duration and Convexity are calculated with Maturity. Return on Asset Ratio (ROA) has a correlation with Interest Coverage Ratio (ICR) of 0.6182 which also is a reasonable outcome as both ratios use EBIT as numerator. Current Ratio (CR) and Return on Assets Ratio (ROA) possess a correlation of 0.5023 which makes sense due to the use of assets in the calculation of the measures. Return on Assets is as well correlated to some extent with Market to Book Ratio (MtB) (0.5291) this is probably due to the book value being related to total assets of the firm.

The variables in our model do not possess any negative correlations higher than 0.5. However, some relationships that have higher negative correlations are Interest Coverage Ratio (ICR) and Debt to Equity Ratio (DE) with -0.4273 indicating that when ICR increases DE decreases and vice versa. This could indicate a better ability to pay interest obligations

by less leveraged firms, both measures are indicators of financial performance. Market Capitalization (MarCap) and Debt to Equity Ratio (DE) is correlated by -0.4192, which could mean that companies with larger market value and size is connected to lower levels of debt, this is not an unreasonable thought as companies with larger capital stemming from equity would not need the same amount of leverage as other firms.

At this stage we choose to include all initially chosen variables even though some might present correlations above 0,5 this is to maintain a good R-Squared and a model that better explains movements in the dependent variable with the help of the independent variables. The variables that are correlated with each other are still useful as they measure different aspects of the relationships in our model. However, the model will be further analyzed in the following parts of this chapter in order assess whether some of these relationships might introduce some issues to our model and its ability to produce valid results in our statistical tests.

6.3 Model Diagnostics

In this section we will go through the linear regression's classical assumptions listed in chapter 5 in order to determine whether our intended regression model is valid and therefore can be used to draw conclusions regarding the cause and effect relationship between yield spread and ESG rating.

6.3.1 Linearity

As the first classical Assumption I state, the regression model needs to be linear and the error term needs to be additive. One way of making sure that the model is linear is to deeper investigate the relationship between the dependent and the individual independent variables to establish whether the individual relationships are linear. This can be done with a simple correlation matrix to determine the strength of the linear relationships. Secondly one can investigate if there are strong simple relationships between the pairs of possible predictor variables. It is also useful to look at the relationship between the variables using scatterplots (Newbold, 2013, p. 529-530). See Appendix 5 for a simple correlation matrix.

Plotting the residuals against the fitted values of the regression is another way to establish linearity. The residual is the difference between the observed value and the estimated value of the dependent variable (Newbold, 2013, p. 478). One should always plot the residuals against the predicted or fitted values of the dependent variable. This analysis can determine if the model errors are stable over the range of predicted values. If you find no pattern in the residuals vs the fitted values you can assure yourself that the model errors are stable over the range (Newbold, 2013, p. 536). We started our model diagnostics with testing this first assumption through plotting the residuals against the fitted values (See Figure 2).

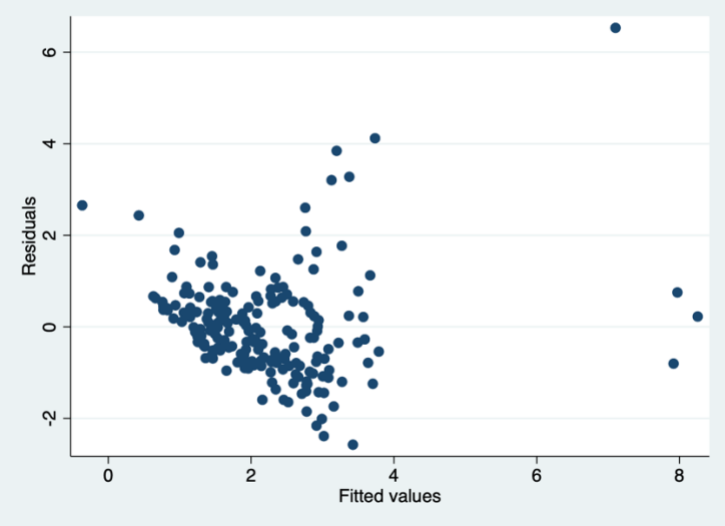


Figure 2 Scatterplot Residuals vs. Fitted values

As we found some difficulties with linearity of the model we felt it necessary to make alterations to our model to adjust for this. Two common ways to adjust for this is quadratic and logarithmic alterations to the variables. Many economic and business relationships may lack a strictly linear model but a good way to alter this is to make the dependent variable a logarithmic one (Newbold, 2013, p. 514-517). Linear regression analysis can still be used for a model that is non-linear in the variables as long as the coefficients are linear. The choice of functional form should be based in the underlying theory and not which form produces the best fit (Studenmund, 2017, p.193). The semi-log function is when some, but not all variables take on a logarithmic function. By taking the logarithm of the dependent variable one will get a model where changes in the independent variables explains the percentage change in the dependent variable (Studenmund, 2017, p. 199). As we are measuring the yield spread in percentage terms this is a suitable functional form for our model which also helps us adjust for non-linearity in the model.

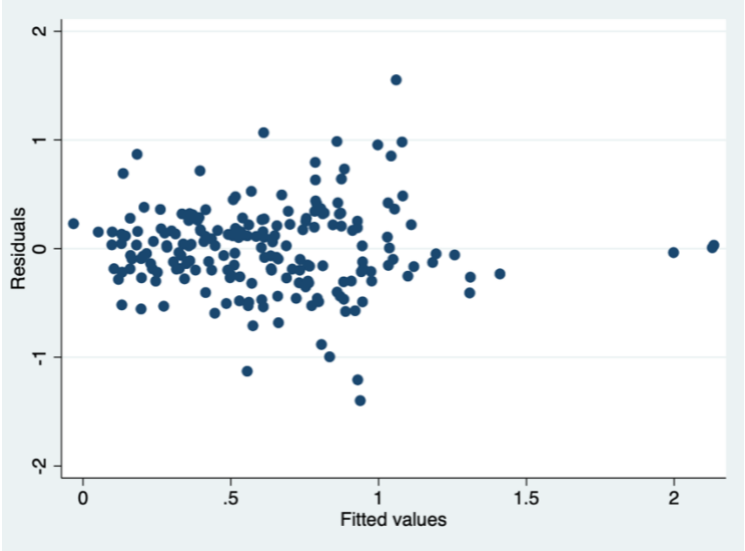


Figure 3 Scatterplot Residuals vs. Fitted Values (log)

With the log-alteration of the dependent variable yield spread and the inclusion of an additive error term in the model we could improve the residual vs. fitted values plot (which can be seen in Figure 3) and therefore we consider the model to meet the classical Assumption I.

6.3.2 Distribution and Correlation of the Error Term

The first step in analysis of the residuals or the error term is to examine the pattern of the residuals with the help of a histogram. Our aim is to find that we have a normally distributed error term around the mean zero. That the error term has a zero population mean (Assumption II) is important as the specific value of the error term is supposed to be drawn completely from chance and means that when the entire population of possible values for the stochastic error term is considered the average value of the term should be zero. However, if the error term does not have a mean of zero in an equation that includes a constant, then estimation of the coefficients absorbs the non-zero mean and the estimates of the other coefficients are unaffected (Studenmund, 2017, p. 94-95).

Assumption VII about the normal distribution of the error term is seen as optional for the OLS regression. It is primarily a concern in hypothesis testing and confidence intervals, which use the regression coefficients to investigate hypotheses regarding economic behavior. However, the assumption is still useful for two reasons: 1) As the error term is a sum of smaller errors the individual minor influences, together moves closer to the normal distribution, 2) The t-statistic and f-statistic in the hypothesis testing are not truly applicable unless the error term is normally distributed (Studenmund, 2017, p. 98-99).

As we aim to perform this study by conducting hypothesis testing, we still wish to fulfill Assumption VII to keep validity of our test statistics even though some statisticians may deem it optional.

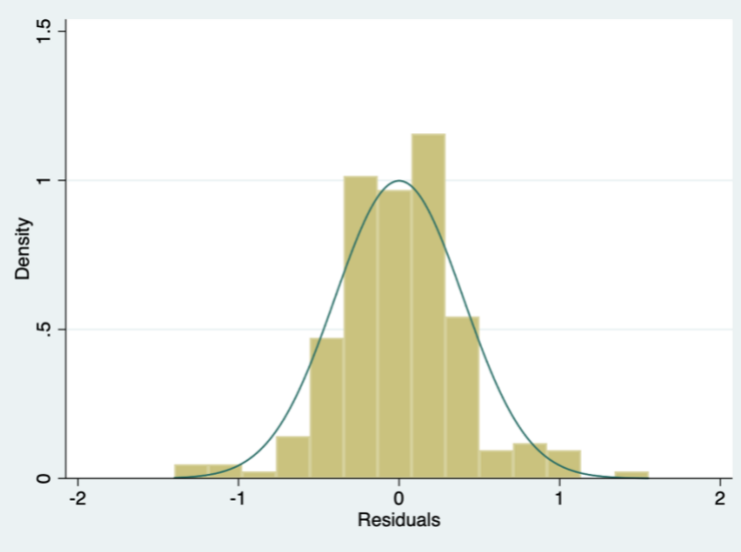


Figure 4 Distribution of Error Term

We have found that the error term was very close to normally distributed around the mean zero by investigating the distribution through a histogram (see Figure 4). What we could assume from the histogram is that the distribution approximately follows a normal distribution by including a normally distributed reference line. However, we found it useful to further investigate that the error term had a zero population mean, thus we investigated the descriptive statistics of the error term and found that the population mean to be very close to zero (-5.00e-10) as can be seen in Appendix 7. Therefore, we conclude that the model fulfills Assumptions II & VII of the simple linear regression.

As Assumption III states, all independent variables need to be uncorrelated with the error term. If the independent/explanatory variables were to be correlated with the error term, the OLS estimates would likely attribute some of the variation resulting from an independent variable to the dependent variable that in fact should be attributed to the error term. This assumption is mostly violated when an important variable is excluded from the model (Studenmund, 2017, p. 95-96). To test for this assumption, we performed a correlation test of the error term against the independent variables as can be seen in Table 5.

