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ESG and financial performance: Evidence from Nordic Markets

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Abstract

This study explores the relationship between ESG scores and financial performance in Nordic markets, using ESG scores from Refinitiv and MSCI. We examine the impact of ESG on performance measures such as Revenue change, ROA, ROE, Stock Return, and WACC. The results indicate a significant positive relationship between ESG combined score and ROA in both Refinitiv and MSCI datasets, as well as a positive but not significant relationship of ESG with ROE. Additionally, we find a significant negative relationship of ESG with WACC in MSCI data and with Revenue in the Refinitiv data. The relationship of ESG with the remaining financial factors remain inconclusive.

For ESG separate ratings, the results have shown social score being significantly positive for profitability where governance score being significantly negative for profitability in Refinitiv data. Environment score does not have any significant relationship with financial performance. On the other hand, ESG controversy rating enhances firm´s return on equity and reduces WACC according to MSCI data.

The results of the study show that the effect of ESG on corporate financial performance is significant for Danish firms and Denmark as country of incorporation proves to be better for financial performance of companies. Additionally, year 2020 was the most significant negative year for financial performance, potentially due to the COVID-19 pandemic. Moreover, increase in firm size proves to significantly increase profitability and reduce WACC.

Foreword

This is the conclusion of a master's degree in business administration from the UiS Business School, with a focus on finance and ESG investments. The master's thesis was composed during the spring semester of 2023, and it has been accredited with 30 credit points. Our research work has provided us with valuable knowledge on the interconnection between ESG ratings and financial performance. We were able to go more deeply into two of our favorite subjects, financial performance and ESG because of the thesis.

We would like to express our gratitude to our supervisor at the UiS Business School Bernt Arne Ødegaard for his assistance in the process, constructive criticism, and insightful advice. We would also like to thank Torkjel Øvsthus at Norske Shell for the corporation and for attempting to assist us in obtaining additional relevant data for our study.

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1. Introduction

ESG has been an emerging topic for years, but it now has become a point of action. ESG has become known not only for the firms in terms of adopting their operations and policies, but it has also grown in relevance for institutional investors and pension funds in terms of diversifying the firm specific risks. ESG is increasingly becoming a focus for executives at global institutional investment firms as the institutions and organizations face shareholder accountability for their ESG performance. It has now become a necessity for companies to enhance their efforts in terms of establishing a statement of purpose, offering integrated financial and ESG reports, boosting middle management engagement in ESG, investing in IT systems, and enhancing internal methods for evaluating and reporting ESG performance. (Eccles et al, 2019). It has been shown that firms with a higher ESG performance have greater access to capital relative to the firms with low ESG performance. This is further evidenced by Hong and Kacperczyk (2009) who claim a lower cost of capital due to lower risk for the high ESG performance companies due to a stronger and wider investor base.

Several studies have demonstrated a positive relationship between a company's environmental, social, and governance (ESG) performance and its financial success. Companies that built methods for monitoring and maintaining ESG performance in the early 1990s outperformed control groups over the next 18 years, according to Harvard Business School research (Eccles et al, 2019). According to Atkins B., (2018), the results of the research conducted by Nordea Equity Research, Bank of America Merrill Lynch, and Amundi Asset Management discovered that firms with superior ESG records produced greater returns, were less likely to have severe price falls, and were less likely to go bankrupt.

Investment in the ESG related projects and activities has become a trend among companies and they have started making strong stances on anti-ESG policies. For instance, according to Kristine Nergaard, (2003) Norway as a country introduced a strict gender quota scheme for women representation in company boards in 2003 and SSGA (State Street Global Advisors), one of the world's biggest asset managers voted against re-election of directors at 400 companies during 2017 proxy season because the companies failed to appoint women to their all-male boards.

Environmental, social, and governance (ESG) investment choices are becoming increasingly popular. To accommodate the demand, several asset management businesses are rapidly developing new solutions. UBS Asset Management, for instance, has tripled its sustainable and impact investing since December 2016, with $17 billion in assets under management (AUM). According to the unit leader at UBS, client demand has increased in the last 24 months. He also indicates that asset owners no longer need to be persuaded of the value of sustainable investment. According to the CEO of a Swedish pension fund AP2, the focus is now on how to successfully extract value through ESG integration.

All statements above conclude that ESG has been making positive rounds in the world by forcing companies to invest in environmentally and socially sustainable projects, but does it make a positive impact in the world and is it sustainable? This can be elaborated by a few questions about the current energy crisis. Russia's war on Ukraine has put pressure on Germany to go back to coal mines for energy extraction, creating a state of uproar among pro-environmentalists (Wele D, 2022). Additionally, Wyoming, a US state has become a leader in criticism of ESG policies as the SRI had put downward pressure on the state's oil and gas activities, thus putting pressure on the biggest employment generating sector (Kevin Killough, 2023). This begs the question of how sustainable is ESG focus and policies? And whether it creates any long-term benefits especially in the periods of crisis situations?

This study aims to investigate the doubts about ESG by asking whether incorporating ESG factors into investment decisions has a positive impact on the financial performance of the corporations or is it all just noise. We aim to do this by investigating the following research question: "***Is ESG relevant for corporate performance?"*** To answer this question, this study focuses on various corporate performance factors such as revenue growth, return on assets (ROA), return on equity (ROE), Stock Return, and WACC and finds the relationship between ESG and chosen corporate performance factors through empirical analysis. Some studies found negative or little to no correlation between ESG and financial performance while others find a positive correlation. This study attempts to add to this body of the research by investigating the relationship between ESG and financial performance by focusing on Nordic stocks which complements the studies on US and other markets. The findings of the study have indeed confirmed that ESG is relevant for corporate performance in terms of reducing the firms´ WACC and increasing its ROA, while impacting the revenue growth negatively. The impact of ESG on the other corporate performance factors is mixed and inconclusive.

2. Literature

2.1 Definition and overview of ESG.

When we talk about defining ESG, two main terms come to light which help derive ESG which are sustainability and corporate social responsibility (CSR).

There is a plethora of definitions of sustainability in this realm but one of the credible definitions is by Alexandra Spiliakos (2018) who defines sustainability in corporations as a way of doing business which has no negative impact on the environment, communities, and society. Similarly, UN World Commission on Environment and Development defines sustainability as "sustainable development is development that meets the need of the present without compromising the ability of future generations to meet their own needs" (United Nations 1987).

When it comes to understanding and specifying the term sustainability, it is very hard as it is a vast term. In finance it has gained the reputation of acting as an umbrella term for many emerging concepts such as sustainable finance, corporate social responsibility (CSR), socially responsible investing (SRI), green investing, ethical investing, and environment social governance (ESG). All these concepts focus on investments with a long-term positive impact on the environment and society where investors also demand positive return like any other investor.

Among all the sustainability focused investment terms, when we talk about sustainability in terms of business, the term which is very well known that takes us closer to understanding ESG is corporate social responsibility (CSR).

Like sustainability, there is a vast number of definitions for CSR where one of the most common is by UN Industrial Development Organization which states that "CSR is a management concept whereby companies integrate social and environmental concerns in their business operations and interactions with their stakeholders." Like this definition, European Commission defines CSR as "a concept by which companies decide voluntarily to contribute to a better society and a cleaner environment by going beyond compliance and investing more into human capital, the environment, and the relations with stakeholders" (Arvidsson 2010). According to Yrr Ahlklo & Carin Lind, (2019), CSR is a broad concept, and it is a policy which to be successful must be linked with the business model.

From the definitions above one can easily come to conclusion that CSR is a policy adopted by the companies to do good for the society, the environment, and for all the other stakeholders of the company. On the other hand, sustainability is a concept behind any policy by the company which ensures that the policy adopted by the company has long term positive implications. When we talk about ESG, we see that it is a very good mix of both sustainability and a very vast form of CSR policy.

A modernized or newer form of corporate social responsibility (CSR) is frequently referred to as Environmental, Social, and Governance (ESG). Due to the subjective nature of how ESG should be defined and the tight relationship between ESG and CSR, it can be challenging to distinguish the two concepts. ESG covers a larger variety of problems by explicitly focusing on the governance issues in addition to the company's social and environmental obligations (Gillan et. al., 2021). Thus, in addition to the environmental factors such as pollution, waste, deforestation, carbon emissions, etc. and social factors such as employee relations, working conditions, diversity, health and safety, conflict management, etc., Yrr Ahlklo & Carin Lind, (2019) mentions the specific governance factors that ESG exclusively focuses on in addition to CSR based environmental and social factors, and these factors are tax strategies, donation, lobbying, corruption, bribery, executive remuneration, and more. Now these ESG policies cannot be same for all companies considering different company structures, functions, and industries they operate in, thus, Van Marrewijk, (2003) argues that in favor of a variety of more precise definitions that better reflect the development, awareness, and ambition levels of organizations, the "one size fits all" definition of CSR & ESG should be abandoned. Additionally, Alexandra Spiliakos, (2018) adds that to link the organizational goals with the values, sustainable business strategies must be unique to each organization.

Therefore, ESG does not have a single definition, rather many researchers, institutions, and organizations define ESG according to their own understanding, relevance, and functions. Gillan et. al., (2021) explain ESG as the way different businesses and investors incorporate environmental, social, and governance concerns in their specific business and investment models in addition to CSR based policies. On the other hand, Alexandra Spiliakos, (2018) in her article in Harvard Business School Online refers to ESG as the metrics that is used by investors and businesses to implement and measure ethical impact and sustainability practices.

2.2 Importance of ESG.

Studies have shown that ESG improves risk management and long-term financial performance while making investment decisions. Jagannathan et al, (2018) argues in their study that investors´ primary mandate is to maximize profits; however, by taking their customers' environmental, social, and governance (ESG) concerns into account, they may be able to lower portfolio risks. Additionally, Jagannathan et al, (2018) states that by incorporating ESG criteria into the investment strategy, investors, even those who are simply concerned with risks and returns, can reduce their exposure to systematic risks.

The investors can use ESG by focusing on the ratings that different companies have. These ESG ratings are becoming increasingly important for companies as they provide a measure of a company's sustainability and ethical performance. As noted by Giese (2019), these ratings can have a significant impact on a firm's cash flow by providing higher valuation and lower cost of capital. Empirical evidence supports the idea that ESG ratings can significantly affect a company's cash flow. Cheng, B., I. Ioannou, and G. Serafeim, (2014) discovered, for instance, that companies with strong CSR performance, such as those with high ESG ratings, had higher stock prices and higher profitability, whereas companies with poor CSR performance experienced significant negative stock price reactions and had lower profitability. The authors also discovered that the impact of CSR on firms' cash flows contributed to the explanation of the association between CSR performance and firm value. They discovered that businesses with great CSR records had reduced capital costs and stronger cash flows, which helped to boost their profitability and stock values. Overall, investors' approach to ESG may have a big influence on the businesses they invest in as well as the overall economy. Investors may promote change toward a more sustainable future by giving ESG issues a higher priority in their investment choices. This study tries to define the link between ESG and financial performance and test whether there is a positive relationship between ESG and financial performance of the companies or is it all just noise, and what investors can learn from this analysis.

2.3 ESG measurement.

To understand ESG better, the way ESG is measured is extremely important. ESG is measured through ESG rating which is a score that tells how well a company did in terms of environment, society, and governance. When considering these ESG ratings, according to PRI (2018), the environmental factor pertains to a company's management of various issues such as pollution,

waste, deforestation, carbon dioxide emissions, and climate change. The social factor relates to a company's treatment of individuals and the community, encompassing aspects such as employee relations, working conditions, diversity, conflict management, health and safety, and interactions with the local community. The governance factor refers to how a company is governed, including policies, tax strategies, donations, lobbying, corruption, and bribery.

ESG ratings are provided by various institutions which are called ESG rating agencies. Some agencies like Refinitiv provide points score, from 0 to 100 where 0 is the worst performance and 100 is the best performance (Refinitiv, 2022) whereas some agencies like MSCI provide a letter grade as ESG score such as A grades for best performance and C grades for worst performance where B grades indicate average performance (MSCI, 2023). Each agency uses various inputs and data sources and considers various environmental, social, and governance factors in ESG ratings and follows a specific framework for measuring each factor and quantifying the qualitative data in each factor.

Considering the popularity of ESG ratings, there are several third party ESG rating agencies which help in assessing the ESG performance of companies via their rating framework. This study collects the ESG data from MSCI and Refinitiv. In the MSCI ESG data of all chosen types which includes ESG combined score, E, S, and G separate scores and the ESG controversy scores, the companies receive the score out of 10 with 10 being the best and 0 being the worst. MSCI ESG Ratings assess how well firms manage financially significant ESG risks and opportunities. According to how exposed they are to ESG risks and how effectively they manage those risks in comparison to peers, MSCI applies a rules-based methodology to identify industry leaders and laggards. MSCI ESG Scores vary from the best, called leader (AAA, AA), average (A, BBB, BB), to the worst, called laggard (B, CCC). In addition, MSCI evaluates loans, mutual funds, exchange-traded funds, and nations (MSCI, 2023). MSCI collects the data from the companies´ disclosure documents, alternative data including government, regulatory and NGO datasets, and 3,400 media sources. This collected data is analyzed based on 35 ESG key issues, where all these measures are grouped into 10 categories under Environment, Social, and Governance pillars. Under Environmental pillars, the main four categories are Climate Change, Natural Capital, Pollution & waste, and Environment Opportunities. Under Social pillars, there are four main categories which include Human Capital, Product Liability, Stakeholder Opposition and Social opportunities, where under Governance pillars, the ESG measures are classified under Corporate Governance and Corporate Behavior (MSCI, 2023).

Refinitiv collects the data from the companies´ annual reports, the company websites, NGO websites, stock exchange filings, CSR reports, and news sources. This collected data is analyzed based on over 630 ESG measures, where all these measures are grouped into 10 categories under Environment, Social, and Governance factors. Under environmental factor, the main three categories are resource use, emissions, and innovation. Under social factor, there are 4 main categories which include workforce, human rights, community, and product responsibility where under governance factor, the ESG measures are classified under management, shareholders, and CSR strategy categories. For each of these E, S, and G, Refinitiv calculates the score based on the relative sum of category weights for the environmental and social categories which vary across industries. However, for the governance categories, the weights remain the same across all industries. The weights are in percentages ranging between 0 and 100. ESG controversy score on the other hand is calculated from 23 ESG controversy topics. Refinitiv penalizes the company if a scandal occurs in a year and same in case of new development in the same scandal. All and not excluding the progress in the controversy including lawsuits, ongoing legislation disputes, new media materials, are all considered in the controversy ratings. The controversy score is calculated as the weighted average of ESG scores and ESG controversy scores per fiscal period with recent controversies reflected in the latest completed period (Refinitiv, 2022).

Each rating agency, as we can see above, follows the same procedure of measuring the ESG score but they vary in terms of the process they use to measure which includes three main terms. First is "measure" which is a way of quantifying the qualitative data, second is "scope" which is the scope of rating factors within each ESG variable where the third is "weights" which are the weights they rating agencies use on each factor and variable (F Berg et al., 2022). Generally, rating agencies face a similar challenge of quantifying the qualitative data, therefore, each rating agency has come up with their own unique way of processing the data and measuring the ESG ratings. The rating agencies also have different scope of factors, meaning the sub-factors within Environment, Social, and Governance vary across rating agencies. Some might be focusing on more factors than others. Lastly, the weights that each rating agency puts on each factor in ESG vary depending upon the understanding and importance of each factor to each rating agency. Therefore, these ratings vary across different rating agencies.

The divergence between ESG ratings is calculated through the correlation between all these ESG ratings by different agencies. The disagreement between the ESG ratings by different providers is substantial as confirmed by the correlation of just 0.38 in the results of (F Berg et

al., 2022) analysis on divergence of ESG ratings. The high correlation of 0.95 or more was found to show similarities among the raters only among the worst performing companies as found by Lopez et al. (2020). The dissection of this divergence indicates that the variation in the ESG ratings comes from 'Measurement divergence' with 56% contribution followed by 'Scope divergence' at 38% and 'Weight divergence' at around 6% (F Berg et al., 2022). This gives a valuable insight into a 'rater effect' or otherwise 'halo effect' which is partly the driver of measurement divergence. F Berg et al. (2022) explains that in this ´rater effect´, the rating agencies might use different indicators to measure the same attribute but the firm receiving a high score in one indicator is also likely to get a high score across all other indicators from the same rating agency. This rater effect contributes to 15% variations (F Berg et al., 2022). These results show a lot of noise in the ESG ratings and ESG performance evaluation in the investment and business realm.

2.4 Implications of divergent ESG ratings.

Considering the importance and vast use of ESG ratings, the divergence in ESG ratings across different raters has some serious consequences. The management of companies in addition to the financial investors use these ESG ratings as the basis for their investment in ESG focused organizational decisions. These varying ESG ratings give mixed signals about where to allocate their human and financial capital which could lead to companies misallocating or not allocating these capitals towards ESG improvement. Additionally, the evaluation of firms' ESG performance becomes difficult which is the main objective of ESG ratings and might lead to low valuation of the firm's ESG performance by the investors and analysts after the ratings have been published as it was observed by Heinkel et al. (2001).

Regardless of divergent ESG ratings and their impact, the most important thing is to see how these ratings impact the financial performance of the companies and whether these emerging ESG policies and ESG rating make a positive impact or not.

2.5 ESG and Financial Performance

2.5.1 Positive & Neutral relationship

The article by Gillian et al. (2021) studies the relationship of ESG and corporate finance impacts of ESG activities. They have found a positive robust relationship between ESG and various corporate finance factors after analyzing several empirical studies. However, at the

same time, they have found no relationship between ESG and the financial performance of the companies from a few studies.

According to Bénabou and Tirole (2010) firms with strong ESG performance have a strong resilience during crisis periods or they have a specific ESG risk factor and thus will have a different systematic risk exposure than the companies with a lower ESG performance. To confirm this, Lins et al. (2017) find that the firms with low ESG scores performed worse than the firms with high ESG scores during the financial crisis of 2008-2009. Thus, these explain clearly how high ESG performing firms will have a lower systematic risk as compared to the firms with low ESG performance. Consistent with this low risk and high ESG performance arguments, El Ghoul et al. (2011) argues with an additional argument in this favor that the responsible firms have a wider investor base and thus will face lower risk relative to the irresponsible firms. This not only explains the ESG and risk relationship, but it also indicates that the firms with a higher ESG performance and the more responsible firms have a greater access to capital relative to the firms with low ESG performance. This is further evidenced by Hong and Kacperczyk (2009) who claim a lower cost of capital due to lower risk for the high ESG performance companies due to a stronger and wider investor base.

Gillian et al. (2021) argues that the theoretical models that consider the investor´s preference in the assessment of the investment, the green firms (firms with high ESG/CSR scores) will have lower cost of capital given enough investors demanding green investments. He continues to mention that these results were consistent with the empirical work on the same type of assessment of green investments. This can further be tested by the implications of the theoretical model by Heinkel et al. (2001) which state that the polluting firms (the firms with low ESG score) are held by investors less due to negative screening which leads to a lower stock price and a higher cost of capital. This leads to promotion of ESG among these polluting firms as they will aim to be more desirable in which they will become less polluting. Thus, requiring green investments not only leads to a lower cost of capital for the investors but also results in the promotion of ESG and adopting ESG compliant policies.

Similarly, many other studies have shown evidence supporting the negative relationship between ESG and the cost of capital, e.g., Chava (2014) found that high ESG firms have a lower cost of capital and Ng & Rezaee (2015) found that the firm´s high environmental and governance performance leads to a lower cost of capital. Additionally, Breuer et al. (2018) found the same negative relationship between the ESG performance of companies and firm´s

cost of capital given that the investor´s protection in that specific country of investment is strong. Thus, all these studies aim towards a lower cost of capital for the firms with a higher ESG score. This can easily be linked with a greater firm value for the firms with strong ESG performance and thus increasing the shareholder´s/investor´s wealth. However, this can be negatively interpreted as well in terms of stock returns as the high valuation of the firms leads to low stock returns as opposed to the stock with low valuation than fundamentals which can be seen in most sin stocks that the investors avoid due to negative screening.

