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Financial Economics

ESG and the Cost of Debt

Evidence from the Nordic countries

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Abstract

This study investigates whether environmental, social and governance (ESG) performance has an effect on the cost of debt for firms incorporated in the Nordic countries. In order to answer this research question, data was collected for the time period 2015-2020 from a sample of 560 active public Nordic firms.

The relationship between ESG performance and the cost of debt is analyzed through Stakeholder theory, risk mitigation view and the overinvestment view. Stakeholder theory and the risk mitigation view predicts a negative relationship, while the overinvestment view suggests a positive relationship. Supporting Stakeholder theory and risk mitigation view, the empirical result of this study finds a negative relationship between ESG performance and the cost of debt. These results are persistent over several performed sensitivity and robustness tests. The implication of these findings is that creditors seem to value ESG performance by rewarding companies in terms of lower cost of debt. These results also suggests that firms may be able to reduce their debt financing costs by improving their ESG performance.

Keywords: ESG, Cost of debt, The Nordics

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1. Introduction

The first chapter introduces the topic and the research question. Firstly, a background to the topic is presented along with the aim of the study. Secondly, the research question is stated and the limitations are recognized. Lastly, the overall structure of the study is presented in order to give the reader an overview of the thesis.

1.1 Background

Sustainability is commonly defined as “meeting the needs of the present without compromising the ability of future generations to meet their own needs.” (United Nations Brundtland Commission 1987). The idea of sustainable development has gained a central role in many modern economies since the climate change debate started as a result of rising temperatures, sea levels and extreme weather events (United Nations 2022).

A survey conducted by the UN global Compact in 2010 found that 93% of the CEO’s interviewed considered corporate responsibility as highly important for the future prosperity of their companies (Lacy et al. 2010). As a result of the increasing importance of sustainability within the corporate sector, measurements like CSR and ESG have been developed as attempts to capture sustainability performance in a quantifiable way. In particular, the ESG (Environmental, Social, and Governance) criteria is a set of standards for corporate operations that investors may utilize to guide their investment decisions (Gassmann et al. 2021). McKinsey (2019) lists five possible ways that ESG practices create value for organizations and its stakeholders. Among these five, cost reduction and improved productivity are listed as two of the effects of an improved ESG performance. Cost reduction in terms of resource efficiency and an improved productivity because ESG development might boost employee motivation and attract talent through improved social reputation. Furthermore, improved ESG performance has been suggested to decrease risks, as firms with better ESG performance tend to have lower credit spreads and higher credit ratings (McKinsey 2019). Credit ratings affect companies' cost of debt, specifically, a firm with higher credit ratings pays lower borrowing costs compared to the same firm with lower credit ratings (Kisgen 2006). Cost of debt is the expenses that corporations incur when they rely on debt financing (Corporate Finance Institute 2022).

There are previous studies that investigate the relationship between sustainability measurements and the cost of debt. The results of the already existing research mostly suggests a negative association between ESG factors and the cost of debt (Erragragui 2018; Eliwa et al. 2021; Goss and Roberts 2011), although positive relationships and insignificant outcomes exist as well. Specifically, positively significant associations between corporate governance and the total cost of debt have been found (Ratajczak and Mikolajewicz 2021) although other investigations find insignificant results for governance controversies on the cost of debt (Eliwa et al. 2021).

From a theoretical perspective, there are some theories that are more commonly applied to explain the problem concerning ESG factors' potential effects on companies' cost of debt. In particular, Stakeholder theory, the overinvestment view and risk mitigation view are widely used in previous research to problematize and understand the nature of the possible relationship (Attig et al. 2013; Eliwa et al. 2021; Erragragui 2018; Menz 2010). Applying Stakeholder theory, a negative relationship would be expected since a more developed ESG performance is argued to benefit stakeholders in terms of reduced risks, less volatility and better reputation which, in turn, could decrease companies debt financing costs (Menz 2010). Furthermore, the risk mitigation view and the overinvestment view are two opposing theories concerning the relationship between ESG and the cost of debt. On the one hand, the risk mitigation view would suggest a negative association between ESG investments and the cost of debt because investments in ESG is viewed as a way of improving the company risk profile (Attig et al. 2013). On the other hand, the overinvestment view would predict a positive relationship between ESG investments and the cost of debt since investments in ESG are considered a waste of company resources when conducted by the firm management (Goss and Roberts 2011).

Since the association between ESG and the cost of debt has been extensively studied before, the intention of this study is to contribute to previous empirical research by adding additional insights through two different dimensions. Firstly, by focusing on the Nordic countries which have not been examined widely before. Secondly, by using the most recent data on ESG performance from the Refinitiv Eikon database.

1.2 Aim of the Study

The purpose of this thesis is to investigate whether ESG performance affects Nordic public companies' cost of debt. Furthermore, this research aims at providing further empirical research regarding the relationship between ESG and the cost of debt. This thesis will provide new relevant empirical research by examining the Nordic region. Also, this study aims at contributing to earlier empirical research by managing the most recent data of ESG performance over the time period 2015-2020.

1.3 Research question

This thesis will provide further empirical research within this field by investigating the following research question:

Does ESG performance affect the cost of debt for public firms incorporated in the Nordic countries?

1.4 Limitations

(I) This study is based on data exclusively retrieved from Refinitiv Eikon and is therefore limited to the available data in this database. As a consequence, this study is subject to selection bias. Since Refinitiv Eikon has limited data on ESG score for Icelantic firms, Iceland accounts only for a small fraction of the total sample.

(II) Refinitiv Eikon database provides the variable ESG score which is used to define ESG performance in this study. The variable ESG score is composed using self-reported information by the firms (Refinitiv Eikon 2021). Therefore, it does not fully reflect ESG performance. Hence, ESG score should be interpreted as a proxy of ESG performance.

(III) The dependent variable is defined as the accounting cost of debt and is therefore restricted to this definition of cost of debt even though there are numerous other recognized candidates utilized in previous studies within this research field.

1.5 Structure

This section provides a brief presentation of the structure of the study to give the reader an overview of the thesis. Chapter two provides a theoretical framework and a summary of previous studies conducted within this research field. This summary is then used to develop the hypothesis tested in this study. The third chapter provides a thorough description of the research design used to test the hypothesis. Chapter four introduces and describes the sample and data collecting process. Chapter five provides the empirical results from the main regression model and the robustness tests performed to test the persistence of the results. The final chapter includes a discussion of the results which culminates in a conclusion.

2. Theoretical framework, literature review and hypothesis development

This chapter provides a review of theory and previous research that investigate similar research questions to that of this study. Firstly, the chapter presents the theoretical framework and the expected findings from a theoretical perspective. Secondly, a literature review which summarizes relevant studies within this research field is provided. The previous research investigates different dimensions of sustainable performance such as corporate social responsibility (CSR) and environmental, social and governance (ESG), which are used interchangeably in this study in the context of previous literature. Finally, a discussion that reasons both around theory and previous research is presented in order to formulate the hypothesis tested in this study.

2.1 Theoretical framework

2.1.1 Stakeholder theory

The stakeholder theory suggests that organizations should consider the interests of all types of stakeholders and not solely shareholders. In particular, stakeholder theory predicts that firms that take all kinds of stakeholders into consideration when making decisions perform better and survive longer than companies that prioritizes certain stakeholders over others (Velte 2017).