Table 5 Correlation Residuals vs. Independent Variables

	Residuals
Residuals	1.0000
ESG Score	0.0000
Maturity	0.0000
Amount Issued	-0.0000
Duration	-0.0000
Credit Default Swap	0.0000
Debt to Equity Ratio	0.0000
Interest Coverage Ratio	0.0000
Return on Asset Ratio	-0.0000
Current Ratio	-0.0000
Market to Book Ratio	0.0000
Market Capitalization	-0.0000
Industry	0.0000

By looking at the correlations between residuals and the independent variables we could conclude that there are no correlations between the residuals and the independent variables, therefore the model meets Assumption III.

6.3.3 Serial Correlation

Assumption IV concerns the way observations of the error term are correlated with each other. In other words, that there is serial correlation of the observations. The observations of the error term are supposed to be independent from each other. If a systematic correlation exists between the observations of the error terms, the OLS estimates will be less precise than estimates that account for the correlation. However, this assumption is most important in

time-series where it would make sense that e.g. an economic shock in one period would affect the following observation of the error term as well (Studenmund, 2017, p. 96).

Normally the researcher would use the Durbin-Watson or the Lagrange Multiplier tests to detect serial correlation (Studenmund, 2017, p. 284-291). We did not use either of these tests as it primarily suitable for time series and for models with non-stochastic residuals.

In this study we are using cross-sectional data for yield spread and other bond characteristics. Therefore, we run no risk of serial or autocorrelation. Some bonds have data ranging as far as for 5 consecutive years, but most data are for individual years and therefore this will not be an issue in our model. Thus, we consider the model to meet Assumption IV.

6.3.4 Heteroskedasticity

In the OLS regression model the researcher needs to assume that the variance of the error term is the same across all observations (Assumption V), meaning that they are continually drawn from identical distributions. If the variation in the error term is not constant it causes the OLS to give inaccurate estimates of the standard errors of the coefficients. Violations of this assumption is called heteroskedasticity (Studenmund, 2017, p. 96-98). As this is more commonly a problem when using cross-sectional data and not time-series data it becomes more relevant for us to fulfill this assumption (Studenmund, 2017, p. 306).

Heteroskedasticity can both be pure (caused by the error term of the correctly specified equation) and impure (caused by model specification error). There are three major consequences of a model with heteroskedasticity; 1) Pure heteroskedasticity does not cause bias in the coefficient estimates, however it does not guarantee accurate coefficient estimates since the heteroskedasticity increases the variance of the estimates. Impure heteroskedasticity will of course lead to specification bias; 2) Heteroskedasticity causes OLS to no longer be the minimum variance estimator (of all the linear unbiased estimators); 3) Heteroskedasticity causes the estimates of the standard errors to be biased, leading to unreliable hypothesis testing and confidence intervals. Usually this issue causes the OLS estimates of the standard errors to be biased downwards, making them too small, resulting in a too high t-score and making it more likely to reject a null hypothesis (Type I errors becomes more likely) (Studenmund, 2017, p. 312-313).

Initially one should investigate if there are any apparent model specification errors, e.g. if it is likely to be any omitted variables. The researcher should also think about if there are any early warning signs of heteroskedasticity e.g. if the data's maximum and minimum values are very different. A simple way of detecting heteroskedasticity is to plot residuals against the dependent variable, as we have done previously in the model diagnostics to assure linearity of the model (Studenmund, 2017, p. 314-316). See Figure 3 of residuals vs. fitted values plot. As we have already corrected this by creating a semi-log function, this plot could help us to further establish homoskedasticity, but we found it useful to investigate this assumption further.

Another test that is commonly used is the Breusch-Pagan Test for heteroskedasticity, we performed this test and could conclude that the variance of the error term was not constant (See Table 6).

Table 6 Breusch-Pagan/Cook-Weisberg Test for Heteroscedasticity

Breusch-Pagan/Cook-Weisberg test for heteroscedasticity	
H0: Constant Variance	
Variables: fitted values of spread	
Chi2(1)	105.96
Prob > chi2	0.0000

Since we detected that the model was heteroskedastic we needed to adjust the model for it to meet Assumption V. A remedy for heteroskedasticity could first be to make sure that there are no model specification error or omitted variables (impure heteroskedasticity). As we have chosen to include a quite high number of explanatory variables based on previous research and our own judgment, we do not see how we could form the equation differently to avoid this type of error and create a better model. Therefore, we do not believe our model suffers from impure heteroskedasticity.

Our model is more likely to have pure heteroskedasticity. The most popular adjustment to correct for pure heteroskedasticity is to create robust standard errors. It adjusts the estimation of the standard errors while it still uses the OLS estimates of the slope coefficients. This makes sense as the pure heteroskedasticity causes problems regarding the standard error but not the coefficients, the technique thus improves the standard errors and corrects the model. Using this method creates biased standard errors but still they are more accurate than the previous standard errors and also creates lower t-scores and decreases the probability that a given estimated coefficient will be significantly different from zero. However, the technique may pose some issues for very small samples which is something the researcher needs to be aware of (Studenmund, 2017, p. 321). By creating robust standard errors, we have corrected our model for pure heteroskedasticity.

A third way to adjust for heteroskedasticity is through modification of more variables in the model, creating e.g. a double-log function which has less variation than the linear form (Studenmund, 2017, p. 321-322). As we have already managed to adjust for heteroskedasticity we do not find this step necessary at this stage.

6.3.5 Multicollinearity

Two independent variables that move very similar to one another, meaning that when one of the variables move, another move in a very similar pattern, causes collinearity between the two. Perfect collinearity means that the two variables moves exactly the same, indicating that they are actually the same variable. This relationship will cause inability of the OLS estimation procedure to determine one variable from the other in the regression analysis. Multicollinearity is when several independent variables are too closely linked to movements in the other independent variables. Not fulfilling Assumption VI, gives a model that is not

suitable to use in estimation of a cause and effect relationship as the model cannot isolate the certain effects of the independent variables on the dependent variable (Studenmund, 2017, p. 98).

The major consequences of multicollinearity are; 1) Estimates will remain unbiased; 2) The variances of the standard errors of the estimates will increase (as it is difficult to establish where the variance comes from); 3) The computed t-scores will fall; 4) Estimates will become very sensitive to changes in the specification; 5) The overall fit of the equation and the estimation of the coefficients of the non-multicollinear variables will be largely unaffected (R-squared will remain largely unchanged) (Studenmund, 2017, p. 226-228). Due to these consequences we find it necessary to make sure that multicollinearity does not exist.

Testing for multicollinearity comes down mainly to judgement by the researcher and his/her specification of the model. One characteristic of the model that should be investigated are the simple correlation coefficients, if there is a strong correlation between two variables there might be a risk for multicollinearity (Studenmund, 2017, p. 232-233). From our initial model we found high correlations for Convexity and Duration 0.9349 (See Table 4 for correlation matrix). This was an indication that our model was at risk of multicollinearity. Therefore, we found it necessary to conduct some more tests regarding this specific correlation and how it could potentially affect our statistical results.

To further investigate multicollinearity, it is useful to look at the Variance Inflation Factors (VIFs). This test indicates the severity of the multicollinearity which looks at the extent to which a given explanatory variable can be explained by all the other explanatory variables. In this test, each variable will be given a VIF that is an index of how much multicollinearity has increased the variance of an estimated coefficient. A high VIF means that the estimated variance of the estimated coefficient has increased which leads to a decreased t-score. A common rule of thumb is that when the VIF is larger than 5, multicollinearity is significant (Studenmund, 2017, p. 233-234).

Table 7 Variance Inflation Factor Test

Variable	VIF
Convexity	10.47
Duration	9.11
Return on Assets ratio	3.87
Interest Coverage ratio	3.15
Maturity	2.45
Amount issued	2.32
Industry	2.06
Current ratio	2.00
Market to Book ratio	1.99
Debt to Equity ratio	1.74
Market Capitalization	1.67
Credit default ratio	1.63
ESG score	1.40
Mean VIF	3.37

When conducting the VIF test we found high numbers for Convexity and Duration (10.47 and 9.11, see Table 7), this did not surprise us as calculating the different measures both include yield to maturity and therefore are highly correlated which our correlation matrix also indicated. After some discussion we made the decision to omit the variable Convexity to adjust for this correlation and still maintain a good variable explaining the volatility and movements in the price of the bonds with Duration as a proxy. After removing the variable for Convexity, we found the VIF test could satisfy Assumption VI with a mean VIF of only 2.11, see Table 8.

Table 8 Variance Inflation Factor Test (Convexity Removed)

Variable	VIF
Returns on Asset Ratio	3.87
Interest Coverage Ratio	3.12
Amount Issued	2.30
Maturity	2.25
Industry	2.06
Current Ratio	1.99
Market to Book Ratio	1.98
Duration	1.69
Market Capitalization	1.65
Debt to Equity Ratio	1.62
Credit Default Swap	1.42
ESG Score	1.37
Mean VIF	2.11

6.4 Adjusted Theoretical Regression Model

As described in the previous chapter, one can modify the regression equation if it fails to meet the OLS's classical assumptions. In the previous sub-chapters regarding model diagnostics we have explained the tests we have conducted, and the measures taken to adjust for failure to meet these assumptions. After performing our tests, we have removed the variable Convexity due to collinearity with Duration and also adjusted the model with robust standards errors. We have therefore created a generalized least squares model that meets the classical assumptions and which we can use further when conducting our statistical tests.

This model will be further analyzed in the following chapters to assess significance of the variables and thus let us form a final model which explains the movements in bond yield spread. A correlation matrix of the adjusted theoretical regression model can be found in Appendix 6.

$$SPRD\ (log)_{it} = \alpha + \beta_1 ESG_{it} + \beta_2 DE_{it} + \beta_3 ICR_{it} + \beta_4 ROA_{it} + \beta_5 MtB_{it} + \beta_6 CR_{it} + \beta_7 IND_{it} + \beta_8 MAT_{it} + \beta_9 DUR_{it} + \beta_{10} NA_{it} + \beta_{11} BP_{it} + \beta_{12} MarCap_{it} + \varepsilon_{it}$$

Where,

SPRD(log) = Yield spread (Logarithmic)
ESG = Combined ESG Score
DE = Debt to Equity Ratio
ICR = Interest Coverage Ratio
ROA = Return on Asset Ratio
MtB = Market to Book Ratio
CR = Current Ratio
IND = Industry Classification
MAT = Bond Maturity
DUR = Bond Duration
NA = Nominal Amount Issued
BP = Bond Price
MarCap = Market Capitalization

6.5 Empirical Results

In this section we will offer a presentation of our empirical results from the hypothesis testing of our model. First, we show the results of our hypothesis testing and after we will go through the results of the adjusted theoretical regression model.

