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Impact of corporate social responsibility on cost of debt in Scandinavian public companies

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Abstract

Research background: In recent decades, companies have paid increasing attention to corporate social responsibility (CSR) and its related performance. Scandinavian countries lead the world in CSR and sustainability. The good CSR performance of Scandinavian companies has motivated studies on this phenomenon, particularly on the connection between a company's CSR and its performance. One of the most important performance indicators and value drivers is the cost of debt.

Purpose of the article: This study assessed the impact of CSR on the cost of debt in Scandinavian public companies.

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Methods: The research was divided into two stages. In the first stage, Scandinavian public companies were divided into two groups (with and without ESG (environmental, social, governance) disclosure scores) to reveal differences in the cost of debt. In the second stage, a fixed-effects regression model for balanced panel data sets was applied from 2011 to 2020 to assess the impact of ESG and its pillars on the cost of debt.

Findings & value added: The results revealed that the cost of debt of companies in Scandinavian countries with ESG disclosure scores was significantly lower. The ESG disclosure scores of these companies have increased significantly over the past 10 years. We found a positive impact of CSR on the cost of debt in Scandinavian public companies. The increase in ESG disclosure and pillar scores reduced the cost of debt. These findings are valuable from a scientific perspective. Scandinavian public companies with ESG scores have higher financial risk, but lower cost of debt. These results support the importance of investors' behavior, information asymmetry, and signaling. The findings have several implications for shareholders, managers and creditors. They suggest that creditors consider ESG disclosures when determining a borrower's creditworthiness. Additionally, it is a message to regulators that the debt market values ESG disclosures.

Introduction

Corporate social responsibility (CSR) is the responsibility that companies have for their impact on the environment and society. This refers to the policies and practices that companies adopt when they voluntarily integrate social, environmental, and transparent business practices into their internal operations and external relationships while abiding by laws, international agreements, and accepted standards of conduct. Companies and other stakeholders have been searching for novel and systemic answers to social, environmental, and broader economic issues. On the one hand, CSR is an important part of global and the European Union (EU) discussions on globalization, competitiveness, and sustainable development. On the other hand, it is a significant value driver for a company. Companies that practice CSR may increase their value through risk, expected cash flows, and cost of capital. Recently, researchers have paid increasing attention to the impact of CSR on the cost of capital (debt, equity, or weighted average). Given that their research is based on different scientific approaches, their findings remain controversial.

Findings on the impact of CSR on the cost of debt are not unanimous. A positive (decreasing) effect was observed by Apergis *et al.* (2022), He *et al.* (2022), Morrone *et al.* (2022), Kordsachia (2021), Maaloul *et al.* (2021), Raimo *et al.* (2021), Yeh *et al.* (2020), and Lee *et al.* (2009). The main reasons for the positive impact of CSR on cost of debt include a sustainable development commitment as well as social responsibility to creditors, reducing informa-

tional asymmetries between the contracting parties and the trustworthiness of the borrower, increasing the disclosure of information and transparency of companies, positive impact of the risk mitigation perspective, reducing companies' idiosyncratic risk by providing additional non-financial information, increasing the reputation of companies, and so on. A negative (increasing) effect was proven by Dobler *et al.* (2015), Menz (2010), and Sharfman and Fernando (2008). Researchers base these relationships on different approaches — exposure to environmental violation risk, increased environmental risk management, and credit ratings — which are more significant to lenders than CSR ratings.

Some studies have focused on the determinants influencing different CSR impacts on the cost of debt. Scientists have revealed the impact of CSR on cost of debt, considering mandatory and non-mandatory CSR legislation (Prasad *et al.*, 2022), long- and short-term liabilities (He *et al.*, 2019), country- and firm-level sustainability (Hoepner *et al.*, 2016), carbon risk profile and awareness (Clarkson *et al.*, 2013; Jung *et al.*, 2018), and the quality of borrowers (Goss & Roberts, 2011).

Scandinavian companies are known for leading CSR and sustainability globally (Gjølberg, 2009; Strand *et al.*, 2015; Midttun *et al.*, 2015). Gjølberg (2009) investigated the index of CSR performance in 20 OECD (Organisation for Economic Co-operation and Development) countries, and revealed that Scandinavian countries (Finland, Sweden, Norway, and Denmark), together with Switzerland as a leader (first place), have the highest CSR performance index (second–fifth places). The author argues that indexes revealed stark disparities between countries in terms of the relative proportion of CSR-active companies they host, and that these disparities were mostly influenced by political-economic systems rather than just ethics. Deep-seated traditions of stakeholder engagement are among the institutional and cultural variables that Strand *et al.* (2015) contribute to the CSR success of Scandinavian companies. According to Midttun *et al.* (2015), Denmark, Finland, Norway, and Sweden are acknowledged as the most advanced welfare states and are increasingly seen as leaders in CSR public policy. Finally, what Scandinavia is doing in CSR and what CSR is doing for Scandinavia is an important research area that needs to be further investigated (Morsing & Strand 2014). Therefore, this study is dedicated to the agenda of CSR in Scandinavian companies as a vehicle for the economy; more particularly, its effects on the cost of debt of Scandinavian companies. The good CSR performance of Scandinavian companies is the main