In addition to the effect of ESG on the firm´s value via its cost of capital, ESG affects the firm value and shareholder´s wealth by impacting various other corporate finance factors such as revenue, growth, return on assets, return on equity, profitability, and more. According to Gillian et al. (2021) the way ESG creates firm value can be defined into two categories. First is by increasing the shareholder wealth, the firm value can be created. This shareholder wealth can be increased by the reduction in the cost of capital as discussed in detail or by increasing the cash flows of the firm which is achieved by good company reputation among customers and higher productivity by employees due to better ESG performance of the company. Second, by maximizing the shareholder´s utility (in case the firm has a high ESG score, the shareholders will value the ESG performance of the companies in addition to the cashflows it produces, thus leading to a high utility even if the firm has same cashflows as an irresponsible firm), the high ESG scores can create the firm value.

Further to explore the positive relationship between ESG and financial performance of the firms, Ferrell et al. (2016) found that the effects of negative relationship between managerial behavior and firm value are reduced by the high ESG ratings. Additionally, Iliev and Roth (2020) saw positive improvements in various profitability factors because of director-driven firm´s ESG performance improvements. Concerning the stock returns, many researchers found a positive relationship between firm value and ESG score but a reduced stock returns for those firms with high value. Hong and Kacperczyk (2009) found that the stocks with low ESG scores (sin-stocks) have low valuation, but high stock returns as opposed to the stocks with high ESG scores.

Moreover, Bolton and Kacperczyk (2020) found a direct negative relationship between CO2 emissions and stocks returns and argued that the firms with low CO2 emissions have low stocks returns were also conclude that such firms have low cost of capital. However, some studies conclude positive effects of ESG performance on the firm value through a positive relationship

with the stock returns. Edmans (2011) concludes that the ESG performance creates firm value and that ESG and stock returns are positively related meaning increase in ESG performance leads to high stock returns. However, he concludes that this is due to mispricing of the intangibles and that these high stock returns diminish as the mispricing diminishes. Cornett et al. (2016) conducted their analysis on the US banks and found that ESG scores are positively related to the return on equity. Statman & Glushkov (2009) did a similar analysis on the US firms to what Humphrey et al. (2012) did for the UK firms. They found a positive relation between the ESG scores of US firm portfolio and the firms' financial performance in the portfolio, which opposes the results of Humphrey et al. (2012).

Empirically, a great number of studies have tried to explore the question of how ESG performance relates to firm performance and have found no relationship or inconclusive relationship. Friede et al. (2015) sources more than 2000 studies and concludes based on their meta-analysis of their literature that "Roughly 90% of studies find a non-negative ESG & CFP (Corporate financial performance) relation, however, most studies report positive findings." According to the analysis of various studies by Gillian et al. (2021) on the relationship between firm´s financial performance and ESG, mixed results were shown with both positive and negative relationship between ESG and various financial performance factors such as ROE, ROA, FCF, stock returns, and more, with some studies even showing no relationship.

Hsu et al. (2018) conclude that in terms of long-term profitability, the environmental choices by the state-owned firms are not significant to the shareholder value. Humphrey et al. (2012) focused on the firms in the UK and concludes that "investors and managers are able to implement a corporate social performance (CSP) investment or business strategy without incurring any significant financial cost (or benefit) in terms of risk or return."

In addition to these positive and neutral relationships between ESG and corporate finance factors of companies, there are many studies which have found a negative relationship between ESG and financial performance of the companies.

2.5.2 Negative relationship

"Doing well by doing good," a well-known notion, contends that ESG is financially beneficial, however, even if the motivations for kindness are non-profit in nature, variation in business financial restrictions might lead to a false link between profits and goodness. Hong et al. (2012) demonstrate that financial limitations are in fact a significant determinant of corporate goodness using two identification methodologies. First, during the Internet bubble, limited

enterprises temporarily relaxed their restraints, and as a result, their goodness improved in comparison to their unrestrained rivals. Second, compared to its less constrained equivalent, a constrained firm's sustainability score rises more with its unique equity valuation and lower cost of capital. In conclusion, when businesses succeed, they are more likely to prosper (Gillan et al, 2021).

While the methodologies used in other articles may vary, the basic conclusions are often similar. Di Giuli and Kostovetsky (2014) investigate the links between ESG-scores over a period of three years with the variations in revenue growth in the same period. No significant connection is discovered. They also find a significant negative effect between ROA or stock returns and ESG-scores in the same period. Additionally, they draw the conclusion that when companies improve their ESG practices, their stock will underperform, and their ROA will decline in the future. They believe that this underperformance is "a direct market reaction to ESG with a lag due to investors' delayed learning of CSR policy changes".

According to another study by Gillan et al, (2021), the agency conflicts increased during the financial crisis, and the consequences of high ESG investment led to bigger value reductions for higher-scoring ESG firms.

Results from two other studies raise concerns regarding the advantages of ESG initiatives for all businesses and across all ESG spectrums. N G & Rezaee (2015) show that the stock market reacts negatively to these ESG contributions, indicating that investors do not appreciate this kind of ESG activities. Servaes and Tamayo (2013) find a dependent relationship between ESG characteristics and company value for the firms. They concluded that ESG investments either damage or have no impact on the value of firms that do not advertise their work, and ESG initiatives only help companies that advertise (Gillan et al. 2021).

3. Data & Methodology

3.1 Research Methodology

To explore the relationship between ESG and corporate financial performance of the companies, this study conducts a multiple ordinary least squared (OLS) regression analysis. The primary purpose of this analysis was to establish a relationship between financial performance and ESG scores and create a model that produces estimated dependent variables (financial performance) that closely approximate the observed data for each company within the sample. The empirical model in this study states that the corporate performance is a function

of ESG performance of the companies. A potential relationship between ESG scores and financial performance may be influenced by variables other than ESG, therefore, the empirical model includes other variables that could influence corporate performance. For this reason, this study has used Firm´s size (Total Revenues), the Country of incorporation, and Years as the period for the analysis as control variables. Following are the regression models:

$$\textbf{Performance}_{it} = \alpha + \beta_1 \textbf{ESG}_{it} + \beta_2 \textbf{log(Size}_{it}) + \beta_3 \textbf{Country}_{it} + \beta_4 \textbf{Years}_{it} + \varepsilon_{it} \quad (1)$$

$$\textbf{Performance}_{it} = \alpha + \beta_1 \textbf{E}_{it} + \beta_2 \textbf{S}_{it} + + \beta_3 \textbf{G}_{it} + \beta_4 \textbf{log(Size}_{it}) + \beta_5 \textbf{Country}_{it} + \beta_6 \textbf{Years}_{it} + \varepsilon_{it} \quad (2)$$

$$\textbf{Performance}_{it} = \alpha + \beta_1 \textbf{ESGC}_{it} + \beta_2 \textbf{log(Size}_{it}) + \beta_3 \textbf{Country}_{it} + \beta_4 \textbf{Years}_{it} + \varepsilon_{it} \quad (3)$$

Performance is the dependent variable whose value will depend on ESG, Firm size, Country of Incorporation, and Years. α is the constant term in the model where β is the value of coefficient which will explain the relationship between the Performance and ESG, Size, Country, and Years. ε is the error term in the model. Detailed regression models can be found in Appendix B.

The central argument is whether ***"firms with higher ESG scores perform better financially than those with lower ESG scores"*** which could be termed as our research hypothesis as well. To study this relationship, this study focuses on various performance measures as dependent variables, ESG scores as independent variables (variable of interest/proxies), and control variable (including fixed effects).

3.1.1 Regression Variables

Dependent Variables	
Δ Revenue	Percentage change in revenues
ROA	Net Income / Total Assets
ROE	Net Income / Total Equity
Stock Return	Percentage change in stock price
WACC	Weighted average cost of capital
Independent Variables	
ESG	ESG combined score
E	Environment score
S	Social score
G	Governance score
ESGC	ESG Controversy score
Control & Fixed Effects	
Size	Firm size in Revenues
Denmark	Dummy variable for country of incoporation Denmark
Finland	Dummy variable for country of incoporation Finland
Norway	Dummy variable for country of incoporation Norway
Sweden	Dummy variable for country of incoporation Sweden
X2022	Dummy variable for the year 2022
X2021	Dummy variable for the year 2021
X2020	Dummy variable for the year 2020
X2019	Dummy variable for the year 2019
X2018	Dummy variable for the year 2018
X2017	Dummy variable for the year 2017
X2016	Dummy variable for the year 2016

Table 1 Regression variable descriptions.

*Note: The table above shows the description of the regression variables used in the empirical analysis. Dependent variables are the performance measures where independent variables are the proxies. The control variables are used to check for any additional variable impact on the performance measures. ΔRevenue is percentage change in revenues which is calculated by: (Revenue at time t – revenue at time t-1)/Revenue at time t-1. Return on assets is calculated by: Net Income/Total Assets. Similarly, the Return on Equity is calculated using the formula: Net Income/Total Equity. Stock return is the percentage change in the stock prices calculated by: (Stock price at time t – Stock price at time t-1)/Stock price at time t-1. In stock price, most recent prior tradable day with trading activity is used provided the last tradable day for the instrument is within 378 completed calendar days (54 weeks). The data for all variables including WACC is collected from Refinitiv except independent variables which is gathered from both Refinitiv and MSCI. WACC is calculated by using a general WACC calculation formula: WACC Formula = (E/V * Ke) + (D/V) * Kd * (1 – Tax rate) where E is value of equity, D is value of debt, and V is the sum of E and D, Ke is the cost of equity and Kd is the cost of debt which are calculated separately. Kd is the interest that the firm pays on its debt where Ke is calculated using CAPM: Cost of Equity = Risk-Free Rate of Return + Beta * (Market Rate of Return – Risk-free Rate of Return). Size is the control variable representing firm size. Firm revenues are used to represent each firm´s*

size. Generally, WACC is ex-ante measure where Refinitiv does not explicitly makes the information about the nature and calculation of WACC public. ESG represent the score of E, S, and G all combined out of 100 in Refinitiv where out of 10 in MSCI. E, S, and G represent separate score out of 100 and out of 10 each in Refinitiv and MSCI respectively. Denmark, Finland, Norway, and Sweden are the dummy variables for countries in which all the firms are incorporated. X2022, X2021, X2020, X2019, X2018, X2017, X2016 are the dummy variables represent the years of which the data we are using. In the regression, each dummy variable is represented by 1 in numerical terms where the absence of the dummy variable is represented by 0. The data for each variable goes back 7 years from 2016 to 2022.

The Table 1 above shows the description of performance variables, ESG proxies (dependent variables), control variable, and fixed effects. The detailed description for each variable is as follows:

Performance measures

We have selected five different measures based on previous studies in the literature to serve as dependent that reflect the financial performance of the companies. The variables are the following: ⊿Revenue, Return on Asset (ROA), Return on Equity (ROE), Stock Return, and Weighted Average Cost of Capital (WACC) as mentioned in Table 1. ⊿Revenue is the percentage change in revenue which is used to represent the growth in the firms. ROE and ROA are both financial ratios which measure the profitability of a company. Refintiv collected the data about firm´s revenues from the company´s financial statements and calculated the returns (ROA and ROE) using the data collected from Company´s Profit and Loss statement, Balance sheet, Statement of Cash Flow, Segment data, Operating Metrics, and the derived data items that are the output of common measures for the data analysis as mentioned in section 3.2. The annual change in stock price (stock return) was added as a dependent variable as well because based on the evidence from previous studies, this variable had interesting insights as some studies showed negative relationship between ESG and stock return which led to a lower cost of capital where other studies showed a positive relationship between ESG and stock return. The stock price from Refinitiv were the latest available year end closing stock price using which we calculated the stock returns for the last 7 years. Refinitiv collects the stock prices from the stock exchanges and indices around the world as mentioned in section 3.2. Our last dependent variable is the weighted average cost of capital (WACC) sourced from Refinitiv as well. Refinitiv draw on their estimation and calculation methodologies and does not explain how WACC is calculated, however, WACC is calculated by using a general WACC calculation formula: WACC Formula = (E/V * Ke) + (D/V) * Kd * (1 – Tax rate) where E is value of equity, D is value of debt, and V is the sum of E and D, Ke is the cost of equity and Kd is the cost of debt which are calculated separately. Kd is the interest that the firm pays on its debt

where Ke is calculated using CAPM: Cost of Equity = Risk-Free Rate of Return + Beta * (Market Rate of Return – Risk-free Rate of Return). Firm revenues are used to represent each firm´s size. Generally, WACC is ex-ante measure where Refinitiv does not explicitly makes the information about the nature and calculation of WACC public. This variable is important to gain insights into the impact of ESG factors on a company's cost of capital, which can in turn affect its financial performance and firm value. Thus, WACC itself is not a performance factor but it affects other performance factors within a firm. For instance, companies that prioritize ESG factors may face different costs of financing than those that do not, due to differences in risk perception and demand for socially responsible investments which could impact a firm´s value. Additionally, WACC is important in terms of analyzing an investment in terms of required or expected return. A high WACC means that firm is facing a higher risk in investor´s eyes and cost of financing is high which could make it more difficult for the firm to generate higher returns than cost of capital which could impact the overall corporate performance. All the dependent variables are defined in Table 2 above.

Independent variables

The ESG score and its components serve as the study's primary variables, and hence they are included in the regressions as independent variables. We divided our regressions into three groups, the first one is the combined score for the three ESG factors: environmental, social, and governance, the secund is the environmental (E), social (S), and governance (G) scores that are all separate from one another and the third group is the ESG controversies score. Data from the Refinitiv data platform and MSCI is used to compile all ratings.

Control variable and fixed effects

We use the firm size as a control variable that has been chosen to be consistent with past research, such as Ahlklo & Lind (2018). We sourced firm size data from the data platform Refinitiv using the reported revenues for our sample of firms. For the fixed effects, we added Years between 2016 and 2022 (our sample period), and the country variables as dummy variables to see the impact of country of incorporation on the firms´ corporate performance.

After obtaining the necessary data, various statistical techniques and tests were employed to assess the regression model and the abovementioned assumptions. A detailed explanation of these tests can be found in the section (statistical tests) below. To manage the data and perform

statistical analyses, we utilized the R programming language, in conjunction with several specific R packages.

3.1.2 Statistical tests

Multiple regression analysis is predicated upon the fulfillment of several assumptions. We evaluated the model's adherence to the following premises: residual normality, homoskedasticity, and multicollinearity. It should be noted, however, that even if the results are highly precise, a regression analysis model cannot establish a causal link between different variables (Studenmund 2014). Therefore, it is critical to ensure that such assumptions are met as these assumptions are critical for ensuring that the analysis's results are valid and reliable.

The assumption of normality of residuals refers to the distribution of residuals, which should be normally distributed. This assumption is critical because it ensures the model's statistical tests are valid and reliable (Jeong & Jung, 2016). We check the normality using the Shapiro-Wilk test. The p-values are highly significant, suggesting absence of normality (normal distribution) in the data. This can also be observed in the Appendix A5.1. the results of the regression could have been impacted by the violation of this assumption.

The level of variability in the residuals across different values of the predictor variables is referred to as homoskedasticity, or the equal variance assumption. It is critical to ensure that this variability is consistent across all predictor variable values, as heteroskedasticity can lead to biased estimates and conclusions (Jeong & Jung, 2016). We check the homoscedasticity using Breusch-Pagan test. The p-values of all the residuals are insignificant, suggesting the absence of heteroskedasticity as it can be seen in Appendix A5.1.

Lastly, the intercorrelations between predictor variables are referred to as multicollinearity. High levels of multicollinearity can result in unreliable regression coefficients, which can affect model accuracy (Jeong & Jung, 2016). We have checked the multicollinearity in the model using variance-inflation-factor (VIF) test. The results of the tests cannot be determined due to the presence of a perfectly correlated variable Sweden which was determined using the Alias test in R as it can be seen in Appendix A5.1. To cover for this, we have removed the dummy variable Sweden from the regressions and ran the regressions again along with VIF test. The test without Sweden regressions shows no signs of multicollinearity which can be seen in Appendix A5.2. Similarly, for the variable ´year´ we have excluded the year 2016 (X2016 variable).

3.2 Data

Refinitiv is the company which provides a complete range of financial data about the companies ranging from all the chosen financial factors to stock market performance and ESG as well. For the analysis, the data for the performance measures is taken from Refinitiv. They collected the data about firm´s revenues from the company´s financial statements and calculated the returns (ROA and ROE) using the data collected from Company´s Profit and Loss statement, Balance sheet, Statement of Cash Flow, Segment data, Operating Metrics, and the derived data items that are the output of common measures for the data analysis.

This study focuses on the Nordics market for our analysis in which we have chosen the stocks from Sweden, Finland, Norway, and Denmark. The reason for choosing the Nordics market is because there has been little research done on the relationship between ESG and financial performance of Nordic companies. Additionally, it is interesting to see how the companies in the greenest most ESG active region are doing financially in relation to ESG performance and whether this ESG/green shift making things good/profitable for these companies or is it just a way the companies get a good reputation in the public and not generate any financial results.

The sample includes all companies that are part of the following indices:

- OMX Stockholm All Shares (OMXSPI)
- OMX Copenhagen All shares (OMXCPI)
- OMX Helsinki All shares (OMXHPI)
- Oslo Børs All-share Index (OSEAX)

Note: the entities in parenthesis are the abbreviations of the stock indices mentioned to their left.

In the sample, we have selected the companies which had the ESG combined scores, E, S, and G separate scores, and ESG controversy scores and the data for the independent variables such as Revenue growth, ROA, ROE, Stock return, and WACC. The reason for selecting these variables is to see the impact of ESG on different corporate performance indicators which in this research are growth, profitability, stock performance, and risk. Additionally, we have chosen a period of 7 years from 2016 to 2022 for the analysis. The reason for not choosing a larger time frame was to accommodate as many companies as possible and increase the sample size. However, we did not limit the sample to a specific industry, firm size, or any other differentiating and exclusive factors because of which the sample could have been reduced even more. Thus, we have companies from various types of industries such as Energy, Banking

and Finance, Alcohol and Brewery, Electronics and Appliances, Engineering, Fertilizers, and more. Based on this, we now have the companies from varying industries and the data which dates to 2015, a total of 7 years and following are the number of companies within each variable when matched with each ESG indicator:

	Δ Revenue	ROA	ROE	Stock Return	WACC
Refinitiv					
ESG	109	63	63	109	109
E	111	67	67	111	111
S	111	67	67	111	111
G	111	67	67	111	111
ESGC	118	69	79	116	114
MSCI					
ESG	185	96	124	179	182
E	185	96	124	179	182
S	185	96	124	179	182
G	185	96	124	179	182
ESGC	185	96	124	179	182

Table 2 Summary of sample size.

*Note: The above table shows the number of companies in the sample pool that is used to evaluate the relationship between ESG proxies and performance measures. ΔRevenue, ROA, ROE, Stock Return, and WACC are performance measures (dependent variables) where ESG, E, S, G, and ESGC are the proxies (Independent variables). ΔRevenue is percentage change in revenue which is calculated by: (Revenue at time t – revenue at time t-1)/Revenue at time t-1. Return on assets is calculated by: Net Income/Total Assets. Similarly, the Return on Equity is calculated using the formula: Net Income/Total Equity. Stock return is the percentage change in the stock prices calculated by: (Stock price at time t – Stock price at time t-1)/Stock price at time t-1. In stock price, most recent prior tradable day with trading activity is used provided the last tradable day for the instrument is within 378 completed calendar days (54 weeks). The data for all variables including WACC is collected from Refinitiv except independent variables which is gathered from both Refinitiv and MSCI. WACC is calculated by using a general WACC calculation formula: WACC Formula = (E/V * Ke) + (D/V) * Kd * (1 – Tax rate) where E is value of equity, D is value of debt, and V is the sum of E and D, Ke is the cost of equity and Kd is the cost of debt which are calculated separately. Kd is the interest that the firm pays on its debt where Ke is calculated using CAPM: Cost of Equity = Risk-Free Rate of Return + Beta * (Market Rate of Return – Risk-free Rate of Return). Firm revenues are used to represent each firm´s size. Generally, WACC is ex-ante measure where Refinitiv does not explicitly makes the information about the nature and calculation of WACC public. ESG represent the score of E, S, and G all combined out of 100 in Refinitiv where out of 10 in MSCI. E, S, and G represent separate score out of 100 and out of 10 each in Refinitiv and MSCI respectively. The data for each variable goes back 7 years from 2016 to 2022, however, the number of companies are different in some variables than the others due to matching/different no. of companies in different datasets, for example: the data for ESG for all companies is same but the data for the number of companies in Revenue is different than the one available for ROA as the data for the Total assets for some companies is not available on Refinitiv. Similarly, the number of companies in the dataset for ESG is different from E, S, and G and ESGC, and when the data is matched with the performance measures, the number of companies is changed in Refinitiv*

dataset. In MSCI dataset, the number of companies is same in all proxies but different in performance measures that is why the different number of companies. The data is matched by: the maximum number of companies are taken within each performance measure in the last 7 years whose complete 7 years data is available then it is matched with the ESG rating of the same company. If there is any data missing for any year in performance measure or the ESG rating of a company, that company is then excluded. This is done to get a reasonable period while not reducing the size of the sample to incredibly low level.