In Table 9 we show the results from the regression model analysis.

Table 9 Robust Random Effects Regression Model (Adjusted Theoretical Model)

Spread (log)	Coefficient	RSE	t	P>t	95% confidence interval	
ESG score	-.007674	.0017329	-4.43	0.000	-.0110924	-.0042556
Maturity	.0801422	.0252231	3.18	0.002	.0303856	-.0042556
Amount issued	-1.00e-7	1.50e-07	-0.67	0.506	-3.96e-07	1.96e-07
Duration	.0560575	.0263055	2.13	0.034	.0041656	.1079494
Price	-.0088842	.0111844	-0.79	0.428	-.0309472	.0131788
Debt to Equity ratio	.0020215	.0014748	1.37	0.172	-.0008878	.0049308
Interest Coverage Ratio	.0039333	.005704	0.69	0.491	-.0073187	.0151854
Return on Assets ratio	-2.470574	2.246174	-1.10	0.273	-6.901518	1.96037
Current ratio	.3089457	.0538964	5.73	0.000	.2026264	.415265
Market to Book ratio	-.0664353	.0323992	-2.05	0.042	-.130348	-.0025226
Industry	.1996963	.0861187	2.32	0.021	.0298132	.3695794
Market Capitalization	-1.95e-8	9.51e-09	-2.05	0.042	-3.83e-08	-7.50e-10
Constant	.8935437	1.167442	0.77	0.445	-1.409425	3.196512

Number of observations	201
F(12,188)	49.32
Probability > F	0.0000
R-squared	0.4314
Root MSE	.41205

6.6 ESG Rating & Corporate Bond Performance

In this chapter, we will go through the results shown in Table 9 more in detail and describe the impact of the different variables on the corporate bond yield spread.

Our model has an R-Squared of 0.4314 which we consider to be a good indication of our model's explanatory power. In this model our constant is not significant and takes on a P-value of 0.445, this is due to the fact that the model has insignificant variables which we will later discuss more in detail.

From our analysis we find that the relationship between corporate bond yield spread and ESG rating does not exist. By our regression model analysis, we see that the impact of ESG score on the yield spread is highly significant even at the 1% significance level. However, the impact is so small (-0.007674 or -0.7674%) that we deem it to be an insignificant impact on the corporate bond yield spread. Therefore, we are not able to reject our null hypothesis that "*There is no relationship between ESG rating and corporate bond yield spread* ". With these results we cannot say that ESG score impacts the performance of bonds in the form of yield spread.

What has a greater impact on the bond yield spread is the Maturity, which is significant at the 1% level and affects the spread positively with just above 8%. This indicates that longer maturities of bonds increase the yield spread. This makes sense as a longer time span on the investment could indicate a higher risk as described in the explanation for the variable Maturity, due to the many events and changes that might take place during this longer period thus leading to a higher risk premium required by investors and a larger yield spread.

Duration has a positive effect on the yield spread of 5.6% and is significant at the 5% level, but not on the 1% level. That Duration has a positive impact is not surprising as it measures the amount of years it takes to regain the initial cost of the bond. As described in previous chapters explaining the variables, this can be expected as a higher duration of the bond is connected to a larger degree of risk for the bondholder and larger exposure to macroeconomic effects on the bond.

What we can see from the regression analysis is that the Current Ratio has a highly significant impact on the corporate bond yield spread. We can see that a one unit increase in the Current Ratio generates a 30% increase in the yield spread according to this model. This is somewhat surprising as one could imagine that a higher current ratio and better ability to pay one's current liabilities should generate a lower spread, but this does not seem to be the case. On the contrary we can see that it generates a larger spread, this might be due to the fact that a high Current Ratio may raise questions regarding the efficient use of resources. Having a large amount of current assets may indicate that the company is not wisely planning their use of resources and are not making the necessary investments for future success thus generating the increased yield spread.

Market to Book ratio (MtB) has a negative impact on yield spread by -0.0664353 (-6.64%) but is only significant at the 5% level and not the 1% level. That MtB has a negative impact on the yield spread seems reasonable as it indicates that a high market value of the firm has a negative effect on bond yield spreads. It could also mean that overvalued companies experience a lower cost of bonds, which is also reasonable as good investor recognition would go together with a lower required risk premium.

Market Capitalization has an impact of -1.95e-8 and is only significant at the 5% level and not the 1% level. Meaning that the result is significant but close to zero and therefore does not possess any explanatory effect that should be taken into consideration and further analyzed.

As the industry variable is only represented by two different general industries (Industrial and Transportation) in our sample it is hard to say whether it actually has an impact on the yield spread. Our model suggests that if the company operates in the industrial sector (dummy value 1) as compared to the transportation sector (dummy value 0), the bond yield spread is higher by approximately 19.97%. We consider this to be a variable that should be further investigated in a larger sample that represents a wider array of industries and we do not wish to draw any general conclusions regarding this as our observations have too few industries represented.

Nominal Amount Issued possess a negative effect on the yield spread, it is however not significant (P-value: 0.506) and therefore we do not consider its impact on the yield spread. Bond Price has a negative effect but is not either significant (P-value: 0.428) and will therefore not be further analyzed. Return on Asset ratio has a highly negative impact on the model but is insignificant (P-Value: 0.273). Interest Coverage Ratio does not have an effect on yield spread according to our model, it is also insignificant (P-Value: 0.491). Firm leverage proxied as Debt to Equity Ratio does not seem to have any effect on the corporate bond yield spread as it shows a p-value of 0.172 making it an insignificant variable to our model.

6.7 Final Regression Model

In this section we describe our final regression model after conducting the necessary statistical tests and having established what variables of the model that are significant and has an impact on corporate bond yield spread. This final regression model has with the help of previous research, our own judgement and analysis of the model and included variables been established to provide the best description of movements in the dependent variable Yield Spread that we are able to produce.

$$SPRD\ (\log)_{it} = \alpha + \beta_1 ESG_{it} + \beta_2 MtB_{it} + \beta_3 CR_{it} + \beta_4 IND_{it} + \beta_5 MAT_{it} + \beta_6 DUR_{it} + \beta_7 MarCap_{it} + \varepsilon_{it}$$

Where,

SPRD (log) = Yield spread (Logarithmic)
ESG = Combined ESG Score
MtB = Market to Book Ratio
CR = Current Ratio
IND = Industry Classification
MAT = Bond Maturity
DUR = Bond Duration
MarCap = Market Capitalization

As this model is not the same as the Adjusted Theoretical Model we have used to analyze the relationship between our variables in previous statistical tests, we intend to look deeper into this Final Regression model and try to see if we can see other characteristics to the relationships within this new model. Therefore, we will conduct another analysis and see if there are any different conclusions to be made regarding this new model.

6.8 Test of Final Regression Model

The results from our final regression model are shown in Table 10 below. In this model we have decided to only include the variables that are significant on the 1% and 5% level. We have therefore removed the variables Nominal Amount Issued, Bond Price, Debt to Equity Ratio, Interest Coverage Ratio and Return on Asset Ratio. However, the constant is still in the model since it was only due to the other insignificant variables that it produced insignificant results in the previous model.

Table 10 Robust Random Effect Regression Model (Final Model)

Spread (log)	Coefficient	RSE	t	P>t	95% confidence interval	
ESG score	-.0073925	.0016173	-4.57	0.000	-.0105824	-.0042027
Maturity	.0719237	.019175	3.75	0.000	.0341041	.1097432
Duration	.0581789	.0239938	2.42	0.016	.0108552	.1055025
Current ratio	.2203584	.028313	7.78	0.000	.1645157	.2762012
Market to Book ratio	-.0945128	.0207427	-4.56	0.000	-.1354243	-.0536012
Industry	-.2851928	.1027513	-2.78	0.006	-.4878524	-.0825331
Market Capitalization	-3.04e-08	6.78e-09	-4.49	0.000	-4.38e-08	-1.71e-08
Constant	.7343419	.1994388	3.68	0.000	.3409824	1.127701
Number of observations	201					
F(12,188)	29.79					
Probability > F	0.0000					
R-squared	0.3951					
Root MSE	.41947					

The first thing to look at is the lower R-Squared which has decreased from 0.4313 in our Adjusted Theoretical Model to 0.3951 in this Final Regression Model. It means that this

regression model does not have the same explanatory power of movements in yield spread as the previous model had. This is of course due to the elimination of variables. Even though we have proven them to be insignificant they still had some explanatory power of the movements in the dependent variable. However, we can see that all variables included in the model now are significant at least at the 5% level which we consider to be an improvement of the model thus producing more reliable results.

ESG Score still has a low effect on yield spread of -0.74% which is actually a decrease from the previous -0.76% but the variable is still highly significant at the 1% level. Like before, the effect is so low that we cannot reject the null hypothesis of "*There is no relationship between ESG rating and corporate bond yield spread* ".

Maturity still shows a positive coefficient (0.0719237) that is slightly lower than in the previous model (0.0801422). Still indicating that longer maturities increase yield spread with approximately 7.19% per year increase of maturity, which is according to other researcher's hypotheses (Oikonomou et al., 2014).

Duration also has a positive effect on the yield spread with approximately 5.82%. This is slightly higher than what it was in the previous model of 5.6%. Duration also has a lower p-value of 0.016 which is a decrease from 0.034 in the previous model. This is proof for the fact that a higher value of duration increases the bond yield spread. However, it is still not significant at the 1% level but only at the 5% level which also was the case in the previous model.