The majority of previous research investigating ESG related performance and financing costs in the context of stakeholder theory find a negative association. The research conducted by Menz (2010) suggests that firms with a socially responsible corporate policy should have lower financing costs since the bankruptcy cost, risks and volatility are reduced by the sustainable performance. These factors are expected to be reduced since the financial consequences from the business are diminished when the possibilities for fines, legal costs and damages are reduced due to improved sustainable performance. Consequently, this will result in lower financial- and operational risks for stakeholders and thus benefit the company by decreasing financing costs. Ratajczak and Mikolajewicz's (2021) research is consistent with this conclusion and their results suggest that social- and environmental performance benefit stakeholders and thus reduce the cost of long-term debt.

Developing and managing ESG related performance might benefit the majority of the stakeholders in terms of reduced costs and overall firm risks (Velte 2017; Ratajczak and Mikolajewicz 2021). Thus, Stakeholder theory predicts the expected relationship between ESG and the cost of debt to be negative.

2.1.2 Agency Theory, Overinvestment view and Risk mitigation view

Agency theory suggests that the separation between ownership and control creates information asymmetry between principals (shareholders) and agents (management). The principal relies on the agent to make decisions regarding the company's operations and financing. Consequently, the agent possesses more information than the principal and has the possibility to exploit such information supremacy to make decisions based on their own self-interest rather than that of the principal. As a result, agency costs arise because of the conflict of interest between the principal and the agent. In addition, agency costs of debt results from similar conflicting interests between shareholders and debtholders. Shareholders have the residual claim on the company and may therefore enjoy possible payoff from increased risk taking, as opposed to debt holders whose return is restricted to the interest rate they place on the loan. Hence, shareholders may benefit from increased risk taking while debt holders generally do not. (Jensen and Meckling 1976)

In the context of ESG, firms' investments in ESG factors may be seen as a result of agency conflicts according to the overinvestment view. Overinvestment theory suggests that ESG investments are a product of agency problems. From this perspective, investments in ESG are considered to be wasteful when carried out by the management of a firm (Goss and Roberts 2011). Barnea and Rubin (2010) argue that such waste of resources occur because the management seeks private benefits from overinvesting in ESG factors at the expense of the shareholders. Tarmuji, Maelah and Tarmuji (2016) emphasize this by stating that the management may be keen to show more consideration to environmental issues because they are not investing their own money and because they seek to gain prestige from the public and improve their reputation. As a consequence, this may lead them to invest in projects that offer unprofitable returns. Thus, higher investments in ESG factors may contribute to lower repayment capabilities (Goss and Roberts 2011; Barnea and Rubin 2005; Tarmuji et al. 2016). Therefore, the overinvestment view predicts the expected relationship between ESG and the cost of debt to be positive.

In contrast to the overinvestment view, the risk mitigation view suggests that increased investments in ESG may be associated with an improved company risk profile. In particular, investments in ESG factors can be seen as protection against risk (Attig et al. 2013). Bauer and Hann (2010) acknowledge legal, reputational and regulatory risks as ESG risks and suggest that such risks might result in higher default risk and increased cash flow volatility. Thus, the risk mitigation view predicts the expected relationship between ESG and the cost of debt to be negative.

2.2 Literature review

The purpose of this section is to provide the reader with an overview of previous literature within the research field investigating sustainability measurements and the cost of debt. Three studies were selected based on their relevance and accuracy to the main topic of this thesis. Specifically, Ratajczak and Mikołajewicz (2021) and Eliwa, Aboud and Saleh (2021) were chosen because of their recent contribution concerning the association between ESG and the cost of debt. In addition, Erragragui's (2018) research was selected because it focuses on firms incorporated in the United States as opposed to Europe which provides the reader with a more complete overview of the empirical examination conducted so far on the topic.

The research conducted by Ratajczak and Mikołajewicz (2021) aims to examine the impact of different dimensions of ESG performance on the cost of debt. The study investigates the impact on various types of debt which is represented by total, short- and long-term corporate debt. The research is based on a sample that consists of the 300 most sustainable companies in the world, based on the ranking system developed by Corporate Knights. (Ratajczak and Mikołajewicz 2021)

Ratajczak and Mikołajewicz (2021) conducted several linear regression models in order to explore the relationship between different aspects of sustainable performance and various types of cost of debt for companies. The dependent variable is represented by total, short- and long-term corporate cost of debt in the different econometric models. Furthermore, different dimensions of sustainability related performance are represented through the independent variable. The measurement of this performance is proxied in the model as various dimensions of CSR performance all gathered from the Refinitiv Eikon database. (Ratajczak and Mikołajewicz 2021)

The results of their research suggest a negative statistically significant relationship between corporate governance- together with social CSR performance and cost of total debt. Furthermore, the researchers surprisingly find a positive association between corporate governance CSR and the cost of long-term debt. The researchers suggest that this positive relationship might be explained by the fact that lenders see corporate governance related expenditures as a waste of company resources and therefore classifies it as an overinvestment. In summary, the statistically significant results suggest that the cost of short-term debt is affected by social and corporate governance CSR solely, whereas the cost of long-term debt is related to all three dimensions of CSR related performance. (Ratajczak and Mikołajewicz 2021)

Eliwa et al. (2021) study focuses more in depth on credit institutions. Specifically, the aim of their study is to investigate if credit institutions offer a lower cost of debt to companies that are productive with regards to their ESG performance and disclosure. The study separates the meaning of ESG performance and disclosure. ESG performance is described as the company's devotion to ESG strategies, while ESG disclosure is described as the company's attempt to affect their apparent devotion to ESG strategies as a way of stirring the perceptions of stakeholders. (Eliwa et al. 2021)

Focusing on non-financial firms operating in 15 European countries over a time period between 2005 and 2016, Eliwa et al. (2021) manage a data set consisting of 6018 firm-year observations. The hypotheses are tested by running Newey and West (1987) standard errors pooled regressions. The dependent variable in all regressions is the company cost of debt which is defined as the ratio of a firm's interest expenses to their respective average debt. Furthermore, the regression models include a control variable called Stake, which is the average of country-level scores of stakeholder orientation which were developed by Dhaliwal et al. (2012) where a higher value indicates higher stakeholder orientation. (Eliwa et al. 2021)

The main result of Eliwa et al.'s study suggests that credit institutions reward companies for their ESG performance and disclosure. In particular, they find that companies that have stronger ESG performance have lower cost of debt, and that ESG disclosure has an equal impact on the cost of debt. Thus, their findings implies that there is a negative association between ESG performance, disclosure and the cost of debt. However, their results are

insufficient in distinguishing the differences in effects of ESG performance and disclosure on the cost of debt. By the inclusion of the variable Stake, they also find that the effect of ESG performance and disclosure on the cost of debt is greater in countries that are more stakeholder oriented. (Eliwa et al. 2021)

In contrast to Ratajczak and Mikołajewicz (2021) and Eliwa et al. (2021), the study of Erragragui (2018) focuses on US corporations. The purpose of the study is to examine the potential impact of CSR incentives on operational- and financial risks that are priced by creditors. The research manages a sample that consists of 214 US firms collected from the S&P 500- and the DS 400-index. Furthermore, the study manages a time-period of 11 years between 2000 to 2011. (Erragragui 2018)