Table 2 above includes the number of firms used in the sample for regression after matching. All these companies are from 4 countries in the Nordics: Denmark, Finland, Norway, and Sweden. From the numbers, it can be seen clearly that the overall, MSCI has a bigger pool of companies than Refinitiv with the highest number at 185 firms and lowest of 96 firms after matching as opposed to 118 highest and 63 lowest number of firms in Refinitiv dataset after matching. General understanding is that the bigger the pool of sample, the better the sample and more concrete the results are. Therefore, in the analysis, without forming any biases, it can be said that the results of MSCI are more robust than Refinitiv due to a bigger sample pool. Appendix C provides a complete list of stocks in Refinitiv dataset.

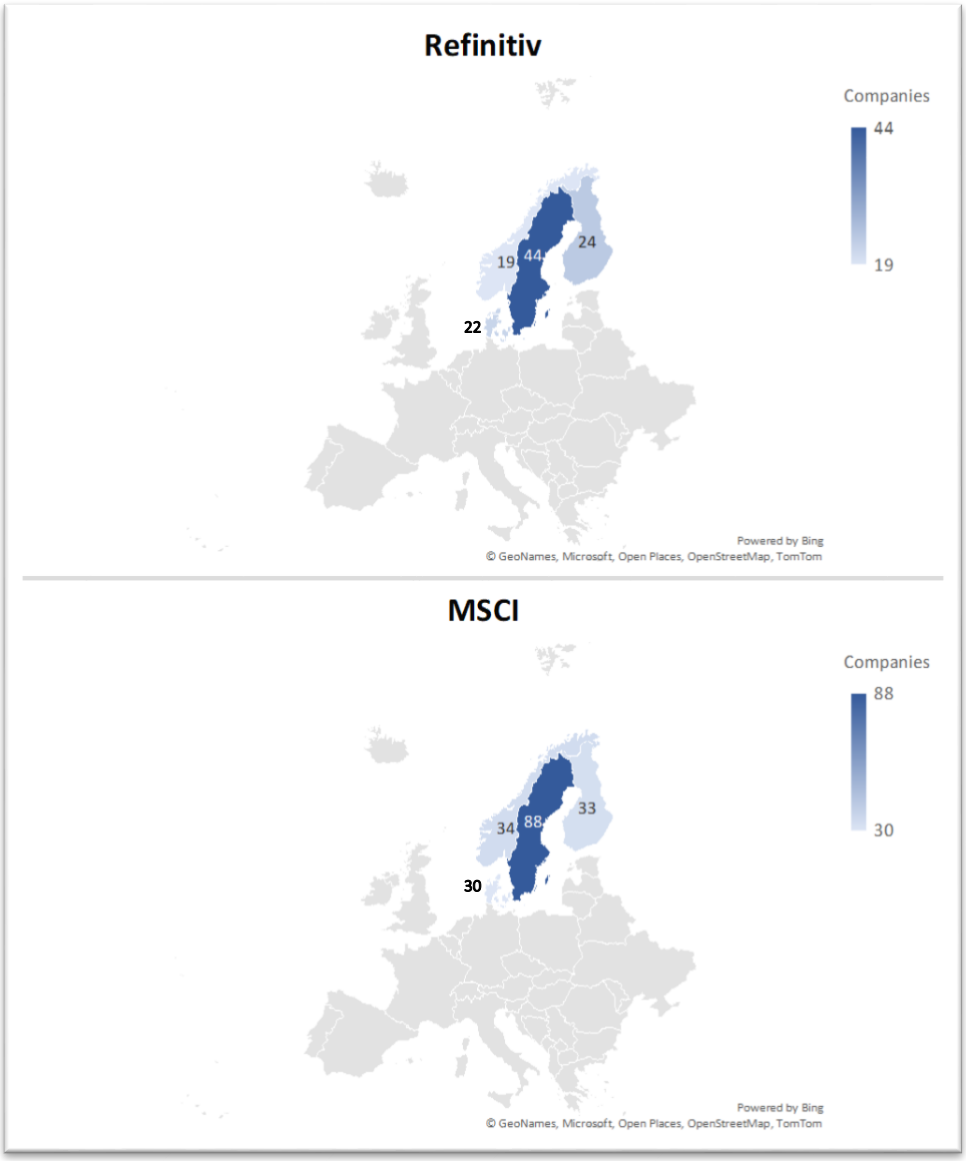

Figure 1 Country of incorporation geographical map.

Note: The figure above shows a geographical map of Europe with a highlighted Nordics region in a blue color pellet. The focus region for this analysis is in blue. The map indicates the number of companies incorporated in each Nordic region segregated between Refinitiv and MSCI datasets. The data used in this mapping is the maximum number of companies pool in MSCI dataset which is 185 companies and 118 companies in Refinitiv dataset as shown in Table 2. The legend shows the highest and lowest number of companies incorporated in one region as in Refinitiv, the maximum companies incorporated in one region are 44 where the number is 88 in MSCI. On the other hand, the minimum number of companies incorporated in one region in Refinitiv is 19 where in MSCI dataset, the number is 30.

Figure 1 above shows the number of companies incorporated in each Nordics region in each Refinitiv and MSCI dataset. In Refinitiv dataset, the number of companies incorporated are as follows: 19 in Norway, 44 in Sweden, 24 in Finland, and 22 in Denmark. On the other hand, in MSCI dataset, 34 are incorporated in Norway, 88 in Sweden, 33 in Finland, and 30 in Denmark. In both datasets, Sweden is the region with the most companies incorporated where

it is the region with the highest correlation with other regions as it can be seen in Appendix A5.1. On the other hand, Denmark is the region with one of the least incorporated companies where it is the most beneficial region for the financial performance of the companies as it can be seen in appendices A1.1 to A2.3.

3.2.1 Descriptive Statistics

The data we have chosen aims to study specific aspects of corporate finance performance of a company. The revenue growth aims to capture the growth of the company where the WACC aims to capture the firm´s risk and ultimately the impact on the firm value. Stock return is chosen to study the return for the investors within a company. Similarly, ROA and ROE are chosen to capture the profitability for the company´s invested equity and assets.

	Min	q25	Mean	Median	q75	Max	SD
Refinitiv							
ESG	8,43	50,82	61,12	62,73	73,91	93,23	16,52
ESGC	1,47	100,00	89,69	100,00	100,00	100,00	22,90
E	0,00	49,44	61,67	65,78	79,58	98,25	22,80
S	4,06	57,27	67,56	71,85	81,90	96,39	19,05
G	3,18	40,11	57,84	58,22	76,80	96,48	21,89
MSCI							
ESG	1,50	5,80	6,98	7,10	8,30	10,00	1,81
ESGC	2,00	10,00	9,77	10,00	10,00	10,00	1,13
E	0,00	4,00	5,51	5,30	6,70	10,00	2,05
S	0,60	4,20	5,28	5,20	6,30	10,00	1,61
G	1,90	5,70	6,45	6,50	7,30	9,40	1,26
Performance measures							
Δ Revenue	-1,00	-0,04	0,69	0,08	0,23	1596,93	19,71
ROA	0,00040	0,03	0,08	0,06	0,10	0,53	0,08
ROE	0,00090	0,10	0,18	0,15	0,22	0,93	0,12
Stock Return	-1,00	-0,23	0,13	0,02	0,29	73,63	1,18
WACC	0,00048	0,04	0,06	0,06	0,08	0,60	0,03
Size	0	30	9002	391	3187	781542	34717

Table 3 Descriptive statistics of Regression Variables.

Note: The table shows the descriptive statistics of Performance measures which are Revenue change, ROA, ROE, WACC, and Stock return and the proxies which are ESG, E, S, G, and ESGC. Revenue change, ROA, ROE, WACC, and Stock return are all in absolute percentages. Size is in million NOK. In Refinitiv, ESG, ESGC, E, S, G are points between 0 and 100. In MSCI, ESG, ESGC, E, S, G are points between 0 and 10. ΔRevenue is percentage change in revenues which is calculated by: (Revenue at time t – revenue at time t-1)/Revenue at time t-1. Return on assets is calculated by: Net Income/Total Assets. Similarly, the Return on Equity is calculated using the formula: Net Income/Total Equity. Stock return is the percentage change in the stock prices calculated by: (Stock price at time t – Stock price at time t-1)/Stock price at time t-1. In stock price, most recent prior tradable day with trading activity is used provided the last tradable day for the instrument is within 378 completed calendar

*days (54 weeks). The data for all variables including WACC is collected from Refinitiv except independent variables which is gathered from both Refinitiv and MSCI. WACC is calculated by using a general WACC calculation formula: WACC Formula = (E/V * Ke) + (D/V) * Kd * (1 – Tax rate) where E is value of equity, D is value of debt, and V is the sum of E and D, Ke is the cost of equity and Kd is the cost of debt which are calculated separately. Kd is the interest that the firm pays on its debt where Ke is calculated using CAPM: Cost of Equity = Risk-Free Rate of Return + Beta * (Market Rate of Return – Risk-free Rate of Return). Firm revenues are used to represent each firm´s size. Generally, WACC is ex-ante measure where Refinitiv does not explicitly makes the information about the nature and calculation of WACC public. ESG represent the score of E, S, and G all combined out of 100 in Refinitiv where out of 10 in MSCI. E, S, and G represent separate score out of 100 and out of 10 each in Refinitiv and MSCI respectively. Min and Max variables indicate the minimum and the maximum value in that variable. The below 25% and 75% values are separated by q25 and q75 respectively which are 25th and 75th quartiles. SD indicates the standard deviation in the data which represents the deviation of the values from the mean. Mean is calculated by taking the average of data: Sum of all values/number of values whereas median is the mid value within each variable. The data for these statistics goes back to 7 years from 2016 to 2022. The fixed effects country and years are not included. Additionally, the data used is prior to processing and matching for both MSCI and Refinitiv.*

Table 3 above provides descriptive statistics for all performance measures mentioned above and the proxies; ESG, E, S, G, and ESGC. The maximum ESG rating in Refinitiv dataset is 93.23 as compared to 10 in MSCI on the other hand the minimum for Refinitiv is lower than MSCI at 8.43 and 1.50 respectively if it is considered in the multiples of 10. Same is the case when the E, S, and G ratings are considered separately, MSCI ratings are more aggressive than Refinitiv and has a lower standard deviation than Refinitiv as well. Overall, companies are rated relatively low on governance in Refinitiv and if we compare it with MSCI, it is still lower in the multiples of 10. This can indicate that, in terms of ESG, Refinitiv rates companies conservatively than MSCI and that higher deviations from mean and variations in the ratings can be seen in Refinitiv´s dataset as compared to MSCI. In terms of ESGC, both Refinitiv and MSCI give higher ratings to companies.

When performance measures are considered, revenue change stock return and firm size have biggest gap between maximum and minimum values with revenue change and stock return falling to negative percentages and the firm size falling all the way to 0. On the other hand, maximum of revenue change goes as high as almost 1600% and firm size going as high as 781,542 million NOK. The reason behind such big differences can be due to the focus of the research on the companies from various industries where each industry could have its own benchmarks for each of these performance measures, therefore, leading to a wide variety and diversity in the data. This could also indicate that the data is not normally distributed which is confirmed by the statistical tests done on the regression models which indicates absence of normality which could have major implications on the regression results.

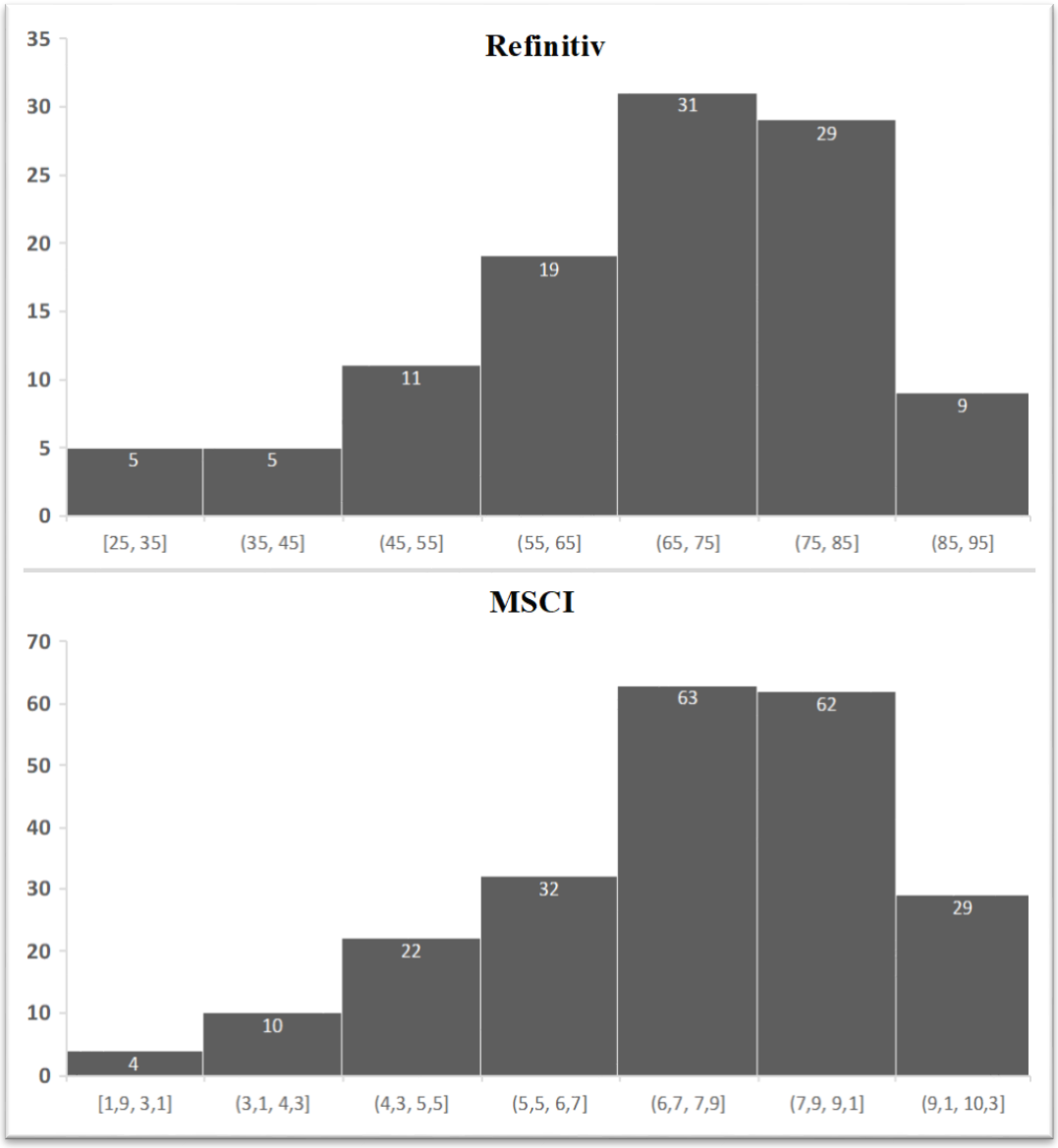

Figure 2 ESG rated no. of companies.

Note: The figure above shows the description of the number of companies rated by Refinitiv and MSCI for ESG. The data used for this graph is the ESG combined ratings for the year 2022 for all the companies in the Nordics before matching with any performance measures hence a higher number of firms in MSCI than in Table 2. Refinitiv rates the companies out of 100 where MSCI rates the companies out of 10. In the figure, the x-axis shows the ratings, more specifically, the groups of ratings. There are 7 groups of ratings for both Refinitiv and MSCI. In the figure, the cutoff for the Refinitiv rating is 95 and for the MSCI is 10.3 which is only due to the integrals. No company was missed out of Refinitiv rankings as no company has received higher than 95 or perfect rating, and no company has received a rating of higher than 10 in MSCI rankings. Similarly, the start of the rantings is 25 and 1.9 for Refinitiv and MSCI respectively. This is again because of integrals and that no company has received a ranking lower than 25 or 1.9 in Refinitiv and MSCI respectively. On the y-axis of the figure are the number of companies. The number within each bar is the number of companies within that corresponding group of rating. For example: in Refinitiv ESG ranting, there are 31 companies who have ESG rating between 65 and 75 as it is shown in the highest bar in the figure shown in the Refinitiv section of the figure.

The above Figure 2 shows the total number of ESG rated firms in the year 2022. The Figure 2 clearly shows the number of firms in MSCI (222 firms) is higher than that of the Refinitiv (109 firms) before matching, indicating a bigger sample pool in MSCI database and this can also be seen in Table 2 as the maximum number of firms in MSCI dataset is 185 as opposed to 118 maximum companies in Refinitiv after matching. However, if we look at the distribution of the graph, the distribution of the companies is clearly visible. We can see that the graph is more inclined towards the right meaning that there are more companies rated higher than 50 and 5 points in Refinitiv and MSCI respectively than below 50 or 5 in Refinitiv and MSCI respectively. Interestingly, 79 firms out of 109 firms in Refinitiv are rated between 55 and 85 points indicating 72% of total number of firms. Similarly, MSCI has rated 157 out of 222 between 5.5 and 9.1 points indicating 71% of the total number of firms. This can give an indication that either Refinitiv and MSCI both are giving high ratings to the firms or that the firms are indeed adopting ESG policies aggressively and are getting rated high. On the other hand, as it was seen in Table 3, Figure 1 also shows that the MSCI rates the firms more aggressively than Refinitiv and gives them a higher rating within each group of rating when Refinitiv´s rating is considered as a multiple of 10.

Refinitiv

	ESG	E	S	G	ESGC	ΔRevenue	Size	ROA	ROE	Stock Return	WACC
ESG	**1.0000**	0.7324	0.7940	0.6367	0.1339	´-0.0144	0.2119	0.0948	´-0.0432	´-0.0289	´-0.0477
E		**1.0000**	0.6494	0.3475	´-0.1898	´-0.0041	0.2953	0.0166	´-0.1030	´-0.0285	´-0.0405
S			**1.0000**	0.3907	´-0.2056	´-0.0535	0.2894	0.2283	0.0578	´-0.0349	´-0.0683
G				**1.0000**	´-0.1585	0.0403	0.2923	´-0.0848	´-0.1210	´-0.0444	´-0.0055
ESGC					**1.0000**	0.0058	´-0.3893	0.0606	0.0035	0.0364	´-0.0428
ΔRevenue						**1.0000**	0.1944	0.0319	0.0163	´-0.0127	0.0516
Size							**1.0000**	´-0.0386	0.0730	0.0184	0.0016
ROA								**1.0000**	0.8501	0.0353	0.1733
ROE									**1.0000**	0.0351	0.0712
Stock Return										**1.0000**	´-0.0188
WACC											**1.0000**

MSCI

	ESG	E	S	G	ESGC	ΔRevenue	Size	ROA	ROE	Stock Return	WACC
ESG	**1.0000**	0.2237	0.5452	0.3035	´-0.1140	´-0.0540	0.2014	0.1403	0.0352	´-0.0449	´-0.0872
E		**1.0000**	0.0635	´-0.0454	0.0257	´-0.0158	0.0931	´-0.0226	´-0.0070	´-0.0289	´-0.01278
S			**1.0000**	´-0.0937	´-0.1473	´-0.0367	0.0865	0.0664	´-0.0144	0.0184	´-0.0035
G				**1.0000**	0.0545	´-0.0020	0.0148	´-0.0703	´-0.0045	´-0.0760	´-0.1064
ESGC					**1.0000**	0.0040	´-0.3960	0.0637	0.0918	´-0.0195	´-0.0373
ΔRevenue						**1.0000**	0.0001	0.0694	0.0687	´-0.0292	0.0706
Size							**1.0000**	´-0.0157	0.0744	0.0033	0.0129
ROA								**1.0000**	0.8348	0.0902	0.2126
ROE									**1.0000**	0.0989	0.0850
Stock Return										**1.0000**	´-0.0585
WACC											**1.0000**

Table 4 Correlation Matrix of Regression Variables

*Note: The above table shows the correlation matrix of the ESG proxies – independent variables (ESG, E, S, G, ESGC, Size) and performance measures – dependent variables (Δ Revenue, size which is firm size, return on assets ROA, return on equity ROE, Stock return, WACC). ΔRevenue is percentage change in revenues which is calculated by: (Revenue at time t – revenue at time t-1)/Revenue at time t-1. Return on assets is calculated by: Net Income/Total Assets. Similarly, the Return on Equity is calculated using the formula: Net Income/Total Equity. Stock return is the percentage change in the stock prices calculated by: (Stock price at time t – Stock price at time t-1)/Stock price at time t-1. In stock price, most recent prior tradable day with trading activity is used provided the last tradable day for the instrument is within 378 completed calendar days (54 weeks). The data for all variables including WACC is collected from Refinitiv except ESG proxy variables which is gathered from both Refinitiv and MSCI. WACC is calculated by using a general WACC calculation formula: WACC Formula = (E/V * Ke) + (D/V) * Kd * (1 – Tax rate) where E is value of equity, D is value of debt, and V is the sum of E and D, Ke is the cost of equity and Kd is the cost of debt which are calculated separately. Kd is the interest that the firm pays on its debt where Ke is calculated using CAPM: Cost of Equity = Risk-Free Rate of Return + Beta * (Market Rate of Return – Risk-free Rate of Return). Firm revenues are used to represent each firm´s size. Generally, WACC is ex-ante measure where Refinitiv does not explicitly makes the information about the nature and calculation of WACC public. ESG represent the score of E, S, and G all combined out of 100 in Refinitiv where out of 10 in MSCI. E, S, and G represent separate score out of 100 and out of 10 each in Refinitiv and MSCI respectively. Same is the case with ESGC. The data used in formulation of this matrix is the ESG proxies, and performance measures data of the companies in the year 2022. The total number of companies used in this data is the same as the maximum number of companies in the Table 2 as 118 companies in Refinitiv dataset and 185 companies in MSCI dataset. The data used is after matching data and all the missing values for the companies that are not present in certain*

matched variables is filled with NAs which could impact the correlations. The table above is segregated between Refinitiv and MSCI due to different ratings provided by both sources and different number of companies in both datasets.