In this final model the effect of the Current Ratio is lower than the 30% in the previous regression model but still has a significant impact. Current Ratio is still the variable that has the largest impact on yield spread with an effect of 22.04% which is significant at the 1% level. From our statistical tests we can conclude that this is the most important variable of the ones we have investigated in this research in regard to the effect on yield spread.

Market to Book Ratio still generates a negative effect on yield spread with a -9.45% decrease per unit increase in MtB ratio. This is significant at the 1% level and still seems valid according to our conclusion that higher market value of the firm would indicate good investor recognition and thus could also decrease the required risk premium by investors, which would affect the yield spread.

The Industry dummy variable is significant at the 1% level and shows a decrease in the spread of -28.52%. This is quite opposite to the results we got in our first regression model. However, the significance level has improved in this final regression model from only being significant at the 5% level in our previous model. Thus, we believe the results are more trustworthy in this latest test and that being in the industrial sector has a decreasing and not increasing effect on yield spread as compared to being in the transportation sector. Since we do only have two industries represented in our sample we can say that the Industrial sector probably experience lower yield spreads by -28.52% as compared to if it were a company in the transportation sector.

Market Capitalization is now significant at even the 1% level and has a coefficient of -3.04e-08, indicating that in this model the variable has increased in significance but still possess an effect close to zero and that the relationship is not very strong or has an actual impact on the yield spread.

After the removal of the insignificant variables in the Adjusted Theoretical model the constant term changed from insignificant to significant on the 1% level in the Final model, which can be observed in Table 10.

7. Analysis

In this chapter we will make an analysis of the results from our statistical tests described in the previous chapter. We will together with reviewed literature and our theoretical framework analyze the results and try to reach conclusions regarding our research question stated in the first chapter. Here we will also evaluate societal, theoretical and practical implications of this study.

The purpose of this thesis has been to see if ESG rating affects companies' cost of debt in the capital market in the Nordic countries. Our way of analyzing the cost of debt was to look deeper into the cost of bonds as this is a crucial part of a company's fundraising ability. We have investigated this relationship through the following research question:

"Does ESG rating affect yield spreads of corporate bonds in the Nordic countries?"

This study is based upon previous research such as Krakas (2015) and Bénabou & Tirole (2010), both studies of drivers for corporate sustainability. Further research such as the one by Goss & Roberts (2011) investigates the cost of bank debt in relation to Corporate Social Responsibility (CSR) and find that companies are rewarded with cheaper loans for good CSR performance. Cost of debt has been further investigated by Campiglio (2016) and Clarkson et al. (2018). Huang et al (2018) found in their study that CSR measures are significant when evaluating the quality of a bond and highlight the importance of bonds as debt instruments. Stellner et al. (2015) could only establish a weak relationship that superior Corporate Social Performance (CSP) results in systematically reduced credit risk. They found support for the fact that a country's ESG performance moderates the CSP-credit risk relationship but otherwise that ESG score did not affect the company's credit rating. Our main source for previous research is the study by Oikonomou et al. (2014) who found that good CSR performance was rewarded by lower yield spreads and that transgressions are penalized with wider yield spreads. Goss & Roberts (2011) also discuss the Risk Mitigating View that companies with superior CSP have a more favorable risk profile and the Overinvestment View that CSR measures could be seen as waste of scarce resources and therefore is a form of value destruction.

All these previous studies have led us to believe that there is likely to be a relationship between sustainability measures of the firm and a lower cost of debt, more defined as cost of bonds. We decided to further analyze this relationship by looking at the Nordic countries who possess the highest ESG scores in the world and by using the relevant theories Stakeholder Theory, Legitimacy Theory, Resource Based View and Agency Theory, which we believe could further explain the dynamics of this relationship.

7.1 ESG Score, Corporate Bond Performance and Cost of Debt

As mentioned in our empirical results, we are not able to reject our null hypothesis that there is no relationship between ESG score and corporate bond yield spread. Even though we reach

significant results, the effect is so small so that we cannot establish any significant impact on yield spread.

From our results we find it difficult to establish that certain philanthropic measures benefit companies in the long-run through the cost of bonds as Bénabou & Tirole (2010) discuss in their study regarding the financial benefit of philanthropic initiatives. We do not see a clear win-win situation where by doing good, a firm is benefitted financially in their cost of debt, we cannot prove that companies with high ESG scores are rewarded with lower yield spreads. We have not found that delegated philanthropy is rewarded by bondholders. If investors where to approve of philanthropic investments through a sacrifice in yield they would require a lower risk premium for companies possessing a higher ESG score thus giving these bonds a lower yield spread. On the other hand, higher ESG score is not penalized through higher yield spreads either according to our results and not clearly connected to any agency costs as Bénabou & Tirole (2010) suggest as a possible outcome.

One could assume according to previous studies (Stellner et al., 2015) that a country's ESG score would affect stakeholders and investors. Like Stellner et al. could conclude; investors in a country who score below average on ESG criteria are less willing to pay a premium for a product simply due to that company's good CSR performance. Likely, they are less interested in ESG scores when making their investment decisions. In opposite, investors would be likely to reward companies with high ESG scores in countries that possess a high ESG rating themselves and thus value investments in ESG factors. This was also our hypothesis, that in the Nordic countries (who all rate high in global ESG ratings) investors would be more concerned with the ESG ratings of the bond issuer and that this would be considered a better investment thus generating a lower bond yield spread. However, we could not establish such a relationship thus we cannot strengthen the conclusion made by Stellner et al. (2015). The study by Stellner et al. (2015) discusses whether CSR investments actually pays off and generates the image of the company being more responsible or if it rather is a waste of scarce resources (Stellner et al., 2015, p. 538). The study is also similar in the way that it tries to consider the ESG performance of the country where the company exist. They have incorporated the degree to which the country pays attention to ESG matters and we choose to investigate the countries with some of the best ESG scores in the world. This makes sense in the way it would likely affect the relevance of the score. If a high ESG score is not rewarded by the external environment there will be a reduction of the marginal benefits from CSR investments. Rational investors will not accept lower reward for their risk if they consider CSR measures to be a waste of scarce resources. They might even demand a higher compensation if they do not agree nor value those investments (Stellner, 2015, p 540). Our research suggests that investments in sustainability measures and thus an increase in ESG score does not lower the required risk premium demanded by bond holders for bearing the risk of investing in bonds on the other hand we cannot see that such measures would increase he required risk premium either. A potential explanation why the ESG score does not affect the yield spread in the Nordic countries could be that the Nordic firms might be considered to be generally sustainable, since sustainability is generally valued in these countries and therefore it does not generate any distinct benefit. However, we have a wide range of ESG scores between 11.18 and 85.38 in our sample and hence this is not a possible explanation for the results of our study since not all firms has a high ESG scores.

As previous research has shown (Goss & Roberts, 2011; Campiglio, 2016; Clarkson et al., 2018) CSR dedicated firms and projects can be benefitted by cheaper cost of debt through bank loans even though the evidence is modest. Our reasoning was that the same would apply to the cost of bonds as it is also a question of debt and ability to respond to a debt obligation. However, our conclusion is not in line with this previous research as we do not establish a relationship where high ESG scores (indicating good CSR by the firm) is rewarded by lower yield spreads and thus lower cost of debt in regard to bonds. A reason to why our results differs from studies conducted on cost of bank loans might be explained that banks acts as quasi-insiders and hence have access to more information about a firm's CSR efforts and can make better evaluations compared to the market (Goss & Roberts, 2011, p. 1807).

The findings of our study are not in line with the previous research that has been conducted by Oikonomou et al. (2014) either. Therefore, we believe that our study proves that there should still be a discussion regarding the impact of ESG score on corporate bond performance. We see that our study contributes to the debate on what is considered a good bond worth investing in and what affects the performance of bonds. Through our results we can draw the conclusion that ESG score of the bond issuer might not generate a lower yield spread and thus a cheaper cost of bonds for the firm. This would indicate that companies seeking financing should rather focus on other aspects to decrease their yield spread and cost of bonds.

The results from our study are more in line with the results of Stellner et al. (2015) in the sense that they could only find weak evidence for the CSP-credit risk relationship and its ability to mitigate perceived risk and generate lower yield spreads. There was no statistically significant evidence that companies who are performing well in CSR are systematically rewarded with better credit ratings, rather the credit institutes look to hard financial facts when evaluating credit profiles (Stellner et al., 2015, p.543). In our study we could find significant results for a negative relationship between ESG rating and yield spread, however, the effect was so small that we concluded the relationship does not possess any substantial effect, quite similar to Stellner et al. (2015) who on the contrary chose to make the conclusion that such a relationship does exist.

Even though we reach similar statistical results as Stellner et al. (2015) we choose not to make the same conclusion as we believe the evidence is too weak. The dynamics in this relationship is very interesting and we believe that our study has contributed to the debate on the relevance and recognition of ESG ratings. In the study on CSR's impact on bank loans by Goss & Roberts (2011), the results are that no strong relationship can be found between the two variables. They produce significant results that are robust to alternative specifications of risk, However, the economic impact is so weak that the conclusion is that CSR at most can be seen as a secondary determinant of yield spreads for bank loans, which is very similar to our results regarding the effect on bond yield spread.

In the credit market we can see a larger number of institutional investors, which might affect the investor climate in that financial market (Oikonomou, 2014, p. 51). Being the main participants in the credit market, institutional investors have the power to promote their view on CSR. If they consider good CSR to be risk reducing, they can reward companies that perform well in that area and penalize those who do not, by changing financing terms

(Stellner, 2015, p. 539). Like Goss & Roberts (2011) found, presence of institutional investors has the ability to decrease yield spreads because of the monitoring they provide if they are not shareholders which in contradiction may increase yield spreads due to agency conflicts. From our study we could not see the decreasing effect from institutional investors on yield spread. However, this area would require some more investigation and establishment of who bond investors actually are in the Nordic countries which is not within the scope of this thesis.