In alignment with previous research, linear regression models are conducted in order to answer the research question. Erragragui conducts two regression models with the cost of debt as the dependent variable. The variable cost of debt is represented by credit rating. Credit rating as a measurement is interpreted as a proxy of total cost of debt since it mainly captures credit risk pricing in the bond market. Furthermore, the independent variable in the models is represented by scores that include different dimensions of CSR related initiatives. (Erragragui 2018)

The main outcome of the analysis is consistent with previous research since the result suggests a negative association between environmental performance and creditors' perception of firms' default risk. Thus, the result of Erragragui (2018) suggests a negative association between environmental performance and the cost of debt for organizations. Furthermore, the result of the research shows no statistically significant effect of corporate governance controversies on the cost of debt. (Erragragui 2018)

2.3 Hypothesis development

In summary, the theoretical framework does not provide a uniform conviction regarding the expected direction of the relationship between ESG and the cost of debt. On the one hand, Stakeholder theory emphasizes the tendency of ESG to reduce risks, volatility and contribute to an overall improved company reputation (Menz 2010). In alignment with Stakeholder theory, the risk mitigation view argues that ESG investments can be seen as protection against risk which improves the company risk profile (Attig et al. 2013). On the other hand, the overinvestment view suggests that ESG investments are associated with unnecessary costs for the company as a result of conflicting interests between the management and shareholders (Goss and Roberts 2011). Thus, there is no absolute consensus regarding the expected association between ESG and the cost of debt from a theoretical perspective.

However, previous empirical research shows more unified findings that insist more strongly on a negative association between ESG and the cost of debt in accordance with stakeholder theory and risk mitigation view. Ratajczak and Mikolajewicz (2021) finds a statistically significant negative relationship between both environmental and social CSR on the cost of long-term debt. These results are highly consistent with the research done by Erragragui (2018). Erragragui also discovered a negative significant relationship between environmental performance and the cost of debt. Moreover, the research conducted by Eliwa et al. (2021) finds that organizations can benefit from a more developed ESG performance since it is indirectly reflected by a lower cost of capital charged by lending institutions. Thus, the overall empirical evidence indicates that there is a negative relationship between ESG and the cost of debt.

In alignment with the empirical evidence, we expect that there is a negative association between ESG and the cost of debt. From a theoretical perspective, this negative relationship might be explained by the fact that improved ESG performance creates value for its stakeholders and that ESG investments are risk mitigating which rewards corporations in terms of lower cost of debt. Therefore, the below stated hypothesis is tested.

H_0 : Improvements in ESG performance does not lower corporations' cost of debt.

H_1 : Improvements in ESG performance lowers corporations' cost of debt.

3. Research design

This chapter provides a description of the ordinary least squares (OLS) regression model that is used to test the hypothesis. Definitions and explanations for the included variables are presented and also motivated in the context of the theoretical and/or empirically proven impact they might have on the dependent variable.

3.1 Econometric model

The following regression equation is run through an OLS regression.

$$COD_{i,t} = \beta_0 + \beta_1 ESG_{i,t} + \beta_2 ICR_{i,t} + \beta_3 Age_{i,t} + \beta_4 Lev_{i,t} + \beta_5 Size_{i,t} + \beta_6 ROA_{i,t} + \beta_7 TI_{i,t} \\ + \beta_8 Year^* + \beta_9 Country^* + \beta_{10} Industry^* + \varepsilon_{i,t}$$

The cost of debt (*COD*) is the dependent variable in this model and it represents the accounting cost of debt. Furthermore, ESG performance (*ESG*) is the variable of interest in the model and is proxied by the ESG Score retrieved from Refinitiv Eikon. The control variables have been selected based on their potential effect on the dependent variable. This econometric model includes the Interest Coverage Ratio (*ICR*) which is calculated as the ratio between EBIT and total interest expense and Age (*Age*) which is defined as the number of years since the company's initial public offering. Furthermore, the model includes Leverage (*Lev*) that represents the ratio between total debt to total assets, Size (*Size*) that is defined as the natural logarithm of total assets in year t, Return on Assets (*ROA*) and Tangible Intensity of assets (*TI*) that represent the ratio between Net PPE and total assets. The model also accounts for fixed effects for time (*Year**), countries (*Country**) and industries (*Industry**). Further description and definitions of the variables are presented in table one. All variables are chosen based on the literature review and are inspired by previous studies investigating similar research questions (Ge and Liu 2015; Erragragui 2018; Ratajczak and Mikołajewicz 2021). See table one for further description and the respective Refinitiv Eikon source codes of the variables included in the regression model.

3.2 Cost of Debt (dependent variable)

The cost of debt is defined as its accounting measure, which equates the ratio between interest expenses and total outstanding debt. Orlitzky, Schmidt and Rynes (2003) find in their meta-analysis of corporate social and financial performance that corporate social/environmental performance (CSP) is more correlated with accounting-based measures of corporate financial performance (CFP) compared to market-based measures. Previous studies investigating the interaction between ESG factors and cost of debt have used the accounting cost of debt to define the dependent variable (Eliwa et al. 2021; Erragragui 2018). Since the dependent variable is based on accounting measurements and assuming that these accounting variables may be skewed for some firms, a natural logarithmic transformation of the cost of debt is conducted. Based on these findings, this study utilizes the natural logarithm of the accounting cost of debt to define the dependent variable Cost of Debt.

3.3 ESG Performance (variable of interest)

ESG performance is proxied by the variable ESG Score retrieved from Refinitiv Eikon and is defined as an overall company score that is based on self-reported information in the environmental, social and corporate governance field. The methodology of the score scale is based on the underlying ESG framework since the scale measures the ESG performance based on verifiable reported public data of companies. The score is constructed from data collection in different fields related to environmental, social and corporate governance aspects and takes a value between 0 and 100. Furthermore, the underlying collections of data in each category are based on different considerations such as materiality, comparability and industry relevance (Refinitiv 2022). Refinitiv Eikon is considered as one of the most reliable publishers regarding ESG scores (Stellner et al. 2015). Furthermore, the measurement is widely used in this research field (Velon 2017; Stellner et al. 2015; Eliwa et al. 2021).

3.4 Control variables

A selection of control variables is included in the regression model in order to mitigate endogeneity issues. Endogeneity concerns arise in this problem area because there are many factors in addition to ESG performance that may have an impact on the cost of debt. This study aims at producing reliable and unbiased estimators by controlling for such effects. The selection of control variables has been chosen based on their theoretical and/or empirically proven impact on the dependent variable. Furthermore, the included control variables have been used in previous studies examining similar research questions.

Interest Coverage Ratio is measured as the ratio between EBIT and total interest expense and intends to capture the extent companies are able to pay their interest payments. Firms with higher interest coverage ratios are expected to be more able to pay their interest payments compared to firms with lower interest coverage ratios. Thus, higher interest coverage ratio should imply lower cost of debt (Baxter 1967). Hence, the expected direction of the relationship between interest coverage ratio and the cost of debt is negative.

Age is measured as the number of years since the company's initial public offering. Ratajczak and Mikołajewicz (2021) found a negative association between firm age and the cost of debt, indicating that the cost of debt decreases as the company gets older. Based on this finding, we expect age to be negatively associated with the cost of debt.