Table 4 displays the correlation among the independent variables (ESG, E, S, G, ESGC, Size) and the dependent variables (Δ Revenue, ROA, ROE, Stock return, WACC) in the regression analysis. The observed values indicate that the correlation between ESG proxies and performance measures is relatively weak, suggesting no significant concerns for the regression analysis. Notably, intriguing patterns emerge, consistent across both the Refinitiv and MSCI datasets.

A noteworthy finding is the negative correlation between WACC and all ESG proxies in both datasets. This implies that higher ESG ratings correspond to a lower weighted average cost of capital (WACC), indicating potential improvements in firm value and reduced risk. However, it is important to note that the degree of correlation is not substantial, thus the impact on WACC reduction is limited.

Furthermore, there is a modest negative correlation between ESG proxies and revenue changes in both Refinitiv and MSCI datasets, indicating that higher ESG ratings are associated with reduced revenues. Similarly, a consistent negative correlation exists between ESG proxies and stock returns in both datasets, suggesting that higher ESG ratings lead to lower stock returns for investors. This contradicts investor expectations regarding favorable outcomes when investing in companies with strong ESG policies.

Conversely, a consistent positive correlation is observed between ROA and ESG proxies in the Refinitiv dataset, suggesting that higher ESG ratings correspond to greater profitability. However, a negative overall yet mixed correlation between ROE and ESG proxies is evident in both Refinitiv and MSCI datasets, which challenges the profitability claims based on ROA from higher ESG ratings.

To conclude correlations, we can say that high ESG ratings are associated with reduced stock returns and revenues, but they also contribute to a lower weighted average cost of capital, increased firm value, and higher return on assets. These findings are further substantiated by the empirical results presented in Table 5 below.

4. Results & Discussion

	Δ Revenue	ROA	ROE	Stock Return	WACC
			Refinitiv		
ESG	**´-0.002****	**0.001*****	**0.0001**	**0.00005**	**´-0.0001**
Adjusted R2	0.013	0.158	0.181	0.135	0.102
Observations	763	441	441	763	763
E	**0.00001**	**´-0.0001**	**´-0.001**	**0.0003**	**0.0001**
S	**´-0.003*****	**0.001*****	**0.002*****	**0.0002**	**´-0.0001**
G	**0.001**	**´-0.001*****	**´-0.001*****	**´-0.001**	**´-0.00003**
Adjusted R2	0.025	0.220	0.217	0.136	0.101
Observations	777	469	469	777	777
ESGC	**0.001**	**´-0.00002**	**0.00004**	**0.0003**	**´-0.0001**
Adjusted R2	0.011	0.123	0.149	0.127	0.101
Observations	826	483	553	812	798
			MSCI		
ESG	**´-0.025**	**0.007*****	**0.002**	**´-0.003**	**´-0.001****
Adjusted R2	0.007	0.143	.084	0.171	0.121
E	**0.002**	**´-0.002**	**´-0.002**	**´-0.002**	**´-0.0004**
S	**´-0.030**	**0.003***	**´-0.001**	**0.003**	**0.00003**
G	**0.012**	**0.0005**	**0.001**	**´-0.012**	**´-0.002*****
Adjusted R2	0.006	0.125	0.082	0.172	0.126
ESGC	**´-0.033**	**0.00004**	**0.009****	**´-0.007**	**´-0.002*****
Adjusted R2	0.007	0.120	0.090	0.172	0.127
Observations	1,288	672	868	1,253	1,274
Size Control	Yes	Yes	Yes	Yes	Yes
Country Fixed Effect	Yes	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes

Table 5 Empirical results

Note: The above table shows the results of the empirical analysis and explores the relationship between ESG and financial factors and focuses on the impact of firm size, country of incorporation, and the period (years) on the performance factors. Additional information about specific impact of firm size, country, and years can be seen in Appendix A1& A2 along with information about basic regression in Appendix A3 & A4. Considering different datasets, the table explores the relationship for Refinitiv and MSCI. The top row shows the performance measures (Dependent variables) which are Revenue, ROA, ROE, WACC, and Stock return where the most left column shows the proxies (Independent variables) which are ESG, E, S, G, and ESGC. Revenue is percentage change in revenues which is calculated by: (Revenue at time t – revenue at time t-1)/Revenue at time t-1. Return on assets is calculated by: Net Income/Total Assets. Similarly, the Return on Equity is calculated using the formula: Net Income/Total Equity. Stock return is the percentage change in the stock prices calculated by: (Stock price at time t – Stock price at time t-1)/Stock price at time t-1. In stock price, most recent prior tradable day with trading activity is used

*provided the last tradable day for the instrument is within 378 completed calendar days (54 weeks). The data for all variables including WACC is collected from Refinitiv except independent variables which is gathered from both Refinitiv and MSCI. WACC is calculated by using a general WACC calculation formula: WACC Formula = (E/V * Ke) + (D/V) * Kd * (1 – Tax rate) where E is value of equity, D is value of debt, and V is the sum of E and D, Ke is the cost of equity and Kd is the cost of debt which are calculated separately. Kd is the interest that the firm pays on its debt where Ke is calculated using CAPM: Cost of Equity = Risk-Free Rate of Return + Beta * (Market Rate of Return – Risk-free Rate of Return). Firm revenues are used to represent each firm´s size. Generally, WACC is ex-ante measure where Refinitiv does not explicitly makes the information about the nature and calculation of WACC public. ESG represent the score of E, S, and G all combined out of 100 in Refinitiv where out of 10 in MSCI. E, S, and G represent separate score out of 100 and out of 10 each in Refinitiv and MSCI respectively. Same is the case with ESGC. The adjusted R^2 explains how well (what percentage of changes in) the performance measures are explained through ESG, E, S, G, ESGC, Firm Size, Country of Incorporation, and Years. The data for the empirical analysis dates back 7 years from 2016 to 2022. The relationship between Performance measures and proxies along with controls and fixed effects are explored using the following empirical models (detailed regression model can be found in Appendix B:*

$$Revenue_{it} = \alpha + \beta_1 ESG\ Proxies_{it} + \beta_2 log(Size_{it}) + \beta_3 Country_{it} + \beta_4 Year_{it} + e_{it}$$
$$ROA_{it} = \alpha + \beta_1 ESG\ Proxies_{it} + \beta_2 log(Size_{it}) + \beta_3 Country_{it} + \beta_4 Year_{it} + e_{it}$$
$$ROE_{it} = \alpha + \beta_1 ESG\ Proxies_{it} + \beta_2 log(Size_{it}) + \beta_3 Country_{it} + \beta_4 Year_{it} + e_{it}$$
$$Stock\ Return_{it} = \alpha + \beta_1 ESG\ Proxies_{it} + \beta_2 log(Size_{it}) + \beta_3 Country_{it} + \beta_4 Year_{it} + e_{it}$$
$$WACC_{it} = \alpha + \beta_1 ESG\ Proxies_{it} + \beta_2 log(Size_{it}) + \beta_3 Country_{it} + \beta_4 Year_{it} + e_{it}$$

The significance level of coefficients is represented by asterisks and the significance levels are as follows:

**** p-value <0.01*
*** p-value <0.05*
** p-vale <0.1*

The above Table 5 explains the relationship between performance measures and ESG ratings. Following is the explanation of the analysis segregated based on combined ESG ratings, effect of E, S, and G separate ratings and the ESGC scores:

4.1 ESG combined score and financial performance

ESG combined scores in Table 5 above has overall mixed results with performance measures if we look at both MSCI and Refinitiv datasets and compare them. However, individually, for the MSCI data, only the return on assets (ROA) and weighted average cost of capital (WACC) of the five dependent variables showed a significant relationship with the total ESG score, while for Refinitiv data, only the return on assets (ROA) and Revenue of the five dependent variables showed a significant relationship with the total ESG score as can be seen in Table 5. When we compare both, we see that ROA in both datasets has a positive relationship with ESG combined ratings with the same significance level, however, ESG ratings from MSCI leads to a higher positive change in ROA at 0.007 as compared to 0.001 in Refinitiv dataset. These findings are in-line with the correlation between ESG proxies and ROA and WACC in Table 4. Additionally, the adjusted R^2 in regressions between ROA and ESG combined ratings in both MSCI and Refinitiv dataset are almost similar, close to 15% in Table 5, meaning that the results

are indeed robust, however this also means that there are other variables that can explain the remaining 85% changes in ROA. If we look at WACC, MSCI data gives us a significant negative relationship between WACC and ESG combined ratings at -0.001, and when it is compared with Refinitiv dataset, we see the same negative relationship between WACC and ESG combined ratings, but it is a non-significant relationship at -0.0001. Similar is the case in the change in Revenues that Refinitiv dataset gives us, a significant negative relationship between Revenue change and ESG ratings at -0.002 but the MSCI dataset gives a non-significant negative relationship between revenue change and ESG at -0.025 as it can be seen in Table 5. We can infer that the significance in both MSCI and Refinitiv datasets could have come from noise. But one thing is quite clear from the results that whether significant or non-significant, MSCI ESG ratings has a higher impact on performance measures in terms of coefficients as compared to Refinitiv ratings as it can be seen in Table 5.

As there was no significance seen among the remaining performance variables, it is difficult to draw any concrete conclusions about the impact of ESG on those performance variables. But on the other hand, having a positive significant result on the ROA and negative significant result on the WACC is a positive sign aligned with earlier research. Greater ESG rated companies have lower weighted average cost of capital (WACC), suggesting lower risk exposure and the ability to obtain capital at a lower cost, which could result in a greater firm valuation but with a lower necessary return. These companies additionally show a better return on assets because of their increased earnings. Moreover, obtaining a significant negative outcome in terms of revenue can be interpreted as a positive indication. This can be attributed to the fact that higher ESG ratings may lead to lower revenues as companies tend to put more resources towards ESG practices and policies and they expect certain revenue growth over the course of years. However, it is important to note that our data set covers a period of 7 years, which suggests that companies may not have had sufficient time in our 7 years period for analysis to generate revenues from new green investments.

Even if the empirical findings of the other variables in Table 5 are not statistically significant, there is still a slightly positive relationship between ESG and Return on Equity (ROE) in the MSCI data. Moreover, there can be a slightly negative relationship between the Revenue, Stock Return and ESG. While for the Refinitiv data there is a slightly positive relationship between the total ESG score and Return on Equity (ROE) and Stock Return, but this relationship is slightly negative between the total ESG score and WACC. Additionally, Table 5 shows that in both MSCI and Refinitiv datasets, the adjusted R^2 in all regressions between ESG and

performance measures does not exceed 20% which can be considered low, indicating that there could be many other variables that can explain the changes in the performance measures.

If we look at the previous research, the ESG findings are consistent with a few papers that our literature study looked at. For instance, Gillian et al (2021) found that greater ESG performance would result in an increase in the firm value, which has an impact on many other corporate financial factors like Revenues and return on assets (ROA). Hong and Kacperczyk (2009) discovered using a similar methodology that firms with higher ESG scores have a reduced weighted average cost of capital (WACC), given that enough investors demanding green investments. Similarly, Bolton and Kacperczyk (2020) found that high ESG rating could lead to a lower stock return which they relate to reduction in cost of capital which can be aligned with our findings of a negative ESG and WACC relationship in both Refinitiv and MSCI datasets along with a negative ESG and stock return relationship in MSCI dataset.

When we look at the controls in Appendix A1.1 and A2.1, we see that in both Refinitiv and MSCI datasets, Denmark is the best country for a country to be incorporated in as it leads to better financial performance. In terms of years fixed effects, we only see the significance of stock return in all years with mixed coefficient signs and in practical terms, it makes sense that stock price is time sensitive and will have a significant mixed relationship with years. However, if we look at the firm size in Appendix A1.1 for Refinitiv dataset, we see that revenue change, ROA, and ROE is positive with increase in firm size but the stock return and WACC reduces with increase in firm size. When this is compared with the results from MSCI dataset in Appendix A2.1, we see that only ROE increases with the increase in firm size where revenue change, ROA, stock return, and WACC reduces with the increase in firm size.

4.2 E, S and G and financial performance

Considering that we had ESG ratings from two different sources, the results of regressions based on these two ESG datasets differ as well in terms of ESG separate ratings. If we look at the regression results of Refinitiv in Table 5, the social factors impact the corporate performance significantly and has a significant positive relationship with returns: ROA and ROE, both at -0.001. This is completely opposite to the effects of social factors on ROA and ROE with significant positive relationship at 0.001 and 0.002 with ROA and ROE respectively. Social factors in the Refinitiv dataset in Table 5 also indicates a negative significant relationship with revenue change at -0.003 but when we look at the R^2 of relationship between revenue change and E, S, and G separate ratings, we see that only 2.5% of the changes in

revenue change are explained indicating lack of robustness. Surprisingly, looking at the environment factors in Refinitiv dataset, there is no significant impact on the corporate performance, however, it has mixed results with negatively impacting ROA and ROE but positively impacting WACC, Stock return, and Revenue change.

On the other hand, if we look at the regression results of MSCI data in Table 5, we do not see any significant impact of E, S, and G factors on the corporate performance except the slightly significant social factors positively impacting ROA and a highly significant negative relationship between governance factors and WACC.

Alarmingly, regressions from both rating agencies datasets show non-significant but negative relationship between environmental factors and returns and a positive relationship with WACC in Refinitiv ESG ratings. This leads to a conclusion of increasing environmental scores being unfavorable for the corporate performance in terms of returns, stock returns, and firm value.

When we compare the overall results of separate ESG ratings from Refinitiv and MSCI in Table 5, we see a great degree of variations, in the sign of coefficients of E, S, and G factors and the significance of coefficients with Refinitiv´s ratings showing a higher significant impact. However, when we looked at the descriptive statistics of Refinitiv´s E, S, and G ratings we saw a great degree of variation and a high standard deviation, with a lack of normality from statistical tests. Thus, we can attribute the significant results in Refinitiv´s dataset in Table 5 to noise in the ESG data. On the other hand, if we compare the results of ESG separate ratings with ESG combined ratings from MSCI in Table 5, we can say that MSCI combined ESG ratings have strong stronger significant impact on performance measures as compared to MSCI separate ESG ratings.

Comparing the results of ESG separate rating in Table 5 with the previous empirical work, we see that the mixed results in Table 5 are similar to the research by Ahlklo et al. (2018) who study E, S, and G factors separately and find their impact on ROA, and stock returns of the companies in the Nordics, and they too have mixed results for the E, S, and G factors. However, they have come up with insignificant results for both ROA and Stock returns which is contrary to our results in terms of coefficient signs.

N G & Rezaee (2015) found that high environmental factors performance leads to lower cost of capital which is contrary to our analysis based on Refinitiv data. Regardless of the significance of the coefficient, it states that increase in environmental performance leads to an increase in WACC. However, N G & Rezaee (2015) findings on Governance factors is similar

to the results of our analysis in Table 5 as increase in governance factors performance leads to a reduction in WACC which ultimately helps in increasing the firm´s value. However, one must keep in mind that a reduced WACC does not only mean reduced firm risk, but it also relates to a lower required return from the firm´s operations/projects focused on ESG and thus leading to investors earning/expecting a lower return from firms with a higher ESG scores.

On the other hand, if we look at the significance of the coefficients of environmental factors in our analysis, our findings align with that of Hsu et al. (2018) and Humphrey et al. (2012) who found an insignificant relationship between environmental factors and shareholder´s value, firm´s risk and firm´s return.

Additionally, if we look at controls in Appendix A1.2 and A2.2, regressions based on both datasets leads to a conclusion of Denmark being the best Nordic country to get a company incorporated as it has significant positive impact on revenue growth and returns and a negative impact on WACC. Similarly, both regressions show that stock returns are highly significant in terms of years which is in-line with the general understanding that the stock price moves with time and ultimately the years would have a significant impact on the stock returns. Firm size on the other hand is highly significant and has a positive relationship with revenue growth, returns and it negatively impacts the WACC when we look at the analysis on Refintiv data unlike the analysis on MSCI data which shows mixed results.

4.3 ESG controversy score and financial performance

The relationship between ESG controversy and financial performance is investigated in this section. The ESG controversy measures the number of controversies and negative events that surround a company's ESG activities.

Looking separately at MSCI and Refinitiv dataset results, we see that in the MSCI data, the empirical findings in Table 5 show a statistically significant positive relationship between ESG controversy score and financial performance, particularly in terms of ROE, and a statistically significant negative relationship between ESG controversy score and WACC. However, when we compare this with Refinitiv´s results, the empirical findings for the Refinitiv data show similar but statistically insignificant results as a slightly positive relationship between the ESG controversy score and financial performance in terms of ROE and a negative relationship with WACC was observed. This cannot be concluded concretely in any way, but it could indicate

that firms with higher ESG controversy scores tend to have higher equity return and higher firm value thus indicating a better financial performance.

Interestingly, the results in the Refinitiv data show a positive relationship between the ESG controversy score and revenue. This finding could indicate that negative publicity and controversies surrounding a company's ESG activities may draw media attention and public interest, which in turn may contribute to an increase in the revenues. However, it is important to note that the positive relationship between ESG controversy score and revenue is not statistically significant so the conclusion could not be considered concrete.

The results in Table 5 indicate that ESG controversies have a negative impact on some financial performance factors, particularly revenue change and stock return in MSCI data and ROA in Refinitiv data in Table 5. This finding is consistent with prior research, which has demonstrated that negative events linked to ESG activities can harm a company's financial performance. Heinkel et al. (2001), for example, discovered that negative ESG events caused by environmentally polluting firms (those with a low ESG score) are held less by investors due to negative screening, resulting in a lower stock return and a higher cost of capital. Thus, decreased financial performance.

4.4 Results Summary

To summaries the results in Table 5 and section 4.1, 4.2, and 4.3, we conclude that, for the MSCI data, our regressions show a statistically significant relationship between financial performance and the ESG combined score in terms of the return on asset (ROA) at 0.007, and the weighted average cost of capital – WACC at -0.001. However, when E, S, and G separate ratings are considered, the relationship with financial performance factors is not as significant as ESG combined ratings, as only the G component showed a significant relationship with the WACC at -0.002. On the other hand, we can see a statistically significant relationship between ESG controversies and financial performance when looking at the ROE and WACC at 0.009 and -0.002 respectively. See Table 5 for a complete summary of the findings.