Based on the results of our study, we argue that it is reasonable to assume that bond investors might value a firm's ability to repay their loan higher than how sustainable a firm is in their operations. This might be a bit different compared to equity investors, that might value sustainability practices higher in their investment decision. Bondholders might be seen as more objective financial investors rather than equity investors who could potentially invest with more feelings and choose the companies they hope will succeed in the future and support its cause. Since bondholders do not own the company they invest in, might also be an explanation to why they are not as concerned with the company's other characteristics apart from ability to repay debt. This would be in line with Goss & Roberts (2011) who assume that a rational investor does not have a social agenda and determine the value of the debt investment mainly based on their ability to repay, which affects the spread. A bond investor could according to our results be considered a more rational investor as ESG rating does not have a significant effect on yield spread. It is more likely that other types of investors have more of a social agenda, e.g. that an equity investor who actually becomes an owner of the company. An individual equity investor might be more likely to value ESG scores, if the investor in question, consider sustainability important. Equity holders also have other possibilities in influencing corporate operations through engagements compared to bond holders, which could also make institutional equity investors more concerned with ESG factors. Bondholders seem to be more similar in their reasoning to loan providing institutes in their investment analysis as both seem to be more concerned with ability to repay debt. One must bear in mind that different types of investors seem to consider different aspects of the company when making their investment decision.

What is also interesting is that the differing results in similar studies seem to depend upon geographical region. Oikonomou et al. (2014) find that firms with superior CSP benefit from better credit ratings using a US sample. While the research in our study and Stellner et al. (2015) find no such relationship affecting credit rating or yield spread using Nordic and European samples. This difference might be due to lag in the recognition of the risk-reducing benefits caused by investments in CSR in the Nordic/European regions as compared to the US (Stellner et al., 2015, p. 543-544). From our data collection process, it was also evident that the biggest reason for eliminating certain bonds from our sample was the lack of ESG scores for unlisted firms, which is a big part of the companies that issue bonds in the Nordic countries. This makes the universe available for analysis quite limited since the number of bonds available for analysis becomes substantially lower. In our study we have more or less analyzed all bonds of the population that met our requirements and still we have a quite modest number of observations. The number of bonds issued in the Nordics is substantially lower compared to the US and the number of listed firms is also lower compared to the US. It is possible that if the same study were to be conducted in a future where issuing bonds would a be more common way to gain financing and it was possible to obtain ESG scores for

unlisted firms, the results from the Nordics would be more comparable to Oikonomou et al. (2014).

The explanatory effect provided by ESG score on the movements in bond yield spread is quite low. This would suggest that bonds are mostly affected by purely financial aspects of the firm, this can be seen through the stronger impact by Current Ratio and MtB ratio on yield spread, indicating that the company's financial position have a larger effect in bond investor's decision-making. Maturity and Industry also have a more significant impact on yield spread indicating that concrete bond characteristics take a more central role in the effect on required risk premium. We can also see that macroeconomic risks seem to be more related to yield spreads as Duration has a stronger relationship to the dependent variable, which is a measure of the bonds volatility in relation to movements in interest rate and larger macroeconomic events.

We know that sustainability measures are becoming more important, that socially responsible investing (SRI) is more relevant today and that this also affects corporate financial performance especially when it comes to equity. However, the debate reaches no consensus and results point in different directions (Oikonomou, 2014, p. 50-51). Therefore, our study contributes to the debate by providing evidence that ESG scores might not be a good indicator for what determines the cost of bonds. We can also say that it seems as though bond investors might think differently about their investment and that they value other things than for example investors in equity. It seems that movements in yield spread are better explained through financial position and characteristics of the firm along with exposure to macroeconomic changes.

7.2 Theoretical Analysis

Using the Stakeholder Theory which states that all those concerned by the firm's operations should be considered in the firm's decision-making, it would be reasonable to believe that bondholders should be a significant concern for the firm as they represent such a crucial part of the firm's fundraising ability and its value creation (De Colle et.al, 2010, p. 405). However, in our results we cannot find any relationship where sustainability measures should be taken in order for the company to secure their cost of financing or that they could benefit from considering all stakeholders. Investing in ESG would be a way of considering all stakeholders of the firm due to the different concerns the ESG factors consider. However, we cannot prove that concerns for all stakeholders lead to any apparent gain for the company when we try to establish benefits through cost of debt and financial performance. We can prove that some aspects of the firm have an effect on yield spread, thus affecting the cost of bonds therefore we still believe it is important for the firm to consider bond investors and bondholders in their operations as a decreased spread can lead to significant financial gain and ability to secure financing.

Legitimacy Theory builds on the belief that there are socially constructed understandings of what is legitimate behavior and what generates legitimacy for a firm (Suchman, 1995, p. 574). It can also be explained as the process through which a business justifies to a peer group

(e.g. investors) their right to exist (Maurer, 1971, p. 361, cited in Hybels 1995, p.241). Through our study we wish to contribute to an understanding of what provides legitimacy for the firm by investors. As for example Socially Responsible Investing (SRI) is becoming more relevant we can assume that investor preferences are changing and that this should be considered by the firm in order to secure legitimacy and the many benefits that legitimacy generates. A company cannot exist if they possess no legitimacy, it would cause great problems in fundraising abilities which is the core topic of this research. Looking at the yield spread as an indicator for what would be considered a better bond investment (a smaller yield spread) and thus less required risk premium we could draw conclusions regarding what provides legitimacy for the firm and thus secures a low cost of debt for the firm. As we could not establish a strong relationship between ESG rating and yield spread we cannot draw the conclusion that a high ESG rating provides legitimacy for the firm in the eye of bond investors. If a business wants to legitimize themselves towards bondholders, it cannot be said that consideration for ESG factors is effective. ESG investments might instead be more useful in the sense of shareholders as these are owners of the firm seeking more than just repayment of debt. If a firm wishes to win legitimacy in order to gain a lower cost of debt, there seems to be other measures than ESG rating that should be considered e.g. a decreased Current Ratio as our results seem to suggest.

As the research by Barney (1991) and the Resource-Based View states, for companies to create competitive advantage firms need to make use of their resources in a strategic way that differs from their competitors. Finding a relationship where a higher ESG rating created a smaller bond yield spread would indicate that a company that strategically manage their resources and possess a high ESG rating would be considered to have a competitive advantage and thus are rewarded with lower yield spread. As we could not establish such a relationship, we cannot say that ESG score creates competitive advantage for bond issuers. Here we do not find evidence for what is considered a strategic resource even though it is reasonable to believe that good implementation of ESG considerations would generate value for the firm and advantage over companies that do not manage to incorporate these factors with the same success.

Agency costs arise when interest of agents and owners of the firm does not align (Jensen and Meckling, 1976, p. 5). Bondholders bear the risk of default of the firm; therefore, they wish that the firm does not engage in risky activities. Investments in CSR can be seen as a way of mitigating risk and thus leading to a lower required risk premium by investors creating lower yield spreads. However, it could also be seen as CSR measures takes away resources from the firm and its owners that could be of better use elsewhere. From our study, it is clear that interests differ between shareholders and other stakeholders of the firm, meaning that this could lead to agency costs/conflicts. As this theory states, interests may differ and may cause problems between owners and investors. What we can conclude from our research is that CSR measures might not be seen favorably by bondholders as they do not perceive it to be a risk minimizing measure which is their primary concern when investing. As owners of the firm clearly see this as important which we can conclude from the rising trend of making CSR investments (Oikonomou, 2014, p.50-51) we can also see that there are some agency conflicts when it comes to CSR investments. As bond investments are common for the institutional investor one should analyze this relationship through the Agency Theory perspective. Like Goss & Roberts (2011) found, institutional investors have the effect to

decrease yield spreads due to their ability to monitor, however as percentage of shares held by institutions increases, spreads increase. Meaning that the presence of block holders in stock might produce agency costs. This leads to the question how institutional investors affect the yield spread and if it could affect the bond yield spread as well. From this analysis we can conclude that there is a distinction between different types of investors and their way of assessing risk (thus affecting the required risk premium) this is something that companies should bear in mind when considering different ways of accumulating capital. They need to be aware that different types of investors value different things when making their investments which will affect the company's cost of financing. The company cannot satisfy all types of investors through certain measures, according to our results therefore the company needs to prioritize and conclude which investors they should consider primarily. They should also be aware that due to the different investor types in the company some decisions might produce agency costs due to the fact that investor objectives do not always align.

The above-mentioned theories have not been used in this way in similar studies before which is how we believe our analysis to contribute to research in the area. According to our deductive approach, the aim of this thesis was not to generate new theory but rather to establish and analyze existing beliefs and theories which we consider this study to have accomplished. Some other interesting theories that have been used to make similar analyses are for example the study by Goss & Roberts (2011) who offer the perspective of the Risk-Mitigating View where CSR plays a risk managing role in the process of enabling bank loans. The contrary theory is the Overinvestment View where CSR rather is seen as a costly diversion of scarce resources which deviates profits form the shareholders. This could be compared to the Shareholder/Stakeholder theory and provides an interesting discussion regarding which stakeholders should be considered in the firm's operations. Could ESG measures and concerns for all stakeholders of the firm offer risk management and thus cheaper cost of debt or should only shareholders be prioritized in order for the firm to succeed?

8. Conclusion

We will finish this thesis with a conclusion regarding our research question and an evaluation of the relevant truth criteria related to research. We will also leave suggestions for further research and areas that we feel could be explored to a greater extent that is beyond the scope of this study.

Our intention with this study was to offer companies guidance in how they could stabilize their fundraising ability by exploring the cost of debt through the cost of bonds. What we can say is that there is nothing that clearly suggest that a higher ESG score will decrease the cost of bonds for companies and therefore the firm should not put efforts into increasing their ESG score with the aim to lower their cost of debt. However, we do not state that these types of investments do not have a risk mitigating ability, as there still are other ways sustainability activities could help the company in their operations and improve their image in the eye of the public which could be beneficial. We have only found that there is no indication of the scores impact in the sense of bond performance for companies listed in the Nordic countries. As this might be due to other effects such as bad incorporation of ESG factors into the Nordic financial landscape as have been suggested by other research, we still reach no consensus with other researchers regarding the dynamics of this relationship.

