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ESG Rating Disagreement and Firm Performance.

An Empirical Study of Nordic Listed Companies.

Master Thesis

By

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Master of Science in Business with Major in Sustainable Finance

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Abstract

The increasing focus on environmental, social, and governance (ESG) matters has led to the emergence of numerous ESG rating agencies that evaluate and rank companies based on their ESG performance. As a result, we now have a wide range of ESG ratings available. This study aims to examine two main aspects. Firstly, it investigates the presence of ESG rating disagreement among Nordic listed firms from 2012 to 2021, considering the ESG ratings provided by Bloomberg, Refinitiv, and S&P Global. Secondly, it explores the potential relationship between ESG rating disagreement and firm performance. We use two different financial measures to measure firm performance, return on assets (ROA) and stock returns. Panel regression with fixed effects is employed to conduct the analysis. Our findings indicate that there is no statistically significant relationship between ESG rating disagreement, stock returns, and ROA in the Nordic market. We discuss the practical implications of these results.

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List of Abbreviations

BM Book-to-Market

CR Current Ratio

CDP Carbon Disclosure Project

CFP Corporate Financial Performance

CSR Corporate Social Responsibility

CSRD Corporate Sustainability Reporting Directive

CSP Corporate Social Performance

ENV Environmental

ESG Environmental, Social, Governance

ESGD Environmental, Social, Governance, Disagreement

ESRS European Sustainability Reporting Standards

GOV Governance

GP Gross Profitability

ICB Industry Classification Benchmark

ISIN International Securities Identification Number

LEV Leverage

ROA Return on Assets

SOC Social

S&P Standard & Poor

SRI Socially Responsible Investing

1 Introduction

Sustainable investing has witnessed a notable rise in popularity over the past decade, signaling a growing awareness among investors of the importance of sustainability. This trend reflects a shift in the investment landscape, with more emphasis placed on considering environmental, social, and governance (ESG) factors when making investment decisions. The global sustainable investment market has experienced remarkable growth, with assets under management in this sector surging to USD 35.3 trillion in 2020, signifying a substantial 55% increase from 2016 to 2020 (GSIA, 2020). This shift in investor mindset, along with the growing demand from regulators and society for more disclosure and transparency, have placed considerable pressure on companies to demonstrate their commitment to ESG issues. As a result of these developments, the need for measuring sustainability has witnessed significant growth. Consequently, ESG rating agencies have emerged. These agencies assess and evaluate the ESG performance of companies, providing investors, stakeholders, and the public with information and ratings that reflect a company's sustainability practices and commitment to responsible business conduct. The agencies take into account a variety of factors when conducting their assessments, which may include carbon emissions, labor practices, board diversity, and ethical governance. By doing so, they aim to empower investors to make informed decisions, identify risks and opportunities, and promote sustainable and responsible investment practices.

Disclosure of ESG information plays a crucial role in non-financial reporting, providing valuable insights into a company's business operations (Li et al., 2018). Therefore, ESG ratings have gained significant importance, attracting attention in the financial press, regulatory debates, policy discussions, and academic research (Gibson et al., 2021). They have also become a central aspect of investment practice (Gibson et al., 2021). As a result, these agencies hold a critical role in the investment process as investors rely on their ratings to obtain a third-party assessment of the ESG performance of corporations (Berg et al., 2022b). However, despite the influence of ESG rating agencies, a substantial disagreement exists among the ratings provided by different agencies. The disagreement stems from the diverse methodologies employed in assigning

company-specific ratings. In addition, quantifying ESG performance presents challenges as methodologies often lack structure, and data can be incomplete (Avramov et al., 2022). The absence of a uniform framework and agreement of a firm's actual ESG performance contributes to high levels of uncertainty among ESG investors (Avramov et al., 2022). Furthermore, it raises concerns that market participants may be misled by these ratings (Christensen et al., 2022). Not surprisingly, investors have expressed significant concerns and criticisms regarding the ratings. These concerns include issues such as inaccuracies, incomplete data, and a lack of transparency, reporting, and disclosure (Rate the Raters, 2020). Accordingly, it becomes crucial for investors to carefully consider whether the approach employed by their chosen ratings provider aligns with their specific ESG preferences and requirements. This study explores the various consequences and financial implications of ESG rating disagreement.