motivation for disclosing the impact of CSR on cost of debt. Despite findings demonstrating strong CSR performance of Scandinavian public companies, no research has been dedicated to the relationship between CSR performance and cost of debt. This research focuses not only on CSR performance, but also on its different activities.

In the first stage of empirical research, Scandinavian public companies were divided into two groups (with and without ESG (Environmental, Social and Governance) disclosure scores) to reveal the differences in cost of debt. Robustness was assessed using a t-test with two paired samples as means. In the second stage, a fixed-effects regression model for balanced panel data sets was applied to assess the effect of ESG and its pillars on cost of debt. The research period covered 2011–2020, and data were taken from the CSRHub and Bloomberg data bases. The CSRHub ESG data have been used in industry, leading to sustainability and all levels of academic research. Bloomberg is a global provider of financial news and data, including real-time and historical price data, financial data, trading news, and analyses of companies, markets, and economies.

The remainder of this paper is organized as follows: Section 2 discloses the effect of CSR on companies' cost of debt, analyzes and summarizes research approaches related to the relationship between CSR and the cost of debt, and consequently, determines the research gap. The data and methods used for problem solving, as well as the hypotheses raised, are presented in Section 3. The empirical analysis and key findings are presented in Section 4, a discussion in Section 5, and conclusions in Section 6.

Literature review

CSR may reduce informational asymmetries between parties and increase borrowers' trustworthiness. This leads to a reduction in monitoring costs, lower default risk, and therefore, a lower cost of debt. Many researchers have proven that better CSR performance positively affects cost of debt and company values.

The notion that companies can use CSR to lower the cost of debt by communicating their commitment to social responsibility and sustainable development to creditors underlies the positive (reducing) effect of CSR on cost of debt (Yeh *et al.*, 2020). Researchers have revealed that better CSR performance can decrease cost of debt, and these results have important

implications for practitioners and researchers. From a practical point of view, companies can use CSR to lower their cost of debt. From an academic point of view, researchers' results are crucial because prior research has paid less attention to emerging capital markets and cost of debt. In addition, Maaloul *et al.* (2021) believe that better information disclosure, which partly determines company transparency, leads to the possibility of incurring lower costs from borrowed financial resources. Moreover, Maaloul *et al.* (2021) explained the positive association between ESG information (performance and disclosure) and cost of debt, with corporate reputation as a mediator. According to Lee *et al.* (2009), the risk mitigation perspective argues that investment in CSR may lower risk and make banks more willing to offer better borrowing terms to companies. Morrone *et al.* (2022) and Raimo *et al.* (2021) focused only on the disclosure of environmental information, proving that it can reduce debt and financing costs.

Some researchers have found that better CSR performance is related to increased cost of debt (Menz, 2010; Sharfman & Fernando, 2008). However, they present different arguments regarding such relationships. Menz (2010) investigated the relationship between the valuation of corporate bonds and CSR standards of European companies. The empirical results show that CSR has not yet been considered when pricing corporate bonds. The researcher argues that credit ratings are more important for bond investors than CSR ratings. According to Sharfman and Fernando (2008), increased environmental risk management elevates the cost of debt because of the higher financial leverage of firms; that is, environment-friendly firms maintain riskier capital structures. Nevertheless, increasing tax subsidies resulting from debt financing can improve a firm's overall economic performance. Dobler *et al.* (2015) indicated that companies investing in greenness cannot create value. These companies are subject to environmental violation risk when they engage in environmental behaviors, which leads to lower valuations, thereby decreasing investors' purchase intentions.

Studies find that the impact of CSR on cost of debt can be both positive and negative. However, some researchers suggest no significant impact. For example, Hoepner *et al.* (2016) reveal that a country's sustainability affects the direct financing of economic activities. The environmental aspect of a country's institutional structure is approximately twice as impactful as its social aspect in determining the cost of corporate loans. Nevertheless, Hoepner *et al.* (2016) do not find any evidence that firm-level sustainability affects the interest rates charged by banks.