8.1 Truth Criteria

For us to be able to evaluate the trustworthiness of our results we have assessed three criteria related to research. These are reliability, validity and generalizability of results. Each of these will be described and we will explain how we have worked to follow the three criteria.

8.1.1 Reliability

Reliability refers to accuracy and precision of measurement and the absence differences in the results if the research were to be conducted again (Collis & Hussey, 2014, p. 217). Reliability becomes especially important in quantitative research as the researcher is more concerned with whether the results are stable or not (Bryman & Bell, 2011, p. 41). There are three different meanings of the term; stability, which can be assured with a test-retest method; internal reliability, which can be assessed with a split-half method of indicators or responses or Cronbach's Alpha; and inter-observer consistency (Bryman & Bell, 2011, p. 157-160).

All data is collected from Refinitiv; therefore, the results are repeatable. Using another data source could potentially generate different results due to the lack of coherence between different measures of ESG factors and scores. Therefore, our results are stable over time, as a new test would very likely show the same results given that same source of data is being used. Since we use secondary data through an archival study, we can also be assured that our results possess internal reliability as the data we retrieve is standardized and assessed by one of the most prominent sources for financial data. When using a statistical testing method, our results does not depend on our interpretation of the results therefore inter-observer consistency will not be an issue in our study. The human error is a risk when testing the

collected data. However, as we are two authors conducting the research, we have the ability to control each other's work along with the help of our supervisor to make sure that as few errors as possible occur.

8.1.2 Validity

Validity concerns the way a test measures what the researcher aims to measure and how the results reflect the phenomenon being studied. What can destroy the validity of statistical tests are for example research errors, e.g. faulty procedures, poor sampling, inaccurate or misleading measurements. In order to assess validity, the researcher can look at face validity. This tries to ensure that the used tests or measures represent what they are supposed to measure or represent (Collis & Hussey, 2014, p. 53). To establish this, the researcher can use the help of others to make sure that the measure is getting at the concept being studied (Bryman & Bell, 2011, p.160). In our study, supervisors and employees at the Statistics department of Umeå University have been consulted. Along with the use of previous literature we have been able to create variables suitable to our research area.

Another issue is to construct validity which relates to the problem that not all studied phenomena are observable. Therefore, you must be able to demonstrate that your observations can be explained by a construct (Collis & Hussey, 2014, p. 53). As our model and included variables build on previous research with the modifications, we deem necessary to suit our study, we consider our tests to possess a high degree of validity due to the careful considerations taken in our model building.

8.1.3 Generalizability

Generalizability concerns the way that the research findings can be generalized to apply to other cases, meaning the population of the study. As we are following a positivist paradigm, we have selected a representative sample in order to make conclusions regarding a population. Using statistical tests is just one way of ensuring generalizability, it can also be achieved under an interpretivist paradigm with the use of a few samples (Collis & Hussey, 2014, p.54).

Since we have carefully chosen a population and a sample of listed companies on the Nordic countries' stock exchanges as described in previous chapters, where we have excluded Iceland for not possessing an ESG rating and financial institutions as they are not representative of our population. We believe we have taken the necessary measures to produce a testable sample upon which we can draw conclusions to be used for the general population.

We cannot draw any conclusion regarding companies that are not listed on these countries' stock exchanges as they possess different firm characteristics. Especially regarding ownership structure and reporting duties and that they are not given an ESG rating. By

making these limitations we believe our results to be generalizable for the carefully chosen population and therefore gives us generalizable results and conclusions in this study.

8.2 Societal and Ethical Implications

As has been established earlier in this thesis and described in the initial chapter of the study; sustainability is gaining importance and Socially Responsible Investing (SRI) is gaining ground and importance in the finance community and debate. Being a part of the Millennial generation where sustainability is an everyday topic and affecting us as citizens in everything we do, this thesis has given us as authors the possibility to further investigate aspects of social and ethical importance in the world of finance. Our hopes were to gain a deeper understanding of the way we can work towards a more sustainable future within our area, finance. It is our core belief that through responsible and considerate investing we can work together to create a more sustainable future for coming generations and a financial landscape that has more consideration for Environmental, Social and Governance factors.

With this study, we believe we have offered more insight into how certain types of investments can help sustainability, but first and foremost we hope that this study will help companies in the future to allocate their sustainability investments. We have established that the relationship between a high ESG score and yield spread does not exist in a way that is significant for companies to consider when trying to secure their cost of capital. Therefore, we can say that companies should not focus their sustainability measures as a means to lower yield spreads of their issued bonds and decrease their cost of debt. There is still evidence through other research that the kind of sustainability measures that increases a company's ESG score has a positive effect on profitability and therefore firms should not disregard the importance of having a high ESG score, making prosocial efforts and consider how to conduct their business ethically. Our results do not suggest that investments in ESG would increase yield spreads either, therefore we believe that investments in ESG factors is still highly relevant in a company's business model today.

Working towards a higher ESG score undoubtedly has positive effects. Reducing carbon foot prints, improving working standards, decrease corruption and ensure human rights among other things certainly has many advantages for society in the bigger picture. However, we cannot say that it would increase bond performance in the form of lower corporate bond yield spread for listed companies in the Nordic countries and thus generate a lower cost of debt for companies that choose to focus on ESG factors.

We hope that our results do not send the message to companies that they should disregard sustainability efforts in their operations. Even though we cannot establish a strong relationship where ESG score would lead to a decreased cost of debt our results point more in that direction than that such measures would increase yield spreads. This means that ESG enhancing measures would more likely lead to positive effects than the opposite.

As it is becoming more common for investors to consider things such as ESG score of the companies they choose to invest in it is also important to know how these measures might affect the financial performance of their investments. Investors are becoming more informed

and more considerate in their investments but there is still a long way to go. We believe that this is what the results of this study is indicating, that sustainability measures are becoming increasingly important, but they have not gained any true effect in this specific relationship yet. Through careful consideration of how savers can place their money we can both help sustainability by choosing responsible investments and by establishing what safe investments are, we can further help investors in their ability to secure and grow capital. Through this study we believe to have offered more guidance to both companies and investors on how to consider ESG score in their investments and what societal and ethical implications it has in the financial market.

8.3 Theoretical and Practical Contributions

With this thesis we have provided a new way to analyze the relationship between ESG score and corporate bond performance and cost of debt using a new set of theories in order to further provide explanations on how investing in ESG Factors can affect different aspects of a company's operations. We have chosen to focus on the cost of debt in this study thorough investigating the cost of bonds which is a crucial part of a company's fundraising ability. By using this new set of theories and way of analyzing cost of debt we have contributed to existing research and provided new guidance for companies in the way they should consider their accumulation of capital.

Through a theoretical discussion we prove that stakeholders are material for companies in the way the company is dependent on bondholders (who are not shareholders) in their fundraising. However, according to our results we cannot say that a higher ESG score in relation to stakeholders actually provides the company with a lower cost of debt. In the same sense we cannot say that high ESG scores provides legitimacy for the firm in the eye of the bondholders and thus generates a lower required of risk premium that the investors demand by the bond issuer. However, the legitimacy that sustainability measures produce in the eye of the general public should not be minimized in its importance. We simply cannot provide evidence for the fact that it provides legitimacy in the relationship to bondholders.

By using The Resource-Based View we have evaluated what creates a competitive advantage and what strategic resources for the firm might be in the sense of them being bond issuers. We cannot prove that companies who have allocated resources in a way to increase ESG score are seen as superior in the issuance of bonds in the sense that they could be provided with a decreased yield spread. We believe that this conclusion is of great importance as the financial landscape is changing rapidly and it is crucial to determine what strategic resources are and what creates competitive advantage. Thus, this is both a contribution to the theoretical discussion and has practical implications as it offers companies a guide to competitive advantage.

We have provided an extension to the Agency Theory by looking at new stakeholders of the firm and how they might affect the company's financial performance. Our results might be an indication that bondholders do not see the benefit of investments in ESG increasing measures. However, we cannot prove that it generates any specific agency costs either. Our

results show that yield spreads do not increase due to higher ESG scores, but we cannot prove that these investments decrease yield spread. It is clear from our research and previous research that agents of the firm consider ESG investments differently which might generate some agency costs when shareholder, managers and bondholders perceive the generated value from investing in ESG factors differently.

We have also investigated the ESG score – corporate bond yield spread relationship by looking at another way of measuring the spread in relation to German Government bonds (as a proxy for the risk-free rate) and thus providing an explanation for what affects the risk premium and thus cost of debt/bonds for the firm. We have by taking this new measure of yield spread provided guidance as to what affects the risk premium required by investors which leads to costs for the bond issuer and their cost of debt. This is a central issue for any company in its operations as cost of capital determines the company's financial performance. Through our results we hope to provide more evidence on perceived risk and its cost seen through the required risk premium.

We consider this study to contribute to the theoretical discussion on cost of debt in the specific context of cost of bonds and how companies can create value. Thus, we offer guidance for companies in their operations and accumulation of capital. Our message to companies is that even though sustainability measures are gaining importance and is widely discussed as a way to gain legitimacy and credibility by investors it cannot be proven that it has the effect of decreased cost of debt in the form of cost of bonds. We do not claim that sustainability measures are unjustified as other research clearly provides proof for the benefits of high ESG Scores. If listed companies in the Nordic countries are looking for ways to decrease the cost of bonds there are however other aspects that should be considered than investments towards an increased ESG score.

8.4 Suggestions for Future Research

The aim of this study was to take a rather unexplored geographical area when investigating the effect of ESG rating on corporate bond performance and cost of debt. We decided to conduct this study on bonds in the Nordic countries as we found it interesting to look at these countries that possess very high sustainability rankings. However, the bond market in these Nordic countries is not as developed as in other geographical regions such as the Eurozone or the US market which previous studies are mostly focused on. We are glad to have been able to offer more insight to this market and region. However, we were not able to create a very large sample upon which to conduct our study. Hopefully, in the future ESG ratings will become more wide-spread among companies listed on the Nordic countries' stock exchanges and also bonds as a debt instrument for these firms. This could provide the possibility to perform better tests regarding this cause and effect relationship.