For the Refinitiv data, very similar to the MSCI data, we conclude that our regressions show a slightly lower than MSCI but statistically significant relationship between financial performance and the ESG ratings based on the return on asset ROA at 0.001 but a significantly negative relationship with revenue change at -0.002. When looking at the E, S, and G factors separately, findings in Table 5 show that only S and G components had a significant

relationship with different variables. For the social factors having a positive relationship with ROA and ROE at 0.001 and 0.002 respectively but a negative relationship with revenue change at -0.003. For the governance factors, we see significant negative relationship with ROA and ROE both at -0.001. For the ESG controversies, we can see a positive insignificant relationship between ESG controversies and financial performance in terms of Revenue, ROE, and Stock Return. Overall, we see that MSCI ESG ratings has a higher impact both in terms of sign of coefficient and the value of coefficient but Refinitiv´s ESG rating show a higher significance in the relationship with performance measures which we can attribute to noise as well. See Table 5 for a complete summary of the findings.

All detailed empirical results and test statistics can be found in Appendix A1, A2, A3, A4, and A5 which contain the R output of the regressions with combined ESG score, E, S, G and ESG controversy score and results for statistical tests.

4.5 Critical review and future research suggestions

There are several limitations that must be considered even if this study's findings provide an extensive insight into the relationship between ESG and financial performance. The use of ESG data from only two rating agencies, MSCI and Refinitiv, is one of the limitations of this study. Additionally, when compared to other earlier research that employed similar approaches, our findings are different in some ways due to different ESG score ratings and sample size. For instance, Ferrell et al. (2016) used the Vigeo and the MSCI ESG data, while we used the MSCI and Refinitiv's ESG score. Rating agencies' use of different scoring methodologies which makes them distinct and provider specific. Even though the ratings agencies used in this study are well known and are a reliable resource for ESG data, the outcomes may vary because other ratings agencies may have different methodologies and more importantly a bigger sample size. Thus, using the data from other rating agencies than just Refinitiv and MSCI could give different and more robust results.

The generalization of the results may be limited by the sample size used in this study which may not be representative for all industries and regions. This study focuses on just Nordics markets mainly because of little work done on this market but this has come at the cost of a smaller sample of companies to analyze. Including other markets in the sample, especially the international markets such as America, Europe, and Asia, could give a bigger sample and more robust results.

One of the limitations of our study was the problem of normality in the data. The data used in this study is not normally distributed and one of the reasons for this we believe is that we have focused on companies of all sizes from all industries which have ESG ratings for the last seven years from 2016 to 2022 or more. Due to different industries and specifically the companies in those industries having different standard financials, the results might not have been as robust as they should have been with normally distributed data. Therefore, focusing the analyses on the specific industries and sectors could also be one way of conducting the same research.

This research was limited to the data going back to just 7 years mainly due to missing ESG ratings for some companies. Therefore, performing the same analysis over an extended period of more than 7 years could give a different but more elaborate relationship between ESG and the financial performance factors of the companies.

Lastly, our research focuses on certain growth, profitability, and firm size factors. Focusing on other financial factors in addition could give a more extensive insight into the effects of ESG on the corporate performance of the companies such as looking at the impact of ESG on free cash flows, R&D, investments, share price movement, assets (current/non-current/total), and more. Moreover, we have used firm´s revenues as an indicator of firm size, using the value of total assets of the firm could be a better indicator of firm size and using the increase in firm´s assets and investments in addition to revenue growth could give a better understanding of the impact of ESG on firm´s growth.

5. Conclusion

The primary objective of this thesis was to investigate the association between Environmental, Social, and Governance (ESG) factors and the financial performance of listed companies in the Nordic exchange markets. The study analyzed ESG performance and financial performance data from two prominent ESG rating agencies, MSCI and Refinitiv, over a period of seven years from 2016 to 2022. Regression analyses were conducted to explore the relationship between ESG factors and financial performance, considering both the combined ESG score and individual ESG components (E, S, and G), as well as the ESG controversy score. The financial performance measures used in the study included revenue, return on assets (ROA), return on equity (ROE), stock return, and weighted average cost of capital (WACC).

Two types of regressions were employed to examine the relationship between ESG and financial performance: one utilizing only ESG ratings and the other incorporating ESG ratings,

control variables, and fixed effects. Across both regression types, the findings support the research question: ***"Is ESG relevant for corporate performance?"*** The results indicate that ESG is indeed relevant for corporate performance. Specifically, companies with higher ESG ratings tend to have lower weighted average cost of capital (WACC), which suggests their ability to raise capital at a lower cost, indicating lower risk exposure and potentially leading to higher firm value with a lower required return. Moreover, the analysis reveals that higher ESG ratings are associated with higher return on assets, indicating increased profitability. However, an increase in the ESG score can also lead to a reduction in revenue growth.

The analysis indicates that the inclusion of control variables and fixed effects in the regression models does not significantly alter the results compared to the basic regression model. The adjusted R-squared values in the regressions with fixed effects improve considerably, suggesting that the inclusion of control variables and fixed effects enhances the explanation of changes in performance measures. Additionally, the addition of control variable and fixed effects provide an insight into Denmark being the best country for the companies to get incorporated as it enhances the financial performance. It was also observed that year 2020 had significantly negative impact on revenue change and profitability terms namely ROA and ROE which can be attributed to Covid-19. Moreover, we see that increase in firm size leads to higher revenue growth, higher profitability (ROA, ROE), and a reduced WACC in Refinitiv dataset, contrary to MSCI which shows reduction in revenue growth and ROA with increase in firm size.

The analysis, however, highlights that the relationship between ESG, and financial performance is complex and mixed. The results vary when considering ESG combined ratings versus separate ratings, and an unexpected finding emerges, indicating an insignificant relationship between environmental factors and performance measures, specifically with an increase in environmental score resulting in negative profitability. Furthermore, the results differ depending on the ESG rating agency employed, emphasizing the importance of utilizing multiple data sources when examining the relationship between ESG and financial performance. Refinitiv's ratings are found to be more conservative compared to MSCI's ratings, and the standard deviation of Refinitiv's ESG ratings is higher than that of MSCI's ratings. Regarding the regression results, MSCI's ESG ratings exhibit a stronger impact on financial performance in terms of both sign and coefficient value, whereas Refinitiv's ESG ratings yield more significant results, potentially attributable to noise and data variation.

Considering the mixed results obtained from the regression analysis, it is crucial to acknowledge the existing literature, which presents conflicting findings on the connection between a company's financial performance and ESG initiatives. The relationship between ESG and financial performance remains a subject of debate, with some studies demonstrating a positive association, while others find no significant relationship. Nonetheless, the literature indicates that firms with strong ESG performance demonstrate resilience during crisis periods, whereas those with low ESG scores perform worse during such periods. Consequently, companies with high ESG performance exhibit lower systematic risk, attract a broader investor base, and enjoy improved access to capital. Nevertheless, it is important to note that other studies have shown a negative relationship between ESG activities and financial performance, particularly in terms of ROA and stock return, suggesting that companies with fewer ESG constraints display greater resilience during crisis periods. Therefore, it is crucial to consider various perspectives and factors that can influence the relationship between ESG initiatives and financial performance, avoiding assumptions or generalizations on the topic.

The conflicting results, noise in the ratings, and other factors can potentially impact investors' judgments and decision-making regarding their investment plans. While ESG elements have been demonstrated to enhance risk management and long-term financial success, the mixed empirical results and rating noise may lead investors astray.

The findings of this study have significant implications for companies, investors, and policymakers. Despite the mixed results presented in Table 5, it is evident that companies prioritizing ESG performance and avoiding ESG policy controversies can achieve higher profitability and lower risk. This is supported by the positive and significant relationship observed between ESG and ROA in both Refinitiv and MSCI datasets, as well as the negative and significant relationship between ESG and WACC in Refinitiv and MSCI datasets, respectively. Furthermore, when considering separate ESG ratings, companies seeking to focus on specific ESG factors may benefit from concentrating on social factors to enhance their scores, as positive and significant relationships exist between social factors and both ROA and ROE. On the other hand, increasing the governance score may lead to negative profitability, as evidenced by the reduction in both ROA and ROE with an increase in governance score.

However, it is essential to acknowledge the limitations of this study, which can be addressed in future research to enhance the clarity and robustness of the results. The utilization of data from only two ESG rating agencies and the limited sample size may restrict the generalizability

of the findings. Future research could expand the sample size and incorporate data from multiple sources to provide a more comprehensive analysis of the relationship between ESG and financial performance. Furthermore, narrowing the focus to specific industries and financial factors could offer a more detailed understanding of the relationship between ESG and financial performance. Additionally, comparing the approaches employed in this regression study with those of previous research reveals that our model diagnostics indicate significant issues with normality, which were not mentioned in prior studies. The limitations of our study could contribute to the divergence of our results from those of previous studies.

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Appendix A. Regression results

A1 Regression results with control variable and fixed effects (Refinitiv)

Model summary

A1.1

Regression results ESG Combined Refinitiv

	Dependent variable:				
	Revenue	ROA	ROE	Stock.Return	WACC
	(1)	(2)	(3)	(4)	(5)
ESG	-0.002**	0.001***	0.0001	0.00005	-0.0001
	(0.001)	(0.0002)	(0.0004)	(0.001)	(0.0001)
log(Size)	0.032***	0.005*	0.020***	-0.006	-0.002**
	(0.011)	(0.003)	(0.006)	(0.011)	(0.001)
Denmark	0.036	0.064***	0.142***	0.062*	-0.003
	(0.039)	(0.008)	(0.016)	(0.037)	(0.003)
Finland	0.028	-0.001	-0.010	0.010	-0.006**
	(0.037)	(0.007)	(0.014)	(0.035)	(0.002)
Norway	-0.029	-0.021*	-0.0004	0.027	0.004*
	(0.041)	(0.011)	(0.022)	(0.039)	(0.003)
X2022	0.063	-0.009	-0.003	-0.178***	0.020***
	(0.053)	(0.011)	(0.023)	(0.050)	(0.003)
X2021	0.058	-0.010	-0.006	0.119**	0.009***
	(0.052)	(0.011)	(0.022)	(0.050)	(0.003)
X2020	-0.006	-0.020*	-0.031	0.198***	-0.004
	(0.052)	(0.011)	(0.022)	(0.049)	(0.003)
X2019	0.023	-0.009	-0.016	0.188***	-0.0004
	(0.052)	(0.011)	(0.022)	(0.049)	(0.003)
X2018	0.060	0.002	-0.010	-0.155***	0.012***
	(0.052)	(0.011)	(0.022)	(0.049)	(0.003)
X2017	-0.067	0.005	0.001	0.143***	0.002
	(0.052)	(0.011)	(0.022)	(0.049)	(0.003)
Constant	-0.589**	-0.098	-0.321**	0.170	0.103***
	(0.254)	(0.072)	(0.143)	(0.240)	(0.017)
Observations	763	441	441	763	763
R^2	0.027	0.179	0.202	0.147	0.115
Adjusted R^2	0.013	0.158	0.181	0.135	0.102
Residual Std. Error	0.381 (df = 751)	0.063 (df = 429)	0.124 (df = 429)	0.361 (df = 751)	0.025 (df = 751)
F Statistic	1.883** (df = 11; 751)	8.486*** (df = 11; 429)	9.859*** (df = 11; 429)	11.778*** (df = 11; 751)	8.855*** (df = 11; 751)
Note:					*p<0.1; **p<0.05; ***p<0.01

Note: The above table shows the results of the empirical analysis and explores the relationship between ESG combined ratings from Refinitv and financial factors and focuses on the impact of firm size, country of incorporation, and the period (years) on the performance factors. The top row shows the performance measures (Dependent variables) which are Revenue, ROA, ROE, WACC, and Stock return where the most left column shows the proxies (Independent variables) which is ESG. Revenue is percentage change in revenues which is calculated by: (Revenue at time t – revenue at time t-1)/Revenue at time t-1. Return on assets is calculated by: Net Income/Total Assets. Similarly, the Return on Equity is calculated using the formula: Net Income/Total Equity. Stock return is the percentage change in the stock prices calculated by: (Stock price at time t – Stock price at time t-1)/Stock price at time t-1. In stock price, most recent prior tradable day with trading activity is used provided the last tradable day for the instrument is within 378 completed calendar days (54 weeks). The data for all variables including WACC is collected from Refinitiv except independent variables which is gathered from both Refinitiv and MSCI. WACC is

*calculated by using a general WACC calculation formula: WACC Formula = (E/V * Ke) + (D/V) * Kd * (1 – Tax rate) where E is value of equity, D is value of debt, and V is the sum of E and D, Ke is the cost of equity and Kd is the cost of debt which are calculated separately. Kd is the interest that the firm pays on its debt where Ke is calculated using CAPM: Cost of Equity = Risk-Free Rate of Return + Beta * (Market Rate of Return – Risk-free Rate of Return). Generally, WACC is ex-ante measure where Refinitiv does not explicitly makes the information about the nature and calculation of WACC public. The log (Size) represents control variable as an additional variable which could potentially explain the changes in the performance measures. The firm size has a log sign in front of it representing the log of firm size which was taken to make the firm size more comparable to the financial performance factors. Firm revenues are used to represent each firm´s size. ESG represent the score of E, S, and G all combined out of 100. The observations represent the total number of observations used within each regression. The adjusted R^2 explains how well (what percentage of changes in) the performance measures are explained through ESG, Firm Size, Country of Incorporation, and Years. Denmark, Finland, and Norway represent the country of incorporation which are dummy variables in the regression to see how important the country of incorporation for the performance measures is. The data for the empirical analysis dates back 7 years from 2016 to 2022. The country fixed effects do not include Sweden out of all Nordic countries because of perfect correlation with other variables. Similarly, the base year 2016 has also been excluded from the year fixed effects for the same reason. The constant shows the value of financial performance factors if ESG scores, firm size, and country and year fixed effects were zero. The relationship between Performance measures and proxies along with controls and fixed effects are explored using the following empirical models (detailed regression model can be found in Appendix B:*

$$Revenue_{it} = \alpha + \beta_1 ESG_{it} + \beta_2 log\,(Size_{it}) + \beta_3 Country_{it} + \beta_4 Year_{it} + e_{it}$$

$$ROA_{it} = \alpha + \beta_1 ESG_{it} + \beta_2 log\,(Size_{it}) + \beta_3 Country_{it} + \beta_4 Year_{it} + e_{it}$$

$$ROE_{it} = \alpha + \beta_1 ESG_{it} + \beta_2 log\,(Size_{it}) + \beta_3 Country_{it} + \beta_4 Year_{it} + e_{it}$$

$$Stock\ Return_{it} = \alpha + \beta_1 ESG_{it} + \beta_2 log\,(Size_{it}) + \beta_3 Country_{it} + \beta_4 Year_{it} + e_{it}$$

$$WACC_{it} = \alpha + \beta_1 ESG_{it} + \beta_2 log\,(Size_{it}) + \beta_3 Country_{it} + \beta_4 Year_{it} + e_{it}$$

The significance level of coefficients is represented by asterisks and the significance levels are as follows:

**** p-value <0.01*

*** p-value <0.05*

** p-vale <0.1*

The higher the significance of the coefficients, the stronger is the relationship between the dependent and independent variables.

A1.2

Regression results ESG Separate Refinitiv

	Dependent variable:				
	Revenue	ROA	ROE	Stock.Return	WACC
	(1)	(2)	(3)	(4)	(5)
E	0.00001	-0.0001	-0.001	0.0003	0.0001
	(0.001)	(0.0002)	(0.0003)	(0.001)	(0.0001)
S	-0.003***	0.001***	0.002***	0.0002	-0.0001
	(0.001)	(0.0002)	(0.0005)	(0.001)	(0.0001)
G	0.001	-0.001***	-0.001***	-0.001	-0.00003
	(0.001)	(0.0001)	(0.0003)	(0.001)	(0.00005)
log(Size)	0.042***	0.004	0.015**	-0.008	-0.001
	(0.012)	(0.003)	(0.006)	(0.011)	(0.001)
Denmark	0.023	0.059***	0.137***	0.065*	-0.002
	(0.038)	(0.008)	(0.015)	(0.036)	(0.003)
Finland	0.033	-0.003	0.002	0.002	-0.007***
	(0.037)	(0.007)	(0.014)	(0.035)	(0.002)
Norway	-0.034	-0.024**	0.009	0.028	0.005*
	(0.040)	(0.010)	(0.020)	(0.038)	(0.003)
X2022	0.071	-0.005	0.001	-0.169***	0.020***
	(0.052)	(0.011)	(0.021)	(0.049)	(0.003)
X2021	0.064	-0.005	-0.002	0.127***	0.010***
	(0.051)	(0.011)	(0.021)	(0.049)	(0.003)
X2020	0.004	-0.020*	-0.036*	0.199***	-0.004
	(0.051)	(0.011)	(0.021)	(0.048)	(0.003)
X2019	0.037	-0.010	-0.022	0.186***	-0.0004
	(0.050)	(0.010)	(0.021)	(0.048)	(0.003)
X2018	0.083*	-0.004	-0.019	-0.154***	0.012***
	(0.050)	(0.010)	(0.021)	(0.048)	(0.003)
X2017	-0.047	0.001	-0.007	0.144***	0.003
	(0.050)	(0.010)	(0.021)	(0.048)	(0.003)
Constant	-0.789***	-0.066	-0.261*	0.241	0.095***
	(0.259)	(0.069)	(0.135)	(0.247)	(0.017)
Observations	777	469	469	777	777
R^2	0.041	0.242	0.239	0.151	0.117
Adjusted R^2	0.025	0.220	0.217	0.136	0.101
Residual Std. Error	0.373 (df = 763)	0.060 (df = 455)	0.119 (df = 455)	0.355 (df = 763)	0.025 (df = 763)
F Statistic	2.524*** (df = 13; 763)	11.167*** (df = 13; 455)	10.996*** (df = 13; 455)	10.426*** (df = 13; 763)	7.742*** (df = 13; 763)
Note:					*p<0.1; **p<0.05; ***p<0.01

Note: The above table shows the results of the empirical analysis and explores the relationship between ESG separate ratings from Refinitv and financial factors and focuses on the impact of firm size, country of incorporation, and the period (years) on the performance factors. The top row shows the performance measures (Dependent variables) which are Revenue, ROA, ROE, WACC, and Stock return where the most left column shows the proxies (Independent variables) which is E, S, and G. Revenue is percentage change in revenues which is calculated by: (Revenue at time t – revenue at time t-1)/Revenue at time t-1. Return on assets is calculated by: Net Income/Total Assets. Similarly, the Return on Equity is calculated using the formula: Net Income/Total Equity. Stock return is the percentage change in the stock prices calculated by: (Stock price at time t – Stock price at time t-1)/Stock price at time t-1. In stock price, most recent prior tradable day with trading activity is used provided the last tradable day for the instrument is within 378 completed calendar days (54 weeks). The data for all variables including

*WACC is collected from Refinitiv except independent variables which is gathered from both Refinitiv and MSCI. WACC is calculated by using a general WACC calculation formula: WACC Formula = (E/V * Ke) + (D/V) * Kd * (1 – Tax rate) where E is value of equity, D is value of debt, and V is the sum of E and D, Ke is the cost of equity and Kd is the cost of debt which are calculated separately. Kd is the interest that the firm pays on its debt where Ke is calculated using CAPM: Cost of Equity = Risk-Free Rate of Return + Beta * (Market Rate of Return – Risk-free Rate of Return). Generally, WACC is ex-ante measure where Refinitiv does not explicitly makes the information about the nature and calculation of WACC public. The log (Size) represents control variable as an additional variable which could potentially explain the changes in the performance measures. The firm size has a log sign in front of it representing the log of firm size which was taken to make the firm size more comparable to the financial performance factors. Firm revenues are used to represent each firm´s size. The scores of E, S, and G are out of 100. The observations represent the total number of observations used within each regression. The adjusted R^2 explains how well (what percentage of changes in) the performance measures are explained through E, S, and G, Firm Size, Country of Incorporation, and Years. Denmark, Finland, and Norway represent the country of incorporation which are dummy variables in the regression to see how important the country of incorporation for the performance measures is. The data for the empirical analysis dates back 7 years from 2016 to 2022. The country fixed effects do not include Sweden out of all Nordic countries because of perfect correlation with other variables. Similarly, the base year 2016 has also been excluded from the year fixed effects for the same reason. The constant shows the value of financial performance factors if E, S, and G scores, firm size, and country and year fixed effects were zero. The relationship between Performance measures and ESG proxies along with controls and fixed effects are explored using the following empirical models (detailed regression model can be found in Appendix B:*

$$Revenue_{it} = \alpha + \beta_1 E_{it} + \beta_2 S_{it} + \beta_3 G_{it} + \beta_4 \log(Size_{it}) + \beta_5 Country_{it} + \beta_6 Year_{it} + e_{it}$$

$$ROA_{it} = \alpha + \beta_1 E_{it} + \beta_2 S_{it} + \beta_3 G_{it} + \beta_4 \log(Size_{it}) + \beta_5 Country_{it} + \beta_6 Year_{it} + e_{it}$$

$$ROE_{it} = \alpha + \beta_1 E_{it} + \beta_2 S_{it} + \beta_3 G_{it} + \beta_4 \log(Size_{it}) + \beta_5 Country_{it} + \beta_6 Year_{it} + e_{it}$$

$$Stock\ Return_{it} = \alpha + \beta_1 E_{it} + \beta_2 S_{it} + \beta_3 G_{it} + \beta_4 \log(Size_{it}) + \beta_5 Country_{it} + \beta_6 Year_{it} + e_{it}$$

$$WACC_{it} = \alpha + \beta_1 E_{it} + \beta_2 S_{it} + \beta_3 G_{it} + \beta_4 \log(Size_{it}) + \beta_5 Country_{it} + \beta_6 Year_{it} + e_{it}$$

The significance level of coefficients is represented by asterisks and the significance levels are as follows:

**** p-value <0.01*

*** p-value <0.05*

** p-vale <0.1*

The higher the significance of the coefficients, the stronger is the relationship between the dependent and independent variables.