Leverage is measured as the ratio between total debt to total assets in year t . The leverage ratio is associated with the overall solvency of the company and in theory excessive leverage is expected to increase the risk of bankruptcy and thus increase the overall cost of external financing (Baxter 1967). Thus, the relationship between leverage and the cost of debt is expected to be positive.

The variable *Size* is defined as the natural logarithm of total assets in year t . Previous research has found that bankruptcy costs tend to be negatively correlated with firm size which in part is explained by findings which suggest that large sized firms differ in credit ratings, cash flow consistency and lower risk of bankruptcy relative to small sized firms (Gruber and Warner 1997; Ang et al. 1982). Therefore, the expected relationship between the variable *Size* and the cost of debt is negative.

The variable *ROA* is defined as the ratio between net income pre-extraordinary items and total assets. *ROA* is included to incorporate the effect of profitability aspects on the cost of debt. Firms that are more profitable are more able to guarantee their creditors payments in the form of principal and interest on their outstanding debt. Ashbaugh-Skaife et al. (2006) found that US firms with a higher *ROA* have better credit ratings compared to firms with lower *ROA*. In alignment with theory and previous empirical research, the expected relationship between *ROA* and the cost of debt is negative.

The *Tangible Intensity of Assets* is defined as Net PPE (Property, Plant and Equipment less accumulated depreciation) divided by Total Assets in year *t* and aims to capture the relative amount of assets that are identified as tangible as opposed to intangible. Charalambakis and Psychoyios (2012) argue that there exists a positive relationship between tangibility of assets and leverage because fixed assets can be used as collateral to debtholders and thus mitigate the risk that lenders face due to the agency costs of debt. Firms with higher tangibility of assets are argued to make lenders view lending to the firm as less risky. The relationship between the tangible intensity of assets and cost of debt is therefore expected to be negative.

Finally, fixed effects for country, year and industry are included as dummy control variables to control for year-, country- and industry-specific characteristics. According to a previous study by Cai et al. (2016) country fixed effects account for approximately 13,4% of the total variations in the score that covers the overall corporate social performance. Therefore, it is deemed relevant to consider these effects in this study as well. In addition to country fixed effects this study also includes year-specific fixed effects in order to mitigate autocorrelation problems (Wooldridge 2009). Lastly, industry fixed effects are included in the model to account for industry specific characteristics. Previous literature distinguishes industries by including fixed effects since there exists findings that suggest industry-dependent relationships regarding exposure to environmental, social and governance issues and the measurements of ESG related performance (Hübel and Scholz 2020; Kaiser 2019). The two digit GICS sector code was used to control for general industry classification.

3.5 Standard errors

The regression analysis is conducted on panel data which implies that each observation will be indexed based on both a unit-identifier (firm) and a time-period identifier (year).

Therefore, it is possible that the residuals are correlated over time and across firms which would imply that the standard errors predicted by OLS may be biased (Petersen 2009). To account for the fact that the firm-year observations are likely to exhibit serial correlation, the standard errors are first clustered on year- and then on firm-level. In particular, the clustering on year accounts for the cross-sectional dependence and the clustering on firm considers the time series dependence.

Table 1: Variables of the Regression Model

Variable	Description	Source code
COD *	Defined as the ratio between interest expenses and total debt outstanding.	TR.InterestExpense and TR.TotalDebtOutstanding
ESG	Refinitiv ESG Score is an overall company score based on the self-reported information in the environmental, social and corporate governance pillars.	TR.TRESGScore
ICR	Measures the number of times within a fiscal period the company generates enough operating income to meet its interest payments. It is calculated as Earnings Before Interest and Taxes for the fiscal period divided by Interest Expense for the same period.	TR.TimesInterestEarned
Age *	Defined as the amount of years since the year of company IPO.	TR.IPODate
Lev *	Defined as the ratio between total debt and total assets. Total assets reported represents the total assets of a company. Total debt represents total debt outstanding, which includes Notes Payable/Short-Term Debt, Current Portion of Long-Term Debt/Capital Leases and Total Long-Term Debt.	TR.TotalDebtOutstanding TR.TotalAssetsReported
Size	Defined as the natural logarithm of Total Assets reported in year t.	TR.TotalAssetsReported
ROA	This value is calculated as the Income after Taxes for the fiscal period divided by the Average Total Assets and is expressed as percentage. Average Total Assets is the average of Total Assets at the beginning and the end of the year. This value is divided by 100 to be expressed in decimal form.	TR.ROATotalAssetsPercent
TI *	Tangibility is defined as the ratio between PPE and Total Assets at year t. PPE normally represents Property/Plant/Equipment, Total & Gross reduced by Accumulated Depreciation, Total. However, when a company reports its fixed assets net of accumulated depreciation, fixed assets are compiled using Property/Plant/Equipment, Total & Net. Total assets reported represents the total assets of a company.	TR.PropertyPlantEquipmentTotalNet TR.TotalAssetsReported
Year FE	Indicates the year of the observation.	
Country FE	Indicates the country of incorporation.	
Industry FE	Indicates the sector which a firm operates in as defined by GICS Sector Code. GICS Classifies companies with increasing granularity by Sector, Industry Group, Industry and Sub-Industry.	TR.GICSSectorCode

Source: Refinitiv Eikon 2022

The table provides specification and a brief description of each variable included in the regression model. Note that (*) indicates that the variable was manually created with the variables retrieved from the Refinitiv Eikon database specified in the right-hand column.

4. Data

The content of this chapter gives a description of the sample and the process of data collection. Furthermore, a review of outliers and other non-representative observations from the dataset is provided along with proposed measures. Lastly, summarized statistics on the variables in the econometric model is presented along with a comparison of descriptive statistics of similar previous studies.

4.1 The Sample and data collection

This study is conducted using a sample from 560 active listed companies that operate within the Nordic region and has at least one year of available data of ESG score and cost of debt over the time period 2015-2020. The collected data aims to capture the possible association between ESG performance and the cost of debt.

This research manages recent data on ESG performance over the financial years 2015-2020. In 2014, the European Commission adopted a directive (2014/95) that implies that public companies with employee levels of 500 and above within Europe need to publish information related to their operation and management regarding environmental, governance and social issues (European Commission 2014). The impact of the regulation is that ESG disclosure in large European public companies becomes a requirement. As a result, the new regulation might lead to an increased number of ESG companies in Europe overall, and therefore also within the Nordic region. Consequently, the attention to environmental, governance and social issues within this area is assumed to be increasing after 2014 due to regulation on ESG disclosure which might benefit the sample size of this research. The study excludes the financial year of 2021 because all companies had not yet published their annual reports when the research was conducted. Therefore, in order to keep the data consistent between companies and countries, the fiscal year of 2021 was excluded.

This study investigates the association between ESG performance and the cost of debt focusing on the Nordic countries. In particular, Sweden, Finland, Norway, Denmark and Iceland. The focus on Nordic countries is defended through two different arguments. Firstly, similar studies within this research field focus on a larger selection of countries (Eliwa et al. 2021; Ratajczak and Mikolajewicz 2021). Therefore, an extension of the research area with the Nordic region would add new research and extend the findings of previous studies.