Some researchers have revealed why socially responsible companies have lower cost of debt, whereas others have not. Gigante and Manglaviti (2022) reveal that companies with ESG information disclosure have lower idiosyncratic risk than their counterparts. Prasad *et al.* (2022) indicate that higher CSR performance reduces the cost of debt and increases the cost of equity of non-financial companies in India, and that mandatory CSR legislation (policy intervention) moderates their relationships by increasing both. According to Kordsachia (2021), empirical evidence from Europe shows contrasting effects of CSR on cost of debt and equity. The author found consistent evidence that socially responsible companies are rewarded with lower financing costs. With regard to the optimal CSR level, this linear relationship is consistent with the diverging value function between shareholders and creditors. Additionally, the reducing impact of CSR on cost of debt is obvious when companies are in relative financial distress. Goss and Roberts (2011) discovered that companies with social responsibility issues pay higher interest rates than those that are more socially responsible. In addition, low-quality borrowers with discretionary CSR spending face higher loan spreads and shorter maturities, but lenders are not concerned about the CSR investments of high-quality borrowers. According to He *et al.* (2019), the cost-reducing effects of environmental information disclosure exist only in long-term liabilities, and environmental responsibilities can make it more difficult for companies to borrow in the short term.

The relationship between a firm's carbon risk and its cost of debt is investigated by Chen *et al.* (2022), Fard *et al.* (2020), Xu and Li (2020), Jung *et al.* (2018) and Clarkson *et al.* (2013). Chen *et al.* (2022) and Fard *et al.* (2020) confirmed that environmental regulatory pressure negatively impacts the debt financing scale of listed enterprises in China. Xu and Li (2020) focused on how environmental policies reduce the debt financing costs of green companies, but increase the costs of high-pollution and high-emission companies. Jung *et al.* (2018) hypothesized that a company's cost of debt would increase along with its historical carbon risk profile, but showing awareness of its carbon-related risks would help mitigate the penalty. According to Clarkson *et al.* (2013), who studied the US companies, disclosing carbon-related information through a CSR report can provide additional information about a firm's future carbon risk profile beyond simply knowing its historical carbon emissions level.

Scandinavian countries (Finland, Sweden, Norway, and Denmark) and companies consistently outperform global averages in terms of CSR and

sustainability. However, as argued by Hoepner *et al.* (2016), a company-level sustainability does not influence cost of debt.

CSR performance can be measured using qualitative measures such as accounting information and quantitative indicators such as ESG disclosure scores. Nevertheless, investors and corporate executives have increasingly embraced the idea that ESG information, such as resource efficiency, good community relations, training and developing the workforce, and board/committee structures, may directly affect a company's reputation, value, and performance. Governments, regulatory agencies, and exchange support increased ESG data disclosure, and crucially, its standardization and verification of ESG data disclosure.

Data and methods

The literature review allowed us to conclude that CSR performance tends to reduce the cost of debt more often than increase it. To test the validity of the aforementioned statements for Scandinavian companies, the following two hypotheses are proposed:

H1: *Companies with ESG disclosure scores have a statistically significant lower cost of debt.*

H2: *ESG disclosure score has a positive impact on the cost of debt of Scandinavian companies.*

H1 was tested in the first stage of the research, and H2 in the second stage.

The impact of CSR pillars (environmental, social, and governance) on the cost of debt remains poorly explored in previous research; therefore, three additional hypotheses are raised:

H3: *Environment disclosure score reduces the cost of debt.*

H4: *Social disclosure score reduces the cost of debt.*

H5: *Governance disclosure score reduces the cost of debt.*

H3–H5 hypotheses are tested in the second stage of the research.

The research methodology consists of two stages. In the first stage, public Scandinavian companies are divided into treatment and control groups, which consist of companies with and without ESG disclosure scores, respectively. This stage reveals the differences in the cost of debt and independent and control variables in the treatment and control groups. In the second stage, the fixed-effects regression model for balanced panel data sets of the treatment group is applied to assess the impact of ESG and its pillars (social, environmental, and governance disclosure scores) on the cost of debt in studied companies. The selection of the fixed-effects model was based on Hausman test results. Goodness of fit was checked by applying the White and Wooldridge tests.

Whether the company was recognized as socially responsible was checked in the CSRHub database, which integrates virtually every source and type of ESG data into a single set of ratings. Socially responsible companies were selected regardless of their ESG disclosure scores. These companies were included in the treatment group. The research period for both stages was 2011–2020.

Table 1 presents a sample of socially responsible companies by country and industry based on the Morningstar classification. The largest share of companies is from Sweden (38.2%); 20.6%, 25.7%, and 15.5% are from Norway, Finland, and Denmark, respectively. Companies operating in industries (31.6%) dominate. The share of companies operating in the utilities and telecommunications industries is the smallest, at only 1.5% and 2.9%, respectively. Financial sector companies and companies with shares not quoted in the market during 2011–2021 were excluded.