A1.3

Regression results ESG Controversy Refinitiv

	Dependent variable:				
	Revenue	ROA	ROE	Stock.Return	WACC
	(1)	(2)	(3)	(4)	(5)
ESGC	0.001	-0.00002	0.00004	0.0003	-0.0001
	(0.001)	(0.0002)	(0.0003)	(0.001)	(0.00004)
log(Size)	0.027***	0.001	0.013***	-0.002	-0.002***
	(0.010)	(0.003)	(0.005)	(0.010)	(0.001)
Denmark	0.024	0.053***	0.126***	0.058	-0.003
	(0.036)	(0.008)	(0.015)	(0.036)	(0.002)
Finland	0.033	-0.013*	-0.020	0.009	-0.006**
	(0.035)	(0.008)	(0.013)	(0.034)	(0.002)
Norway	-0.011	-0.033***	0.008	-0.008	0.005*
	(0.038)	(0.011)	(0.017)	(0.037)	(0.003)
X2022	0.063	-0.003	-0.002	-0.158***	0.018***
	(0.049)	(0.012)	(0.019)	(0.048)	(0.003)
X2021	0.034	-0.003	-0.003	0.134***	0.008**
	(0.049)	(0.012)	(0.019)	(0.048)	(0.003)
X2020	-0.017	-0.017	-0.022	0.194***	-0.004
	(0.049)	(0.012)	(0.019)	(0.048)	(0.003)
X2019	0.016	-0.006	-0.014	0.199***	-0.001
	(0.049)	(0.012)	(0.019)	(0.048)	(0.003)
X2018	0.053	-0.0003	-0.013	-0.139***	0.012***
	(0.049)	(0.012)	(0.019)	(0.048)	(0.003)
X2017	-0.062	0.005	0.002	0.148***	0.002
	(0.049)	(0.012)	(0.019)	(0.048)	(0.003)
Constant	-0.659**	0.054	-0.141	0.045	0.117***
	(0.270)	(0.083)	(0.127)	(0.263)	(0.018)
Observations	826	483	553	812	798
R^2	0.024	0.143	0.166	0.139	0.114
Adjusted R^2	0.011	0.123	0.149	0.127	0.101
Residual Std. Error	0.373 (df = 814)	0.069 (df = 471)	0.121 (df = 541)	0.362 (df = 800)	0.025 (df = 786)
F Statistic	1.854** (df = 11; 814)	7.119*** (df = 11; 471)	9.781*** (df = 11; 541)	11.724*** (df = 11; 800)	9.171*** (df = 11; 786)
Note:					*p<0.1; **p<0.05; ***p<0.01

*Note: The above table shows the results of the empirical analysis and explores the relationship between ESG controversy ratings from Refinitv and financial factors and focuses on the impact of firm size, country of incorporation, and the period (years) on the performance factors. The top row shows the performance measures (Dependent variables) which are Revenue, ROA, ROE, WACC, and Stock return where the most left column shows the proxies (Independent variables) which is ESG. Revenue is percentage change in revenues which is calculated by: (Revenue at time t – revenue at time t-1)/Revenue at time t-1. Return on assets is calculated by: Net Income/Total Assets. Similarly, the Return on Equity is calculated using the formula: Net Income/Total Equity. Stock return is the percentage change in the stock prices calculated by: (Stock price at time t – Stock price at time t-1)/Stock price at time t-1. In stock price, most recent prior tradable day with trading activity is used provided the last tradable day for the instrument is within 378 completed calendar days (54 weeks). The data for all variables including WACC is collected from Refinitiv except independent variables which is gathered from both Refinitiv and MSCI. WACC is calculated by using a general WACC calculation formula: WACC Formula = (E/V * Ke) + (D/V) * Kd * (1 – Tax rate) where*

*E is value of equity, D is value of debt, and V is the sum of E and D, Ke is the cost of equity and Kd is the cost of debt which are calculated separately. Kd is the interest that the firm pays on its debt where Ke is calculated using CAPM: Cost of Equity = Risk-Free Rate of Return + Beta * (Market Rate of Return – Risk-free Rate of Return). Generally, WACC is ex-ante measure where Refinitiv does not explicitly makes the information about the nature and calculation of WACC public. The log (Size) represents control variable as an additional variable which could potentially explain the changes in the performance measures. The firm size has a log sign in front of it representing the log of firm size which was taken to make the firm size more comparable to the financial performance factors. Firm revenues are used to represent each firm´s size. ESGC represent the score of ESG controversy out of 100. The observations represent the total number of observations used within each regression. The adjusted R^2 explains how well (what percentage of changes in) the performance measures are explained through ESGC, Firm Size, Country of Incorporation, and Years. Denmark, Finland, and Norway represent the country of incorporation which are dummy variables in the regression to see how important the country of incorporation for the performance measures is. The data for the empirical analysis dates back 7 years from 2016 to 2022. The country fixed effects do not include Sweden out of all Nordic countries because of perfect correlation with other variables. Similarly, the base year 2016 has also been excluded from the year fixed effects for the same reason. The constant shows the value of financial performance factors if ESGC scores, firm size, and country and year fixed effects were zero. The relationship between Performance measures and proxies along with controls and fixed effects are explored using the following empirical models (detailed regression model can be found in Appendix B:*

$$Revenue_{it} = \alpha + \beta_1 ESGC_{it} + \beta_2 log\,(Size_{it}) + \beta_3 Country_{it} + \beta_4 Year_{it} + e_{it}$$

$$ROA_{it} = \alpha + \beta_1 ESGC_{it} + \beta_2 log\,(Size_{it}) + \beta_3 Country_{it} + \beta_4 Year_{it} + e_{it}$$

$$ROE_{it} = \alpha + \beta_1 ESGC_{it} + \beta_2 log\,(Size_{it}) + \beta_3 Country_{it} + \beta_4 Year_{it} + e_{it}$$

$$Stock\ Return_{it} = \alpha + \beta_1 ESGC_{it} + \beta_2 log\,(Size_{it}) + \beta_3 Country_{it} + \beta_4 Year_{it} + e_{it}$$

$$WACC_{it} = \alpha + \beta_1 ESGC_{it} + \beta_2 log\,(Size_{it}) + \beta_3 Country_{it} + \beta_4 Year_{it} + e_{it}$$

The significance level of coefficients is represented by asterisks and the significance levels are as follows:

**** p-value <0.01*

*** p-value <0.05*

** p-vale <0.1*

The higher the significance of the coefficients, the stronger is the relationship between the dependent and independent variables.

A2 Regression results with control variable and fixed effects (MSCI)

Model summary

A2.1

Regression results ESG Combined MSCI

	Dependent variable:				
	Revenue	ROA	ROE	Stock.Return	WACC
	(1)	(2)	(3)	(4)	(5)
ESG	-0.025	0.007***	0.002	-0.003	-0.001**
	(0.050)	(0.002)	(0.003)	(0.006)	(0.0004)
log(Size)	-0.157***	-0.004*	0.002	-0.007	-0.002***
	(0.054)	(0.002)	(0.003)	(0.007)	(0.0005)
Denmark	0.108	0.051***	0.092***	0.055*	-0.007***
	(0.231)	(0.007)	(0.012)	(0.029)	(0.002)
Finland	0.144	-0.011	-0.020*	0.007	-0.007***
	(0.227)	(0.007)	(0.012)	(0.028)	(0.002)
Norway	0.451**	-0.032***	-0.004	0.088***	-0.004**
	(0.224)	(0.009)	(0.012)	(0.028)	(0.002)
X2022	0.079	-0.010	-0.018	-0.242***	0.024***
	(0.303)	(0.010)	(0.016)	(0.038)	(0.003)
X2021	0.089	-0.008	-0.013	0.126***	0.013***
	(0.303)	(0.010)	(0.015)	(0.038)	(0.003)
X2020	0.003	-0.020**	-0.032**	0.185***	0.001
	(0.302)	(0.010)	(0.015)	(0.038)	(0.003)
X2019	-0.005	-0.008	-0.016	0.201***	0.0004
	(0.302)	(0.010)	(0.015)	(0.038)	(0.003)
X2018	0.100	-0.001	-0.008	-0.166***	0.012***
	(0.301)	(0.010)	(0.015)	(0.038)	(0.003)
X2017	0.484	0.003	0.001	0.088**	0.003
	(0.301)	(0.010)	(0.015)	(0.037)	(0.003)
Constant	3.794***	0.128**	0.114	0.221	0.118***
	(1.205)	(0.053)	(0.076)	(0.158)	(0.011)
Observations	1,288	672	868	1,253	1,274
R^2	0.016	0.157	0.095	0.179	0.129
Adjusted R^2	0.007	0.143	0.084	0.171	0.121
Residual Std. Error	2.888 (df = 1276)	0.068 (df = 660)	0.121 (df = 856)	0.354 (df = 1241)	0.026 (df = 1262)
F Statistic	1.874** (df = 11; 1276)	11.180*** (df = 11; 660)	8.193*** (df = 11; 856)	24.545*** (df = 11; 1241)	16.984*** (df = 11; 1262)
Note:					*p<0.1; **p<0.05; ***p<0.01

*Note: The above table shows the results of the empirical analysis and explores the relationship between ESG combined ratings from MSCI and financial factors and focuses on the impact of firm size, country of incorporation, and the period (years) on the performance factors. The top row shows the performance measures (Dependent variables) which are Revenue, ROA, ROE, WACC, and Stock return where the most left column shows the proxies (Independent variables) which is ESG. Revenue is percentage change in revenues which is calculated by: (Revenue at time t – revenue at time t-1)/Revenue at time t-1. Return on assets is calculated by: Net Income/Total Assets. Similarly, the Return on Equity is calculated using the formula: Net Income/Total Equity. Stock return is the percentage change in the stock prices calculated by: (Stock price at time t – Stock price at time t-1)/Stock price at time t-1. In stock price, most recent prior tradable day with trading activity is used provided the last tradable day for the instrument is within 378 completed calendar days (54 weeks). The data for all variables including WACC is collected from Refinitiv except independent variables which is gathered from both Refinitiv and MSCI. WACC is calculated by using a general WACC calculation formula: WACC Formula = (E/V * Ke) + (D/V) * Kd * (1 – Tax rate) where E is value of equity, D is value of debt, and V is the sum of E and D, Ke is the cost of equity and Kd is the cost of debt which are calculated separately. Kd is the interest that the firm pays on its debt where Ke is calculated using CAPM: Cost of Equity*

*= Risk-Free Rate of Return + Beta * (Market Rate of Return – Risk-free Rate of Return). Generally, WACC is ex-ante measure where Refinitiv does not explicitly makes the information about the nature and calculation of WACC public. The log (Size) represents control variable as an additional variable which could potentially explain the changes in the performance measures. The firm size has a log sign in front of it representing the log of firm size which was taken to make the firm size more comparable to the financial performance factors. Firm revenues are used to represent each firm´s size. ESG represent the score of E, S, and G all combined out of 100. The observations represent the total number of observations used within each regression. The adjusted R^2 explains how well (what percentage of changes in) the performance measures are explained through ESG, Firm Size, Country of Incorporation, and Years. Denmark, Finland, and Norway represent the country of incorporation which are dummy variables in the regression to see how important the country of incorporation for the performance measures is. The data for the empirical analysis dates back 7 years from 2016 to 2022. The country fixed effects do not include Sweden out of all Nordic countries because of perfect correlation with other variables. Similarly, the base year 2016 has also been excluded from the year fixed effects for the same reason. The constant shows the value of financial performance factors if ESG scores, firm size, and country and year fixed effects were zero. The relationship between Performance measures and proxies along with controls and fixed effects are explored using the following empirical models (detailed regression model can be found in Appendix B:*

$$Revenue_{it} = \alpha + \beta_1 ESG_{it} + \beta_2 log\ (Size_{it}) + \beta_3 Country_{it} + \beta_4 Year_{it} + e_{it}$$

$$ROA_{it} = \alpha + \beta_1 ESG_{it} + \beta_2 log\ (Size_{it}) + \beta_3 Country_{it} + \beta_4 Year_{it} + e_{it}$$

$$ROE_{it} = \alpha + \beta_1 ESG_{it} + \beta_2 log\ (Size_{it}) + \beta_3 Country_{it} + \beta_4 Year_{it} + e_{it}$$

$$Stock\ Return_{it} = \alpha + \beta_1 ESG_{it} + \beta_2 log\ (Size_{it}) + \beta_3 Country_{it} + \beta_4 Year_{it} + e_{it}$$

$$WACC_{it} = \alpha + \beta_1 ESG_{it} + \beta_2 log\ (Size_{it}) + \beta_3 Country_{it} + \beta_4 Year_{it} + e_{it}$$

The significance level of coefficients is represented by asterisks and the significance levels are as follows:

**** p-value <0.01*

*** p-value <0.05*

** p-vale <0.1*

The higher the significance of the coefficients, the stronger is the relationship between the dependent and independent variables.

A2.2

Regression results ESG Separate MSCI

	Dependent variable:				
	Revenue	ROA	ROE	Stock.Return	WACC
	(1)	(2)	(3)	(4)	(5)
E	0.002	-0.002	-0.002	-0.002	-0.0004
	(0.040)	(0.001)	(0.002)	(0.005)	(0.0004)
S	-0.030	0.003*	-0.001	0.003	0.00003
	(0.051)	(0.002)	(0.002)	(0.006)	(0.0004)
G	0.012	0.0005	0.001	-0.012	-0.002***
	(0.069)	(0.003)	(0.004)	(0.008)	(0.001)
log(Size)	-0.162***	-0.002	0.004	-0.007	-0.002***
	(0.053)	(0.002)	(0.003)	(0.007)	(0.0005)
Denmark	0.103	0.052***	0.093***	0.055*	-0.007***
	(0.232)	(0.007)	(0.012)	(0.029)	(0.002)
Finland	0.115	-0.009	-0.021*	0.017	-0.005**
	(0.235)	(0.007)	(0.012)	(0.029)	(0.002)
Norway	0.449**	-0.036***	-0.007	0.094***	-0.003
	(0.225)	(0.009)	(0.013)	(0.028)	(0.002)
X2022	0.064	-0.004	-0.016	-0.242***	0.024***
	(0.303)	(0.010)	(0.015)	(0.038)	(0.003)
X2021	0.085	-0.002	-0.010	0.121***	0.012***
	(0.303)	(0.010)	(0.015)	(0.038)	(0.003)
X2020	0.002	-0.016	-0.030*	0.179***	0.0002
	(0.303)	(0.010)	(0.015)	(0.038)	(0.003)
X2019	-0.010	-0.005	-0.015	0.200***	0.0003
	(0.302)	(0.010)	(0.015)	(0.038)	(0.003)
X2018	0.094	0.001	-0.007	-0.165***	0.012***
	(0.302)	(0.010)	(0.015)	(0.037)	(0.003)
X2017	0.482	0.005	0.001	0.087**	0.003
	(0.301)	(0.010)	(0.015)	(0.037)	(0.003)
Constant	3.830***	0.123**	0.110	0.277*	0.130***
	(1.247)	(0.058)	(0.079)	(0.163)	(0.011)
Observations	1,288	672	868	1,253	1,274
R^2	0.016	0.142	0.096	0.180	0.134
Adjusted R^2	0.006	0.125	0.082	0.172	0.126
Residual Std. Error	2.890 (df = 1274)	0.069 (df = 658)	0.121 (df = 854)	0.354 (df = 1239)	0.026 (df = 1260)
F Statistic	1.596* (df = 13; 1274)	8.367*** (df = 13; 658)	6.943*** (df = 13; 854)	20.940*** (df = 13; 1239)	15.058*** (df = 13; 1260)
Note:					*p<0.1; **p<0.05; ***p<0.01

Note: The above table shows the results of the empirical analysis and explores the relationship between ESG separate ratings from MSCI and financial factors and focuses on the impact of firm size, country of incorporation, and the period (years) on the performance factors. The top row shows the performance measures (Dependent variables) which are Revenue, ROA, ROE, WACC, and Stock return where the most left column shows the proxies (Independent variables) which is E, S, and G. Revenue is percentage change in revenues which is calculated by: (Revenue at time t – revenue at time t-1)/Revenue at time t-1. Return on assets is calculated by: Net Income/Total Assets. Similarly, the Return on Equity is calculated using the formula: Net Income/Total Equity. Stock return is the percentage change in the stock prices calculated by: (Stock price at time t – Stock price at time t-1)/Stock price at time t-1. In stock price, most recent prior tradable day with trading activity is used provided the last tradable day for the instrument is within 378 completed calendar days (54 weeks). The data for all variables including

*WACC is collected from Refinitiv except independent variables which is gathered from both Refinitiv and MSCI. WACC is calculated by using a general WACC calculation formula: WACC Formula = (E/V * Ke) + (D/V) * Kd * (1 – Tax rate) where E is value of equity, D is value of debt, and V is the sum of E and D, Ke is the cost of equity and Kd is the cost of debt which are calculated separately. Kd is the interest that the firm pays on its debt where Ke is calculated using CAPM: Cost of Equity = Risk-Free Rate of Return + Beta * (Market Rate of Return – Risk-free Rate of Return). Generally, WACC is ex-ante measure where Refinitiv does not explicitly makes the information about the nature and calculation of WACC public. The log (Size) represents control variable as an additional variable which could potentially explain the changes in the performance measures. The firm size has a log sign in front of it representing the log of firm size which was taken to make the firm size more comparable to the financial performance factors. Firm revenues are used to represent each firm´s size. The scores of E, S, and G are out of 100. The observations represent the total number of observations used within each regression. The adjusted R^2 explains how well (what percentage of changes in) the performance measures are explained through E, S, and G, Firm Size, Country of Incorporation, and Years. Denmark, Finland, and Norway represent the country of incorporation which are dummy variables in the regression to see how important the country of incorporation for the performance measures is. The data for the empirical analysis dates back 7 years from 2016 to 2022. The country fixed effects do not include Sweden out of all Nordic countries because of perfect correlation with other variables. Similarly, the base year 2016 has also been excluded from the year fixed effects for the same reason. The constant shows the value of financial performance factors if E, S, and G scores, firm size, and country and year fixed effects were zero. The relationship between Performance measures and ESG proxies along with controls and fixed effects are explored using the following empirical models (detailed regression model can be found in Appendix B:*

$$Revenue_{it} = \alpha + \beta_1 E_{it} + \beta_2 S_{it} + \beta_3 G_{it} + \beta_4 log\,(Size_{it}) + \beta_5 Country_{it} + \beta_6 Year_{it} + e_{it}$$

$$ROA_{it} = \alpha + \beta_1 E_{it} + \beta_2 S_{it} + \beta_3 G_{it} + \beta_4 log\,(Size_{it}) + \beta_5 Country_{it} + \beta_6 Year_{it} + e_{it}$$

$$ROE_{it} = \alpha + \beta_1 E_{it} + \beta_2 S_{it} + \beta_3 G_{it} + \beta_4 log\,(Size_{it}) + \beta_5 Country_{it} + \beta_6 Year_{it} + e_{it}$$

$$Stock\ Return_{it} = \alpha + \beta_1 E_{it} + \beta_2 S_{it} + \beta_3 G_{it} + \beta_4 log\,(Size_{it}) + \beta_5 Country_{it} + \beta_6 Year_{it} + e_{it}$$

$$WACC_{it} = \alpha + \beta_1 E_{it} + \beta_2 S_{it} + \beta_3 G_{it} + \beta_4 log\,(Size_{it}) + \beta_5 Country_{it} + \beta_6 Year_{it} + e_{it}$$

The significance level of coefficients is represented by asterisks and the significance levels are as follows:

**** p-value <0.01*

*** p-value <0.05*

** p-vale <0.1*

The higher the significance of the coefficients, the stronger is the relationship between the dependent and independent variables.

