



# Impact of ESG disclosure on Credit Ratings in the Nordics

Daniel Hentilä

Department of Finance and Economics

Hanken School of Economics

Helsinki

2022

## HANKEN SCHOOL OF ECONOMICS

<b>Department of:</b> Finance and Economics	<b>Type of work:</b> Thesis
<b>Author:</b> Daniel Hentilä	<b>Date:</b> 30.3.2022
<b>Title of thesis:</b> Impact of ESG disclosure on Credit Ratings in the Nordics.	
<p><b>Abstract:</b> As Corporate Social Responsibility is becoming more important the number of CSR-related studies has grown rapidly in recent years. Studies have been conducted on how ESG affects firm performance and the cost of capital. Many of these studies have found a positive relationship between the two. However, what has been studied less is the relationship between ESG and credit ratings. There has been little research on this relationship and most of the research is based on U.S. firms. Therefore, to broaden the understanding of this relationship the purpose of this study is to examine the relationship between ESG disclosure and credit rating in the Nordics, mainly Denmark, Finland, Norway, and Sweden as this geographic area has not been studied yet.</p> <p>The dataset includes credit ratings and ESG disclosure and its individual pillar scores for 168 listed non-financial Nordic companies between the years 2009 and 2020. Five financial variables have been chosen as control variables for the study. The data is used to conduct an ordered probit regression to examine the relationship. Overall, 24 models are estimated to examine the relationship between ESG disclosure and credit ratings. Four models examine the whole sample and 12 examine the relationship between ESG disclosure and credit ratings in a country-level regression. The study also includes 8 models to investigate how ESG disclosure impacts credit ratings on different company leverage levels.</p> <p>The findings from this study suggest that ESG disclosure and all its individual pillars have a significant negative (positive) relationship with credit ratings. ESG disclosure has the most impact on credit ratings from the independent variables whilst the impact from Governance disclosure has the least impact. The country-level models display some differing results suggesting that the Environmental disclosure score has a significant impact in Denmark, Norway, and Sweden but not in Finland. Social disclosure score has a significant impact in each country except Denmark. And lastly, the Governance disclosure score has a significant impact only in Norway. The results from this study conclude that there is a positive relationship between ESG and credit ratings and that by having a higher ESG disclosure score companies can obtain a better credit rating.</p>	
<p><b>Keywords:</b> ESG, Disclosure, CSR, Credit rating, Sustainability, Nordics, Ordered probit</p>	

## CONTENTS

1	Introduction .....	1
1.1	Motivation.....	2
1.2	Research purpose .....	3
1.3	Limitations .....	3
1.4	Structure.....	4
2	Theoretical framework .....	5
2.1	Corporate social responsibility .....	5
2.1.1	CSR theories .....	6
2.1.1.1	Carroll's CSR pyramid.....	6
2.1.1.2	Triple bottom line theory.....	7
2.1.1.3	The Stakeholder Theory .....	9
2.1.2	ESG as a measurement for CSR .....	10
2.1.3	Limitations of ESG scoring .....	11
2.1.4	ESG in Nordics.....	11
2.2	Credit rating .....	12
2.2.1	Internal credit rating .....	13
2.2.2	External credit rating .....	14
2.2.3	Issues with credit rating agencies .....	15
2.2.4	Determining credit rating.....	16
3	Literature review.....	18
3.1	CSR and firm performance .....	18
3.2	CSR and cost of capital.....	20
3.3	CSR and credit rating.....	23
3.4	Hypothesis development.....	25
4	Data.....	28
4.1	Sample description.....	28
4.1.1	Dependent variable .....	30
4.1.2	Independent variables .....	31
4.1.3	Control variables .....	32
4.2	Descriptive statistics .....	33
5	Methodology.....	38
5.1	Ordered probit regression .....	38

5.2	Model specification.....	39
5.3	Model diagnostics .....	40
6	Empirical Results.....	41
6.1	Results from the study .....	41
7	Conclusion.....	50
	REFERENCES .....	52

## APPENDICES

Appendix 1	Abbreviations.....	58
------------	--------------------	----

## TABLES

Table 1	Sample distribution .....	29
Table 2	Country distribution .....	29
Table 3	Industry distribution .....	30
Table 4	Credit rating distribution.....	31
Table 5	Descriptive statistics.....	34
Table 6	Descriptive statistics for independent variable.....	35
Table 7	Descriptive statistics for low and high leveraged companies .....	36
Table 8	Correlation matrix .....	37
Table 9	Variance inflation factor.....	40
Table 10	Regression results on the sample .....	43
Table 11	Regression results on country-level .....	45
Table 12	Regression results based on leverage .....	48

## FIGURES

Figure 1	Carroll's pyramid of CSR (Carroll, 2016) .....	6
Figure 2	Credit ratings (S&P Global, 2019; Moody's, 2021; Fitch, 2021).....	15
Figure 3	A strong environmental, social, and governance (ESG) proposition links to value creation in five essential ways (Henisz et al., 2019).....	19
Figure 4	ESG Score development in Nordic countries 2009-2020 .....	32

## **1 INTRODUCTION**

In September 2015, Volkswagen was caught installing a “defeat device” in their diesel vehicles that would identify when the vehicles were tested for their emissions (Environmental Protection Agency [EPA], 2015; Rhodes, 2016). This scandal led to Volkswagen losing 40% of its stock value in 2015, costing 31,3 billion euros, and losing the trust of shareholders, governments, and customers (Jung & Sharon, 2019). Facebook - Cambridge Analytica scandal in March 2018. Cambridge Analytica acquired the Facebook data of over ten million users without the users’ consent. The illegally obtained data was later on used to influence how people would vote in the presidential election. This data breach ended up costing 5 billion US dollars to Facebook (Federal Trade Commission [FTC], 2019; Confessore, 2018). Danske Bank money laundering scandal in 2018, where Danske Bank’s Estonian branch was found to have laundered money worth over 200 billion euros between the years 2007-2015 (Bruun & Hjejle, 2018). The full costs of the scandal are yet to be final since the aftermath is still going on.

All the above-mentioned scandals are Corporate Social Responsibility (CSR) related issues. This shows the magnitude of ignoring environmental, social, and governance-related actions. According to the KPMG (2020) Survey of Sustainability Reporting, the majority of the companies in their study have reported about sustainability in 2020. To put this in perspective, in 2002 mere 18% were reporting on sustainability. The ideal situation is for companies to be fully transparent when it comes to CSR-related issues. Corporate social responsibility and Responsible business conduct by the European Commission (2019) states that when companies are conducting business, they must acknowledge all stakeholders because the actions of companies affect the lives of everyone on this planet through different sources. In order to encourage CSR, the EU has established both mandated and optional initiatives. United Nations Global Compact (2021) has also set forth principles for companies on how they should promote responsible business. These principles include issues related to environment, social, and governance. The importance and demand for CSR is growing all the time as awareness of what is happening in the world is growing. This can be seen in socially responsible investing (SRI) as in 2020 U.S. fund investors invested \$51.1 billion in sustainable funds according to Hale (2021). The amount of SRI was more than doubled by the investments made in 2019 to sustainable funds.

## 1.1 Motivation

Nordic countries have implemented CSR actions well into their everyday business. As proof of this, the Sustainable Development Report (SDG) 2020 has placed Denmark, Finland, Norway, and Sweden in the top six for achieving their sustainable development goals. Even though Nordic countries are operating at a high level of CSR performance the number of studies concerning Nordic countries and CSR is low.

Prior literature about CSR performance mostly concerns the relationships between CSR and firm performance. However, these prior studies usually study companies from the United States or European companies altogether. A study by Friede, Busch, and Bassen (2015) examined over 2200 individual studies considering the link between ESG and corporate firm performance (CFP). From the 2200 individual studies, Friede et al. (2015) found that nearly 90% of the previously made studies found the relationship between ESG and CFP to be nonnegative. Another well-researched topic is the relationship between CSR and the cost of capital. Again, most of the studies are concerning companies from the United States or Europe. Findings from this field have shown some mixed results. El Ghouli, Guedhami, Kwok, and Mishra (2011) examined the effect of CSR on the cost of equity. The study observed US companies and found that the firms with higher CSR scores benefitted from a lower cost of equity. Eliwa, Aboud, and Saleh (2021) also found that with better ESG performance and disclosure firms are able to obtain a lower costs of debt from lending institutions.

The relationship between CSR and credit ratings has seen less interest from researchers. Most of the studies related to this topic are concerned with U.S. and European companies. The prior studies mostly hypothesize that there is a positive association between CSR performance and credit ratings (Aslan, Poppe, & Posch, 2021; Attig, El Ghouli, Guedhami, & Suh, 2013; Devalle, Fiandrino, & Cantino, 2017). The results from these studies have been in line with the suggestions that there is a positive association between CSR and credit ratings. Nevertheless, none of these prior studies have examined Nordic countries. As previously mentioned, the level of CSR performance in Nordic countries is high. Thus, it is in the interest of this study to examine if Nordic countries which are operating at a high level of CSR performance receive any benefit from it in their credit ratings. This idea is backed by previous studies which suggest that CSR has a positive relationship with credit ratings.

## **1.2 Research purpose**

The purpose of this thesis is to study the relationship between ESG and credit ratings in the Nordics by using ESG disclosure scores as independent variables. ESG actions taken by companies are increasing and it is preferred by the stakeholders. Therefore, companies should try to maximize the wealth of their shareholders in a socially responsible way. Many previous studies have displayed results suggesting that there is a positive relationship between ESG and firm performance. From this, it could be assumed that the same positive relationship would hold between ESG and credit ratings in the Nordics.

This thesis contributes to the previous studies by examining the relationship between ESG and credit ratings by introducing a new geographic study area the Nordic countries, mainly Denmark, Finland, Norway, and Sweden. To gain a better understanding of the relationship between ESG disclosure and credit ratings, three regression models are conducted. First a sample regression including the entire sample was made to investigate the relationship between ESG and credit ratings, secondly, a country-level regression was conducted to obtain more robust results and, lastly this study tests to see whether the level of leverage affects how much a company benefits from its ESG disclosure on their credit rating.

## **1.3 Limitations**

The amount of data for Nordic listed non-financial companies is one thing that limits this study. The number of Nordic companies with a credit rating from nationally recognized statistical rating organizations (NRSRO) is low and therefore, only a small portion of the Nordic listed companies could be represented if using NRSRO credit ratings. The amount of ESG scores is also quite low for Nordic listed companies and leads to a smaller sample. The amount of data somewhat limits this study, but a decent sample size was gathered to examine the relationship between ESG disclosure and credit ratings. For future studies, it would be interesting to study the relationship between ESG and credit ratings in the Nordics with long-term credit ratings from NRSROs as the dependent variable.

For future studies, different control variables could also be used to get more robust results. It would be also interesting to study how the size of a firm affects the relationship between ESG and credit ratings in Nordics.

#### **1.4 Structure**

The structure of this thesis will be as followed: Chapter 2 discusses corporate social responsibility and its theories, ESG, and Credit ratings. Chapter 3 presents the literature review for the study. This chapter includes prior studies made about the link between CSR and firm performance, CSR and cost of capital, and lastly, CSR and credit ratings. Hypotheses for the study are developed at the end of chapter 3. Chapter 4 explains the data used in the study. This chapter includes tables displaying how the data has been distributed among countries and industries, how the credit ratings have been distributed, descriptive statistics, and correlation matrices. Chapter 5 goes over the methodology for the study. Chapter 6 will display the results for three different ordered probit regressions and discuss them. Limitations of the study are also discussed in this chapter. Lastly, chapter 7 will conclude the study.

## **2 THEORETICAL FRAMEWORK**

This chapter will firstly go over the concept of Corporate Social Responsibility (CSR) and some of its most relevant theories. It is important to understand how companies can benefit from CSR actions to later make the connection on how these actions may improve the credit ratings of companies. In connection with CSR, the chapter will review ESG as a measurement for CSR and how ESG is seen in the Nordic. Also, some of the limitations regarding ESG are discussed. Secondly, this chapter will discuss credit ratings, credit rating-related limitations, and lastly, how credit ratings are determined.

### **2.1 Corporate social responsibility**

The sole purpose of companies is argued to be creating jobs and maximizing wealth. While this is true, this objective should not be pursued without considering the issues that come with it. Human rights, working conditions, environment, corruption, gender equality, just to name a few (State Secretariat for Economic Affairs [SECO], 2020). These are all issues that need to be acknowledged when conducting responsible business. CSR is the act where companies have internalized these issues and are conscious of how their decisions affect socially and environmentally (United Nations Industrial Development Organization [UNIDO], 2017). As a concept CSR has been around for a while already. CSR started to take its place in the 1950s even though there had been some early actions already taken before that (Carroll, 2008). In the 1950s some early ideas of CSR had been planted in companies, but the actions taken by business managers were close to none (Carroll, 2008).

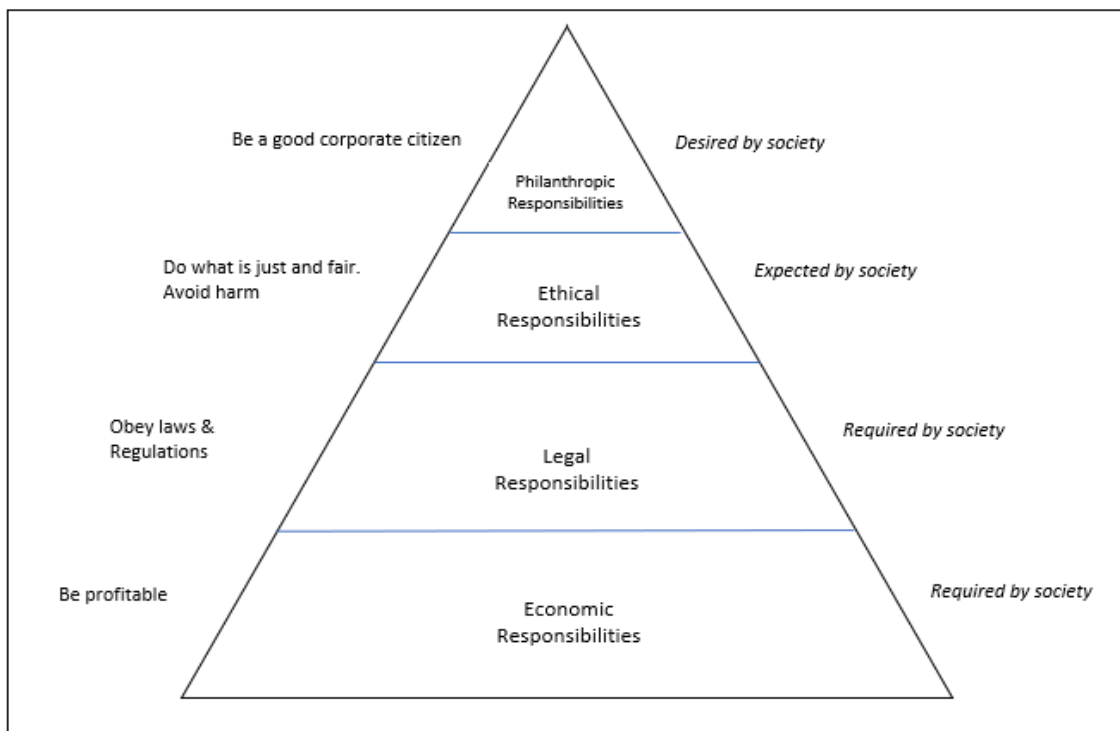
CSR has developed rapidly over recent years and companies must take into consideration the fact that social and environmental issues are a part of the companies' everyday decisions (Montiel, 2008). Studies show companies disclosing their CSR actions on their websites already in 1998. Esrock and Leichty (1998) investigated a random sample of Fortune 500 businesses and found that 82 percent of the companies which had websites had mentioned CSR-related issues on their websites. This is to show that companies have started to inform about their CSR-related actions already in late the 90s. In the 20<sup>th</sup> century, there are loads of CSR actions taken due to many different reasons such as stakeholders' expecting CSR actions, mandatory CSR actions required by law, and different initiatives such as the Paris Climate Agreement. No more can companies look the other way when it comes to conducting a responsible business towards the society and environment.