Considering the data presented in Table 1, additional 136 companies, whose distribution by industry was identical to the distribution of companies in the treatment group, were randomly included in the control group. Thus, the final sample size was 272. Treatment and control groups were used for data comparison. According to the averages of the data obtained in the descriptive statistics, distance between the indicators of the treatment and control groups is estimated. The robustness of H1 was assessed using a t-test with two paired samples as means.

In the second stage, a fixed-effects regression model was applied to the treatment group using balanced panel data from 2011 to 2020. The hypotheses H2–H5 were tested at this stage. The ESG disclosure scores, cost of debt, and control variables were obtained from the Bloomberg Database.

Yeh *et al.* (2020) employed the realized cost of debt calculated as the ratio of interest expenses in year t divided by the average interest-bearing debt outstanding during year t . Meanwhile, Maaloul *et al.* (2021) used government bond rates, a debt adjustment factor, and the proportions of short- and long-term debts to total debt for the cost of debt calculation. Following the discussion above, we calculate the realized cost of debt using Bloomberg's data.

$$COD_{i,t} = \frac{I_{i,t}}{D_{i,a,t}} \quad (1)$$

where $COD_{i,t}$ is the cost of debt of company i in year t , $I_{i,t}$ is the interest payable by company i in year t , and $D_{i,a,t}$ is the average interest-bearing debt outstanding of company i in year t . Outstanding average interest-bearing debt is the average interest-bearing debt fixed at the end of a quarter.

The choice of control variables was based on a review of previous research and the choice of variables that reflect the most diverse areas of financial management and the indicators that represent them. Company size was applied by Dhaliwal *et al.* (2014), Yeh *et al.* (2020), Maaloul *et al.* (2021); financial leverage was included by Dhaliwal *et al.* (2014), Yeh *et al.* (2020), Prasad *et al.* (2022); market-to-book ratio was used as a control variable by Dhaliwal *et al.* (2014), Yeh *et al.* (2020), Prasad *et al.* (2022); and return on assets (ROA) was included in the research by Yeh *et al.* (2020). Four additional accounting-based variables — current ratio, total solvency ratio, asset turnover, and gross profit margin — were chosen as control variables. This is because banks always consider accounting data before borrowing money, and these ratios reflect a company's short- and long-term solvency and turnover. The gross profit margin may indicate good or poor management practices and/or inferior products. The size of a company ($SIZE_{it}$) is measured by the natural logarithm of total assets; financial leverage (LEV_{it}) is the ratio of total debt to total assets; market-to-book ratio (MB_{it}) is measured as the ratio of share market price to share book value; ROA_{it} is measured as the ratio of earnings before interest and taxes ($EBIT_{it}$) to total assets; current ratio (CR_{it}) is calculated as the ratio of current assets to current liabilities; total solvency ratio (TSR_{it}) is the ratio of equity to total liabilities; asset turnover ratio (ATR_{it}) is the ratio of sales revenue to total assets; and gross profit margin (GPM_{it}) is measured as gross profit to sales revenue ratio.

La Rosa *et al.* (2018) state that numerous authors have discussed inherent endogeneity issues. A potential solution to this issue is using instrumental variable methods. However, implementing these techniques in traditional management and accounting research remains challenging (Larcker & Rusticus, 2010). The key advantage of the fixed-effects model is that it allows control for all time-invariant omitted variables. This is important when it is impossible to observe variables. The most important limitation is unobserved heterogeneity owing to unmeasured characteristics that vary over time. Nikolaev and Van Lent (2005) argue that performing fixed effects estimations may reduce the endogeneity bias, and contribute to the production of consistent results. We control for cross-sectional correlations by employing time and company, because there is evidence in the literature that this procedure may generate better results. The empirical model is expressed as follows:

$$COD_{i,t} = \beta_0 + \beta_1 CSR_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 LEV_{i,t} + \beta_4 MB_{i,t} + \beta_5 ROA_{i,t} + \beta_6 CR_{i,t} + \beta_7 TSR_{i,t} + \beta_8 ATR_{i,t} + \beta_9 GPM_{i,t} + Fixed\ effects + \varepsilon_{it} \quad (2)$$

where β_0 is constant or intercept term, i stands for a company, t for a time, and ε_{it} is error term.

To test the impact of CSR pillars on companies' cost of debt, we used their disclosure scores instead of the ESG disclosure score.

Results

The empirical findings are as follows: First, the descriptive statistics of the ESG disclosure scores are presented. Then, the difference between the COD of companies with and without ESG disclosure scores is revealed, and robustness is checked. Subsequently, the descriptive statistics of the control variables for companies in both categories are presented. Finally, socially responsible companies are investigated, and results of the correlation and multivariate regression analyses are presented.