A2.3

23/04/2023, 16:31 ESG controversy regression MSCI.html

Regression results ESG Controversy MSCI

	Dependent variable:				
	Revenue	ROA	ROE	Stock.Return	WACC
	(1)	(2)	(3)	(4)	(5)
ESGC	-0.033	0.00004	0.009**	-0.007	-0.002***
	(0.068)	(0.002)	(0.004)	(0.008)	(0.001)
log(Size)	-0.173***	-0.003	0.005	-0.010	-0.003***
	(0.053)	(0.002)	(0.003)	(0.007)	(0.0005)
Denmark	0.106	0.051***	0.091***	0.054*	-0.007***
	(0.232)	(0.007)	(0.012)	(0.029)	(0.002)
Finland	0.139	-0.009	-0.021*	0.006	-0.007***
	(0.227)	(0.007)	(0.012)	(0.028)	(0.002)
Norway	0.444**	-0.036***	-0.002	0.087***	-0.005**
	(0.226)	(0.009)	(0.012)	(0.028)	(0.002)
X2022	0.060	-0.003	-0.016	-0.245***	0.023***
	(0.302)	(0.010)	(0.015)	(0.038)	(0.003)
X2021	0.069	-0.001	-0.010	0.123***	0.012***
	(0.302)	(0.010)	(0.015)	(0.038)	(0.003)
X2020	-0.015	-0.015	-0.030*	0.182***	0.0005
	(0.302)	(0.010)	(0.015)	(0.038)	(0.003)
X2019	-0.020	-0.004	-0.014	0.198***	-0.0003
	(0.302)	(0.010)	(0.015)	(0.038)	(0.003)
X2018	0.087	0.002	-0.005	-0.168***	0.011***
	(0.302)	(0.010)	(0.015)	(0.038)	(0.003)
X2017	0.475	0.005	0.003	0.086**	0.003
	(0.301)	(0.010)	(0.015)	(0.037)	(0.003)
Constant	4.332***	0.146**	-0.028	0.338*	0.153***
	(1.579)	(0.064)	(0.093)	(0.205)	(0.014)
Observations	1,288	672	868	1,253	1,274
R^2	0.016	0.134	0.101	0.179	0.135
Adjusted R^2	0.007	0.120	0.090	0.172	0.127
Residual Std. Error	2.888 (df = 1276)	0.069 (df = 660)	0.121 (df = 856)	0.354 (df = 1241)	0.026 (df = 1262)
F Statistic	1.873** (df = 11; 1276)	9.321*** (df = 11; 660)	8.779*** (df = 11; 856)	24.600*** (df = 11; 1241)	17.861*** (df = 11; 1262)
Note:					*p<0.1; **p<0.05; ***p<0.01

Note: The above table shows the results of the empirical analysis and explores the relationship between ESG controversy ratings from MSCI and financial factors and focuses on the impact of firm size, country of incorporation, and the period (years) on the performance factors. The top row shows the performance measures (Dependent variables) which are Revenue, ROA, ROE, WACC, and Stock return where the most left column shows the proxies (Independent variables) which is ESG. Revenue is percentage change in revenues which is calculated by: (Revenue at time t – revenue at time t-1)/Revenue at time t-1. Return on assets is calculated by: Net Income/Total Assets. Similarly, the Return on Equity is calculated using the formula: Net Income/Total Equity. Stock return is the percentage change in the stock prices calculated by: (Stock price at time t – Stock price at time t-1)/Stock price at time t-1. In stock price, most recent prior tradable day with trading activity is used provided the last tradable day for the instrument is within 378 completed calendar days (54 weeks). The data for all variables including WACC is collected from Refinitiv except independent variables which is gathered from both Refinitiv and MSCI. WACC is

*calculated by using a general WACC calculation formula: WACC Formula = (E/V * Ke) + (D/V) * Kd * (1 – Tax rate) where E is value of equity, D is value of debt, and V is the sum of E and D, Ke is the cost of equity and Kd is the cost of debt which are calculated separately. Kd is the interest that the firm pays on its debt where Ke is calculated using CAPM: Cost of Equity = Risk-Free Rate of Return + Beta * (Market Rate of Return – Risk-free Rate of Return). Generally, WACC is ex-ante measure where Refinitiv does not explicitly makes the information about the nature and calculation of WACC public. The log (Size) represents control variable as an additional variable which could potentially explain the changes in the performance measures. The firm size has a log sign in front of it representing the log of firm size which was taken to make the firm size more comparable to the financial performance factors. Firm revenues are used to represent each firm´s size. ESGC represent the score of ESG controversy out of 100. The observations represent the total number of observations used within each regression. The adjusted R^2 explains how well (what percentage of changes in) the performance measures are explained through ESGC, Firm Size, Country of Incorporation, and Years. Denmark, Finland, and Norway represent the country of incorporation which are dummy variables in the regression to see how important the country of incorporation for the performance measures is. The data for the empirical analysis dates back 7 years from 2016 to 2022. The country fixed effects do not include Sweden out of all Nordic countries because of perfect correlation with other variables. Similarly, the base year 2016 has also been excluded from the year fixed effects for the same reason. The constant shows the value of financial performance factors if ESGC scores, firm size, and country and year fixed effects were zero. The relationship between Performance measures and proxies along with controls and fixed effects are explored using the following empirical models (detailed regression model can be found in Appendix B:*

$$Revenue_{it} = \alpha + \beta_1 ESGC_{it} + \beta_2 log\,(Size_{it}) + \beta_3 Country_{it} + \beta_4 Year_{it} + e_{it}$$

$$ROA_{it} = \alpha + \beta_1 ESGC_{it} + \beta_2 log\,(Size_{it}) + \beta_3 Country_{it} + \beta_4 Year_{it} + e_{it}$$

$$ROE_{it} = \alpha + \beta_1 ESGC_{it} + \beta_2 log\,(Size_{it}) + \beta_3 Country_{it} + \beta_4 Year_{it} + e_{it}$$

$$Stock\ Return_{it} = \alpha + \beta_1 ESGC_{it} + \beta_2 log\,(Size_{it}) + \beta_3 Country_{it} + \beta_4 Year_{it} + e_{it}$$

$$WACC_{it} = \alpha + \beta_1 ESGC_{it} + \beta_2 log\,(Size_{it}) + \beta_3 Country_{it} + \beta_4 Year_{it} + e_{it}$$

The significance level of coefficients is represented by asterisks and the significance levels are as follows:

**** p-value <0.01*

*** p-value <0.05*

** p-vale <0.1*

The higher the significance of the coefficients, the stronger is the relationship between the dependent and independent variables.

A3 Regression results without control variable and fixed effects (Refinitiv)

Model summary

A3.1

Regression without control ESG (Refinitiv)

	Dependent variable:				
	Revenue	ROA	ROE	Stock.Return	WACC
	(1)	(2)	(3)	(4)	(5)
ESG	-0.0002	0.0004*	-0.00005	-0.0003	-0.0001
	(0.001)	(0.0002)	(0.0005)	(0.001)	(0.0001)
Constant	0.091*	0.051***	0.195***	0.114**	0.073***
	(0.053)	(0.015)	(0.031)	(0.054)	(0.004)
Observations	763	441	441	763	763
R^2	0.0001	0.008	0.00003	0.0002	0.002
Adjusted R^2	-0.001	0.006	-0.002	-0.001	0.001
Residual Std. Error	0.384 (df = 761)	0.068 (df = 439)	0.137 (df = 439)	0.389 (df = 761)	0.026 (df = 761)
F Statistic	0.069 (df = 1; 761)	3.590* (df = 1; 439)	0.011 (df = 1; 439)	0.142 (df = 1; 761)	1.741 (df = 1; 761)
Note:					*p<0.1; **p<0.05; ***p<0.01

*Note: The above table shows the results of the empirical analysis and explores the relationship between ESG combined ratings from Refinitv and financial factor. The top row shows the performance measures (Dependent variables) which are Revenue, ROA, ROE, WACC, and Stock return where the most left column shows the proxies (Independent variables) which is ESG. Revenue is percentage change in revenues which is calculated by: (Revenue at time t – revenue at time t-1)/Revenue at time t-1. Return on assets is calculated by: Net Income/Total Assets. Similarly, the Return on Equity is calculated using the formula: Net Income/Total Equity. Stock return is the percentage change in the stock prices calculated by: (Stock price at time t – Stock price at time t-1)/Stock price at time t-1. In stock price, most recent prior tradable day with trading activity is used provided the last tradable day for the instrument is within 378 completed calendar days (54 weeks). The data for all variables including WACC is collected from Refinitiv except independent variables which is gathered from both Refinitiv and MSCI. WACC is calculated by using a general WACC calculation formula: WACC Formula = (E/V * Ke) + (D/V) * Kd * (1 – Tax rate) where E is value of equity, D is value of debt, and V is the sum of E and D, Ke is the cost of equity and Kd is the cost of debt which are calculated separately. Kd is the interest that the firm pays on its debt where Ke is calculated using CAPM: Cost of Equity = Risk-Free Rate of Return + Beta * (Market Rate of Return – Risk-free Rate of Return). Generally, WACC is ex-ante measure where Refinitiv does not explicitly makes the information about the nature and calculation of WACC public. ESG represent the score of E, S, and G all combined out of 100. The observations represent the total number of observations used within each regression. The adjusted R^2 explains how well (what percentage of changes in) the performance measures are explained through ESG. The data for the empirical analysis dates back 7 years from 2016 to 2022. The constant shows the value of financial performance factors if ESG scores were zero. The relationship between Performance measures and ESG proxy is explored using the following empirical models (detailed regression model can be found in Appendix B:*

$$Revenue_{it} = \alpha + \beta_1 ESG_{it} + e_{it}$$

$$ROA_{it} = \alpha + \beta_1 ESG_{it} + e_{it}$$

$$ROE_{it} = \alpha + \beta_1 ESG_{it} + e_{it}$$

$$Stock\ Return_{it} = \alpha + \beta_1 ESG_{it} + e_{it}$$

$$WACC_{it} = \alpha + \beta_1 ESG_{it} + e_{it}$$

The significance level of coefficients is represented by asterisks and the significance levels are as follows:

**** p-value <0.01*

*** p-value <0.05*

** p-vale <0.1*

The higher the significance of the coefficients, the stronger is the relationship between the dependent and independent variables.

A3.2

Regression without control E S G (Refinitiv)

	Dependent variable:				
	Revenue	ROA	ROE	Stock.Return	WACC
	(1)	(2)	(3)	(4)	(5)
E	0.001	-0.0004**	-0.001***	-0.0002	0.00000
	(0.001)	(0.0002)	(0.0003)	(0.001)	(0.0001)
S	-0.002**	0.002***	0.003***	0.0002	-0.0001
	(0.001)	(0.0002)	(0.0005)	(0.001)	(0.0001)
G	0.001*	-0.001***	-0.001***	-0.001	0.00003
	(0.001)	(0.0001)	(0.0003)	(0.001)	(0.00005)
Constant	0.111**	0.031**	0.113***	0.144***	0.074***
	(0.053)	(0.015)	(0.031)	(0.054)	(0.004)
Observations	777	469	469	777	777
R^2	0.008	0.098	0.069	0.002	0.005
Adjusted R^2	0.004	0.092	0.063	-0.001	0.001
Residual Std. Error	0.377 (df = 773)	0.065 (df = 465)	0.130 (df = 465)	0.382 (df = 773)	0.026 (df = 773)
F Statistic	2.143* (df = 3; 773)	16.769*** (df = 3; 465)	11.490*** (df = 3; 465)	0.619 (df = 3; 773)	1.330 (df = 3; 773)
Note:					*p<0.1; **p<0.05; ***p<0.01

*Note: The above table shows the results of the empirical analysis and explores the relationship between ESG separate ratings from Refinitv and financial factors. The top row shows the performance measures (Dependent variables) which are Revenue, ROA, ROE, WACC, and Stock return where the most left column shows the proxies (Independent variables) which is E, S, and G. Revenue is percentage change in revenues which is calculated by: (Revenue at time t – revenue at time t-1)/Revenue at time t-1. Return on assets is calculated by: Net Income/Total Assets. Similarly, the Return on Equity is calculated using the formula: Net Income/Total Equity. Stock return is the percentage change in the stock prices calculated by: (Stock price at time t – Stock price at time t-1)/Stock price at time t-1. In stock price, most recent prior tradable day with trading activity is used provided the last tradable day for the instrument is within 378 completed calendar days (54 weeks). The data for all variables including WACC is collected from Refinitiv except independent variables which is gathered from both Refinitiv and MSCI. WACC is calculated by using a general WACC calculation formula: WACC Formula = (E/V * Ke) + (D/V) * Kd * (1 – Tax rate) where E is value of equity, D is value of debt, and V is the sum of E and D, Ke is the cost of equity and Kd is the cost of debt which are calculated separately. Kd is the interest that the firm pays on its debt where Ke is calculated using CAPM: Cost of Equity = Risk-Free Rate of Return + Beta * (Market Rate of Return – Risk-free Rate of Return). Generally, WACC is ex-ante measure where Refinitiv does not explicitly makes the information about the nature and calculation of WACC public. The scores of E, S, and G are out of 100. The observations represent the total number of observations used within each regression. The adjusted R^2 explains how well (what percentage of changes in) the performance measures are explained through E, S, and G. The data for the empirical analysis dates back 7 years from 2016 to 2022. The constant shows the value of financial performance factors if E, S, and G scores were zero. The relationship between Performance measures and ESG proxies are explored using the following empirical models (detailed regression model can be found in Appendix B:*

$$Revenue_{it} = \alpha + \beta_1 E_{it} + \beta_2 S_{it} + \beta_3 G_{it} + e_{it}$$

$$ROA_{it} = \alpha + \beta_1 E_{it} + \beta_2 S_{it} + \beta_3 G_{it} + e_{it}$$

$$ROE_{it} = \alpha + \beta_1 E_{it} + \beta_2 S_{it} + \beta_3 G_{it} + e_{it}$$

$$Stock\ Return_{it} = \alpha + \beta_1 E_{it} + \beta_2 S_{it} + \beta_3 G_{it} + e_{it}$$

$$WACC_{it} = \alpha + \beta_1 E_{it} + \beta_2 S_{it} + \beta_3 G_{it} + + e_{it}$$

The significance level of coefficients is represented by asterisks and the significance levels are as follows:

**** p-value <0.01*

*** p-value <0.05*

** p-vale <0.1*

The higher the significance of the coefficients, the stronger is the relationship between the dependent and independent variables.

A3.3

Regression without control ESGC (Refinitiv)

	Dependent variable:				
	Revenue	ROA	ROE	Stock.Return	WACC
	(1)	(2)	(3)	(4)	(5)
ESGC	0.0001	0.0002	0.00002	0.001	-0.0001
	(0.001)	(0.0001)	(0.0003)	(0.001)	(0.00004)
Constant	0.066	0.065***	0.185***	0.032	0.073***
	(0.055)	(0.014)	(0.024)	(0.057)	(0.004)
Observations	826	483	553	812	798
R^2	0.00003	0.004	0.00001	0.001	0.002
Adjusted R^2	-0.001	0.002	-0.002	0.0001	0.001
Residual Std. Error	0.375 (df = 824)	0.073 (df = 481)	0.131 (df = 551)	0.388 (df = 810)	0.026 (df = 796)
F Statistic	0.029 (df = 1; 824)	1.774 (df = 1; 481)	0.007 (df = 1; 551)	1.076 (df = 1; 810)	1.465 (df = 1; 796)
Note:					*p<0.1; **p<0.05; ***p<0.01

*Note: The above table shows the results of the empirical analysis and explores the relationship between ESG controversy ratings from Refinitv and financial factors. The top row shows the performance measures (Dependent variables) which are Revenue, ROA, ROE, WACC, and Stock return where the most left column shows the proxies (Independent variables) which is ESG. Revenue is percentage change in revenues which is calculated by: (Revenue at time t – revenue at time t-1)/Revenue at time t-1. Return on assets is calculated by: Net Income/Total Assets. Similarly, the Return on Equity is calculated using the formula: Net Income/Total Equity. Stock return is the percentage change in the stock prices calculated by: (Stock price at time t – Stock price at time t-1)/Stock price at time t-1. In stock price, most recent prior tradable day with trading activity is used provided the last tradable day for the instrument is within 378 completed calendar days (54 weeks). The data for all variables including WACC is collected from Refinitiv except independent variables which is gathered from both Refinitiv and MSCI. WACC is calculated by using a general WACC calculation formula: WACC Formula = (E/V * Ke) + (D/V) * Kd * (1 – Tax rate) where E is value of equity, D is value of debt, and V is the sum of E and D, Ke is the cost of equity and Kd is the cost of debt which are calculated separately. Kd is the interest that the firm pays on its debt where Ke is calculated using CAPM: Cost of Equity = Risk-Free Rate of Return + Beta * (Market Rate of Return – Risk-free Rate of Return). Generally, WACC is ex-ante measure where Refinitiv does not explicitly makes the information about the nature and calculation of WACC public. ESGC represent the score of ESG controversy out of 100. The observations represent the total number of observations used within each regression. The adjusted R^2 explains how well (what percentage of changes in) the performance measures are*

explained through ESGC. The data for the empirical analysis dates back 7 years from 2016 to 2022. The constant shows the value of financial performance factors if ESGC scores were zero. The relationship between Performance measures and proxies along with controls and fixed effects are explored using the following empirical models (detailed regression model can be found in Appendix B:

$$Revenue_{it} = \alpha + \beta_1 ESGC_{it} + e_{it}$$

$$ROA_{it} = \alpha + \beta_1 ESGC_{it} + e_{it}$$

$$ROE_{it} = \alpha + \beta_1 ESGC_{it} + e_{it}$$

$$Stock\ Return_{it} = \alpha + \beta_1 ESGC_{it} + e_{it}$$

$$WACC_{it} = \alpha + \beta_1 ESGC_{it} + + e_{it}$$

The significance level of coefficients is represented by asterisks and the significance levels are as follows:

**** p-value <0.01*

*** p-value <0.05*

** p-vale <0.1*

The higher the significance of the coefficients, the stronger is the relationship between the dependent and independent variables.