Secondly, the Nordic countries have been proven to be especially efficient in their environmental performance. A study of the Environmental Performance Index reported that all the Nordic countries were within the top rank when the regions were evaluated on environmental performance (Robeco 2021). Moreover, the organization Global Risk Profile publishes an ESG index where they rank countries along several criterias every year. The organization managed a third-party risk management and their developed index measures risks within the country related to the environment, human rights and safety based on numerous variables (Global Risk Profile 2021). The publication in 2021 showed that all the Nordic countries were at the top of this ranking (Global Risk Profile 2021). Altogether, these two arguments frame the Nordic region as an interesting area of research.

4.2 Cleaning the data

The initial dataset included data that was irrelevant and non-representative for the target sample data. In order to receive a representative unbalanced dataset, the initial data was cleaned of outliers and firm-year observations that did not have ESG scores and cost of debt variables provided on Refinitiv Eikon. The following adjustments of the dataset have been completed during the process:

- (I) Specific firm-year observations that did not include ESG data within the time period were eliminated.
- (II) Specific firm-year observations that did not include cost of debt data within the time period were eliminated
- (III) Data points that were identified as outliers were controlled through winsorizing.

Outliers are defined as observations that differ significantly from the majority of observations (Durivage 2015). According to Bouslah et. al. (2013), datasets that are subject to the presence of outliers might affect the researcher's ability to draw trustworthy conclusions based on the data. In accordance with previous research, some control variables were winsorized to minimize the influence of extreme values on the regression outcome (Goss and Roberts 2011; Eliwa et al. 2021). The winsorized variables were selected with respect to outcomes from scatter plot analyzes. Winsorizing modifies the values above or below the selected percentile with the value of the nearest extreme (Stata 2020).

4.3 Descriptive statistics

This section provides an overview of descriptive statistics of the collected sample data which is summarized in table two as well as figure one, two and three. Table two provides information about the mean, median, standard deviation (SD), maximum and minimum values for most of the variables included in the regression model. When comparing the sample data characteristics in this thesis with the research of Maaloul, Zéghal, Amar and Mansour (2021) and Eliwa et al. (2021), it shows similar patterns.

The ESG performance variable in Maaloul et al. (2021) has a mean of 61.22, a standard deviation of 8.71, a maximum value of 86.35 and a minimum value of 38.00. When relating their sample data to the one in this study it is found that this study operates on a wider span of ESG performance as the difference between minimum and maximum values are comparably larger. Furthermore, the standard deviation is larger in this thesis compared to theirs. These differences in sample characteristics can partly be explained by the different population identification for which the sample is drawn from. Another explanatory reason for the noted differences is that Maaloul et al. (2021) collected their data from Sustainalytics database rather than Refinitiv Eikon as in this study.

The cost of debt variable is compared with Eliwa et al. (2021) since their research utilizes a similar definition of the dependent variable as this study. They find that the cost of debt variable has a mean of 0.74, a standard deviation of 0.2, a maximum value of 1.41 and a minimum value of -0.65. When comparing their sample data to the one in this study it is found that this study includes a wider spread of cost of debt values since the difference between minimum and maximum values is larger. Furthermore, the standard deviation for the cost of debt variable is higher in this thesis. These differences in sample characteristics can partly be explained by the fact that Eliwa et al. (2021) use total financial debt as the denominator when calculating the cost of debt instead of total debt as in this study. Also, their study is conducted on a sample of 214 firms as opposed to the sample of 560 firms in this study. Consequently, the difference in sample size might be an explanation of the larger difference in the range between maximum and minimum values in this data set.

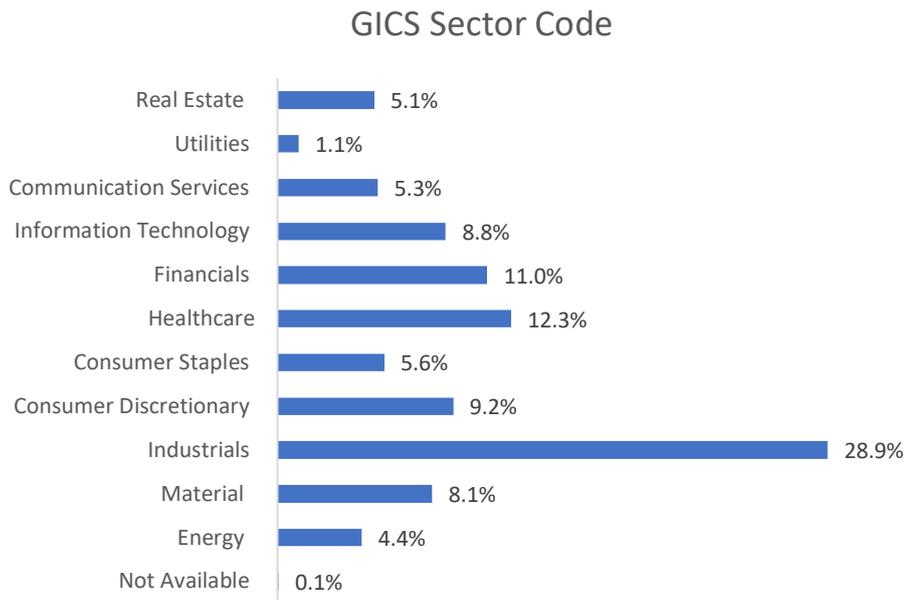
Table 3: Summarizing Statistics on the Variables

Summary statistics	Mean	Median	SD	Max	Min
COD	-4.002	-3.979	1.784	3.995	-12.329
ESG	50.26	51.69	20.681	94.64	1.387
ICR	-30.198	10.35	5183.233	70266.86	-130241.67
Age	26.277	19	29.897	115	0
Lev	.246	.229	0.188	2.961	0
Size	20.76	20.871	2.189	27.23	14.108
ROA	.033	.049	0.175	.973	-2
TI	.182	.112	0.197	.919	0

The table consists of summarizing statistics about some of the variables included in the econometric model. Note that the table provides a summary of statistics of non-winsorized variables.

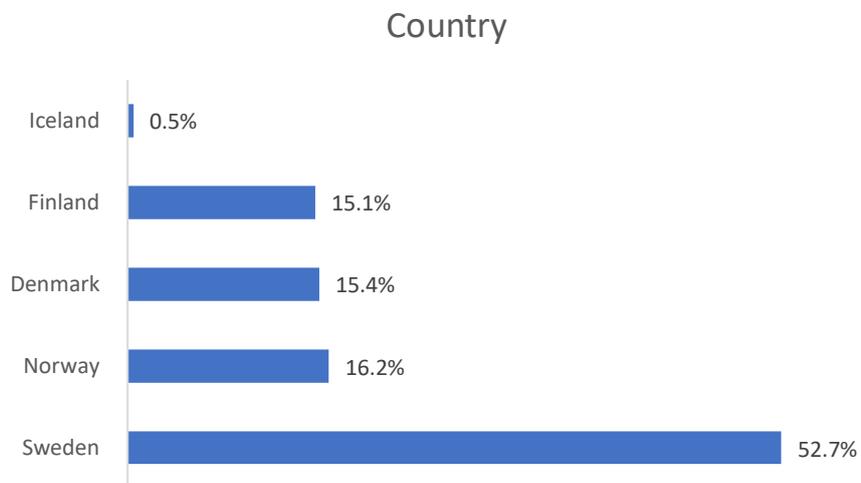
Figure one to three describes the frequency distribution of the observations for sector, country, and year. GICS Sector Codes have been used to divide the observations into different sectors. As indicated by figure one, the industrial sector has the largest amount of data which make up 28.9% of the total amount of observations. This finding is consistent with other research investigating similar research questions (Maaloul et al. 2021; Eliwa et al. 2021). As presented in table two, the largest number of observations are from firms incorporated in Sweden and make up 52.7% of the sample. As mentioned before, Iceland only accounts for 0.5% of the sample due to the fact that a very small fraction of the publicly traded Icelandic companies had ESG scores provided on the Refinitiv Eikon database. Lastly, figure three shows that the sample is highly skewed towards the more recent years. An explanation for the larger number of observations in the latter years might be the increasing importance of sustainability issues as suggested by the survey conducted by the UN Global Compact in 2010 (Lacy et al. 2010) and the European commission directive in 2014 (European Commission 2014). Thus, the increasing importance of sustainability may explain why the database for ESG score is becoming more extensive over time.