### 2.1.1 CSR theories

This subsection of the paper will review CSR theories that are the most known and commonly used by companies. The theories covered by this paper are the CSR pyramid, Triple Bottom Line Theory, and The Stakeholder Theory. The theories will be presented in the same order that they are mentioned above.

#### 2.1.1.1 Carroll's CSR pyramid

One of the most famous theories for CSR is a theory by Carroll (1991) and it is called the CSR pyramid and it consists of four different parts. The four parts of the pyramid include Economic, Legal, Ethical, and Philanthropic responsibilities (Carroll, 2016). The basis of the whole pyramid is the economic part and without it, none of the other parts can be fulfilled by a company. Next, the paper will go over the parts of the pyramid separately. Figure 1 displays the CSR pyramid.



**Figure 1** Carroll's pyramid of CSR (Carroll, 2016)

**Economic:** The economic side of the pyramid does not at first seem like an important part of a CSR action. The meaning of economic responsibilities is that a company must be profitable. The reason why economic responsibility is at the bottom of the pyramid is that none of the other parts of the pyramid can be fulfilled without a profitable company. This is the whole foundation for the pyramid. When a company is profitable it is paying

taxes, employing people, and returning to shareholders. If a company is not profitable it is not a sustainable business in the long run (Carroll, 2016).

**Legal:** The next part of the pyramid is the legal requirements. This part means that companies are fulfilling the minimum law requirements and obeying them. Society requires companies to follow the law (Carroll, 2016).

**Ethical:** After legal requirements come the ethical requirements. This is where corporate social responsibility first comes to be seen in the pyramid with actions that most people consider to be responsible actions. A profitable company that fulfills its legal requirements can do a little more with some responsible actions. These actions can include for example environmental actions, such as investing in new machinery which reduces carbon emissions or buying products from responsible suppliers. The ethical part is the one that many people feel is the most important part because it includes environmental actions. Natural disasters and global warming threatening the earth requires companies to make the decisions that are environmentally friendly and do not harm the earth. Society expects ethical actions rather than requiring them (Carroll, 2016).

**Philanthropic:** On the top of the CSR pyramid is philanthropic requirements. The actions related to philanthropy may include for example donating money to charity, sponsoring youth education or sports events, or giving employees days off to do voluntary work. Philanthropic actions are usually non-profitable and therefore can raise the reputation of a company in the eyes of the community. Although philanthropic actions are usually non-profitable, these actions may have long-term and global impacts. The level of education in the future for example can be heavily impacted if companies pay for youth education (Carroll, 2016).

#### *2.1.1.2 Triple bottom line theory*

The Triple Bottom Line Theory (TBL) is a theory that believes that companies have three different pillars they should be concerned about. The three pillars that companies should pay attention to are Profit, People, and Planet. These three pillars can be then rephrased as Economic, Social, and Environmental pillars (Fischbach & Księżak, 2018). The TBL theory believes that these three pillars are very closely related with each other, and companies should target to be responsible in each of these pillars. It is not enough to be responsible in two of the three pillars and leave one out (Fischbach & Księżak, 2018).

Next, the three pillars will be explained in more depth starting with profit, then people, and lastly, planet.

**Profit:** Similarly, as with Carroll's CSR Pyramid, TBL also considers profit or the economic pillar to be very important in corporate social responsibility. A company needs to be profitable to pay taxes, employ people, and return to its shareholders. Many theories just like TBL believe that when companies are profitable, they should use their profits for responsible actions. Fischbach and Księżak (2018) divide the profit pillar into three different aspects according to a study made by Uddin, Hassan, and Tarique (2008), which are discussed next. Firstly, according to the Multiplier Effect, the success of a profitable company should extend to all stakeholders and not just the shareholders. When a company is profitable it should hire new employees and pay better salaries. As a result, purchasing power would increase and so would the amount of taxes paid. The success of a company would also be seen in the society that the company operates in as companies are much more willing to invest in responsible activities when they are making profits (Fischbach & Księżak, 2018). The next aspect of the profit pillar is taxes. This aspect can be quite self-explanatory since companies which are making more profits are also paying more taxes. Taxes are then used by governments to help their society in different ways. If a company were to evade taxes it would be seen in a bad light as their statement would indicate that they do not want to contribute to society through taxes (Fischbach & Księżak, 2018). Last but not least, companies should avoid activities that can damage trust. The essence of this feature is that businesses should avoid doing anything that might harm their reputation. Many things can damage a company's reputation but, in the profits pillar, these actions include mostly financial crimes such as fraud, money laundering, bribery and corruption, etc. (Fischbach & Księżak, 2018).

**People:** People pillar which is the act of social responsibility, means that companies should act in the interest of society. Society in this context includes the employees, customers, and other stakeholders that are affected by the actions that a company takes and whom the company cannot survive without (Fischbach & Księżak, 2018). Fischbach and Księżak (2018) discuss that according to Uddin et al. (2008) the people pillar can also be divided into three different aspects. The First aspect discusses the responsibility towards customers which is a major part of the people pillar since customers nowadays are more aware of the actions that companies make through social media and the internet. Therefore, companies need to act in a way that is responsible toward customers for them to even have customers. Customers look for products and services that fulfill

the requirements that they have. Companies need to be aware of these customer requirements and act accordingly (Fischbach & Księżak, 2018). The next aspect is the responsibility towards employees. To be responsible toward employees means having safe, healthy, and good working conditions, where people can feel productive and supported. These things should be self-evident and the starting point in every company. When these conditions are met companies can offer additional benefits for employees such as education or fitness related (Fischbach & Księżak, 2018). Lastly, there is the responsibility towards the community. These actions may include for example donations to schools or sponsoring youth sports. Anything that can help a community and its people.

**Planet:** The planet pillar or environmental responsibility means that companies must take responsibility for example not polluting and destroying our environment. It is more important than ever to lower the carbon emissions of companies. Many actions are already being taken toward a carbon-neutral future. Volkswagen for example has committed to the Paris Climate Agreement and become carbon neutral by the year 2050. Companies have the most important role to play in environmentally friendly operations, as they are also the ones who pollute it the most (Fischbach & Księżak, 2018). Again, Fischbach and Księżak (2018) have divided the planet pillar into different aspects according to a study done by Uddin et al. (2008). Environmental effect and the win-win situation are the two facets of the pillar. The environmental effect component refers to how a company's actions affect the environment. The actions can be quantifiable through different measurements and therefore, according to the TBL, the actions should be well managed, so that the environment is not harmed. The second aspect is the win-win situation, where the actions taken by the companies benefit both the environment and the company. A situation like this can be cutting costs by removing unnecessary operations that are also harmful to the environment. Also, by becoming a more environmentally friendly company, new customers will be attracted which in turn benefits the company through sales.

#### *2.1.1.3 The Stakeholder Theory*

A company's operations can affect many different people and places, and these are the so-called stakeholders. Stakeholders include all those who affect a company and all those who are affected by the company (Freeman, 2015; Brin & Nehme, 2019). The idea behind the stakeholder theory considering corporate social responsibility is that companies should take into consideration all their stakeholders when making decisions. The board

of a company should include a member for each stakeholder group to make sure that they are represented in the company. This would mean that there would have to be full transparency between the board members. If there is a lack of transparency among board members, certain stakeholders may suffer. This can often happen if information about the company's operations is not shared with everyone (Brin & Nehme, 2019). Stakeholder theory differs from the previously mentioned theories in a way that it was not originally designed for CSR. However, the theory still resembles CSR actions very much.

### ***2.1.2 ESG as a measurement for CSR***

If CSR is the actual concept of sustainable and responsible business, then ESG is the actual actions taken by companies and a way of measuring the sustainable and responsible actions. Many third-party suppliers such as Bloomberg, MSCI, Refinitiv (formerly Thomson Reuters), and Sustainalytics are providing ESG scores for companies (Johnson, 2020). The data providers may use different methodology, data, weight, etc. but they generally give somewhat similar outcomes for companies.

This study uses Bloomberg's ESG Disclosure scores. Bloomberg's ESG disclosure is available from Bloomberg Terminal, and it offers ESG disclosure scores for a large number of companies in over 100 countries. Instead of measuring the ESG actions taken by companies, Bloomberg's score measures the extent to which a company discloses its ESG activities. Bloomberg's ESG disclosure score is based on information from public annual reports, sustainability reports, press releases, and third-party studies. Bloomberg does not contact companies for ESG information and therefore only uses publicly available information (Bloomberg Professional Services, 2021). Therefore, if a company has poorly disclosed its ESG performance, it will be penalized in the Bloomberg ESG Disclosure score. Bloomberg encourages companies to disclose ESG performance as much as possible which will then show in an improved disclosure score. The ESG and its individual pillars environment, social and governance disclosure scores range from 0 to 100, where 0 is the worst and 100 is the best. The score is based on how well a firm has disclosed its ESG actions rather than on the actual ESG performance. Environment, social, governance-specific, and sector-specific data are included by Bloomberg in their ESG disclosure score evaluation. Overall, Bloomberg includes 800 individual variables to arrive at their ESG disclosure score (Framework ESG, 2016).

### **2.1.3 Limitations of ESG scoring**

When considering ESG ratings it is important to be aware of the fact that different rating agencies use different ways and methods when giving out ESG ratings to companies. As mentioned earlier in this paper there are many different third-party rating agencies that are rating companies based on their ESG performance. Some rating agencies' ESG ratings inform how well companies disclose their ESG actions while others might inform what is the exposure of ESG risk a company is under.

Billio, Costola, Hristova, Latino, and Pelizzon (2021) study the rating criteria of different rating agencies and how reliable they are. The findings firstly show that agencies use a great deal of different raw data when starting the rating process. Some agencies use annual reports, some use annual reports and questionnaires given out to companies to fill out and some also use stock market registrations. Billio et al. (2021) also find that the number of ESG criteria that agencies use to rate companies' ESG performance differs from 37 risk factors to 300 risk factors. Lastly, there is a clear differences between the weights given to each criterion used in the assessment of ESG ratings. These findings show that there is a clear difference in how agencies give out their ESG ratings to companies.

Drempetic, Klein, and Zwergel (2019) study how company size influences ESG scores. The findings obtained from the study suggested that larger companies on average have better ESG ratings. Based on these results, it could be assumed that larger companies have more resources available to use for sustainable and responsible investments but also for ESG reporting. As Billio et al. (2021) discussed that there are many differences between credit rating agencies and Drempetic et al. (2019) concluded that larger companies tend to have higher ESG ratings, one should be critical when observing ESG ratings.

### **2.1.4 ESG in Nordics**

As the purpose of this study is to study the Nordic countries, mainly Denmark, Finland, Norway, and Sweden, it is important to understand how ESG actions are implemented in these countries. Nordic countries have been very active toward sustainable development. According to the Sustainable Development Report (SDG) 2020 by Fuller, Kroll, Lafortune, Sachs, Schmidt-Traub, and Woelm (2020), the top three countries in achieving their sustainable development goals are Sweden, Denmark, and Finland whilst Norway sits in the sixth place. These rankings confirm what Strand, Freeman, and

Hockerts (2015) wrote in their paper about Nordic countries being the leaders in sustainable development and CSR.

This means that Nordic countries are doing something right regarding CSR, but what is it. One thing that is playing a big role in the success of Nordic CSR performance is stakeholder engagement. Nordic corporate governance sees stakeholder and company relationships in a different light than many other countries. Strand et al. (2015) presents an idea where there are inside-out and outside-in companies. Inside-out companies are companies that first consider what is in their best interest and then stakeholders, whilst outside-in companies consider what is in the interest of the stakeholders and the world and then the interest of the company. Nordic companies are believed to be outside-in companies and through this kind of thinking Nordic companies have been able to excel in sustainability and CSR actions.

Another source for the success in sustainable and CSR actions in the Nordics is the government. Castles (2009) discusses that Nordic countries have had social democratic parties in government for a long time. Social democratic parties are often linked with sustainability and CSR. Therefore, Nordic countries have regulations regarding social and environmental issues that companies must consider and comply with (Strand et al., 2015). Following with Nordic corporate governance, companies in the Nordics (Except Finland) are required to have an employee representation on their board of members (Thomsen, 2016). Also, the shareholders of Nordic companies tend to remain as owners longer, the boards are consolidated and the income differences in companies is much narrower than in for example the United States (Thomsen & Canyon, 2012; Strand et al., 2015).

## **2.2 Credit rating**

This subchapter will discuss the purpose behind credit ratings. As credit ratings are provided by internal (mainly banks) and external (credit rating agencies, CRA) parties this chapter will include a section on both credit rating providers, what is their role in providing credit ratings and how are the ratings measured. Lastly, some critiques on credit ratings will be discussed.

For borrowers to avoid potential credit losses, they need to know the creditworthiness of their customers. Determining creditworthiness can be challenging as there are many different aspects that must be considered such as ownership of the company, industry, financial situation, and future outlook. For the purpose of determining creditworthiness

and predicting the probability of default of firms, credit ratings were developed. What credit ratings are essentially telling their reader is someone's opinion on how well a firm is able to meet their financial obligations and their probability of default.