A4 Regression results without control variable and fixed effects (MSCI)

Model summary

A4.1

Regression without control (MSCI) ESG

	Dependent variable:				
	Revenue	ROA	ROE	Stock.Return	WACC
	(1)	(2)	(3)	(4)	(5)
ESG	-0.089*	0.006***	0.002	-0.008	-0.001***
	(0.046)	(0.002)	(0.002)	(0.006)	(0.0004)
Constant	0.819**	0.033**	0.170***	0.152***	0.076***
	(0.339)	(0.014)	(0.019)	(0.046)	(0.003)
Observations	1,288	672	868	1,253	1,274
R^2	0.003	0.019	0.001	0.001	0.007
Adjusted R^2	0.002	0.018	-0.0002	0.0005	0.006
Residual Std. Error	2.896 (df = 1286)	0.073 (df = 670)	0.127 (df = 866)	0.389 (df = 1251)	0.027 (df = 1272)
F Statistic	3.766* (df = 1; 1286)	13.238*** (df = 1; 670)	0.831 (df = 1; 866)	1.566 (df = 1; 1251)	8.760*** (df = 1; 1272)
Note:					*p<0.1; **p<0.05; ***p<0.01

Note: The above table shows the results of the empirical analysis and explores the relationship between ESG combined ratings from MSCI and financial factor. The top row shows the performance measures (Dependent variables) which are Revenue, ROA, ROE, WACC, and Stock return where the most left column shows the proxies (Independent variables) which is ESG. Revenue is percentage change in revenues which is calculated by: (Revenue at time t – revenue at time t-1)/Revenue at time t-1. Return on assets is calculated by: Net Income/Total Assets. Similarly, the Return on Equity is calculated using the formula: Net Income/Total Equity. Stock return is the percentage change in the stock prices calculated by: (Stock price at time t – Stock

*price at time t-1)/Stock price at time t-1. In stock price, most recent prior tradable day with trading activity is used provided the last tradable day for the instrument is within 378 completed calendar days (54 weeks). The data for all variables including WACC is collected from Refinitiv except independent variables which is gathered from both Refinitiv and MSCI. WACC is calculated by using a general WACC calculation formula: WACC Formula = (E/V * Ke) + (D/V) * Kd * (1 – Tax rate) where E is value of equity, D is value of debt, and V is the sum of E and D, Ke is the cost of equity and Kd is the cost of debt which are calculated separately. Kd is the interest that the firm pays on its debt where Ke is calculated using CAPM: Cost of Equity = Risk-Free Rate of Return + Beta * (Market Rate of Return – Risk-free Rate of Return). Generally, WACC is ex-ante measure where Refinitiv does not explicitly makes the information about the nature and calculation of WACC public. ESG represent the score of E, S, and G all combined out of 100. The observations represent the total number of observations used within each regression. The adjusted R^2 explains how well (what percentage of changes in) the performance measures are explained through ESG. The data for the empirical analysis dates back 7 years from 2016 to 2022. The constant shows the value of financial performance factors if ESG scores were zero. The relationship between Performance measures and ESG proxy is explored using the following empirical models (detailed regression model can be found in Appendix B:*

$$Revenue_{it} = \alpha + \beta_1 ESG_{it} + e_{it}$$

$$ROA_{it} = \alpha + \beta_1 ESG_{it} + e_{it}$$

$$ROE_{it} = \alpha + \beta_1 ESG_{it} + e_{it}$$

$$Stock\ Return_{it} = \alpha + \beta_1 ESG_{it} + e_{it}$$

$$WACC_{it} = \alpha + \beta_1 ESG_{it} + e_{it}$$

The significance level of coefficients is represented by asterisks and the significance levels are as follows:

**** p-value <0.01*

*** p-value <0.05*

** p-vale <0.1*

The higher the significance of the coefficients, the stronger is the relationship between the dependent and independent variables.

A4.2

Regression without control (MSCI) E S G

	Dependent variable:				
	Revenue	ROA	ROE	Stock.Return	WACC
	(1)	(2)	(3)	(4)	(5)
E	-0.019	-0.002	-0.001	-0.005	-0.0003
	(0.039)	(0.001)	(0.002)	(0.005)	(0.0004)
S	-0.065	0.003*	-0.0004	0.004	-0.0002
	(0.050)	(0.002)	(0.003)	(0.007)	(0.0005)
G	-0.014	-0.004	-0.001	-0.024***	-0.002***
	(0.065)	(0.003)	(0.003)	(0.009)	(0.001)
Constant	0.733	0.098***	0.200***	0.260***	0.086***
	(0.570)	(0.023)	(0.031)	(0.077)	(0.005)
Observations	1,288	672	868	1,253	1,274
R^2	0.002	0.012	0.0002	0.007	0.013
Adjusted R^2	-0.001	0.008	-0.003	0.005	0.010
Residual Std. Error	2.900 (df = 1284)	0.074 (df = 668)	0.127 (df = 864)	0.388 (df = 1249)	0.027 (df = 1270)
F Statistic	0.672 (df = 3; 1284)	2.772** (df = 3; 668)	0.070 (df = 3; 864)	3.061** (df = 3; 1249)	5.493*** (df = 3; 1270)
Note:					*p<0.1; **p<0.05; ***p<0.01

*Note: The above table shows the results of the empirical analysis and explores the relationship between ESG separate ratings from MSCI and financial factors. The top row shows the performance measures (Dependent variables) which are Revenue, ROA, ROE, WACC, and Stock return where the most left column shows the proxies (Independent variables) which is E, S, and G. Revenue is percentage change in revenues which is calculated by: (Revenue at time t – revenue at time t-1)/Revenue at time t-1. Return on assets is calculated by: Net Income/Total Assets. Similarly, the Return on Equity is calculated using the formula: Net Income/Total Equity. Stock return is the percentage change in the stock prices calculated by: (Stock price at time t – Stock price at time t-1)/Stock price at time t-1. In stock price, most recent prior tradable day with trading activity is used provided the last tradable day for the instrument is within 378 completed calendar days (54 weeks). The data for all variables including WACC is collected from Refinitiv except independent variables which is gathered from both Refinitiv and MSCI. WACC is calculated by using a general WACC calculation formula: WACC Formula = (E/V * Ke) + (D/V) * Kd * (1 – Tax rate) where E is value of equity, D is value of debt, and V is the sum of E and D, Ke is the cost of equity and Kd is the cost of debt which are calculated separately. Kd is the interest that the firm pays on its debt where Ke is calculated using CAPM: Cost of Equity = Risk-Free Rate of Return + Beta * (Market Rate of Return – Risk-free Rate of Return). Generally, WACC is ex-ante measure where Refinitiv does not explicitly makes the information about the nature and calculation of WACC public. The scores of E, S, and G are out of 100. The observations represent the total number of observations used within each regression. The adjusted R^2 explains how well (what percentage of changes in) the performance measures are explained through E, S, and G. The data for the empirical analysis dates back 7 years from 2016 to 2022. The constant shows the value of financial performance factors if E, S, and G scores were zero. The relationship between Performance measures and ESG proxies are explored using the following empirical models (detailed regression model can be found in Appendix B:*

$$Revenue_{it} = \alpha + \beta_1 E_{it} + \beta_2 S_{it} + \beta_3 G_{it} + e_{it}$$

$$ROA_{it} = \alpha + \beta_1 E_{it} + \beta_2 S_{it} + \beta_3 G_{it} + e_{it}$$

$$ROE_{it} = \alpha + \beta_1 E_{it} + \beta_2 S_{it} + \beta_3 G_{it} + e_{it}$$

$$Stock\ Return_{it} = \alpha + \beta_1 E_{it} + \beta_2 S_{it} + \beta_3 G_{it} + e_{it}$$

$$WACC_{it} = \alpha + \beta_1 E_{it} + \beta_2 S_{it} + \beta_3 G_{it} + + e_{it}$$

The significance level of coefficients is represented by asterisks and the significance levels are as follows:

*** p-value <0.01

** p-value <0.05

* p-vale <0.1

The higher the significance of the coefficients, the stronger is the relationship between the dependent and independent variables.

A4.3

Regression without control (MSCI) ESGC

	Dependent variable:				
	Revenue	ROA	ROE	Stock.Return	WACC
	(1)	(2)	(3)	(4)	(5)
ESGC	0.009	0.003	0.009***	-0.007	-0.001*
	(0.065)	(0.002)	(0.004)	(0.009)	(0.001)
Constant	0.089	0.052**	0.096***	0.167*	0.079***
	(0.639)	(0.020)	(0.035)	(0.086)	(0.006)
Observations	1,288	672	868	1,253	1,274
R^2	0.00002	0.003	0.008	0.001	0.003
Adjusted R^2	-0.001	0.002	0.007	-0.0002	0.002
Residual Std. Error	2.900 (df = 1286)	0.074 (df = 670)	0.126 (df = 866)	0.389 (df = 1251)	0.027 (df = 1272)
F Statistic	0.021 (df = 1; 1286)	2.169 (df = 1; 670)	6.965*** (df = 1; 866)	0.697 (df = 1; 1251)	3.780* (df = 1; 1272)
Note:					*p<0.1; **p<0.05; ***p<0.01

*Note: The above table shows the results of the empirical analysis and explores the relationship between ESG controversy ratings from Refinitv and financial factors. The top row shows the performance measures (Dependent variables) which are Revenue, ROA, ROE, WACC, and Stock return where the most left column shows the proxies (Independent variables) which is ESG. Revenue is percentage change in revenues which is calculated by: (Revenue at time t – revenue at time t-1)/Revenue at time t-1. Return on assets is calculated by: Net Income/Total Assets. Similarly, the Return on Equity is calculated using the formula: Net Income/Total Equity. Stock return is the percentage change in the stock prices calculated by: (Stock price at time t – Stock price at time t-1)/Stock price at time t-1. In stock price, most recent prior tradable day with trading activity is used provided the last tradable day for the instrument is within 378 completed calendar days (54 weeks). The data for all variables including WACC is collected from Refinitiv except independent variables which is gathered from both Refinitiv and MSCI. WACC is calculated by using a general WACC calculation formula: WACC Formula = (E/V * Ke) + (D/V) * Kd * (1 – Tax rate) where E is value of equity, D is value of debt, and V is the sum of E and D, Ke is the cost of equity and Kd is the cost of debt which are calculated separately. Kd is the interest that the firm pays on its debt where Ke is calculated using CAPM: Cost of Equity = Risk-Free Rate of Return + Beta * (Market Rate of Return – Risk-free Rate of Return). Generally, WACC is ex-ante measure where Refinitiv does not explicitly makes the information about the nature and calculation of WACC public. ESGC represent the score of ESG controversy out of 100. The observations represent the total number of observations used within each regression. The adjusted R^2 explains how well (what percentage of changes in) the performance measures are explained through ESGC. The data for the empirical analysis dates back 7 years from 2016 to 2022. The constant shows the value of financial performance factors if ESGC scores were zero. The relationship between Performance measures and proxies along with controls and fixed effects are explored using the following empirical models (detailed regression model can be found in Appendix B:*

$$Revenue_{it} = \alpha + \beta_1 ESGC_{it} + e_{it}$$

$$ROA_{it} = \alpha + \beta_1 ESGC_{it} + e_{it}$$

$$ROE_{it} = \alpha + \beta_1 ESGC_{it} + e_{it}$$

$$Stock\ Return_{it} = \alpha + \beta_1 ESGC_{it} + e_{it}$$

$$WACC_{it} = \alpha + \beta_1 ESGC_{it} + + e_{it}$$

The significance level of coefficients is represented by asterisks and the significance levels are as follows:

**** p-value <0.01*

*** p-value <0.05*

** p-vale <0.1*

The higher the significance of the coefficients, the stronger is the relationship between the dependent and independent variables.

A5 Model diagnostics

Sample model for test demonstration: (using MSCI dataset)

Revenue = ESG + log (Size) + Country + Year

A5.1 Before modification

Alias test

	ESG	Size	Denmark	Finland	Norway	X2022	X2021	X2020	X2019	X2018	X2017
Sweden	0	0	-1	-1	-1	0	0	0	0	0	0

VIF test

```
Error in vif.default(R21) : there are aliased coefficients in the model
```

Breusch-Pagan test

BP	12.694
df	10
p-value	0.2413

Shapiro-Wilk normality test

W	0.059048
p-value	< 2.2 e-16

Note: Alias test shows Sweden´s perfect correlation with other Nordic countries. The results can be confirmed from the VIF test which gives an error because of Sweden being part of the regression. The Breusch-Pagan test is used to detect heteroscedasticity. This test assumes that the residuals are distributed with equal variance where when this assumption is violated, there is heteroscedasticity present in the results. The p-value of the in this test is not significant thus suggesting the absence of heteroscedasticity. This can be due to the log of size. Additionally, the Shapiro-Wilk test helps us to determine the normality of the data. If the p-value of the results are not significant, this suggests normal distribution of the data or vice versa. In the results of this test, the p-value is highly significant thus suggesting the absence of normal distribution.

A5.2 After modification

Alias test
N/A

VIF test											
	ESG	log(Size)	Denmark	Finland	Norway	X2022	X2021	X2020	X2019	X2018	X2017
p-value	1.19454	1.18654	1.12904	1.17189	1.1392	1.76363	1.7354	1.7285	1.7218	1.7182	1.7157

Breusch-Pagan test	
BP	22.601
df	11
p-value	0.02011

Shapiro-Wilk normality test	
W	0.070473
p-value	< 2.2 e-16

Note: Based on the Alias test and the error showed in VIF test previously, the new model removes the country Sweden from the regression and runs the tests again. Alias test gives N/A as there is no perfect correlation seen. The results of Alias test can be confirmed from the VIF test which gives values less than 5 for all variables suggesting absence of any correlation. The Breusch-Pagan test however has worsened as the p-value of the test has gone below 0.05 suggesting the presence of heteroscedasticity now. Additionally, the Shapiro-Wilk test remains unchanged as it still shows the absence of normal distribution through its significant p-value.

Appendix B. Regression Models

B1 Regression models with controls and fixed effects

Group 1: ESG Combined

$$Revenue_{it} = \alpha + \beta 1\ ESG_{it} + \beta 2\ \log(Size_{it}) + \beta 3\ Country_{it} + \beta 4\ Year_{it} + e_{it}$$

$$ROA_{it} = \alpha + \beta 1\ ESG_{it} + \beta 2\ \log(Size_{it}) + \beta 3\ Country_{it} + \beta 4\ Year_{it} + e_{It}$$

$$ROE_{it} = \ + \beta 1\ ESG_{it} + \beta 2\ \log(Size_{it}) + \beta 3\ Country_{it} + \beta 4\ Year_{it} + e_{it}$$

$$Stock\ Return_{it} = \alpha + \beta 1\ ESG_{it} + \beta 2\ \log(Size_{it}) + \beta 3\ Country_{it} + \beta 4\ Year_{it} + e_{it}$$

$$WACC_{it} = \alpha + \beta 1\ ESG_{it} + \beta 2\ \log(Size_{it}) + \beta 3\ Country_{it} + \beta 4\ Year_{it} + e_{it}$$

Group 2: E, S, and G

$$Revenue_{it} = \alpha + \beta 1\ E_{it} + \beta 2\ S_{it} + \beta 3\ G_{it} + \beta 4\ \log(Size_{it}) + \beta 5\ Country_{it} + \beta 6\ Year_{it} + e_{it}$$

$$ROA_{it} = \alpha + \beta 1\ E_{it} + \beta 2\ S_{it} + \beta 3\ G_{it} + \beta 4\ \log(Size_{it}) + \beta 5\ Country_{it} + \beta 6\ Year_{it} + e_{it}$$

$$ROE_{it} = \alpha + \beta 1\ E_{it} + \beta 2\ S_{it} + \beta 3\ G_{it} + \beta 4\ \log(Size_{it}) + \beta 5\ Country_{it} + \beta 6\ Year_{it} + e_{it}$$

$$Stock\ Return_{it} = \alpha + \beta 1\ E_{it} + \beta 2\ S_{it} + \beta 3\ G_{it} + \beta 4\ \log(Size_{it}) + \beta 5\ Country_{it} + \beta 6\ Year_{it} + e_{it}$$

$$WACC_{it} = \alpha + \beta 1\ E_{it} + \beta 2\ S_{it} + \beta 3\ G_{it} + \beta 4\ \log(Size_{it}) + \beta 5\ Country_{it} + \beta 6\ Year_{it} + e_{it}$$

Group 3: ESG Controversy

$Revenue_{it} = \alpha + \beta 1\ ESGC_{it} + \beta 2\ \log(Size_{it}) + \beta 3\ Country_{it} + \beta 4\ Year_{it} + e_{it}$

$ROA_{it} = \alpha + \beta 1\ ESGC_{it} + \beta 2\ \log(Size_{it}) + \beta 3\ Country_{it} + \beta 4\ Year_{it} + e_{it}$

$ROE_{it} = \alpha + \beta 1\ ESGC_{it} + \beta 2\ \log(Size_{it}) + \beta 3\ Country_{it} + \beta 4\ Year_{it} + e_{it}$

$Stock\ Return_{it} = \alpha + \beta 1\ ESGC_{it} + \beta 2\ \log(Size_{it}) + \beta 3\ Country_{it} + \beta 4\ Year_{it} + e_{it}$

$WACC_{it} = \alpha + \beta 1\ ESGC_{it} + \beta 2\ \log(Size_{it}) + \beta 3\ Country_{it} + \beta 4\ Year_{it} + e_{it}$

B2 Regression models without controls and fixed effects

Group 1: ESG Combined

$Revenue_{it} = \alpha + \beta 1\ ESG_{it} + e_{it}$

$ROA_{it} = \alpha + \beta 1\ ESG_{it} + e_{It}$

$ROE_{it} = \alpha + \beta 1\ ESG_{it} + e_{it}$

$Stock\ Return_{it} = \alpha + \beta 1\ ESG_{it} + e_{it}$

$WACC_{it} = \alpha + \beta 1\ ESG_{it} + e_{it}$

Group 2: E, S, and G

$Revenue_{it} = \alpha + \beta 1\ E_{it} + \beta 2\ S_{it} + \beta 3\ G_{it} + e_{it}$

$ROA_{it} = \alpha + \beta 1\ E_{it} + \beta 2\ S_{it} + \beta 3\ G_{it} + e_{it}$

$ROE_{it} = \alpha + \beta 1\ E_{it} + \beta 2\ S_{it} + \beta 3\ G_{it} + e_{it}$

$Stock\ Return_{it} = \alpha + \beta 1\ E_{it} + \beta 2\ S_{it} + \beta 3\ G_{it} + e_{it}$

$WACC_{it} = \alpha + \beta 1\ E_{it} + \beta 2\ S_{it} + \beta 3\ G_{it} + e_{it}$

Group 3: ESG Controversy

$Revenue_{it} = \alpha + \beta 1\ ESGC_{it} + e_{it}$

$ROA_{it} = \alpha + \beta 1\ ESGC_{it} + e_{it}$

$ROE_{it} = \alpha + \beta 1\ ESGC_{it} + e_{it}$

$Stock\ Return_{it} = \alpha + \beta 1\ ESGC_{it} + e_{it}$

$WACC_{it} = \alpha + \beta 1\ ESGC_{it} + e_{it}$

Appendix C. List of stocks (Refinitiv)

Company Name	Company Name
Akastor ASA	Elisa Oyj
Aker Solutions ASA	Eniro Group AB
Alfa Laval AB	Equinor ASA
AP Moeller - Maersk A/S	Fabege AB
Assa Abloy AB	Fastighets AB Balder
Atlas Copco AB	FLSmidth & Co A/S
Axfood AB	Fortum Oyj
Bang & Olufsen A/S	Genmab A/S
Beijer Ref AB (publ)	Getinge AB
Billerud AB (publ)	Gjensidige Forsikring ASA
Boliden AB	GN Store Nord A/S
Cargotec Corp	Hexagon AB
Carlsberg A/S	Hexpol AB
Castellum AB	Holmen AB
Chr Hansen Holding A/S	Hufvudstaden AB
Clas Ohlson AB	Huhtamaki Oyj
Coloplast A/S	Husqvarna AB
CTT Systems AB	Intrum AB
Dampskibsselskabet Norden A/S	Investor AB
Demant A/S	ISS A/S
Dno ASA	JM AB
DSV A/S	Kemira Oyj
Electrolux AB	Kesko Oyj
Elekta AB (publ)	Kone Oyj

Company Name	Company Name
Ratos AB	Konecranes Abp
REC Silicon ASA	L E Lundbergforetagen AB (publ)
Rockwool A/S	Lindab International AB
Sampo plc	Metso Outotec Corp
Sandvik AB	Modern Times Group MTG AB
Sanoma Oyj	Mowi ASA
SAS AB	Ncc AB
Schibsted ASA	Nederman Holding AB
Sectra AB	Neste Oyj
Securitas AB	Nibe Industrier AB
Skanska AB	Nkt A/S
SKF AB	Nobia AB
SSAB AB	Nokia Oyj
Stora Enso Oyj	Nokian Tyres plc
Storebrand ASA	Nolato AB
Svenska Cellulosa SCA AB	Norsk Hydro ASA
Swedish Match AB	Novo Nordisk A/S
Swedish Orphan Biovitrum AB (publ)	Novozymes A/S
Saab AB	Oriola Oyj
Tele2 AB	Orion Oyj
Telefonaktiebolaget LM Ericsson	Orkla ASA
Telenor ASA	Outokumpu Oyj
Telia Company AB	Pandora A/S
TGS ASA	PGS ASA

Company Name
Tietoevry Oyj
Tomra Systems ASA
Topdanmark A/S
Trelleborg AB
Tryg A/S
UPM-Kymmene Oyj
Uponor Oyj
VBG Group AB (publ)
Veidekke ASA
Vestas Wind Systems A/S
Volvo AB
Wartsila Oyj Abp
Wihlborgs Fastigheter AB
Yara International ASA
YIT Oyj