Figure 1: Distribution of Observations Based on Sector



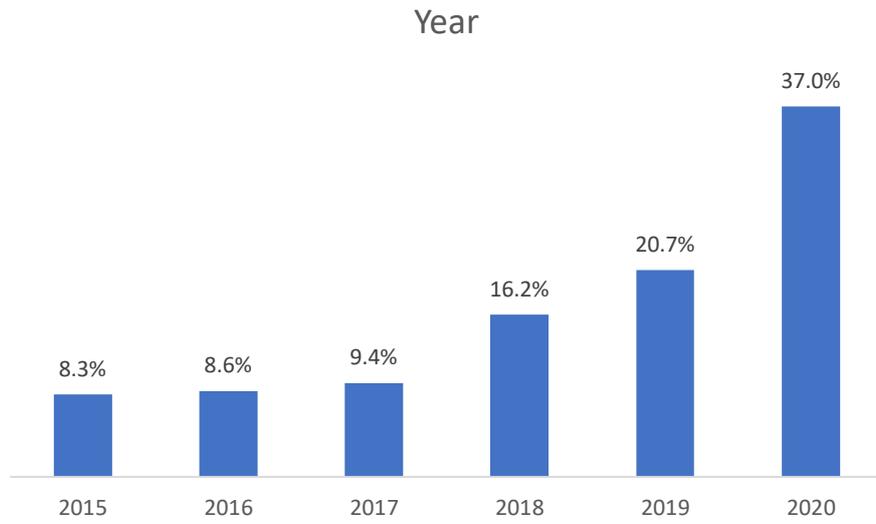
The figure describes the frequency distribution of observations for different GICS sectors.

Figure 2: Distribution of Observations Based on Country



The figure describes the frequency distribution of observations per each of the Nordic countries: Iceland, Finland, Denmark, Norway and Sweden.

Figure 3: Distribution of Observations Based on Year



The figure describes the frequency distribution of observations per year for the time period 2015-2020 used in this study.

5. Empirical Result

This chapter presents the empirical results from the regression which are related to the hypothesis of this study. In addition, this chapter also provides the results from performed robustness and sensitivity tests. The results from all tests are presented along with tables that summarize the regression outcomes.

5.1 Result from the regression

The main regression analysis investigates whether ESG performance have an impact on the cost of debt for companies incorporated in the Nordic countries. In alignment with empirical evidence within this research field, the relationship between ESG performance and the cost of debt is expected to be negative (Eliwa et al. 2021; Erragragui 2018; Ratajczak and Mikolajewicz 2021). Furthermore, the empirical evidence on the negative relationship between ESG and the cost of debt is supported theoretically by the Stakeholder theory and the risk mitigation view.

Column one, two, three and four in table three provides the evolution of the regression outcome when including control variables and adding fixed effects for country, industry and year one at a time. Furthermore, column five and six presents the final regression results when standard errors are clustered at year- or firm-level, respectively.

Referring table three, column five, the outcome of the regression is in accordance with the expectations since the coefficient representing a proxy of ESG performance is estimated to -0.00614 at a significance level of 5%. Therefore, the null hypothesis can be rejected at a 5% significance level. The estimated effect on the cost of debt by increasing ESG performance with one unit is approximately -0.614% . Hence, creditors seem to value ESG performance by rewarding companies in terms of reduced financing costs. Since the regression outcome is statistically insignificant when standard errors are clustered at firm-level these results will not be further interpreted.

Table 3: Summarized results of the regression output

	(1) COD	(2) COD	(3) COD	(4) COD	(5) COD	(6) COD
ESG	-0.00570*** (0.002)	-0.00975*** (0.007)	-0.00977*** (0.007)	-0.00533*** (0.005)	-0.00614** (0.037)	-0.00614 (0.208)
ICR		-0.000128** (0.025)	-0.000129** (0.025)	-0.000133** (0.036)	-0.000136** (0.029)	-0.000136*** (0.007)
Age (w)		-0.000581 (0.555)	-0.000670 (0.500)	-0.00574*** (0.001)	-0.00592*** (0.001)	-0.00592 (0.106)
Lev (w)		1.355*** (0.006)	1.359*** (0.007)	1.254*** (0.004)	1.540*** (0.003)	1.540*** (0.006)
Size		0.0929* (0.098)	0.0944* (0.099)	0.127** (0.037)	0.121* (0.075)	0.121 (0.107)
ROA		-1.014*** (0.001)	-0.985*** (0.001)	-1.269*** (0.008)	-1.188*** (0.005)	-1.188** (0.032)
TI (w)		-0.0215 (0.888)	-0.0392 (0.793)	0.665** (0.010)	0.0109 (0.931)	0.0109 (0.985)
_cons	-3.711	-5.715	-5.577	-5.928	-5.383	-5.383
Adj. R ²	0.004	0.049	0.047	0.225	0.235	0.235
YearFE	No	No	Yes	Yes	Yes	Yes
CountryFE	No	No	No	Yes	Yes	Yes
IndustryFE	No	No	No	No	Yes	Yes
Clustered SE (Firm)	No	No	No	No	No	Yes
Clustered SE (Year)	Yes	Yes	Yes	Yes	Yes	No
Obs.	1387	1373	1373	1373	1372	1372

p-values in parentheses
* *p* < 0.1, ** *p* < 0.05, *** *p* < 0.01

Table presents the regression results used to test the hypothesis stated in section 2.3. Column one to six aims to provide the reader with an overview of how the regression output evolves when including control variables and different fixed effects. The variables Age (Age), Leverage (Lev) and Tangible Intensity (TI) are winsorized at the 1% level which implies that the observations above the 99th percentile and below the 1st percentile are replaced with the corresponding nearby observation. The winsorized variables are indicated with a “w” in the table. Standard errors are clustered at year.

With regards to the control variables, most of the results are in line with the expectations. Age, Leverage and Return on Asset (ROA) showed highly statistically significant outcomes, with the respective coefficients -0.00592, 1.540 and -1.188. These results suggest that a higher age and higher return on assets rewards companies in terms of decreased cost of debt, while higher leverage increases the cost of debt. These results are in accordance with the expected theoretical and/or empirically proven relationships between Age, Leverage and return on asset (ROA) and the cost of debt. The variables Interest Coverage Ratio and Size showed statistically significant outcomes at a 5% and 10% significance level, respectively. Interest Coverage Ratio has a coefficient of -0.000136 which direction is in alignment with

the expectation. However, Size shows the opposite sign than expected suggesting that larger firms have higher cost of debt.