As credit ratings are considered to be opinions of someone, there are multiple different credit ratings given out to firms by internal and external agencies. Internal ratings are mostly given by banks and used for determining loan terms and pricing other financial instruments. External agencies on the other hand are CRAs. CRAs rate companies based on their creditworthiness and then provide these ratings to whomever needs them (Czarnitzki & Kraft, 2007). There are many different credit rating agencies, but the most well-known agencies are S&P, Moody's, and Fitch. The actual credit rating is usually a letter combination or a numerical value. For example, S&P credit rating system starts from the best ratings AAA, AA+, AA... and goes all the way down to ...CCC, CCC-, D (default) which is the worst (S&P Global, 2019).

### ***2.2.1 Internal credit rating***

Internal credit ratings are mostly given by banks to their customers. This is a way for banks to evaluate the creditworthiness of their borrowers. Unlike the external "third-party" credit ratings, internal credit ratings are not public information. CRAs usually rate the creditworthiness of public listed companies whilst smaller companies do not need credit ratings from CRAs. Therefore, banks must conduct their own risk assessments in order to determine the creditworthiness of their customers. The credit ratings that banks give to their customers work in a similar fashion as credit ratings from CRAs and therefore measure the creditworthiness of their customers.

The ratings given by banks to their customers differ from each other in terms of how many different grades the banks have, to which default probability the ratings correspond to and who makes the rating assessments (Treacy & Carey, 2000). One reason behind the need for internal credit ratings is the fact that banks credit related operations have expanded to many different products and the number of counterparties has increased tremendously. This has led to a situation where the old ways of assessing creditworthiness of customers are no longer enough and new more structured and formal systems have been developed to assess the creditworthiness of customers and help make loan decisions (Treacy & Carey, 2000).

### **2.2.2 External credit rating**

The idea of giving credit ratings to firms started already at the beginning of the 20<sup>th</sup> century when John Moody started rating railroad bonds. In 1924 the big three CRAs had already been established which were then called Moody's, Poor's Publishing company, Standard Statistics Company, and Fitch Publishing. Poor and Standard joined forces in 1941 and became Standard and Poor's (White, 2010). The big three remain as the most well-known and used CRAs in the world. They offer their credit ratings to institutional and individual investors, intermediaries, debt issuers, businesses, and corporations. The reason why credit ratings were originally invented was because investors needed information on which railroad bonds to invest in. Moreover, from which railroad bond is the investor more likely to get their investment back. The same applies in the 21<sup>st</sup> century as there are situations where someone lends money and needs to know if the borrower is able to repay the loan (White, 2013).

As mentioned before the three most well-known CRAs are S&P, Moody's, and Fitch. The so-called Big three are recognized as "nationally recognized statistical rating organizations" (NRSROs) by the U.S. Securities Exchange Commission (SEC). On top of the Big three, there are seven other smaller CRAs that are also recognized as NRSROs (White, 2013). So why do lenders and investors need this information from all these NRSROs. In order to determine the creditworthiness of a company lenders and investors will need to know many things about a company. What is the ownership of the company like, in what industry does the company operate in, what is the financial condition of the company, what does the past of a company look like in terms of loan repayment, and what is the future outlook of a company like. There are multiple different aspects to consider when determining the creditworthiness of a company and it can be very time-consuming and difficult to gather all the data needed to conduct the assessment internally. And whilst some conduct their own credit assessments, many acquire credit ratings from the above-mentioned CRAs. This is because it is convenient to acquire all of the ratings from one place but also because the creditworthiness of a borrower might change during the loan period and thus the credit rating must be updated. CRAs update the credit ratings if something occurs that would require a change in a company's credit rating. CRAs mostly offer credit ratings that assess companies' creditworthiness on a long-term horizon which is beneficial for lenders and investors, but they also offer short-term credit ratings.

The way CRAs classify the credit ratings is fairly similar. The ratings are usually divided into two groups which are mainly investment grade and speculative. The credit ratings are given as letter combinations that describe the creditworthiness of a company. In figure 4. the long-term credit ratings given by the Big three CRAs are presented. The credit ratings start from the highest rating which for S&P is AAA, for Moody's Aaa, and for Fitch AAA. Credit ratings that are BBB, Baa, or better belong to the investment-grade category. These credit ratings imply a high level of creditworthiness and credit quality. Below BBB and Baa ratings are speculative ratings which imply that the issuer/borrower is able to repay a loan, but they are facing some uncertainties regarding their business or financial circumstances that could possibly at some point affect their credit risk (S&P Global, 2019).

<b>Credit rating agency</b>	<b>Standard and Poor's</b>	<b>Moody's</b>	<b>Fitch</b>
Investment grade	AAA	Aaa	AAA
	AA	Aa	AA
	A	A	A
	BBB	Baa	BBB
Speculative	BB	Ba	BB
	B	B	B
	CCC	Caa	CCC
	CC	Ca	CC
	C	C	C
	Default	D	

**Figure 2** Credit ratings (S&P Global, 2019; Moody's, 2021; Fitch, 2021)

### **2.2.3 Issues with credit rating agencies**

Even though CRAs provide valuable information for investors, lenders, and others, there are issues related to CRAs. Most notably CRAs have gotten their fair share of criticism because of the 2008 financial crisis (Johansson, 2010). The criticism mostly concerns the big three as they have a majority market share in providing credit ratings. The two main reasons why CRAs have been criticized so heavily for the crisis are the so-called issuer-pays model and the fact that CRAs enjoy having almost like an immunity from liabilities (Johansson, 2010; Coffee, 2010). Starting with the issuer-pays model and what this essentially means is that the debt issuer pays the CRAs for the credit rating. How this can cause a conflict of interest is because debt issuers are trying to get the best rating possible for their debt or security in order to sell it to investors. The debt issuer requests

an offer for a rating from all CRAs and is likely to take the rating from the CRA that offers the best rating. This causes CRAs to start rating companies with a better credit rating than the company should actually receive. From here the second issue can be brought up which is that CRAs had almost like an immunity from liabilities during the financial crisis in 2008 (Coffee, 2010). This provoked much debate after the financial crisis because CRAs could not be held liable for having negligently given false ratings to companies just to get credit rating deals with customers (Johansson, 2010). In 2013 the European Commission decided to put into force new rules against CRAs which were stricter. The new rules were stricter in terms CRAs being more accountable for their actions (European Commission, 2013).

#### ***2.2.4 Determining credit rating***

There are different ways of determining credit ratings, but they all have the same purpose which is to measure the credit risk. As previously mentioned, NRSROs use the issuer-pays-model, where a company contacts the NRSRO for a credit rating. After this, the NRSROs analyze the company, and then based on their analysis of credit risk they give a credit rating for the company. The factors that usually matter the most in credit ratings are profitability, coverage, and solvency ratios. High profitability usually correlates to a better credit rating whilst high leverage correlates to a worse credit rating. The ratings from the NRSROs are updated on behalf of the agency whenever the credit quality of a company has changed sufficiently. A company can cancel the credit rating from the NRSROs from which point on they do not receive credit ratings anymore (Bondioli, Goldberg, Hu, Li, Maalaoui, & Stein 2021).

The credit ratings used in this study are Bloomberg's 1-Yr Default Risk ratings. The credit ratings from Bloomberg work a little differently than the ones from NRSROs. The credit ratings are determined according to Bloomberg DRSK public firm model which is a hybrid model combining a statistical approach with a structural model. The model is similar to Altman Z-score (1968) in way that it is a factor model that is fit to default event. The difference to the Altman Z-score is that the Bloomberg model is fit to a logistic regression instead of using multiple discriminant analysis (MDA). Unlike the NRSROs credit ratings which are updated only when sufficient changes in a company's credit quality occur, the DRSK models default probabilities are recalculated on daily basis and consist of over 65,000 public firm default probabilities (Bondioli et al., 2021).

As mentioned, the DRSK is a hybrid model which uses a statistical approach with a structural model. Logistic regression is used to estimate the probability of default events and the factors used in the regression are chosen so that they best capture credit risk. While the factors include relevant accounting ratios, one of the most important factors is from the Merton-Black-Cox structural model which is the distance to default. To estimate real-world default probabilities the DRSK model uses historically realized defaults in the logistic regression against the different factors. The factors included in the DRSK model include financial factors: bank flag, return on assets, and non-performing loans and non-financial factors: Distance to default and interest coverage. As the DRSK model estimates default probabilities, the companies are grouped into credit risk buckets which indicate a credit rating for companies. This makes comparing the default risks between companies easier (Bondioli et al., 2021).

### **3 LITERATURE REVIEW**

This chapter will discuss how CSR actions affect firm performance, cost of capital, and credit ratings. There are many ways companies can improve their CSR performance in a way that also benefits their financial performance. It is important for this study to establish an understanding of how CSR affects firm performance and cost of capital since they both are closely related to credit ratings. This chapter will begin with CSR and firm performance, how it is seen and how can CSR improve firm performance. Also, a few prior studies about the link between CSR and firm performance will shortly be discussed. Secondly, the chapter will go over how CSR and the cost of capital, both equity and debt are related. Prior studies about the relationship between CSR and the cost of capital will be discussed. Lastly, previous literature about CSR and credit ratings will be discussed and the hypotheses for the study will be developed.

#### **3.1 CSR and firm performance**

As CSR is becoming more important in businesses all over the world, many studies have been made to examine if CSR performance is beneficial for companies in terms of financial performance. Mainly the question is that do companies with better CSR performance enjoy higher financial performance than companies with poor CSR performance (Ho, Lee, Lin, & Ng, 2020). Prior to the studies regarding this relationship, some researchers had opinions as to whether companies should engage in CSR activities. Friedman's (1970) argument that the main aim of companies is to increase shareholder wealth is one of the most well-known. In this ideology, there is no room for CSR activities as companies are only responsible for their shareholders. As CSR is becoming more important across businesses and everyday life, companies must try to maximize the wealth of their shareholders in a socially responsible way.

As studies examining the relationship between CSR actions and firm performance are increasing, Henisz, Koller, and Nuttall (2019) released an article on five ways that ESG creates value in McKinsey's Quarterly issue. In the article, the authors point out five ways ESG actions can improve the financial performance of a firm. Figure 3 below displays the five ways.

	<b>Strong ESG proposition (examples)</b>	<b>Weak ESG Proposition (examples)</b>
Top-line growth	-Attract B2B and B2C customers with more sustainable products. -Achieve better access to resources through stronger community and government relations.	-Lose customers through poor sustainability practices (eg, human rights, supply chain) or a perception of unsustainable/unsafe products. -Lose access to resources (including from operational shutdowns) as a result of poor community and labor relations.
Cost reduction	-Lower energy consumption. -Reduce water intake	-Generate unnecessary waste and pay correspondingly higher waste-disposal costs. -Expend more in packaging costs.
Regulatory and legal interventions	-Achieve greater strategic freedom through deregulation. -Earn subsidies and government support.	-Suffer restrictions on advertising and point of sale. -Incur fines, penalties, and enforcement actions.
Productivity uplift	-Boost employee motivation. -Attract talent through greater social credibility.	-Deal with "social stigma," which restricts talent pool. -Lose talents as a result of weak purpose.
Investment and asset optimization	-Enhance investment returns by better allocating capital for the long term (eg, more sustainable plant and equipment). -Avoid investment that may not pay off because of longer-term environmental issues	-Suffer stranded assets as a result of premature write-downs. -Fall behind competitors that have invested to be less energy hungry.

**Figure 3** A strong environmental, social, and governance (ESG) proposition links to value creation in five essential ways (Henisz et al., 2019).

As from figure 3 can be seen, there are many ways ESG actions can improve firm performance by creating new opportunities, lowering costs, or improving productivity just to name a few. Nevertheless, prior studies investigating the connection between CSR and firm performance have shown differing findings. Over 2200 independent studies on the connection between ESG and CFP were evaluated by Friede et al. (2015). From the 2200 individual studies, Friede et al. (2015) found that nearly 90% of the studies found the relationship between ESG and CFP to be nonnegative. This suggests that the majority of the studies conclude that CSR is beneficial for firm performance. Gregory, Tharyan, and Whittaker (2014) studied the relationship between CSR and firm value and found that CSR affects firm value positively by improving long-run growth. Fatemi, Glaum, and Kaiser (2018) study how ESG actions and disclosure affects firm value. ESG strengths

had a positive influence on firm value, whereas ESG concerns had a negative impact, according to the research. High ESG disclosure according to Fatemi et al. (2018) has a detrimental impact on the positive link between ESG strengths and firm value, and vice versa. ESG disclosure has a positive impact on the negative link between ESG weaknesses and firm value. Lastly, the authors found that environmental strengths was the only individual ESG pillar that had a positive effect on firm value. All three pillars indicated that their weaknesses decrease firm value (Fatemi et al., 2018).

On the other hand, there are also studies suggesting a neutral or negative relationship between CSR/ESG and firm performance. A Study by Lima Crisóstomo, de Souza Freire, and Cortes de Vasconcellos (2011) found that CSR has a negative impact on firm value in Brazil. The authors argue that this might be because of a lack of knowledge about CSR by the stakeholders in Brazil. Ho et al. (2020) found the relationship between CSR and corporate social performance to be neutral. Ho et al. (2020) proceeded to study the relationship by examining how financial slack which in the article is described as excess financial resources, affects the relationship. The results showed that firms with financial slack benefitted more from CSR activities.

As there are differing results from studying the effect of CSR on firm value, some of this can be explained by theories, mainly shareholder theory and stakeholder theory. A company's main purpose, according to shareholder theory, is to maximize its shareholders' wealth while doing the bare minimum in terms of CSR initiatives (Friedman, 1970). For that reason, investing more into CSR than necessary would decrease firm value. Whereas stakeholder theory suggests that companies should maximize the wealth of their stakeholders, thereby increasing CSR investing would increase the firm value. After examining prior literature regarding the connection between CSR and firm value and prior literature on how ESG can affect firm value (Henisz et al. 2019), this paper assumes that CSR has a positive effect on firm value. Regardless of studies having mixed results, the majority of the previous studies have shown positive effects of CSR in relation to firm value.

### **3.2 CSR and cost of capital**

One branch of study related to CSR is the link between CSR and the cost of capital. These studies aim to find out if better CSR performance can lower the cost of capital for firms. There are two components to the cost of capital which are the cost of equity (CoE) and

the cost of debt (CoD). Cost of capital is the minimum required rate of return for companies to be profitable.