Figure 1 shows the means of the ESG disclosure scores of Scandinavian public companies, and Appendix 1 shows the standard deviations, lowest and highest values, and medians.

Figure 1 reveals that the mean of ESG disclosure scores of Scandinavian public companies is 43.0, and that of environment, social, and governance disclosure scores are 34.3, 34.5, and 58.1, respectively (range is 0–100).

Moreover, the ESG disclosure scores increased over time, except for the social disclosure score, which decreased significantly in 2020 with the start of the COVID-19 pandemic. Additionally, the environmental disclosure score is more sensitive to information asymmetry than other disclosure scores. Analysis of the lowest and highest values revealed public companies with zero environmental and social disclosure scores; however, all companies had ESG and governance disclosure scores higher than zero. The strongest pillar of ESG disclosure is governance (ranging from 9.9 to 96.8). A comparative analysis of the means and medians shows that the distribution of all disclosure scores is skewed to the left, except for the governance disclosure score.

Figure 2 illustrates the mean of cost of debt. The average mean is approximately twice as low (4.69%) in companies with ESG disclosures as in companies without (9.11%) (Table 1). Robustness was assessed by performing a t-test of two paired samples for means with a significance level of $p < 0.05$. Additionally, standard deviation of the cost of debt is significantly higher in companies without ESG disclosure, indicating higher risk. The mean COD of both groups of companies is higher, showing skewness toward the right. These findings allow us to prove the first hypothesis (H1). Companies with ESG disclosure scores have significantly lower cost of debt.

Descriptive statistics of the regression variables for companies with and without ESG disclosure scores are presented in Panels A and B of Table 2.

Companies with ESG disclosure scores tend to be 1.5 times larger than those without. However, the standard deviation of the size was similar in both categories. We conclude that the levels of CSR performance and disclosure positively correlate with company size. Even though governments, regulatory agencies, and exchanges encourage more ESG data disclosure, as well as standardization and verification, smaller companies apply for ESG disclosure scores less often.

The financial leverage of companies with an ESG disclosure score is 0.47, and that without is 0.29. These data indicate that companies with higher financial risk are more willing to disclose their CSR performance based on their ESG disclosure scores. However, the standard deviation is extremely high for companies with high ESG disclosure scores. A comparative analysis of the means and medians showed that the distribution of financial leverage in both groups of companies was skewed to the right. Minh *et al.* (2022) argue that there is no clear link between CSR and compa-

ny leverage, because there are two competing viewpoints on why companies engage in CSR initiatives. According to Bae *et al.* (2011) and Verwijmeren and Derwall (2010), companies with high levels of CSR have less debt in their capital structures to protect their stakeholders from adverse repercussions or insolvency. According to Ho *et al.* (2021), investor attention and liquidity are the principal channels through which CSR effectively reduces leverage. Harjoto (2017) and Bae *et al.* (2019) present a different approach that CSR engagement may increase firms' operating and financial leverage (Harjoto, 2017), and reduce market share losses when firms are highly leveraged (Bae *et al.*, 2019).

Descriptive statistics reveal that companies with ESG disclosure scores have higher market-to-book ratios, returns on assets, and gross profit margins. This means that markets value the CSR performance of companies and have higher expectations related to investment decisions (MB ratios are 3.22 and 2.76 accordingly). ROA is 2.4 times higher in companies with ESG disclosure scores, but GPM is quite similar (0.41 and 0.38 accordingly). Although socially responsible performance incurs additional costs, both ROA and GPM are higher for companies with ESG disclosure scores. We conclude that CSR responsibility is closely related to good management practices for sales, costs of goods sold, operating expenses, financing, investing, and other activities. This is not surprising, because the governance pillar includes criteria such as cumulative voting, executive compensation, shareholder rights, takeover defense, staggered boards, and independent directors. Short-term solvency or liquidity, measured by the current ratio, is higher in companies without ESG disclosure scores, indicating higher liquidity and lower risk. Long-term solvency, measured by the equity-to-total-liabilities ratio, indicates higher solvency and lower risk for this group of companies. ATR shows the efficiency of company performance, which is slightly lower in the first group of companies. This phenomenon may be related to a higher level of investment in socially responsible companies.

Table 3 illustrates the Pearson correlations between COD, CSR performance, and control variables. COD is negatively and significantly correlated with ESG and environmental, social, and governance disclosure scores (-0.29, -0.29, -0.21, and -0.14, respectively).

Heteroscedasticity, also known as heterogeneity of variance, is checked applying White test (a p-value of less than 0.05). The test provides results in overestimating the goodness of fit as measured by the Pearson coefficient. The Wooldridge test for autocorrelation in the panel data showed no first-

order autocorrelation ($p = 0.58$). According to Naimy *et al.* (2023), a non-stationary time series may result in false inferences or erroneous regressions. Therefore, an Augmented Dickey-Fuller test was used. All the variables included in the panel regression model were stationary. The Hausman test results (p -value of less than 0.05) revealed that the fixed-effects panel model is more suitable than the random-effects model.