5.2 Sensitivity and robustness tests

This section provides the results of performed robustness and sensitivity tests that have been conducted to test whether the results from the main regression are robust when changing different assumptions and model specifications. Each of the four tests has been carried out independently from one another. Firstly, the dependent variable was replaced by another definition of the cost of debt. Secondly, the control variables Size and ROA were replaced by other definitions of firm size and profitability. Thirdly, all independent variables were lagged. Lastly, the largest GICS sector in terms of firm-year observations, Industry, was excluded from the sample. Overall, the performed tests indicate that the results from the main analysis are robust.

5.2.1 Replacing the dependent variable, control variables and applying lagged values

In the main analysis, the dependent variable cost of debt is specified as the natural logarithm of the accounting cost of debt. Since there are multiple other recognized candidates utilized in previous studies within this research field to identify the cost of debt, a robustness test was conducted by replacing the dependent variable with another measurement. Specifically, the accounting cost of debt was replaced by the marginal cost of a company for issuing new debt. This variable was retrieved from the Refinitiv Eikon database and is further specified in table four.

Table 4: Specification of the tested dependent variable

Variable	Description	Source code
COD_WACC	Cost of debt represents the marginal cost to the company of issuing new debt now. It is calculated by adding weighted cost of short-term debt and weighted cost of long-term debt based on the 1-year and 10-year points of an appropriate credit curve.	TR.WACCCostofDebt

Source: Refinitiv Eikon 2022. The table provides a specification of the variable COD_WACC which was used as an alternative measurement of the cost of debt in the first robustness check.

The result from the regression is summarized in table five, column five, and shows a significant negative association between ESG performance and the cost of debt. Hence, the results are consistent with the primary analysis which implies that higher ESG performance lowers the company cost of debt charged by creditors, even when the cost of debt variable is redefined. This consistency reinforces the reliability of the primary findings of this study.

Table 5: Summarized results of the regression output with replacement of the dependent variable

	(1)	(2)	(3)	(4)	(5)
	COD_WACC	COD_WACC	COD_WACC	COD_WACC	COD_WACC
ESG	-0.00569** (0.044)	-0.0102*** (0.002)	-0.0104*** (0.001)	-0.00782** (0.010)	-0.00796*** (0.006)
ICR		0.00000158 (0.680)	0.00000106 (0.754)	0.00000128 (0.733)	0.000008 (0.559)
Age (w)		-0.00108*** (0.005)	-0.00165*** (0.004)	-0.00227*** (0.007)	-0.00259*** (0.003)
Lev (w)		0.440* (0.058)	0.715** (0.035)	0.661** (0.048)	0.671** (0.037)
Size		0.0842*** (0.002)	0.0313*** (0.007)	0.0323** (0.014)	0.0384* (0.094)
ROA		-0.955*** (0.000)	-1.040*** (0.000)	-1.032*** (0.000)	-1.034*** (0.000)
TI (w)		0.720*** (0.000)	0.718*** (0.001)	0.701*** (0.000)	0.619*** (0.003)
_cons	0.670	-1.043	0.584	0.557	0.514
<i>Adj. R</i> ²	0.015	0.085	0.196	0.361	0.758
YearFE	No	No	Yes	Yes	Yes
CountryFE	No	No	No	Yes	Yes
IndustryFE	No	No	No	No	Yes
Clustered SE (Year)	Yes	Yes	Yes	Yes	Yes
Obs.	1359	1301	1301	1301	1300

p-values in parentheses
* *p* < 0.1, ** *p* < 0.05, *** *p* < 0.01

The table presents the regression results from the first robustness test where the dependent variable cost of debt is redefined as the marginal cost of a company for issuing new debt. The variables Age (Age), Leverage (Lev) and Tangible Intensity (TI) are winsorized at the 1% level which implies that the observations above the 99th percentile and below the 1st percentile are replaced with the corresponding nearby observation. The winsorized variables are indicated with a “w” in the table. Standard errors are clustered at year.

The second robustness test was performed by replacing the control variables Size and ROA with Revenue and Return on Invested Capital (ROIC), respectively. Two regressions were conducted, one with replacement of the variable Size and one with replacement of the variable ROA, all else equal to the main regression model. Table six, column one, provides the coefficients for the variables ESG and Revenue where no significant results were found for either coefficient. Table six, column two, provides the coefficients for the variables ESG and ROIC where the variables showed the same significant results and the same direction of the relationship as of the main analysis. Particularly, the variable ESG has a coefficient of -0.00699, which is relatively close to the results of the main analysis.

Table 6: Summarized results of the regression output with replacement of control variables

	(1) COD	(2) COD
ESG	-0.00095 (0.573)	-0.00699** (0.034)
Revenue	0.019 (0.750)	
ROIC		-0.002*** (0.001)
<i>Adj. R</i> ²	0.236	0.244
YearFE	Yes	Yes
CountryFE	Yes	Yes
IndustryFE	Yes	Yes
Clustered SE (Year)	Yes	Yes
Obs.	1267	1377

p-values in parentheses
* *p* < 0.1, ** *p* < 0.05, *** *p* < 0.01

The table presents the regression results from the second robustness test where the control variables ROA and Size were replaced by other measurements of profitability and size. Specifically, ROA was replaced by Return on Invested Capital (ROIC) and Size was replaced by Revenue. The variables were replaced one at a time keeping the remaining parts of the model unchanged. The variables Age (Age), Leverage (Lev) and Tangible Intensity (TI) are winsorized at the 1% level which implies that the observations above the 99th percentile and below the 1st percentile are replaced with the corresponding nearby observation. The winsorized variables are indicated with a “w” in the table. Standard errors are clustered at year.

Since the main regression model utilizes unlagged values of all the independent variables, it implicitly assumes that the effect of ESG performance, and all other included variables, on the cost of debt is immediate. However, there is reason to believe that there is a delayed effect on the cost of debt. In example, one could argue that it is actually the previous year's ESG performance that drives today's cost of debt. Therefore, the third robustness check was conducted by running the same regression as of the main analysis but with one year lagged values for all of the independent variables. Considering the frequency distribution of observations based on year in figure three, lagging all independent variables would result in a large loss of firm-year observations because a large fraction of observations for year 2020 would be discarded. In order to avoid a large lapse of observations when lagging the independent variables, new data was retrieved from 2021 and removed from 2015 for the dependent variable.

The result of the regression is summarized in table seven, column five, and shows a weakly significant negative association between ESG and the cost of debt. The output is consistent with the result from the main analysis which implies that higher ESG performance lowers the company cost of debt charged by creditors, also with lagged independent variables.