**Cost of Equity:** According to El Ghouli et al. (2011) companies can lower their CoE in two different ways, mainly with the number of investors and the risk to which the company is exposed to. Firms with a larger investor base tend to have a lower CoE than firms with a smaller investor base. According to El Ghouli et al. (2011) investors are more inclined to invest in firms with high CSR since the amount of information available is larger than for low CSR companies. This is backed by Merton's (1987) statement about investors wanting to know more about the companies in which they are going to invest in. El Ghouli et al. (2011) also argue that companies with high CSR performance are usually more transparent in their actions since they want to showcase their responsible operations. Thus, investors are more inclined to invest in firms with higher CSR since the amount of information available is larger than for low CSR companies (El Ghouli et al., 2011). The second argument, the risk to which the company is exposed to implies that low CSR companies are facing more risk. Companies that are exposed to more risk will often have a more uncertain future. The company's level of risk is lowered through CSR measures because future cash flows are not negatively impacted by potential future controversies. This also enables companies to have good relationship with stakeholders (Godfrey, Merrill, & Hansen, 2009). High CSR companies receive less risk and better future outlooks which attract investors (El Ghouli et al., 2011).

**Cost of debt:** In their study, Goss and Roberts (2011) explore the link between CSR and the cost of bank loans. They offered two separate perspectives on how CSR may cut the cost of bank loans in the article: risk minimization and overinvestment. According to risk minimization, the object of CSR is to lower the risk that a firm incurs and hence lower the cost incurred in bank loans. This view by Goss and Roberts (2011) is based on prior literature studying the relationship between CSR and risk. As banks determine the creditworthiness of firms before giving out loans, decreased risk and improved performance through CSR will be rewarded with better loan terms. The other view is the overinvestment view which is in line with agency theory and suggests that overinvesting in CSR activities can increase the risk of a firm. Therefore, banks requiring a higher costs and interest on their loans since they are taking on more risk (Goss & Roberts, 2011).

There are many previous studies that investigate the connection between CSR and the CoE and CoD. To start with studies that consider the CoE, the impact of CSR on CoE was investigated by El Ghouli et al. (2011). The study had 12 915 US firm-year observations

and discovered that companies with better CSR scores had reduced equity costs. El Ghouli et al. (2011) argued that companies with low CSR performance are seen as riskier because of a smaller investors base. Similarly, Chouaibi, Rossi, and Zouari (2021) found a negative association between CSR the CoE, implying that a higher CSR score will decrease the CoE. Dahiya and Singh (2021), on the other hand, set out to investigate the link between CSR disclosure and the CoE of Indian manufacturing enterprises and discovered a positive relationship. Better CSR disclosure, according to this conclusion, would raise CoE.

The other component in the cost of capital is debt. As previously discussed, firms benefit from having a lower CoD and studies have been made in order to examine the relationship between CSR and the CoD. For instance, Goss and Roberts (2011) investigate the link between CSR and bank debt in the US. The findings from the study are statistically significant but economically modest according to Goss and Roberts (2011). The authors call the results economically modest since according to the study companies that have CSR concerns tend to pay only 7 to 18 basis points extra on their bank loans. Another study concerning the CSR and CoD is by Eliwa et al. (2021). The study concentrates on whether lending institutions are rewarding firms with great ESG performance and disclosure with a better cost of capital. The study considers EU-based non-financial firms between 2005-2016. Eliwa et al. (2021) findings suggest that with better ESG performance and disclosure firms are able to obtain a lower CoD from lending institutions.

Studies have also shown insignificant or negative relationship between CSR and CoD. Hoepner, Oikonomou, Scholtens, and Schröder (2016) explored the effect of sustainability on the cost of bank loans between companies and countries. Hoepner et al. (2016) included 28 countries in their study which were divided into four regions, mainly America (ex. USA), Asia-Pacific, Europe, and the USA. As a dependent variable, the authors used corporate spreads of bank loans and multiple sustainability scores as independent variable. The study's findings indicated that there is a statistically and economically significant positive association between country sustainability and loan cost, but no evidence that firm-level sustainability influences debt cost (Hoepner et al., 2016). Similar findings were made by Stellner, Klein, and Zwergel (2015) where the link between CSR and credit risk was examined. The authors found only weak statistical significance for the benefits of CSR investing.

Eliwa et al. (2021) argue that there is a difference between ESG performance and ESG disclosure since the latter provides additional information. The difference between these two can possibly explain the differing results received from previous studies. Despite some of the mixed findings, this paper will assume that CSR affects the cost of capital, both equity and debt positively as it did with CSR and firm performance.

### **3.3 CSR and credit rating**

The previous subchapters have been discussing about how CSR can affect firm performance and the cost of capital. As the previous studies have shown there seems to be a positive relationship between CSR and firm performance as well as between CSR and cost of capital. From these results, it is reasonable to assume that the relationship between CSR and credit ratings would also be positive so that better CSR performance would result in a better credit rating. Previous studies will be presented in order to understand what the relationship between CSR and credit ratings is.

Bhattacharya and Sharma (2019) and Attig et al. (2013) argue that it is important to invest in CSR since it provides stakeholders with more information than just traditional financial information. This information related to CSR can help firms decrease their credit risk and therefore, impact credit ratings positively. This is because firms that do more for their stakeholders in terms of CSR-related actions are seen as better firms in the eyes of the market as well as the customers because of the better reputation. McMillan and Joshi (1997) also discuss that corporate reputation creates value and so a good reputation can put a firm ahead of its competitors. The beneficial impact of CSR on default risk, according to Shahrour, Girerd-Potin, and Taramasco (2021), may be attributed to loyalty, long-term contracts, increased productivity, reputation, trust, absence of environmental disasters, and reduced CoE. Attig et al. (2013) argue that there are three different channels through which companies can positively affect their credit ratings through CSR activities. Firstly, firms can improve relations with stakeholders through CSR and by doing so increase the firm's long-term sustainability. Secondly, firms may demonstrate effective use of internal resources and great financial performance, and third, firms can limit the danger of incurring expenditures as a result of socially irresponsible behavior (Attig et al., 2013). ESG intentions may also be risk-reducing, according to Devalle et al. (2017) for two reasons: first, ESG factors impact borrowers' cash flow, and second, firms' default likelihood calculations. From this Devalle et al. (2017) argue that ESG actions should impact credit ratings positively. Although CSR actions may have positive impacts on companies' financial performance

and therefore better credit ratings are obtained, not all CSR actions may be beneficial for a company. Shahrour et al. (2021) discuss the possible reverse causality between default risk and CSR in their study but do not find it. Reverse causality in their study would have meant that companies that are experiencing financial difficulties and are on the verge of bankruptcy would have decreased their CSR spending, resulting in a lower CSR (Shahrour et al., 2021).

The number of studies that have examined the relationship between CSR and credit ratings is still quite low. Studies tend to focus on US companies mostly, but studies have also been conducted that consider European companies as well as some other countries such as India. None of the studies have yet considered only Nordic companies. Nonetheless, the studies that have examined the relationship have all found similar results.

Devalle et al. (2017) study the relationship between ESG investments and credit risk in two different ways. First, Devalle et al. (2017) try to make connections between previous literature and link these findings to their study to fill out missing gaps on the subject. Second, they use empirical methods in order to examine the relationship between ESG performance and credit ratings. The results obtained by Devalle et al. (2017) show that the most meaningful results were received from social and governance-related variables whilst environmental actions did not have a significant impact on credit ratings. Furthermore, the study concluded that there is clear evidence from the empirical study that ESG performance affects credit rating positively. Shahrour et al. (2021) studied the relationship between CSR performance and firm default risk in Eurozone and argue that the relationship cannot be proved unless it has been studied across all countries. Shahrour et al. (2021) examined the relationship between CSR performance and firm default risk from 2003 to 2017. They found that higher CSR performance lowers the risk of default for the period. To gain a better understanding of how CSR can affect firm default risk Shahrour et al. (2021) divided the sample into three subsamples. The subsamples examine the relationship before, during, and after the 2008 financial crisis. CSR had a considerable influence on the risk of default during and after the financial crisis, but not before (Shahrour et al., 2021). Weber, Scholz, and Michalik (2010) also discussed the importance of careful risk management and the inclusion of CSR-related actions in credit risk rating assessment after the 2007 financial crisis. Positive results were also found by Attig et al. (2013) who studied how CSR affects the credit rating given by credit rating agencies in the United States. As previously discussed, CSR can lower the

cost of capital of a company and therefore, Attig et al. (2013) also studied if better CSR performance can lower the cost of capital of companies through better credit rating since companies often raise debt or equity capital to finance their operations. The study discovered that while CSR strengths can result in a better credit rating and that CSR issues can result in a worse credit rating, the CSR acts that affect credit ratings the most are those that are socially valued and have an impact on stakeholders (Attig et al. 2013). Aslan et al. (2021) studied how ESG performance affects a company's probability of default. The study found that higher ESG and its individual pillars result in a lower probability of default. Interestingly Aslan et al. (2021) also found that ESG score has the most significant impact on the probability of default in the energy, financial, and real estate sectors. The financial and real estate sectors have been left out from most of the studies due to their unique financial statements so there are no comparisons for these results. As most of the studies have focused on developed nations, Bhattacharya and Sharma (2019) decided to study if ESG disclosure can predict the credit ratings of companies in India. The authors found that ESG score, environmental score, and social score all had a positive significant relationship with credit ratings. Governance score on the other hand was positive but insignificant. They argue that the variable governance may be insignificant since governance disclosure is mandatory in India. The same kind of mandatory disclosure can be seen in Europe. According to European Parliament and the Council of the European Union (2014) it is mandatory for public firms to disclose the diversity of boards. Bhattacharya and Sharma (2019) also found that medium-sized firms receive more benefits from great ESG disclosure whilst larger companies are more generally rated well because of their strong financial position.

The studies mentioned above have used slightly different variables to examine the relationship between CSR/ESG and credit rating. Some of the studies have used CSR scores (Attig et al., 2013; Shahrour et al., 2021), whilst some have used ESG performance and disclosure scores (Aslan et al., 2021; Devalle et al., 2017; Bhattacharya & Sharma, 2019). The studies have still produced similar results which suggest that with better CSR score or ESG performance firms are able to lower their credit risk and therefore receive a better credit rating. The results are also in-line with the previous research considering the relationship between CSR and firm performance and CSR and cost of capital.

### **3.4 Hypothesis development**

The previous literature considering the relationship between CSR/ESG scores, and credit ratings mostly argue that there is a positive relationship between the two. This suggests

that companies with a higher CSR/ESG score have better credit ratings. As the purpose of this study is to examine the relationship between ESG disclosure and credit ratings in the Nordic countries the four hypotheses of this study are in-line with the previous findings. The previous studies have not considered Nordic countries and therefore this study will bring new information to the previous studies by introducing a new geographic area. The following hypotheses have been created to answer the research purpose of this thesis:

**H1: Firm's ESG disclosure score has an impact on firm's credit rating in the Nordics.**

As ESG disclosure is the combined score from its individual pillars, this study assumes that higher ESG disclosure score results in a better credit rating. This is also backed up by prior research that has also found the relationship to be meaningful.

**H2: Firm's Environmental disclosure score has an impact on firm's credit rating in the Nordics.**

Firms that operate in environmentally friendly way are able to attract more customers with sustainable products. Governments are more willing to let sustainable firms have access to resources. Environmentally friendly companies are able to bring their costs down by reducing energy consumption (Henisz et al., 2019). Therefore, this study assumes that higher Environment disclosure score is assumed to result in a better credit rating. Prior research has also found this relationship to hold.

**H3: Firm's Social disclosure score has an impact on firm's credit rating in the Nordics.**

Higher Social reputation through charities, philanthropy and so on, can be seen favorable in the eyes of stakeholders. This good reputation can lead to improved sales and therefore, improve the financial performance of a firm (Bhattacharya & Sharma 2019). This study assumes that higher Social disclosure score results in a better credit rating. Prior research has also found this relationship to hold.

**H4: Firm's Governance disclosure score has an impact on firm's credit rating in the Nordics.**

Firm's that disclose more information are portrayed as more profitable than firm's that disclose less. Rouf (2011) argues that company governance is encouraged to disclose

more when firm's profitability is higher since it increases the confidence in investors. This study assumes that higher Governance disclosure score results in a better credit rating. Prior research has also found this relationship to hold.

## **4 DATA**

This chapter will explain the data that is used to conduct the tests in this study. Firstly, this chapter will go over the sample and give a short description of the data and where it has been obtained from. Secondly, the dependent variable, independent variables and control variables will be explained. And lastly, the descriptive statistics and correlation matrix will be presented.

### **4.1 Sample description**

The data gathered for this study is obtained from two different sources, mainly Bloomberg Terminal and Refinitiv Eikon Datastream. The ESG disclosure scores and credit ratings are obtained from Bloomberg Terminal and the control variables from Refinitiv Eikon Datastream. Since the amount of Nordic companies with credit rating from an NRSRO's is low, this study uses Bloomberg's 1-Yr Default Risk rating as a credit rating. Bloomberg offers their 1-Yr Default Risk which is presented as a credit rating. The credit rating is a short-term credit rating, and it is comparable to short-term credit ratings from NRSROs (Bondioli et al., 2021). Bloomberg Terminal also offers their ESG disclosure scores which are used in the study. The original sample size is 716 companies which consisted of Danish, Finnish, Norwegian and Swedish publicly listed companies. From the original sample financial, insurance, and real estate companies have been excluded. These companies have been excluded from the sample because of their unique financial statements. Many Nordic companies have not received an ESG disclosure score and for that reason the companies that do not have ESG disclosure scores must be excluded from the sample since they cannot be examined. The sample is cleaned and companies which do not have any information on ESG or is missing most of its ESG disclosure scores are removed from the sample. To make the data more balanced, companies which lacked financial information were removed from the sample. The final sample consists of 168 non-financial companies and 15 180 firm-year observations.

The time-period from which the data was collected is between 2009-2020. Not all of the companies have ESG disclosure scores through the whole time-period of 2009-2020. In fact, the sample showed that there is large increase in the amount of ESG disclosure scores given to companies after the year 2015. One reason for the increased amount of given ESG disclosure scores after 2015 might be the EU directive 2014/95/EU which stated that EU law requires listed companies to disclose information about environmental matters, social matters and treatment of employees, respect for human rights, anti-corruption and bribery and diversity on company boards (European

Parliament and the Council of the European Union, 2014). Nevertheless, the whole sample from 2009-2020 is being observed to see how the ESG disclosure scores have affected credit ratings during that period. Table 1 displays the number of companies observed in the sample. As mentioned earlier, not all of the companies have ESG disclosure scores for the whole time-period 2009-2020. The sample distribution shows that out of the 168 companies in the sample 97 companies had ESG disclosure scores between the years 2009-2020. From the sample 71 companies had ESG disclosure scores from 2016 to 2020. All together the sample includes 168 companies.