Table 4 presents the regression results for the relationship between CSR performance and COD. The ESG disclosure score has a positive impact on the cost of debt of Scandinavian companies: the cost of debt decreases when the ESG score increases, and vice versa. Thus, H2 is proved. The market-to-book ratio indicates market expectations; the higher the expectations, the lower the COD, which could be explained by signaling theory. Usually, larger companies have a lower cost of debt, but our estimates show that size is not statistically significant. This phenomenon could be related to the fact that larger companies maintain higher financial risk; their CSR performance requires many investments with higher business risk, and their size becomes insignificant. Financial leverage is not a statistically significant factor. The reason for this could be the U-shaped relationship between financial leverage and COD proven by the Modigliani-Miller tax shelter-bankruptcy cost hypothesis and trade-off theory. A statistically significant and doubtful impact on COD was observed for the total solvency ratio, asset turnover ratio, and gross profit margin. The impact of all the aforementioned independent variables should be reversed from a risk and return relationship perspective. However, the results revealed a direct impact, which could be related to huge investments in R&D (Research and Development), which is a characteristic of socially responsible companies. Such investments create value for the company and distort the relationship between turnover, profitability, and COD. Moreover, a company could have low debt; however, but if its cash management is poor and accounts payable are surging, its solvency might not be as solid as that implied by measures that consider only debt.

The regression estimates of the impact of the ESG disclosure pillars on COD are similar: the positive impact of all CSR pillars on COD is also revealed; that is, COD decreases with the increasing value of all scores. Considering the control variables, only one difference is observed: size is significant when governance disclosure scores are used as the independent variable. Thus, H3–H5 hypotheses are proved.

Our study has some limitations. First, companies without ESG disclosure scores are socially responsible, and their CSR can be disclosed through CSR reporting using various quantitative indicators. Second, ESG disclosures' cost-reducing effects may be stronger for long-term interest-bearing liabilities. Third, this study includes only a limited set of control variables.

Discussion

We assessed the influence of CSR performance on cost of debt in Scandinavian public companies. CSR performance was measured using the ESG and pillar scores. Selection of these indicators as measures of CSR performance allowed us to make a relative comparison.

We divided Scandinavian public companies into two groups (treatment and control) to determine whether ESG scores affected the cost of debt. According to Fandella *et al.* (2023), such an analysis is relatively coarse; however, this approach has the advantage of avoiding information loss for companies without ESG scores in econometric analysis. We attempted to include all companies with ESG scores in the panel regression model, but some had missing values for the variables in the Bloomberg database. We assumed a linear relationship between the cost of debt and ESG scores using a fixed-effects regression model. ESG scores can have a marginal impact on cost of debt. In this case, more sophisticated models could be developed and applied, such as the logit or probit models used by Gigante and Manglaviti (2022).

Our findings reveal the positive impact of ESG disclosure scores on Scandinavian companies' cost of debt. Similar results were reported in previous studies conducted in other countries (Yeh *et al.*, 2020; Maaloul *et al.*, 2021; Morrone *et al.*, 2022; Raimo *et al.*, 2021). For example, Maaloul *et al.* (2021) explained the positive association between ESG information and cost of debt using corporate reputation as a mediator. Following their results, we considered that the role of mediators could also be taken into account. However, we first assessed the existence of a relationship between ESG scores and cost of debt, and did not include mediators in our research.

Our results show that socially responsible companies have better financial performance and higher financial risk. Despite the higher financial risk, we find that their cost of debt is significantly lower. Our results suggest the need to focus on investors' behavior, information asymmetry, and signal-

ing. This idea is also supported by Santos-Jaén *et al.* (2021), who argue that CSR practices positively affect debt terms by decreasing asymmetric information. Some researchers, such as He *et al.* (2022), looked at companies' idiosyncratic risk and opinion divergence and found that CSR disclosure can reduce it. Mbanyele *et al.* (2022) claimed that idiosyncratic risk acts as a bridge between companies and their stakeholders to achieve superior green innovation performance. Thus, future research should explore systemic and idiosyncratic risks as mediators.

Finally, we emphasize the need to pay attention to greenwashing. The ESG measure, an indicator of CSR performance, may not reflect real CSR activities. As indicated in Gigante and Manglaviti (2022), the risk of greenwashing exists, and it should be considered to avoid incorrect measurements of CSR performance.