This research is conducted through a quantitative study where we have used secondary data to analyze a relationship between ESG rating and corporate bond yield spread. It would be interesting to investigate this relationship using a qualitative study where the researcher could dig deeper into the thinking of bond investors. Such as institutional investors who remain the

majority of investors in the credit market and to further expand the knowledge regarding investment decisions and reasoning. This could offer guidance as to whether bond investments are made purely rational or if other factors might affect decisions, such as ESG rating of the bond issuer.

Like in the study of Goss & Roberts (2011) the Risk Mitigating and Overinvestment View offer interesting insights into the effect of ESG rating on the performance and price of debt. It would be interesting to perform the study on bonds using these theories in the Nordic countries to see whether Nordic investors see CSR measures as risk mitigating or as an overinvestment causing value destruction. An analysis through more theories that might be related to the financial market would also be an interesting contribution to the theoretical discussion.

We would also find it interesting to conduct a similar study on a different geographical region to see if it would be possible to produce a larger sample which other studies have managed to do. However, other studies have not used our way to measure yield spread and this could be a contribution to research in the area as it offers a new measure of the required risk premium above the risk-free rate by bond investors.

Reference List

Abusabha, R., & Woelfel, M.L. (2003). Qualitative vs quantitative methods: Two opposites that make a perfect match. *Journal of the American Dietetic Association*, 103(5), 566–569. https://doi.org/10.1053/jada.2003.50129.

Agrawal, D., Elton, E.J., Gruber, M.J., Mann, C. (2001). Explaining the Rate Spread on Corporate Bonds. *The Journal of Finance,* 56 (1), 247-278. https://doi.org/10.1111/0022-1082.00324.

Allen, J., Bartholdy, S., Douma, K., Georgieva, A., Orsagh, M., Sloggett, J., (2018). *Guidance and case studies for ESG integration in equities and fixed income.* [Published document]. Virginia: CFA Institute. https://www.unpri.org/download?ac=5908. [Retrieved 2019-02-18].

Association of Business Schools (2015). *Academic Journal Guide 2015.* [Published Document]. London: Association of Business Schools.

Barney, J.B. (1991): Firm resources and sustained competitive advantage. *Journal of Management,* 17(1): 99-120. https://doi.org/10.1177/014920639101700108.

Bassen, A., Busch, T., Friede, G. (2015). ESG and financial performance: aggregated evidence from more than 2000 empirical studies. *Journal of Sustainable Finance & Investment*, 5 (4), 210-233. https://doi.org/10.1080/20430795.2015.1118917.

Bell, E., & Bryman, A. (2007). The Ethics of Management Research: An Exploratory Content Analysis. *British Journal of Management*, 18(1), 63–77. https://doi.org/10.1111/j.1467-8551.2006.00487.x.

Bell, E. & Bryman, A. (2011). *Business Research Methods*. 3rd edition. New York: Oxford University Press.

Bénabou, R. & Tirole, J. (2010). Individual and Corporate Social Responsibility, *Economica,* 77, 1-19. https://doi.org/10.1111/j.1468-0335.2009.00843.x.

Campiglio, E. (2016). Beyond Carbon Pricing: The Role of Banking and Monetary Policy in Financing the Transition to a Low-Carbon Economy. *Ecological Economics*, 121, pp. 220–230. doi: 10.1016/j.ecolecon.2015.03.020. https://doi.org/10.1016/j.ecolecon.2015.03.020.

Capelle-Blanchard, G., Crifo, P., Diaye, M-A., Oueghlisse, R., Scholtens, B. (2018). Sovereign bond yield spreads and sustainability: An empirical analysis of OECD countries. *The Journal of Banking and Finance*, 98 (1), 156-169. https://doi.org/10.1016/j.jbankfin.2018.11.011.

Clarkson, P., Herbohn, K., & Jung, J., (2018). Carbon Risk, Carbon Risk Awareness and the Cost of Debt Financing. *Journal of Business Ethics*, 150(4), 1151–1171. https://doi.org/10.1007/s10551-016-3207-6.

Collis, J. & Hussey, R. (2014). *Business Research: a practical guide for undergraduate and postgraduate students.* 4th edition. Basingstoke: Palgrave Macmillan.

Cowton, C. (1998). The Use of Secondary Data in Business Ethics Research. *Journal of Business Ethics*, 17(4), 423–434. https://doi.org/10.1023/A:1005730825103.

De Colle, S., Freeman, R. E., Harrison, J. S., Parmar, B. L., Purnell, L., Wicks, A. C. (2010). Stakeholder Theory: The State of the Art. *The Academy of Management Annals*, 4(1), 403–445. https://doi.org/10.1080/19416520.2010.495581.

DeFusco, R. A., McLeavey, D. W., Pinto, J.E., Runkle, D. E. (2004). *Quantitative Methods for Investment Analysis*. 2nd edition. Charlottesville: CFA Institute.

Dimson, E. Karakas, O., & Li, X., 2015. Active Ownership. *Review of Financial Studies*, 28, 3225-3268. https://doi.org/10.1093/rfs/hhv044.

Donaldson, T., & Preston, L. E. (1995). The Stakeholder Theory of the Corporation: Concepts, Evidence, and Implications. *The Academy of Management Review*, 20(1), 65–91. https://doi.org/10.2307/258887.

European Commission (2018) Sustainable finance: Commission's Action Plan for a greener and cleaner economy. *Press Release, Brussels, Belgium. 2018-03-08.* http://europa.eu/rapid/press-release_IP-18-1404_en.htm [Retrieved 2019-02-17]

European Commission (n.d.). Employment, Social Affairs & Inclusion; Non-EU nationals. *European Commission*. https://ec.europa.eu/social/main.jsp?catId=470&langId=en. [Retrieved 2019-05-13].

Farrarese, C., Hanmer, J. (2018). The Impact of ESG investing in corporate bonds. [Unpublished document]. Luxembourg: Fidelity International. https://www.fidelityinstitutional.com/en/the-impact-of-esg-investing-on-corporate-bonds-cf89bb/ [Retrieved 2019-02-17].

Fernando, C.S., Sharfman, M.P. & Uysal, V.B., 2017. Corporate environmental policy and shareholder value: Following the smart money. *Journal of Financial and Quantitative Analysis*, 52, 2023-2051. https://doi.org/10.1017/S0022109017000680.

Goss, A., & Roberts, G., (2011). The impact of corporate social responsibility on the cost of bank loans. *Journal of Banking and Finance*, 35(7), 1794–1810. https://doi.org/10.1016/j.jbankfin.2010.12.002

Huang, J., Hu, W., & Zhu, G. (2018). The Effect of Corporate Social Responsibility on Cost of Corporate Bond: Evidence from China. *Emerging Markets Finance and Trade*, 54(2), 255–268. https://doi.org/10.1080/1540496X.2017.1332591.

Hybels, R. C. (1995). On legitimacy, legitimation, and organizations: A critical review and integrative theoretical model. *Academy of Management Journal, Best Conference Proceedings, 38*, 241–245. https://doi.org/10.5465/AMBPP.1995.17536509.

Jensen, M. C. & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3(4), 305–360. https://doi.org/10.1016/0304-405X(76)90026-X

Kebewar, M., Shah, S. N. (2013). *US Corporate Bond Yield Spread: A default risk debate*. Article. Orléans: University of Orléans.

Kraaijenbrink, J., Spender, J.-C., & Groen, A. J. (2010). The Resource-Based View: A Review and Assessment of Its Critiques. *Journal of Management*. Los Angeles, CA: SAGE Publications. https://doi.org/10.1177/0149206309350775

Kresge, N., Weiss, R. (2015). Volkswagen drops 23% after admitting diesel emission cheat. *Bloomberg,* [Online], September 2. Available via: https://www.bloomberg.com/news/articles/2015-09-21/volkswagen-drops-15-after-admitting-u-s-diesel-emissions-cheat [Retrieved 2019-01-11]

Longstaff, F. A., Mithal, S., Neis, E. (2005). Corporate yield spreads: Default risk or liquidity? New evidence from the credit default swap market. *The Journal of Finance*, 60(5), 2213-2253.

MacIntosh, R. & O'Gorman, K. D. (2015). *Research Methods for Business & Management: A guide to writing your dissertation.* 2nd edition. Oxford: Goodfellow Publishers Limited.

Neate, R. (2018). Over $119bn wiped off Facebook's market cap after growth shock. *The Guardian*, [Online] July 26. Available via: https://www.theguardian.com/technology/2018/jul/26/facebook-market-cap-falls-109bn-dollars-after-growth-shock [Retrieved 2019-01-11]

Nenty, H. J. (2009). Writing a Quantitative Research Thesis. *International Journal of Educational Sciences*, 1(1), 19–32. https://doi.org/10.1080/09751122.2009.11889972.

Newbold, P., Carlsson, W. L. & Thorne, B. M. (2013). *Statistics for Business and Economics.* 8th edition. USA: Pearson Education, Inc.

Oikonomou, I., Brooks, C., & Pavelin, S. (2014). The Effects of Corporate Social Performance on the Cost of Corporate Debt and Credit Ratings. *Financial Review*, 49(1), 49–75. https://doi.org/10.1111/fire.12025

Orts, E., Strudler, A., (2009). Putting a Stake in Stakeholder Theory. *Journal of Business Ethics*., 88, 605–615. https://doi.org/10.1007/s10551-009-0310-y.

Panda, B., & Leepsa, N. M. (2017). Agency theory: Review of Theory and Evidence on Problems and Perspectives. *Indian Journal of Corporate Governance*, 10(1), 74–95. https://doi.org/10.1177/0974686217701467

Porter, M. E. (1985). Competitive advantage: creating and sustaining superior performance. New York: Free Press.

Refinitiv (2018), Datastream Macroeconomic Analysis, https://www.refinitiv.com/en/products/datastream-macroeconomic-analysis. [Retrieved 2019-04-25]

Refinitiv. (2019) *Thomson Reuters ESG Scores* [Brochure]. No place. https://www.refinitiv.com/content/dam/marketing/en_us/documents/methodology/esg-scores-methodology.pdf [Retrieved 2019-03-08]

RobecoSAM (2018). Country Sustainability Ranking Update – November 2018 [Report]. Available via: https://www.robecosam.com/media/9/7/2/97240b9afc893d103d558ce50f066bc5_2018-11-robecosam-country-sustainability-ranking-en_tcm1011-16188.pdf [Retrieved 2019-03-21].