**Table 1 Sample distribution**

<b>Time</b>	<b># Of companies</b>	<b>Observations</b>
2009-2020	97	1164
2016-2020	71	354
<b>Total</b>	<b>168</b>	<b>1518</b>

Tables 2 and 3 shows how the companies in the study have distributed between countries and industries respectively. The companies have distributed quite evenly between Denmark, Finland, and Norway. The sample includes 29 companies from Denmark, 39 from Finland, and 37 from Norway. Most of the companies are from Sweden which comes as no surprise since Sweden has the most public listed companies. The sample includes 63 companies from Sweden which represents 38% of the sample. Moreover, all four countries included in the study are well represented which should indicate that the fixed effect variable *Country* should have some significant meaning. As for the industry distribution, 33% of the companies belong in the industrial sector which is the most of all industries. Companies that belong in the following industries, materials, consumer discretionary, and consumer staples are also well numbered in the study representing 14%, 12% and 11% respectively. Furthermore, all the industries are well represented which means that the fixed effect variable *Industry* in the study should have some significant meaning.

**Table 2 Country distribution**

<b>Country</b>	<b># Of companies</b>	<b>Percentage</b>
DK	29	17 %
FI	39	23 %
NO	37	22 %

SE	63	38 %
<b>Total</b>	<b>168</b>	<b>100 %</b>

**Table 3 Industry distribution**

<b>Industry</b>	<b># Of companies</b>	<b>Percentage</b>
Consumer Staples	19	11 %
Energy	13	8 %
Industrials	55	33 %
Health Care	16	9 %
Communications	8	5 %
Technology	10	6 %
Materials	23	14 %
Consumer Discretionary	21	12 %
Utilities	3	2 %
<b>Total</b>	<b>168</b>	<b>100 %</b>

#### **4.1.1 Dependent variable**

As previously mentioned, the dependent variable used in the study is Bloomberg's 1-Yr Default Risk which presents the short-term probability of default. The Default Risk is presented as credit ratings which correlates the short-term credit ratings of major NRSRO's. The Bloomberg 1-Yr Default Risk ratings range from Investment grade 1 (IG1) to IG10, High Yield 1 (HY1) to HY6 and Distressed 1 (DS1) to DS5. As the ratings obtained for the sample mostly belonged to the IG category, they were pooled into 8 categories. Ashbaugh-Skaife, Collins, and LaFond (2006) also pooled credit ratings into 7 categories in their study for analysis purposes. Pooling the credit ratings into categories allows this study to use ordered probit regression which will be discussed further on in chapter 5. After pooling the credit ratings into 8 categories ranging from 1 being the best to 8 being the worst, the corresponding ratings are as follows: IG1 = 1, IG2 = 2, IG3 = 3, IG4 = 4, IG5 = 5, IG6 = 6, IG7-10 = 7, and HY1-HY6 = 8. The distribution of the credit ratings is shown in Table 4. Majority of the short-term credit ratings given by Bloomberg fall into the first category which is the best credit rating. In the sample the first category represents 26% of the credit ratings. Second largest category of the credit ratings is the category 7 which includes 17% of the credit ratings in the sample. It can be seen that the

rest of the credit ratings have been distributed evenly each representing around 8-12% of the sample.

**Table 4 Credit rating distribution**

<b>Credit rating</b>	<b># Of ratings</b>	<b>Percentage</b>
1	395	26 %
2	155	10 %
3	139	9 %
4	127	8 %
5	120	8 %
6	141	9 %
7	257	17 %
8	184	12 %
<b>Total</b>	<b>1518</b>	<b>100 %</b>

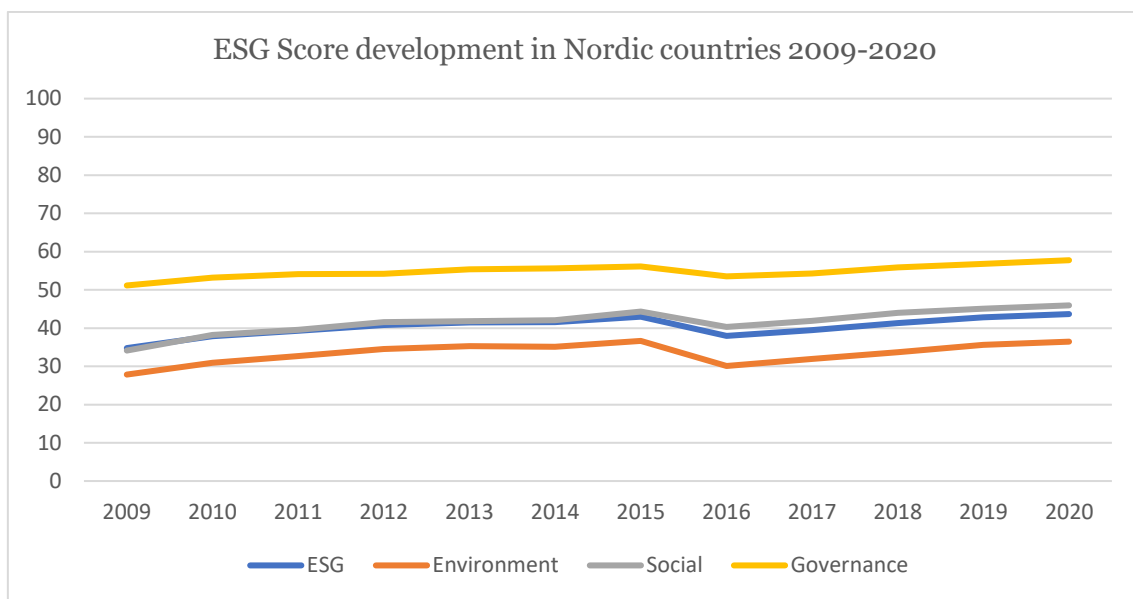
#### **4.1.2 Independent variables**

As the purpose of the study is to examine the relationship between ESG disclosure scores and credit ratings, the independent variable used in the study is Bloomberg's ESG disclosure score and its individual pillars. There are multiple different sources from which to obtain ESG scores and the reason for choosing Bloomberg's ESG Disclosure scores is because the study also uses Bloomberg's credit rating. The ESG disclosure score and its individual pillars are explained below.

- **ESG Disclosure Score:** Bloomberg's ESG score based on the level of company's environmental, social, and governance disclosure.
- **Environmental Disclosure Score:** Bloomberg's ESG score based on the level of company's environmental disclosure.
- **Social Disclosure Score:** Bloomberg's ESG score based on the level of company's social disclosure.
- **Governance Disclosure Score:** Bloomberg's ESG score based on the level of company's governance disclosure.

Figure 4. shows the development of the ESG scores over the time-period 2009-2020. Governance disclosure score has had the highest average value of all four since 2009. According to the figure, on average companies' Governance disclosure score has been

little over 50 in 2009, whilst social score is around 35 and the worst score which is the environment score is below 30. All of the scores have increased over time as the average Governance disclosure score is nearly 60, Social disclosure score is around 45 and Environment disclosure score is close to 40. The largest increase has been in Environmental score which has increased 36%. This means that companies have been disclosing their environmental actions better in the recent years. Social score increased nearly 35% during the sample period and Governance score 15%. The overall ESG score has increased 29% during the sample period. Figure 4 display the development of ESG disclosure during the sample period from 2009 to 2020.



**Figure 4** ESG Score development in Nordic countries 2009-2020

#### 4.1.3 Control variables

When examining the explanatory variables for credit ratings most often profitability and leverage must be considered. The control variables chosen for this study are along with the variables used by Attig et al. (2013). The variables include *Size*, *Coverage*, *Margin*, *Leverage* and *Capint*. Attig et al. (2013) also include variables Beta and Loss in their study, but these two variables could not be found on Refinitiv Eikon Datastream and therefore are not included in the study. Short descriptions and assumptions about the control variables are mentioned below.

**Size:** is the natural logarithm of total assets. The variable Size is expected to affect the dependent variable Credit rating negatively (positively). If companies' total assets are larger it should indicate a better Credit rating

**Coverage:** is calculated as the ratio of EBIT plus interest rate divided by interest rate. Coverage is expected to affect the dependent variable Credit rating negatively (positively). Larger coverage should indicate a better Credit rating.

**Margin:** is calculated as companies operating income divided by sales. Margin is expected to affect the dependent variable credit rating negatively (positively). Higher Margin should indicate a better Credit rating

**Leverage:** is calculated as companies long-term debt divided by total assets. Leverage is expected to affect the dependent variable credit rating positively (negatively). Higher leverage should indicate a worse Credit rating.

**Capint:** is calculated as companies' property, plant, and equipment (PPE) divided by total assets. Capint is expected to affect the dependent variable Credit rating negatively (positively). Higher Capint should indicate a better Credit rating.

#### 4.2 Descriptive statistics

In this section the descriptive statistics for the data will be presented and discussed shortly. Table 5 below presents the descriptive statistics for the sample. The sample has 1518 observations for each variable. The dependent variable *credit rating* has a minimum value of 1 which indicates the best credit rating IG1 and a maximum value of 8 which includes credit ratings HY1-HY6. The median value for *credit rating* is 4 and the mean is 4,18.

The independent variables ESG disclosure score and its individual pillars have also been presented in table 5. The scores take on value between 0-100 depending on how well companies have disclosed their ESG related actions. *ESG* and *Social* both have mean value of around 41. The lowest mean value of from the individual pillars belongs to *Environment* which is 33,43. The highest mean value from the individual pillars belongs to *Governance* which is 55,01. From this information it can be concluded that companies disclose more governance related actions than social and environmental. The disclosure of each individual pillar has been increasing during the time-period 2009-2020 as shown in figure 4.

The control variables include *Size*, *Coverage*, *Margin*, *Leverage*, and *Capint*. The control variables *Coverage* and *Margin* include some big outliers. The minimum value of *Coverage* is -12 757 and the maximum value is 28 276 and for *Margin* the minimum value is -1022. The control variables could have been winsorized but by doing so some

key variables might have been deleted. Since the defined research scope is the Nordic companies it is best not to winsorize any of the variables.

**Table 5 Descriptive statistics**

	Obs.	Min	Mean	Median	Max	STD	Kurtosis	Skew
<i>Credit rating</i>	1518	1	4,18	4	8	2,59	-1,53	0,09
<i>ESG</i>	1518	9,92	40,49	40,91	77,27	12,97	-0,79	-0,03
<i>Environment</i>	1518	0,78	33,43	33,33	82,95	16,68	-0,76	0,03
<i>Social</i>	1518	3,51	41,99	43,86	73,68	13,56	-0,45	-0,17
<i>Governance</i>	1518	17,86	55,01	57,14	80,36	10,26	0,63	-0,62
<i>SIZE</i>	1518	7,36	13,44	13,51	17,28	1,57	0,21	-0,32
<i>COVERAGE</i>	1518	-12757	114,48	10,68	28276	1231,06	344,61	16,02
<i>MARGIN</i>	1518	-1022	-1,45	0,08	0,62	33,87	687,85	-25,50
<i>LEVERAGE</i>	1518	0	0,77	0,44	42,05	1,64	288,59	13,43
<i>CAPINT</i>	1518	0	1,24	0,53	41,63	2,24	82,99	6,68

To observe the ESG disclosure scores more thoroughly, table 6 show the descriptive statistics for ESG and its individual pillar disclosure scores by countries. Table 6 shows that Denmark has the lowest mean value for ESG, Environmental, and Social disclosure score of all the countries. Finland on the other hand has the highest mean value for ESG, Environmental, Social, and Governance disclosure score.

As table 5 already showed, Governance disclosure score has the highest mean value of all of the disclosure scores. The same can be seen in table 6 as each country has the highest mean value with Governance disclosure score. Environmental disclosure score had the lowest mean value in table 5 and the same pattern continues in table 6 also. Overall, it looks like the amount of ESG related disclosure is highest in Finland and Sweden while there is less ESG related disclosure in Denmark and Norway. The study will return to table 6 later on when the results for a regression that tests the impact of ESG disclosure score on credit ratings separately with each country are presented.

**Table 6 Descriptive statistics for independent variable**

	<b>Min</b>	<b>Mean</b>	<b>Median</b>	<b>Max</b>
<b>Denmark</b>				
<i>ESG</i>	9,92	35,26	35,54	60,74
<i>Environment</i>	2,33	27,26	27,91	60,47
<i>Social</i>	3,51	38,05	38,60	68,42
<i>Governance</i>	23,21	50,84	50,00	75,00
<b>Finland</b>				
<i>ESG</i>	15,70	46,35	48,97	77,27
<i>Environment</i>	2,33	41,41	42,64	80,62
<i>Social</i>	3,51	43,48	43,86	73,68
<i>Governance</i>	32,14	60,61	62,50	80,36
<b>Norway</b>				
<i>ESG</i>	12,81	36,12	35,95	63,22
<i>Environment</i>	2,33	28,94	28,68	64,46
<i>Social</i>	12,28	41,14	43,86	73,68
<i>Governance</i>	17,86	47,45	48,21	75,00
<b>Sweden</b>				
<i>ESG</i>	14,88	40,91	41,74	72,73
<i>Environment</i>	0,78	32,82	34,11	82,95
<i>Social</i>	8,77	43,26	43,86	70,18
<i>Governance</i>	26,79	56,76	57,14	71,43

As the study will investigate how ESG disclosure affects credit ratings of companies with different levels of leverage the sample has been divided into low and high leveraged companies. Table 7 displays the descriptive statistics for low and high leveraged companies. The subsamples include 760 observations for low leveraged and 758 for high leveraged companies.

Low leveraged companies have better credit ratings according to table 7 as the mean credit rating for low leveraged companies is 3,7 and the median 3 whereas the mean credit rating for high leveraged companies is 4,6 and the median 5. This tells that the amount of leverage has a clear impact on credit ratings. Interestingly the mean value for ESG, Environment, and Governance disclosure is higher for the high leveraged companies. Mean value for Social disclosure score is higher for the low leveraged companies but just a little. Size wise the low and high leveraged companies do not differ much as their mean values for *Size* are 13,45 and 13,42 respectively. The mean value for Leverage is 0,18 for low leveraged and 1,37 for the high leveraged companies. The

minimum and maximum values for *Leverage* between low and high leveraged companies differ quite drastically.