Table 7: Summarized results of the regression output with lagged values

	(1) COD	(2) COD	(3) COD	(4) COD	(5) COD
ESG	-0.00932** (0.033)	-0.00740* (0.054)	-0.00751* (0.050)	-0.00417 (0.124)	-0.00464* (0.093)
ICR		-0.0000215 (0.450)	-0.0000206 (0.470)	-0.0000217 (0.442)	-0.0000223 (0.437)
Age (w)		-0.00158* (0.054)	-0.00133 (0.118)	-0.00444** (0.047)	-0.00489** (0.039)
Lev (w)		1.095 (0.156)	0.947 (0.222)	0.976 (0.191)	1.231 (0.155)
Size		0.00196 (0.977)	0.0314 (0.646)	0.0436 (0.574)	0.0416 (0.564)
ROA		-1.451*** (0.000)	-1.381*** (0.000)	-1.567*** (0.006)	-1.494*** (0.002)
TI (w)		0.0236 (0.744)	0.0352 (0.582)	0.411 (0.082)	-0.0529 (0.716)
cons	-3.358 (0.000)	-3.654 (0.058)	-4.406 (0.026)	-4.557 (0.032)	-4.260 (0.026)
Adj. R ²	0.014	0.061	0.074	0.172	0.192
YearFE	No	No	Yes	Yes	Yes
CountryFE	No	No	No	Yes	Yes
IndustryFE	No	No	No	No	Yes
Clustered SE (Year)	Yes	Yes	Yes	Yes	Yes
Obs.	1419	1369	1369	1369	1368

p-values in parentheses
* *p* < 0.1, ** *p* < 0.05, *** *p* < 0.01

The table presents the regression results from the third robustness test where all independent variables were replaced by their one year lagged counterpart. The variables Age (Age), Leverage (Lev) and Tangible Intensity (TI) are winsorized at the 1% level which implies that the observations above the 99th percentile and below the 1st percentile are replaced with the corresponding nearby observation. The winsorized variables are indicated with a “w” in the table. Standard errors are clustered at year.

5.2.2 Sensitivity test of industry exclusion

The frequency distribution in figure one shows that the industrial sector has the largest proportion of observations in the sample compared to all of the other sectors. The industrial sector includes companies that are classified with GICS sector code 20. In order to test whether the largest sector drove the output of the regression, a sensitivity test was conducted

by excluding all companies that operated within the industrial sector. The exclusion of the industrial sector resulted in a regression with 967 observations which imposed a decrease of the original sample size with 406 observations.

The results from the regression are summarized in table eight, column five, and show a negative association between ESG and the cost of debt on a 5% significance level. These results are consistent with the output from the main regression model, which implies that the largest sector in the sample does not solely drive the relationship between ESG and the cost of debt. Thus, the consistency between the results strengthens the reliability of the primary findings of this research.

Table 8: Summarized results of the regression output excluding observations from the industrial sector.

	(1) COD	(2) COD	(3) COD	(4) COD	(5) COD
ESG_GICS20	-0.00806*** (0.001)	-0.0136*** (0.008)	-0.0136*** (0.007)	-0.00961*** (0.004)	-0.01250** (0.032)
ICR		-0.000130** (0.020)	-0.000130** (0.020)	-0.000135** (0.027)	-0.000137** (0.021)
Age (w)		0.000603 (0.601)	0.000535 (0.644)	-0.00274* (0.078)	-0.00314* (0.052)
Lev (w)		1.330*** (0.010)	1.343*** (0.009)	1.325*** (0.008)	1.790*** (0.006)
Size		0.115 (0.124)	0.115 (0.143)	0.134* (0.056)	0.154 (0.110)
ROA		-1.180*** (0.003)	-1.159*** (0.003)	-1.351** (0.021)	-1.191** (0.021)
TI (w)		-0.123 (0.547)	-0.139 (0.511)	0.651** (0.033)	-0.509** (0.016)
_cons	-3.588 (0.000)	-5.987 (0.005)	-5.826 (0.008)	-5.925 (0.004)	-5.608 (0.019)
Adj. R ²	0.008	0.073	0.074	0.215	0.238
YearFE	No	No	Yes	Yes	Yes
CountryFE	No	No	No	Yes	Yes
IndustryFE	No	No	No	No	Yes
Clustered SE (Year)	Yes	Yes	Yes	Yes	Yes
Obs.	979	967	967	967	966

p-values in parentheses
* *p* < 0.1, ** *p* < 0.05, *** *p* < 0.01

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The table presents the regression results from the sensitivity test where the industrial sector was excluded from the sample. The variables Age (Age), Leverage (Lev) and Tangible Intensity (TI) are winsorized at the 1% level which implies that the observations above the 99th percentile and below the 1st percentile are replaced with the corresponding nearby observation. The winsorized variables are indicated with a “w” in the table. Standard errors are clustered at year.

6. Discussion and Conclusion

This study investigates if the ESG performance of firms has an effect on the cost of debt for Nordic public firms. In order to provide further empirical research on the relationship between ESG and the cost of debt, this study exclusively investigates the Nordic countries while utilizing the most recent available data on ESG performance. In order to examine the association between ESG performance and the cost of debt, data was collected from the time period 2015-2020 from a sample of 560 active public firms incorporated in the Nordic countries.

There are two opposing theoretical views regarding the direction of the relationship between ESG and the cost of debt. On the one hand, Stakeholder theory and the risk mitigation view suggest a negative relationship. On the other hand, the overinvestment view predicts a positive relationship.

The main finding of this study is that there is a negative association between ESG performance and the cost of debt. Concludingly, the empirical results imply that ESG performance has an effect on the cost of debt for public firms incorporated in the Nordic countries. In particular, improved ESG performance lowers firms' debt financing costs. In accordance with Stakeholder theory, this relationship may be interpreted as a consequence of the effect of sustainable performance to reduce firm risk and bankruptcy costs. Similarly, the risk mitigation view explains the negative association between ESG performance and the cost of debt as a result of ESG investments improving effect on companies' risk profiles. On the contrary, the overinvestment view fails to predict the relationship between ESG performance and the cost of debt in this study. Hence, the suggestion that investments in ESG are a waste of company resources resulting from agency conflicts does not seem to be the main explanation behind the empirical results.

The implication of the main findings in this study is that firms might be able to reduce their debt financing costs by improving their ESG performance. Since investments in ESG can have other positive implications for corporations, such as cost reductions and productivity, firms' decision to invest in ESG might not be exclusively based on the reductive effect it seems to have on firms' cost of debt. That is to say, the negative relationship between ESG

performance and the cost of debt might not be used as a base argument for corporations to invest in ESG issues but can rather be seen as an associated effect.

Since this study is based on data retrieved from Refinitiv Eikon, it is limited to the available data in this database. This implies that the study is subject to selection bias. Furthermore, the dependent variable in the econometric model is defined as the accounting cost of debt and is therefore restricted to this particular definition. However, this limitation is investigated in a robustness test that replaces the dependent variable with another definition. The robustness and sensitivity tests performed suggest that the results from the main analysis are persistent when replacing different variables with other definitions and when excluding the Industrial GICS sector. Overall, the results from the robustness and sensitivity tests amplify the reliability of the main findings of this study.

Even though this research manages to find significant results on the association between ESG performance and the cost of debt, it has some limitations which opens up for the possibility of future research to extend the scope of this study's findings. For instance, it would be interesting to investigate the differences in effects of ESG performance on the cost of debt during periods of recession and economic booms. With respect to the overinvestment view, it could be argued that investments in ESG issues might be more prone to be perceived as a waste of company resources during recessions when resources are scarcer in general. Furthermore, it might be interesting to extend the findings of this study by connecting the relationship between ESG and the cost of debt to firms' choice of capital structure. If the cost of debt decreases with ESG performance, it would be possible to infer that firms with better ESG performance may operate with more leverage. However, to infer such a relationship one would have to investigate the association between ESG and the cost of equity to obtain a more extensive picture of ESG and the cost of capital in the context of corporate financing decisions.

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