Stellner, C., Klein, C., Zwergel, B., 2015. Corporate social responsibility and Eurozone corporate bonds: The moderating role of country sustainability. *Journal of Banking & Finance*, 59, 538-549. https://doi.org/10.1016/j.jbankfin.2015.04.032.

Stoney, C., & Winstanley, D. (2001). Stakeholding: Confusion or Utopia? Mapping the Conceptual Terrain. *Journal of Management Studies*, 38(5), 603–626. https://doi.org/10.1111/1467-6486.00251.

Studenmund, A. H. (2017). Using econometrics: a practical guide (7th edition, Pearson new international edition). Harlow, Essex: Pearson Education.

Suchman, M. C. (1995). Managing Legitimacy: Strategic and Institutional Approaches. *The Academy of Management Review*, 20(3), 571–610. https://doi.org/10.2307/258788.

The Economist (2017), Sustainable investment joins the mainstream: Millennials are coming into money and want to invest it responsibly. *The Economist*, [Online] November 25. Available via: https://www.economist.com/finance-and-economics/2017/11/25/sustainable-investment-joins-the-mainstream [Retrieved 2019-02-18].

Wijnberg, Nachoem M. (2000). Normative Stakeholder Theory and Aristotle: The Link Between Ethics and Politics. *Journal of Business Ethics*, 25(4), 329–342. https://doi.org/10.1023/A:1006086226794.

Appendix

Appendix 1: ESG Score

New Model	Measures	Weight	
Environmental	61	34%	**ESG Score**
Resource Use	19	11%	
Emissions	22	12%	
Innovation	20	11%	
Social	63	35.50%	
Workforce	29	16%	
Human Rights	8	4.50%	
Community	14	8%	
Product Responsibility	12	7%	
Governance	54	30.50%	
Management	34	19%	
Shareholders	12	7%	
CSR Strategy	8	4.50%	
Not Applicable	0	0%	
ESG Controversies	23		
ESG Controversies	23		
	201		

(Refinitiv, 2019, p.18)

Appendix 2: Full List of Keywords

Keywords		
General	**RQ**	**Theory**
ESG	Corporate Bonds	Legitimacy Theory
Environment	Nordic Bonds	Agency theory
Social	Volatility	Stakeholder Theory
Governance	Risk	The Resource Based View (RBV)
CSR	Bond Performance	Overinvestment View
Corporate	Bond Spread	Risk Mitigating View
Social	Bond Yield	
Responsibility	Bond Return	
Financial Performance	Maturity	
Corporate Bonds	Redemption	
Cost of Bonds	Bond Features	
Cost of Debt	Price	
Cost of Capital	Interest Rate	
Yield Spread	Coupon	
Risk Premium	Equity	
Investor Recognition	Bond Issuer	
Volatility	Bond Investor	
Credit Risk		
Risk of Default		
Investor Concerns		

Appendix 3: List of Bond Issuers

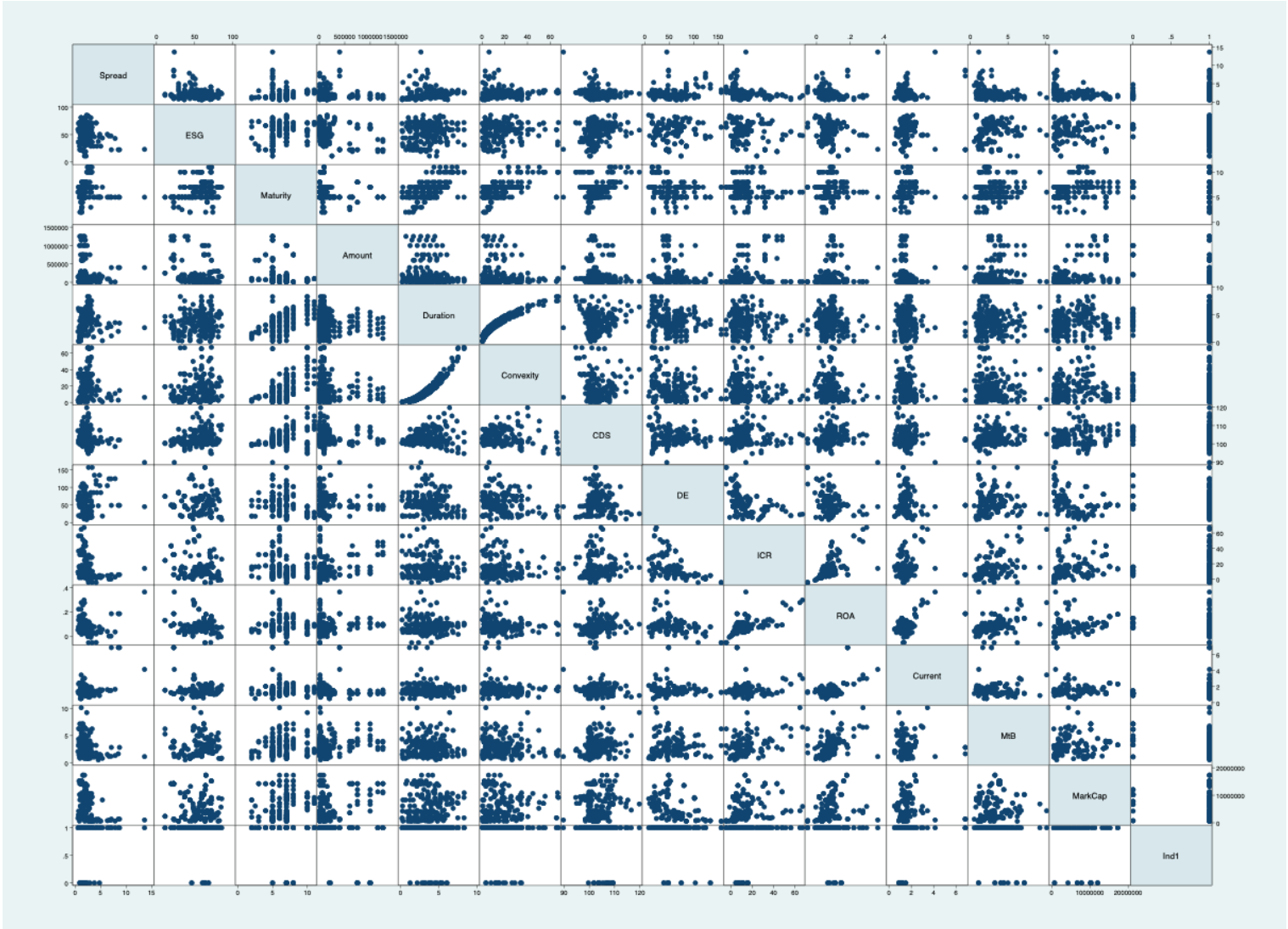
Name 2019
AMER SPORTS OYJ
BILLERUDKORSNAS AB
CARGOTEC OYJ
DNA OYJ
DNO ASA
DSV A/S
ELEKTA AB PUBL
HEXAGON AB
HUHTAMAKI OYJ
HUSQVARNA AB
ICA GRUPPEN AB
INDUTRADE AB
KEMIRA OYJ
KONECRANES ABP
METSA BOARD OYJ
NIBE INDUSTRIER AB
NORSK HYDRO
ORION OYJ
ORKLA ASA
OUTOKUMPU OYJ
OUTOTEC OYJ
SAAB
SANDVIK
SAS AB
SCHIBSTED ASA
TIETO OYJ
VEIDEKKE ASA
YARA INTL.ASA
YIT OYJ

Appendix 4: ESG Grade

Score Range	Grade
0.0 < score < 0.083333	D-
0.083333 < score < 0.0166666	D
0.166666 < score < 0.250000	D+
0.250000 < score < 0.333333	C-
0.333333 < score < 0.416666	C
0.416666 < score < 0.500000	C+
0.500000 < score < 0.583333	B-
0.583333 < score < 0.666666	B
0.666666 < score < 0.750000	B+
0.750000 < score < 0.833333	A-
0.833333 < score < 0.916666	A
0.916666 < score < 1	A+

(Refinitiv, 2019, p. 7)

Appendix 5: Simple Correlation Matrix



Appendix 6: Correlation Matrix of Adjusted Theoretical Model

	Spread_log	ESG	MAT	NA	DUR	BP	DE	ICR	ROA	CR	MarCap	IND	MtB
Spread_log	1.000												
ESG	-0.1615	1.0000											
MAT	0.2181	0.2499	1.0000										
NA	-0.1369	-0.3455	-0.1753	1.0000									
DUR	0.2987	0.1386	0.5848	-0.1416	1.0000								
BP	-0.0961	0.2589	0.4256	-0.0293	0.0579	1.0000							
DE	0.1104	0.0674	-0.1918	-0.0985	-0.1340	-0.0444	1.0000						
ICR	-0.2805	-0.1317	-0.0671	0.2958	-0.1359	0.0092	-0.4273	1.0000					
ROA	-0.1276	-0.0699	0.0409	0.1564	-0.0738	0.1075	-0.2998	0.6182	1.0000				
CR	0.3152	-0.1048	-0.0271	-0.0880	-0.0660	-0.0459	-0.0916	0.0475	0.5023	1.0000			
MarCap	-0.1889	-0.1540	0.2123	0.4095	0.0702	0.1294	-0.4192	0.2806	0.2820	0.0138	1.0000		
IND	0.0142	-0.1106	-0.1266	-0.4437	-0.0705	-0.1811	-0.0996	0.0680	-0.1644	0.1456	-0.1267	1.0000	
MtB	-0.3018	0.1102	0.1265	0.2113	-0.0719	0.2585	-0.0196	0.4760	0.5291	0.0147	0.1725	-0.3109	1.0000

Appendix 7: Distribution of Error Term

Variable	Observations	Mean	Std. Dev.	Min	Max
Residuals	201	-5.00e-10	0.3995018	-1.398871	1.553124

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