**Table 7 Descriptive statistics for low and high leveraged companies**

<b>Low</b>	Obs.	Min	Mean	Median	Max	STD
<i>Credit rating</i>	760	1	3,713	3	8	2,473
<i>ESG</i>	760	9,917	39,927	40,083	72,727	12,974
<i>Environment</i>	760	0,775	32,475	31,783	82,946	16,331
<i>Social</i>	760	3,509	42,076	43,860	73,684	14,311
<i>Governance</i>	760	19,643	54,716	57,143	75,000	10,069
<i>SIZE</i>	760	7,359	13,456	13,553	17,132	1,619
<i>COVERAGE</i>	760	-12757	217,121	18,435	28276	1734,164
<i>MARGIN</i>	760	-1022	-2,888	0,077	0,624	47,792
<i>LEVERAGE</i>	760	0	0,183	0,173	0,444	0,137
<i>CAPINT</i>	760	0	0,608	0,324	17,667	1,206
<b>High</b>						
<i>Credit rating</i>	758	1	4,650	5	8	2,629
<i>ESG</i>	758	13,223	41,048	41,736	77,273	12,944
<i>Environment</i>	758	2,326	34,396	34,884	82,946	16,984
<i>Social</i>	758	3,509	41,912	43,860	73,684	12,778
<i>Governance</i>	758	17,857	55,310	57,143	80,357	10,456
<i>SIZE</i>	758	8,702	13,420	13,480	17,280	1,514
<i>COVERAGE</i>	758	-49,466	11,559	7,678	367,108	24,355
<i>MARGIN</i>	758	-53,791	-0,004	0,085	0,612	2,145
<i>LEVERAGE</i>	758	0,444	1,369	0,807	42,048	2,162
<i>CAPINT</i>	758	0	1,874	1,067	41,626	2,796

The correlation matrix in table 8 displays the correlation in the sample. It is important that there is no multicollinearity in the data when conducting an ordered probit regression. As the matrix suggests, the ESG score, and its individual pillars are highly correlated with each other which is not an issue since they are not used in the same model and therefore no multicollinearity will be present. The variables *Leverage* and *Capint* are somewhat correlated. The usual limit used for too much correlation is 0,8. The correlation between *Leverage* and *Capint* is 0,82 which is right at the limit.

Some assumptions about the relationship between the dependent variable *Credit rating* and the independent variables can be made from the correlation matrix. *ESG* and its

individual pillars have a significant negative correlation with *Credit rating* meaning the higher the ESG score or some of its pillars should result in a lower Credit rating. The same goes for the independent variables *Size*, *Coverage* and *Margin*. All three variables have a significant negative correlation with the dependent variable which was expected. Meaning higher values will result in better credit rating. Variable *Leverage* has a positive correlation with the dependent variable which was expected. Higher leverage will result in a worse credit rating. Lastly, *Capint* has a positive correlation with the dependent variable which was expected to be negative.

**Table 8 Correlation matrix**

	1	2	3	4	5	6	7	8	9	10
Credit rating	<b>1</b>									
ESG	-0.20***	<b>1</b>								
Environment	-0.18***	0.97***	<b>1</b>							
Social	-0.19***	0.82***	0.69***	<b>1</b>						
Governance	-0.15***	0.74***	0.61***	0.56***	<b>1</b>					
SIZE	-0.15***	0.55***	0.51***	0.45***	0.48***	<b>1</b>				
COVERAGE	-0.09***	-0.06**	-0.07***	-0.06**	-0.01	-0.06	<b>1</b>			
MARGIN	-0.05*	0.10***	0.08***	0.12***	0.07**	0.12***	0.01	<b>1</b>		
LEVERAGE	0.19***	-0.03	-0.03	-0.01	-0.06**	-0.15***	-0.04	0.02	<b>1</b>	
CAPINT	0.19***	0.01	0.02	0.02	-0.08**	-0.19***	-0.04	0.02	0.82***	<b>1</b>

Note: Significance codes: 0 '\*\*\*', 0.01 '\*\*', 0.05 '\*'

## 5 METHODOLOGY

This chapter will go over the method that will be applied in the study to examine the relationship between ESG disclosure and credit rating. Previous studies from Devalle et al. (2017) and Attig et al. (2013) have used ordered logit and probit regression respectively to study the relationship between CSR/ESG and credit ratings. Devalle et al. (2017) and Attig et al. (2013) had credit ratings as dependent variable which were ordinal in nature and their dependent variables had 7 and 8 values respectively. This study will use ordered probit regression since the dependent variable is ordinal in nature. The study follows closely the work of Attig et al. (2013).

### 5.1 Ordered probit regression

Most often when credit rating determinants are being modelled an ordinal least squared (OLS) regression is an incorrect model to use because of the ordinal nature of the credit ratings. This is where ordered probit and logit models come in picture. These two models are the most used models when determining credit ratings.

The basic logistic function which is used to deal with binary dependent variables can be presented as follows:

$$F(z_i) = \frac{e^{z_i}}{1 + e^{z_i}} = \frac{1}{1 + e^{-z_i}}$$

Where  $e$  is the exponential under the logit approach. The function  $F$  is a cumulative logistic distribution. The logistic model estimated would be as follows:

$$P_i = \frac{1}{1 + e^{-(\beta_1 + \beta_2 x_{2i} + \dots + \beta_k x_{ki} + u_i)}}$$

where  $P_i$  is the probability that  $y_i = 1$  (Brooks, 2008).

The probit model differs from the logit model in that probit model uses cumulative normal distribution instead of the cumulative logistic function. The function  $F$  from the logistic function is replaced by:

$$F(z_i) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{1}{2}\left(\frac{z_i}{\sigma}\right)^2}$$

where it becomes the cumulative distribution function for a standard normally distributed random variable (Brooks, 2008).

Because the densities are so close, the logit and probit models will characterize the data similarly in the great majority of cases and offer similar graphs for fitted regressions. The independent variables and the probability that  $y_i = 1$  are also correlated similarly between the models. The two models might give differing results only in cases where the dependent variable is extremely unbalanced in the model (Brooks, 2008).

When the dependent variable takes on more than two values and the values have a natural ordering, the probit and logit models are not the correct models anymore. A generalization of the probit and logit models known as ordered probit and ordered logit must be used. This study will use the ordered probit model. The ordered probit model is as follows:

$$R_i^* = X_i\beta + \varepsilon_i,$$

$$R_i = \begin{cases} 1 & \text{if } R_i^* \leq \mu_0 \\ 2 & \text{if } \mu_0 < R_i^* \leq \mu_1 \\ 3 & \text{if } \mu_1 < R_i^* \leq \mu_2 \\ 4 & \text{if } \mu_2 < R_i^* \leq \mu_3 \\ 5 & \text{if } \mu_3 < R_i^* \leq \mu_4 \\ 6 & \text{if } \mu_4 < R_i^* \leq \mu_5 \\ 7 & \text{if } R_i^* \leq \mu_5 \end{cases}$$

where  $R_i$  are the observed rating scores that are given numerical values as follows: IG1 = 1, IG2 = 2, IG3 = 3, IG4 = 4, IG5 = 5, IG6 = 6, IG7-IG10 = 7, HY1 or below = 8. In the above equation  $R_i^*$  is the unobservable true rating,  $X_i$  is a vector of explanatory variables,  $\beta$  is a vector of coefficients,  $\mu_i$  are the threshold parameters to be estimated along with  $\beta$ , and  $\varepsilon_i$  is a disturbance term that is assumed normally distributed (Brooks, 2008).

## 5.2 Model specification

As justified in subchapter 5.1, the study will use the ordered probit model in order to examine the relationship between credit ratings and ESG disclosure scores. As ESG score and its individual pillars will not be used in same models, there will be four models in total. The four models will test the validity of the hypotheses made for this study. Model one includes credit rating as the dependent variable and ESG as the independent variable. The model also includes control variables and fixed effects for year and industry. The independent variables in models 2-4 are Environment, Social, and Governance. Models 2-4 also include the same dependent variable, control variables and

fixed effects. These four model will test the validity of the hypotheses. The four models are presented below:

$$\text{Credit rating}_t = X_i\beta\text{ESG}_t + \beta\text{Size}_t + \beta\text{Coverage}_t + \beta\text{Margin}_t + \beta\text{Leverage}_t + \beta\text{Capint}_t + \varepsilon_i$$

$$\text{Credit rating}_t = X_i\beta\text{Environment}_t + \beta\text{Size}_t + \beta\text{Coverage}_t + \beta\text{Margin}_t + \beta\text{Leverage}_t + \beta\text{Capint}_t + \varepsilon_i$$

$$\text{Credit rating}_t = X_i\beta\text{Social}_t + \beta\text{Size}_t + \beta\text{Coverage}_t + \beta\text{Margin}_t + \beta\text{Leverage}_t + \beta\text{Capint}_t + \varepsilon_i$$

$$\text{Credit rating}_t = X_i\beta\text{Governance}_t + \beta\text{Size}_t + \beta\text{Coverage}_t + \beta\text{Margin}_t + \beta\text{Leverage}_t + \beta\text{Capint}_t + \varepsilon_i$$

### 5.3 Model diagnostics

To further examine the multicollinearity between the variables a Variance Inflation Factor (VIF) has been applied to the sample regression. VIF is a simple test for determining whether a regression model has multicollinearity. VIF measures how much the predicted coefficients' variances are inflated. A general assumption about VIF is that a value greater than 10 indicates multicollinearity in the model (Das, 2019). From table 9 the results for the VIF tests can be seen and all the values are less than 10. All values are less than two except for *Leverage* and *Capint* which have values close to 3. The results of the VIF test are in-line with the correlation matrix in table 7 and conclude that there is no multicollinearity in the data or in the ordered probit model.

**Table 9 Variance inflation factor**

	1	2	3	4
ESG	1,53			
Environment		1,42		
Social			1,39	
Governance				1,35
SIZE	1,58	1,48	1,40	1,40
COVERAGE	1,02	1,02	1,02	1,02
MARGIN	1,02	1,02	1,03	1,02
LEVERAGE	3,02	3,03	3,01	2,99
CAPINT	3,15	3,17	3,13	3,07

## 6 EMPIRICAL RESULTS

The results from the study are presented in this chapter. The results will be discussed in the following order. Firstly, the whole sample, secondly the relationship is tested on country level, and lastly the relationship is tested based on the level of leverage companies have. The study set out to examine the relationship between credit ratings and ESG disclosure scores. More specifically, does ESG disclosure have any significant impact on credit ratings. The study focuses on Nordic listed companies since this geographic area has not been included in previous studies.

### 6.1 Results from the study

To examine the actual relationship between credit ratings and ESG scores an ordered probit model was used. Four hypotheses were made for the study and their correctness was observed with the regression models 1-4 in table 10. All of the models had five control variables as well as *Year* and *Industry* as fixed effects. The McFadden's  $R^2$  values for the models ranged between 0.049-0.057.

Model 1 displays the results for H1: Firm's ESG disclosure score has an impact on firm's credit rating in the Nordics. The results show that ESG Disclosure score has a negative (positive) significant relationship with credit rating suggesting that higher ESG score will result in a better credit rating. Dependent variable *Size* is not significant in model 1 but still has a negative coefficient as expected. *Coverage* and *Leverage* are significant at 0.1% level with their coefficient being as expected. *Margin*, and *Capint* are insignificant. *Margin* has its expected sign, which is negative, but *Capint* loads positively although the expected sign was negative.

The hypothesis 1 examined if ESG disclosure score has an impact on firms' credit ratings in the Nordics. As previous studies have concluded, ESG scores tends to have a positive impact on financial performance. The results from the ordered probit model suggests that ESG disclosure score has a significant impact on credit ratings in Nordics also. The results obtained are like the ones obtained by Aslan et al. (2021) who found that ESG performance has a negative significant impact on probability of default and Bhattacharya and Sharma (2019) who found ESG score to have a significant impact on credit ratings. Attig et al. (2013) studied how CSR affects credit ratings and, also concluded that CSR has a positive significant impact on credit ratings. Based on the results hypothesis 1 can be accepted and conclude that ESG disclosure has an impact on credit ratings in the Nordics.

Model 2 displays the results for H2: Firm's Environment disclosure score has an impact on firm's credit rating in the Nordics. The results suggest that Environment disclosure score has a negative (positive) significant relationship with credit rating suggesting that higher environmental score will also result in a better credit rating. The control variables remain the same as in model 1.

The result from model 2 follow prior studies as Aslan et al. (2021) found environmental performance to have a significant negative impact on probability of default, Bhattacharya and Sharma (2019) found environmental score to have a positive significant impact on credit ratings, and Attig et al. (2013) found environmental performance to have a positive significant impact on credit ratings. Devalle et al. (2017) found some differing results suggesting that their environmental measures which included resources, emissions, and environmental innovations had a positive relationship with credit ratings, but the results were insignificant.

It could be argued that companies are able to receive a better credit rating from great environmental disclosure because environmentally friendly companies might be able to attract new customers with sustainable products, governments are more inclined to provide resources to sustainable businesses and lastly, lowering energy use can help companies to cut costs (Henisz et al., 2019). Nevertheless, the results obtained from this study are in line with prior studies and based on the results hypothesis 2 can be accepted and conclude that Environmental disclosure has an impact on credit ratings in the Nordics. To further test the relationship country level tests were conducted.

Model 3 displays the results for H3: Firm's Social disclosure score has an impact on firm's credit rating in the Nordics. The results suggest that Social disclosure score has a negative (positive) significant relationship with credit rating meaning that higher social score will also result in a better credit rating. *Size*, *Coverage*, and *Leverage* are significant and have their expected signs whilst *Margin* and *Capint* are insignificant.

The results from model 3 are in line with prior studies as Aslan et al. (2021) found social performance to have a negative significant impact on probability of default, Bhattacharya and Sharma (2019) found social score to have a positive significant impact on credit ratings and Attig et al. (2013) found community score and product score to have a positive significant impact on credit ratings. Again, Devalle et al. (2017) obtained some differing results in their study. The author's included three variables to measure social measures which included workforce, community enhancement, and product

responsibility. All three variables had positive loadings but only community enhancement was significant.

Great social disclosure can improve financial performance though increased sales because socially responsible companies have a good reputation amongst the stakeholders (Bhattacharya & Sharma, 2019). The improved financial performance through responsible actions then contributes to better credit ratings. Based on the results the hypothesis 3 can be accepted and conclude that Social disclosure has an impact on credit ratings in the Nordics. To further test the relationship, country level tests were conducted.

Model 4 displays the results for H4: Firm's Governance disclosure score has an impact on firm's credit rating in the Nordics. The results suggest that Governance disclosure has a negative (positive) and significant relationship with credit rating. The control variables are similar to the ones in model 3.

Prior research has found similar results as Aslan et al. (2021) found governance performance to have a negative significant impact on probability of default, Attig et al. (2013) found diversity score and employee relations score to have a positive significant impact on credit ratings, and Devalle et al. (2017) found from their governance measures two to be positive significant, mainly shareholder's policies and CSR strategies. Bhattacharya and Sharma (2019) found governance score to have a positive impact on credit ratings but insignificant.