Conclusions

Despite the well-developed literature on the effects of CSR on cost of debt, no empirical studies have examined how the disclosure of CSR performance influences cost of debt in Scandinavian companies. Scandinavian countries are leading the implementation of public policies that target CSR, however, it does not matter that company-level CSR performance generates additional value through the cost of capital. CSR performance is measured not only by the ESG disclosure score, but also by its pillars (environmental, social, and governance disclosure scores). Our research methodology consisted of two stages. Treatment and control groups were formed to reveal differences in cost of debt. The fixed-effects regression model for balanced panel data sets is applied to reveal the impact of ESG disclosure scores on cost of debt in the companies of the treatment group in the second stage.

The empirical findings reveal that companies in Scandinavian countries with ESG disclosure scores have significantly lower cost of debt. Socially responsible companies are more transparent, which is related to a greater disclosure of information about their activities, making them more favorable to creditors. In addition, these companies transfer part of their obligations regarding social responsibility to creditors. It should be highlighted that among the companies in the control group there are more or less socially responsible companies, but the ESG score is a strong positive signal

of the debt capital market. Strong CSR public policy, reporting initiatives, and stakeholders' engagement lead to the fact that Scandinavian countries and their policymakers are doing a lot toward CSR. Thus, companies benefit from lower costs and higher values, and governments take a larger share of companies' value.

These findings are valuable from a scientific perspective. Scandinavian public companies with ESG scores have higher financial risk, but lower cost of debt. These results support the importance of investors' behavior, information asymmetry, and signaling when investigating the relationship between CSR and cost of debt.

Our findings have several implications for shareholders, managers, creditors, and regulators. First, they can help make shareholders and managers aware of the potential benefits (lower cost of debt and higher value) of ESG management and disclosure. Second, our findings suggest that creditors consider ESG disclosures when assessing borrowers' creditworthiness. Third, they broadcast a message to regulators that the debt market values ESG disclosure and further supports policies that encourage or enforce companies' commitment to ESG.

This study examines the impact of CSR on companies' cost of debt. Disclosure was measured using ESG scores and three different pillars. Further research may extend this study by measuring CSR through other quantitative indicators, because some companies in the control group could also be socially responsible. The impact of ESG disclosures on the cost of debt can be examined by considering only long-term debt.

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Annex

Table 1. A sample of socially responsible companies by country and industry in 2011–2020

Industry	Sweden	Norway	Finland	Denmark	Total
Basic materials	6	2	5	1	6
Energy	2	6	1	0	2
Industrials	18	8	12	5	18
Healthcare	4	0	1	7	4
Consumer discretionary	12	4	6	1	12
Consumer staples	5	5	6	3	5
Technology	3	2	2	3	3
Telecommunications	2	1	1	0	2
Utilities	0	0	1	1	0
Total	52	28	35	21	136

Table 2. Descriptive statistics of the regression variables

Panel A. For companies with ESG disclosure score						
	Obs.	Mean	S.D.	Min	Median	Max
COD	1360	0.05	0.03	0.01	0.04	0.28
SIZE	1360	7.63	1.59	2.10	7.70	14.38
LEV	1360	0.47	3.37	0.00	0.20	70.30
MB	1360	3.22	2.94	0.18	2.25	27.51
ROA	1360	0.12	0.44	-4.38	0.07	6.22
CR	1360	1.75	1.55	0.14	1.40	18.52
TSR	1360	1.20	1.53	-0.61	0.83	18.96
ATR	1360	0.95	0.55	0.02	0.85	4.31
GPM	1360	0.41	0.24	-1.38	0.39	1.00
Panel B. For companies without ESG disclosure score						
	Obs.	Mean	S.D.	Min	Median	Max
COD	1360	0.09	0.22	0.00	0.03	2.05
SIZE	1360	4.89	1.78	0.02	4.91	9.48
LEV	1360	0.29	0.22	0.00	0.25	2.57
MB	1360	2.76	2.57	0.03	1.90	19.03
ROA	1360	0.05	0.44	-2.14	0.06	7.69
CR	1360	2.18	4.86	0.09	1.43	157.56
TSR	1360	3.28	30.68	-0.70	0.96	767.57
ATR	1360	1.09	0.89	0.00	0.94	9.66
GPM	1360	0.38	1.12	-0.38	0.39	1.00