Based on the results the hypothesis can be accepted and conclude that Governance disclosure has an impact on credit ratings in the Nordics. To further test the relationship, country level tests were conducted.

**Table 10**      **Regression results on the sample**

<b><i>Rating</i></b>	(1) Credit rating	(2) Credit rating	(3) Credit rating	(4) Credit rating
<b>ESG</b>	-0.021*** (-7.241)			
<b>Environment</b>		-0.015*** (-6.853)		
<b>Social</b>			-0.017*** (-6.788)	
<b>Governance</b>				-0.008*

				(-2.488)
<b>SIZE</b>	-0.018 (-0.768)	-0.033 (-1.472)	-0.045* (-2.076)	-0.086*** (-3.963)
<b>COVERAGE</b>	-0.0001* (-2.458)	-0.0001* (-2.516)	-0.0001* (-2.547)	-0.0001* (-2.389)
<b>MARGIN</b>	-0.0005 (-0.602)	-0.0006 (-0.768)	-0.0003 (-0.337)	-0.0007 (-0.829)
<b>LEVERAGE</b>	0.173*** (4.389)	0.170*** (4.315)	0.178*** (4.483)	0.179*** (4.543)
<b>CAPINT</b>	-0.004 (-0.147)	-0.004 (-0.181)	-0.003 (-0.116)	-0.015 (-0.651)
<b>Industry effect</b>	Yes	Yes	Yes	Yes
<b>Year effect</b>	Yes	Yes	Yes	Yes
<b>N</b>	1518	1518	1518	1518
<b>R<sup>2</sup></b>	0.057	0.056	0.056	0.049

Note: Significance codes: 0 '\*\*\*', 0.001 '\*\*', 0.01 '\*', 0.05 '.'

T value presented in parentheses.

To further examine the relationship between ESG disclosure and credit ratings, the relationship has been modeled on country level. Environmental, Social, and Governance disclosure scores are tested against credit ratings for each country. As shown in table 6, the descriptive statistics for ESG disclosure scores by country, Denmark has the lowest mean value for ESG, Environment, and Social disclosure score. Meanwhile Finland has the highest mean value for all of the scores. The results for the country level regressions are presented in tables 11.

The control variables vary in their significance. For Denmark, *Coverage* and *Leverage* are significant and have their expected signs, while the rest of the control variables are insignificant. For Finland *Margin* and *Leverage* are significant and have their expected signs. The rest of the control variables are insignificant. For Norway only *Capint* is significant. With Sweden *Margin*, *Leverage*, and *Capint* are significant whilst *Size* and *Coverage* are insignificant.

The independent variables also display some differing results. Even though Finland had the highest mean value for Environment disclosure score it is the only country whose result for Environment disclosure score is insignificant. Denmark, Norway, and Sweden all show a significant relationship between Environmental disclosure score and credit rating. The relationship with Environmental disclosure score is negative for all countries

implying that higher score should lead to a better credit rating. Social disclosure score is significant for Finland and Norway and has a negative coefficient. Social disclosure score also has a negative coefficient for Denmark and Sweden, but the result is insignificant. Lastly, Governance disclosure score is only significant in the case of Norway. The score has a negative coefficient for each country, but is insignificant for Denmark, Finland, and Sweden.

The results from the country level regression were somewhat similar to the results obtained by Bhattacharya and Sharma (2019). They found that environmental score, and social score had positive significant relationship with credit ratings but governance score on the other hand was positive but insignificant. They argued that the variable governance may be insignificant since governance disclosure is mandatory in India. As discussed in chapter 6, according to European Parliament and of the Council of the European Union (2014) it is mandatory for public firms to disclose the diversity of boards in Europe. This may have affected the results in the country level regression, as the impact of Governance disclosure score was insignificant.

No prior research has been done on the subject of how ESG affects credit ratings, firm performance, or cost of capital in a country level regression investigating Nordic countries. Thus, it is difficult to link the results to any prior studies. Overall, the results imply that only in Norway all of the individual ESG disclosure scores significantly impact credit rating.

**Table 11** Regression results on country-level

	Credit rating	Credit rating	Credit rating	Credit rating	Credit rating	Credit rating
		(Denmark)			(Finland)	
<b>Environment</b>	-0.021** (-2.945)			-0.007 (-1.446)		
<b>Social</b>		-0.011 (-1.484)			-0.009* (-2.322)	
<b>Governance</b>			-0.003 (-0.337)			-0.006 (-0.596)
<b>SIZE</b>	0.120 (1.828)	0.060 (1.013)	0.038 (0.656)	0.012 (0.164)	0.018 (0.301)	-0.002 (-0.242)
<b>COVERAGE</b>	-0.004*** (-3.840)	-0.004*** (-3.927)	-0.004*** (-3.943)	-0.0001 (-1.445)	-0.0001 (-1.381)	-0.0001 (1.417)
<b>MARGIN</b>	-0.001. (-1.667)	-0.001 (-1.272)	-0.002. (-1.691)	-6.989*** (-8.589)	7.006*** (-8.631)	-7.120*** (-8.850)

<b>LEVERAGE</b>	0.494** (3.090)	0.456** (2.899)	0.435** (2.715)	0.801*** (3.467)	0.814*** (3.560)	0.852*** (3.750)
<b>CAPINT</b>	0.283* (2.387)	0.176 (1.522)	0.192 (1.622)	-0.122 (-0.712)	-0.135 (-0.827)	-0.166 (-1.064)
<b>Year effect</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>N</b>	271	271	271	412	412	412
<b>McFadden's R2</b>	0.18	0.17	0.17	0.12	0.12	0.12
	Credit rating	Credit rating	Credit rating	Credit rating	Credit rating	Credit rating
		(Norway)			(Sweden)	
<b>Environment</b>	-0.026*** (-3.513)			-0.012*** (-3.408)		
<b>Social</b>		-0.024** (-2.785)			-0.009. (-1.929)	
<b>Governance</b>			-0.027** (-3.017)			-0.002 (-0.326)
<b>SIZE</b>	-0.049 (-0.706)	-0.118. (-1.883)	-0.060 (-0.838)	-0.064 (-1.575)	-0.093* (-2.311)	-0.122** (-3.097)
<b>COVERAGE</b>	0.0007 (1.392)	0.0007 (1.285)	0.0006 (1.206)	-0.00007 (-1.340)	-0.00007 (-1.379)	-0.00006 (-1.324)
<b>MARGIN</b>	-0.690 (-1.192)	-0.647 (-1.119)	-0.584 (-0.999)	-4.168*** (-8.071)	-4.145*** (-7.942)	-4.314*** (-8.399)
<b>LEVERAGE</b>	0.031 (0.335)	0.079 (0.864)	0.072 (0.784)	0.205*** (3.749)	0.195*** (3.578)	0.197*** (3.660)
<b>CAPINT</b>	0.274*** (4.365)	0.232*** (3.803)	0.234*** (3.847)	-0.122** (-3.278)	-0.121** (-3.211)	-0.132*** (-3.561)
<b>Year effect</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>N</b>	283	283	283	552	552	552
<b>McFadden's R2</b>	0.21	0.20	0.21	0.08	0.08	0.08

Note: Significance codes: 0 '\*\*\*', 0.001 '\*\*', 0.01 '\*', 0.05 '.'

T value presented in parentheses.

Lastly, this study tests to see if the amount of firm leverage affects the impact of ESG disclosure on credit ratings. As the sample regression in table 10 displayed, higher leverage can lead to a worse credit rating and that the impact of *Leverage* has also been the biggest of all the control variables in table 10. Companies with high leverage usually have worse credit ratings than low leveraged companies. Therefore, the study seeks to examine if companies with high leverage can still benefit from great ESG disclosure and improve their credit rating. As mentioned previously in this paper, company's level of

risk can be lowered through CSR measures because future cash flows are not negatively impacted by potential future controversies (Godfrey et al., 2009).

Cathcart, Dufour, Rossi, and Varotto (2020) study the impact of leverage on credit ratings in Europe and they found that leverage significantly impacts credit ratings. The test included SMEs and large companies and the results were similar for both indicating that higher leverage leads to a worse credit rating. Andrikopoulos and Kriklani (2013) studied listed non-financial companies in Denmark and found that companies with higher leverage tend to disclose less about their environmental practices. To study how ESG disclosure impacts credit ratings on different leverage levels, the sample was divided into two parts. The first half includes the lower half of the sample which represents the low leveraged companies, and the second half includes the upper half of the sample which represents the high leveraged companies.

The control variables had somewhat differing results between the low and high leveraged companies. Table 12 displays that *Size*, *Margin*, and *Capint* are all insignificant predictors for the low leveraged companies. *Size* is insignificant but interestingly has a positive loading suggesting that increase in firm size would result in a worse credit rating. *Capint* also has a positive loading which is not the expected sign. *Coverage* loads negatively and is significant, but the impact is modest. *Leverage* loads positively and is significant. The impact of *Leverage* on credit ratings with the low leveraged companies is very large compared to earlier models. The control variables for the high leveraged companies suggest that *Coverage* and *Margin* have a significant impact on credit rating. *Margin* has a big impact on credit ratings with high leveraged companies suggesting that higher profit margin lowers credit ratings. *Size*, *Leverage* and *Capint* all have their expected signs, but are insignificant.

As for the ESG and its individual disclosure scores, they all load negatively and are significant for the low leveraged companies. The largest impact to credit ratings comes from ESG disclosure score whilst Environment disclosure score has almost similar impact. Social and Governance disclosure scores have slightly lower impact on credit rating. For the high leveraged companies, again ESG and each of its individual disclosure score load negatively and are significant. The impact of ESG and Environmental disclosure score is higher with low leveraged companies, but the impact of Social and Governance disclosure scores is similar with low and high leveraged companies. The significance of Governance disclosure score is much less significant than the rest of the

independent variables. The same thing applies to the sample regression and for the country level regression.

From the results it can be concluded that the credit ratings of both low and high leveraged companies are impacted by ESG disclosure and its individual pillars. The impact is only slightly bigger with low leveraged companies. According to the results, companies with low or high levels of leverage are able to improve their credit rating by disclosing more of their ESG related actions. What is interesting about the results is that low leveraged companies are affected strongly by the increase in leverage while high leveraged companies are not. And high leveraged companies on the other hand can benefit greatly from having higher profit margin when low leveraged companies do not have the same benefit.

**Table 12**      **Regression results based on leverage**

	Credit rating	Credit rating	Credit rating	Credit rating
		(Low leveraged companies)		
<b>ESG</b>	-0.031*** (-7.417)			
<b>Environment</b>		-0.026*** (-8.160)		
<b>Social</b>			-0.015*** (-4.446)	
<b>Governance</b>				-0.015** (-3.111)
<b>SIZE</b>	0.040 (1.220)	0.040 (1.261)	-0.045 (-1.530)	-0.042 (-1.300)
<b>COVERAGE</b>	-0.00007. (-1.773)	-0.00007. (-1.826)	-0.00008. (-1.807)	-0.00006 (-1.609)
<b>MARGIN</b>	-0.001 (-1.303)	-0.001 (-1.559)	-0.0009 (-1.141)	-0.001. (-1.651)
<b>LEVERAGE</b>	1.644*** (5.334)	1.734*** (5.608)	1.426*** (5.109)	1.449*** (5.207)
<b>CAPINT</b>	0.062 (1.596)	0.069. (1.787)	0.053 (1.389)	0.005 (1.450)
<b>Industry effect</b>	Yes	Yes	Yes	Yes
<b>Year effect</b>	Yes	Yes	Yes	Yes
<b>N</b>	760	760	760	760
<b>McFadden's R<sup>2</sup></b>	0.07	0.07	0.06	0.05

	Credit rating	Credit rating	Credit rating	Credit rating
	(High leveraged companies)			
<b>ESG</b>	-0.014*** (-3.483)			
<b>Environment</b>		-0.008** (-2.626)		
<b>Social</b>			-0.017*** (-4.474)	
<b>Governance</b>				-0.008. (-1.892)
<b>SIZE</b>	-0.055 (-1.613)	-0.078* (-2.353)	-0.043 (-1.282)	-0.098** (-3.118)
<b>COVERAGE</b>	-0.005** (-3.181)	-0.005** (-3.178)	-0.005** (-3.058)	-0.005** (-3.219)
<b>MARGIN</b>	-2.110*** (-6.087)	-2.095*** (-6.053)	-2.013*** (-5.814)	-2.094*** (-6.038)
<b>LEVERAGE</b>	0.078 (1.455)	0.078 (1.466)	0.084 (1.559)	0.085 (1.593)
<b>CAPINT</b>	0.025 (0.762)	0.021 (0.641)	0.033 (0.981)	0.014 (0.450)
<b>Industry effect</b>	Yes	Yes	Yes	Yes
<b>Year effect</b>	Yes	Yes	Yes	Yes
<b>N</b>	758	758	758	758
<b>McFadden's R<sup>2</sup></b>	0.07	0.07	0.08	0.07

Note: Significance codes: 0 '\*\*\*', 0.001 '\*\*', 0.01 '\*', 0.05 '.'

T value presented in parentheses.

## 7 CONCLUSION

The purpose of this study was to examine the relationship between ESG disclosure and credit ratings in the Nordics. To examine the relationship this study used Bloomberg's 1-Yr Default Risk rating as the dependent variable and Bloomberg's ESG disclosure and each of its individual disclosure scores as the independent variables. Five different financial variables from the study by Attig et al. (2013) were used as control variables to explain how the credit ratings are determined. The study included 168 listed non-financial Nordic companies and 15 180 firm-year observations over the time-period 2009-2020. To find out how the ESG disclosure score and its individual pillars impact credit ratings an ordered probit model was used.

To examine the relationship between ESG disclosure scores and credit ratings in the Nordics, four hypotheses were developed. These four hypotheses were tested with an ordered probit model. According to the results from the sample regression, all four hypotheses were accepted, and the study concluded that ESG disclosure and its individual pillars impact credit ratings in the Nordics. The results suggested that higher ESG disclosure can result in a better credit rating. To further examine the relationship between ESG disclosure and credit ratings, an ordered probit regression was conducted on country level to obtain more robust results. The results from the country level regression were somewhat different to the sample regression. Environmental disclosure score had a significant impact in Denmark, Norway, and Sweden but not in Finland. Social disclosure score had a significant impact in each country except Denmark. And lastly, Governance disclosure score had a significant impact only in Norway. The results from the country level regression were somewhat similar to the results obtained by Bhattacharya and Sharma (2019) who found that environmental score, and social score had positive significant relationship with credit ratings but governance score on the other hand was positive but insignificant. They argued that the variable governance may be insignificant since governance disclosure is mandatory in India. According to European Parliament and the Council of the European Union (2014) it is mandatory for public firms to disclose the diversity of boards in Europe. This may have affected the results in the country level regression, as the impact of Governance disclosure score was insignificant for all countries except Norway.

Lastly, the study examined if the impact of ESG disclosure on credit ratings differed between low leveraged and high leveraged companies. The results suggested that the impact of ESG disclosure on credit ratings is similar between low and high leveraged

companies. Overall, the results from all regressions suggest that ESG disclosure score and its individual pillars have an impact on credit ratings in the Nordics and therefore having a better ESG disclosure score may improve the credit rating of a company. The results are also in-line with the results from previous studies.

This study brought new information to the existing literature on the relationship between ESG and credit ratings by introducing a new geographic area. This study focused on Nordics which included listed non-financial companies from Denmark, Finland, Norway, and Sweden. Results suggested that in the Nordics higher ESG disclosure results in a better credit rating. Even though the results from this study are significant there are still suggestions for further research. Different credit ratings and ESG scores could be studied in the Nordics since the results from this study only apply to Bloomberg's credit rating and ESG disclosure scores. Also, the Bloomberg 1-YR Default Risk rating is a short-term credit rating, so it would be interesting to study if the impact of ESG is the same on long-term credit ratings in the Nordics.

To further understand the strengths of great ESG disclosure, more studies should be conducted that examine the Nordics. Firstly, new control variables could be used in future studies to obtain more robust results. Secondly, future studies should examine if firm size affects the impact of ESG on credit ratings in the Nordics. Lastly, the relationship between ESG and firm performance, and ESG and cost of capital in the Nordics should also be studied.

The results from this study can help stakeholders to better understand how ESG disclosure can affect the credit rating of a company in the Nordics. Nevertheless, these results should not be generalized since only Nordic listed companies were studied and ESG disclosure score and credit rating from Bloomberg Terminal was used. The results should also encourage firms to engage in more ESG related activities since they can improve the long-term financial performance of a firm and therefore lead to a better credit rating.

## REFERENCES

- Altman, E. I. (1968). Financial ratios, discriminant analysis and the prediction of corporate bankruptcy. *The Journal of finance*, 23(4), 589-609.
- Andrikopoulos, A. & Kriklani, N. (2013). Environmental Disclosure and Financial Characteristics of the Firm: The Case of Denmark. *Corporate social-responsibility and environmental management*, 20(1), 55-64.
- Ashbaugh-Skaife, H., Collins, D. W. & LaFond, R. (2006). The effects of corporate governance on firms' credit ratings. *Journal of accounting & economics*, 42(1), 203-243.
- Aslan, A., Poppe, L. & Posch, P. (2021). Are sustainable companies more likely to default? Evidence from the dynamics between credit and ESG ratings. *Sustainability (Basel, Switzerland)*, 13(15), 8568.
- Attig, N., El Ghouli, S., Guedhami, O., & Suh, J. (2013). Corporate social responsibility and credit ratings. *Journal of Business Ethics*, 117(4), 679-694.
- Bhattacharya, S. & Sharma, D. (2019). Do environment, social and governance performance impact credit ratings: A study from India. *International Journal of Ethics and Systems*, 35(3), 466-484.
- Billio, M., Costola, M., Hristova, I., Latino, C. & Pelizzon, L. (2021). Inside the ESG ratings: (Dis)agreement and performance. *Corporate social-responsibility and environmental management*, 28(5), 1426-1445.
- Bloomberg Professional Services. (2021) *ESG Data*.
- Bondioli, M., Goldberg, M., Hu, N., Li, C., Maalaoui, O., & Stein, H. J. (2021). The Bloomberg Corporate Default Risk Model (DRSK) for Public Firms. SSRN Electronic Journal.
- Brin, P. & Nehme, M. N. (2019). Corporate social responsibility: Analysis of theories and models. *Eureka: Social and Humanities*, 5, 22-30.
- Brooks, C. (2008). *Introductory econometrics for finance* (2nd ed.). Cambridge University Press.
- Bruun & Hjejle, (2018). Report on the Non-Resident Portfolio at Danske Bank's Estonian branch.
- Carroll, A. B. (1991). The pyramid of corporate social responsibility: Toward the moral management of organizational stakeholders. *Business Horizons*, 34(4), 39-48.
- Carroll, A. B. (2008). *A History of Corporate Social Responsibility: Concepts and Practices*.

- Carroll, A. B. (2016). Carroll's pyramid of CSR: Taking another look. *International journal of corporate social responsibility*, 1(1), 1-8.
- Castles, F. G. (2009). *The social democratic image of society: A study of the achievements and origins of scandinavian social democracy in comparative perspective*.
- Cathcart, L., Dufour, A., Rossi, L. & Varotto, S. (2020). The differential impact of leverage on the default risk of small and large firms. *Journal of corporate finance (Amsterdam, Netherlands)*, 60, 101541.
- Chouaibi, Y., Rossi, M. & Zouari, G. (2021). The effect of corporate social responsibility and the executive compensation on implicit cost of equity: Evidence from French ESG data. *Sustainability (Basel, Switzerland)*, 13(20), 11510.
- Coffee, J. C. (2010). Ratings Reform: The Good, The Bad, and The Ugly. Columbia Law and Economics Working Paper No. 375, ECGI - Law Working Paper No. 162/2010.
- Confessore, N. (2018, April 4). Cambridge Analytica and Facebook: The Scandal and the Fallout So Far. *The New York Times*.
- Czarnitzki, D. & Kraft, K. (2007). Are credit ratings valuable information? *Applied Financial Economics*, 17:13, 1061-1070.
- Dahiya, M. & Singh, S. (2021). The linkage between CSR and cost of equity: An Indian perspective. *Sustainability accounting, management and policy journal (Print)*, 12(3), 499-521.
- Das, P. (2019). *Econometrics in Theory and Practice: Analysis of Cross Section, Time Series and Panel Data with Stata 15. 1*. Springer Singapore Pte. Limited.
- Devalle, A., Fiandrino, S., & Cantino, V. (2017). The Linkage between ESG Performance and Credit Ratings: A Firm-Level Perspective Analysis. *International Journal of Business and Management*, 12(9):53.
- Drempetic, S., Klein, C. & Zwergel, B. (2019). The Influence of Firm Size on the ESG Score: Corporate Sustainability Ratings Under Review. *Journal of business ethics*, 167(2), 333-360.
- El Ghouli, S., Guedhami, O., Kwok, C. C. & Mishra, D. R. (2011). Does corporate social responsibility affect the cost of capital? *Journal of banking & finance*, 35(9), 2388-2406.
- Eliwa, Y., Aboud, A. & Saleh, A. (2021). ESG practices and the cost of debt: Evidence from EU countries. *Critical perspectives on accounting*, 79, 102097.

- Environmental Protection Agency. (2015). California notify Volkswagen of Clean Air Act violations/Carmaker allegedly used software that circumvents emissions testing for certain air pollutants.
- Esrock, S. L. & Leichty, G. B. (1998). Social responsibility and corporate web pages: Self-presentation or agenda-setting? *Public relations review*, 24(3), 305-319.
- European Commission. (2013). Stricter rules for credit rating agencies to enter into force.
- European Commission. (2019). *Corporate social responsibility & Responsible business conduct*.
- European Parliament and the Council of the European Union (2014), “*Directive 2014/95/EU of the European parliament and of the council of 22 October 2014 amending directive 2013/34/EU as regards disclosure of non-financial and diversity information by certain large undertakings and groups*”.
- Fatemi, A., Glaum, M. & Kaiser, S. (2018). ESG performance and firm value: The moderating role of disclosure. *Global finance journal*, 38, 45-64.
- Federal Trade Commission. (2019). *FTC Imposes \$5 Billion Penalty and Sweeping New Privacy Restrictions on Facebook*.
- Fischbach, B. & Księżak, P. (2018). Triple Bottom Line: The Pillars of CSR. *Journal of Corporate Responsibility and Leadership*, 4(3), 95.
- Fitch. (2021). *Rating Definitions*.
- Framework ESG. (2016). *Behind the Terminal: Understanding the Bloomberg ESG Numbers*.
- Freeman, R. E. (2015). *Strategic management: A stakeholder approach*.
- Friede, G., Busch, T. & Bassen, A. (2015). ESG and financial performance: Aggregated evidence from more than 2000 empirical studies. *Journal of sustainable finance & investment*, 5(4), 210-233.
- Friedman, M. (1970) The Social Responsibility of Business Is to Increase Its Profits. *New York Times Magazine*, 13 September 1970, 122-126.
- Fuller, G., Kroll, C., Lafortune, G., Sachs, J., Schmidt-Traub, G., & Woelm, F. (2020). The Sustainable Development Goals and COVID-19. Sustainable Development Report 2020 Cambridge University Press, 2020. 510 p. *Population and Development Review*, 46(3), 630–631.

- Godfrey, P. C., Merrill, C. B. & Hansen, J. M. (2009). The relationship between corporate social responsibility and shareholder value: An empirical test of the risk management hypothesis. *Strategic management journal*, 30(4), 425-445.
- Goss, A. & Roberts, G. S. (2011). The impact of corporate social responsibility on the cost of bank loans. *Journal of banking & finance*, 35(7), 1794-1810.
- Gregory, A., Tharyan, R., & Whittaker, J. (2014). Corporate Social Responsibility and Firm Value: Disaggregating the Effects on Cash Flow, Risk and Growth. *Journal of Business Ethics*, 124(4), 633–657.
- Hale, J. (2021). *A Broken Record: Flows for U.S. Sustainable Funds Again Reach New Heights*. Morningstar, Inc.
- Henisz, W., Koller, T., & Nuttall, R. (2019). Five ways that ESG creates value. *Getting your environmental, social, and governance (ESG) proposition right links to higher value creation. Here's why*.
- Ho, J. A., Lee, C., Lin, W. L., & Ng, S. I. (2020). Does corporate social responsibility lead to improved firm performance? The hidden role of financial slack. *Social responsibility journal*, 16(7), 957-982.
- Hoepner, A., Oikonomou, I., Scholtens, B. & Schröder, M. (2016). The Effects of Corporate and Country Sustainability Characteristics on The Cost of Debt: An International Investigation. *Journal of business finance & accounting*, 43(1-2), 158-190.
- Johansson, T. (2010). Regulating credit rating agencies: The issue of conflicts of interest in the rating of structured finance products. *Journal of banking regulation*, 12(1), 1-23.
- Johnson, C. (2020). The measurement of environmental, social and governance (ESG) and sustainable investment: Developing a sustainable new world for financial services. *Journal of securities operations & custody*, 12(4), 336-356.
- Jung, J. C. & Sharon, E. (2019). The Volkswagen emissions scandal and its aftermath. *Global business and organizational excellence*, 38(4), 6-15.
- KPMG. (2020). *The KPMG Survey of Sustainability Reporting 2020*.
- Lima Crisóstomo, V., de Souza Freire, F. & Cortes de Vasconcellos, F. (2011). Corporate social responsibility, firm value and financial performance in Brazil. *Social responsibility journal*, 7(2), 295-309.
- McMillan, G. S. & Joshi, M. P. (1997). Part IV: How Do Reputations Affect Corporate Performance?: Sustainable Competitive Advantage and Firm Performance: The Role of Intangible Resources. *Corporate reputation review*, 1(1), 81-85.

- Merton, R. C. (1987). A Simple Model of Capital Market Equilibrium with Incomplete Information. *The Journal of finance (New York)*, 42(3), 483-510.
- Montiel, I. (2008). Corporate Social Responsibility and Corporate Sustainability: Separate Pasts, Common Futures. *Organization & Environment*, 21(3), 245–269.
- Moody's. (2021). *Understanding ratings*.
- Rhodes, C. (2016). Democratic Business Ethics: Volkswagen's Emissions Scandal and the Disruption of Corporate Sovereignty. *Organization studies*, 37(10), 1501-1518.
- Rouf, A. (2011). The Financial Performance (Profitability) and Corporate Governance Disclosure in the Annual Reports of Listed Companies of Bangladesh. *Journal of economics and business research*, 17(2), 103-117.
- S&P Global. (2019). *Guide to Credit Rating Essentials. What are credit ratings and how do they work?*
- Shahrour, M. H., Girerd-Potin, I. & Taramasco, O. (2021). Corporate social responsibility and firm default risk in the Eurozone: A market-based approach. *Managerial finance*, 47(7), 975-997.
- State Secretariat for Economic Affairs. (2020). *CSR Issues*.
- 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.
- Strand, R., Freeman, R., & Hockerts, K. (2015). Corporate Social Responsibility and Sustainability in Scandinavia: An Overview. *Journal of Business Ethics*, 127(1), 1–15.
- Thomsen, S. (2016). Nordic Corporate Governance Revisited. *Nordic Journal of Business*, 65(1), 4-12.
- Thomsen, S., & Conyon, M. (2012). Stakeholder Governance in Scandinavia. In *Corporate Governance: Mechanisms and Systems*, (pp. 285–305). McGraw Hill
- Treacy, W. F. & Carey, M. (2000). Credit risk rating systems at large US banks. *Journal of banking & finance*, 24(1), 167-201.
- Uddin, M.B., Hassan, M.R., Tarique, K.M. (2008), "Three Dimensional Aspects of Corporate Social Responsibility", Daffodil International University. *Journal of Business and Economics*, Vol. 3, No. 1, pp. 199–212.

United Nations Global Compact. (2021). *The Ten Principles*.

United Nations Industrial Development Organization. (2017). *What is CSR?*

Weber, O., Scholz, R. W. & Michalik, G. (2010). Incorporating sustainability criteria into credit risk management. *Business strategy and the environment*, 19(1), 39-50.

White, L. J. (2010). Markets: The Credit Rating Agencies. *The Journal of economic perspectives*, 24(2), 211-226.

White, L. J. (2013). Credit Rating Agencies: An Overview. *Annual review of financial economics*, 5(1), 93-122.

**APPENDIX 1      ABBREVIATIONS**

---

<b>Abbreviation</b>	<b>Meaning</b>
CFP	Corporate firm performance
CoD	Cost of debt
CoE	Cost of equity
CRA	Credit rating agency
CSR	Corporate social responsibility
ESG	Environment, Social, and Governance
HY	High yield
IG	Investment grade
NRSRO	Nationally recognized statistical rating organization
SRI	Socially responsible investing
TBL	Triple bottom line theory
VIF	Variance inflation factor