Table 3. Correlation matrix

	ESG	E	S	G	SIZE	MB	ROA	CR	GPM	TSR	LEV	ATR	COD
ESG	1.0000												
E	0.8928***	1.0000											
S	0.7923***	0.6522***	1.0000										
G	0.7083***	0.4632***	0.2989***	1.0000									
SIZE	0.4776***	0.4516***	0.4119***	0.2814***	1.0000								
MB	0.0622**	0.0633**	0.0321**	0.0788***	-0.0209**	1.0000							
ROA	0.0122***	0.0163***	0.0112***	-0.0136***	-0.1309***	0.0479***	1.0000						
CR	-0.0072	-0.0043	-0.0074	-0.0085	-0.0057	0.0018	0.0105	1.0000					
GPM	-0.2233***	-0.2370***	-0.1575***	-0.1263***	-0.1776***	0.1655***	-0.0015***	0.0219***	1.0000				
TSR	-0.1500***	-0.1928***	-0.0716***	-0.0523***	-0.2198***	0.0578***	-0.0506***	0.0100***	0.2172***	1.0000			
LEV	-0.1289***	-0.1318***	-0.0817***	-0.1109***	-0.1514***	-0.0511***	-0.0086***	-0.0030***	0.1137***	-0.0098***	1.0000		
ATR	-0.0159***	0.0101***	-0.0056***	-0.0863***	-0.2136***	0.1172***	0.0660***	-0.0096***	-0.2100***	-0.1104***	0.0773***	1.0000	
COD	-0.2919***	-0.2886***	-0.2123***	-0.1357***	-0.1819***	-0.1631***	-0.0105	0.0132	0.1663***	0.2169***	0.0617	0.0757***	1.0000

Note: *p < 0.10, **p < 0.05, and ***p < 0.01.

Table 4. The impact of CSR on COD: regression estimates

	COD	COD	COD	COD
Constant	0.0047*** (2.963)	0.0528*** (9.025)	0.0544*** (9.230)	0.0642*** (9.779)
ESG	-0.0007*** (-9.624)	x	x	x
EDS	x	-0.0004*** (-7.990)	x	x
SDS	x	x	-0.0004*** (-6.718)	x
GDS	x	x	x	-0.0003*** (-4.283)
SIZE	0.0000 (1.045)	0.0000 (-0.010)	-0.0005 (-0.792)	-0.0014** (-2.361)
MB	-0.0017*** (-5.939)	-0.0017*** (-5.902)	-0.0018*** (-6.270)	-0.0018*** (-6.118)
ROA	-0.0008 (0.440)	-0.0006 (0.333)	-0.0006 (0.040)	-0.0010 (0.544)
CR	0.0000 (0.136)	0.0000 (0.134)	0.0000 (0.210)	0.0000 (0.077)
GPM	0.0002*** (4.517)	0.0002*** (4.447)	0.0002*** (4.989)	0.0002*** (5.069)
TSR	0.0032*** (5.970)	0.0030*** (5.471)	0.0034*** (6.327)	0.0034*** (6.175)
LEV	0.0002 (0.672)	0.0002 (0.713)	0.0003 (1.154)	0.0002 (0.977)
ATR	0.0047*** (2.963)	0.0051*** (3.117)	0.0051*** (3.116)	0.0041** (2.472)
Company Fixed Effects	Included	Included	Included	Included
Time Fixed Effects	Included	Included	Included	Included
Observations	1360	1360	1360	1360
F-value	27.4459***	23.868***	21.5409***	18.2111***
LSDV R ²	0.366	0.352	0.342	0.328
Within R ²	0.172	0.154	0.141	0.122

Figure 1. The means of ESG disclosure scores of Scandinavian public companies

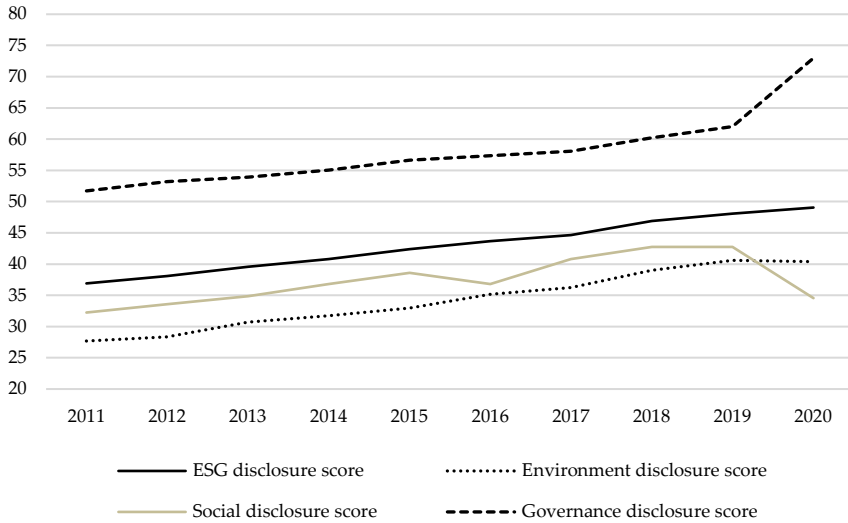


Figure 2. COD of Scandinavian public companies with and without ESG disclosure score