1.1 Motivation for this study

Our motivation for conducting this study stems from our interest in sustainability within finance and our aspiration to work professionally with sustainable investments. Our motivation is further inspired by the prior research conducted by Gibson et al., 2021 and other scholars in the field who have highlighted the significance of ESG rating disagreement. Building upon their work, the primary objective of this study is to fill a research gap by specifically examining the relationship between ESG rating disagreement and firm performance in the Nordic region. While previous studies have predominantly focused on the American and larger European markets, there is a notable lack of investigation into companies from the Nordic countries. This research gap prompted our curiosity and led us to delve into the unique context of the Nordic market. By narrowing our focus to this region, we aim to shed light on the potential implications of ESG rating disagreement within the Nordic business landscape and bridge the gap in existing research on ESG rating disagreement.

1.2 ESG in the Nordic region

European countries are recognized as leaders in promoting sustainable development (Bullay, 2019 and Johansson et al., 2021 cited in Rahi et al., 2022, p.293). Among them, the Nordic countries have a strong tradition of sustainability and have been at the forefront of the ESG movement. According to the 2021 ESG Index, Finland, Sweden, Iceland, and Norway hold the top four positions globally in terms of ESG ratings, with Denmark ranking seventh (Global Risk Profile, 2021). Additionally, the Sustainable Development Report for 2022, which assesses countries' progress toward achieving the 17 Sustainable Development Goals (SDGs), ranks Finland, Denmark, Sweden, and Norway as the top four countries among all 193 UN Member States (Sustainable Development Report, 2022). Furthermore, the Nordic region demonstrates a strong interest in impact investing, with 9 out of 10 Nordic investors expressing interest in this field, and 22% planning to invest in impact strategies, as indicated by a study engaged by NN Investment Partners (Fixsen, 2020).

The Nordic financial institutions exhibit exceptional economic performance, close interconnections, and are subject to similar risks, policies, and institutions (Aggarwal, 2013; Berg et al., 1993 cited in Rahi et al., 2022, p.294). Interestingly, Eccles et al., 2011 found that the level of interest in the top 20 ESG metrics differ depending on geographical location (Europe vs. America). The study also indicates that when it comes to investor preferences, U.S. investors demonstrate a higher level of interest in governance aspects while showing relatively less interest in environmental information, in contrast to their European counterparts. This finding is particularly intriguing when comparing it to our own results and studies conducted within the United States. Given the scarcity of previous research on ESG ratings in the Nordic market, it is highly relevant, important, and timely to study the impact of ESG rating disagreement in this region. Hence, we formulate a two-part research question:

"Whether the Nordic is experiencing ESG rating disagreement, and how it impacts firm performance of Nordic companies".

2 Literature Review

This section provides an overview of the existing literature on ESG rating disagreement. It further examines the relationship between ESG ratings, ESG rating disagreement, and firm performance. Lastly, we explore the literature on diverse beliefs within financial markets.

2.1 ESG Rating Disagreement

ESG ratings have become widely used as a benchmark for evaluating a company's responsible and sustainable practices (Berg et al., 2022b). However, extensive literature documents significant variation in ratings assigned to the same company by different rating agencies (Berg et al., 2022a; Berg et al., 2022b; Chatterji et al., 2016; Gibson et al., 2021). For instance, in the study by Berg et al., 2022b analyzing ESG ratings from six different agencies, they observed a wide range of ratings ranging from 0.38 to 0.71. The variation in ratings is typically measured through correlation. Generally, ratings exceeding 0.8 are favored, while values above 0.667 are regarded as the minimum threshold for forming initial conclusions based on the raters' assessments (Krippendorff, 2004, p.204, cited in Berg et al., 2022b, p.9). The study by Gibson et al., 2021 confirms the lack of consensus and consistency in ESG ratings across different agencies. Notably, their study found the governance dimension to have the lowest average pairwise correlation (0.16), while the environmental dimension exhibited the highest (0.46). The overall average correlation across all dimensions was 0.45. However, Berg et al., 2022a reported an overall average pairwise correlation of only 0.2, while Berg et al., 2022b found it to be 0.54. Thus, drawing tentative conclusions based on the assessments provided by these agencies is not feasible according to any of these studies. The existing literature on ESG rating disagreement consistently highlights the low correlation observed among different raters. These findings underscore the considerable divergence in ESG ratings and emphasize the importance of enhancing consistency and standardization within the industry.

2.2 Determinants of Disagreement

Academic literature extensively addresses the issue of inconsistency and disagreement in ESG ratings. Various studies, including Berg et al., 2022b and Christensen et al., 2022, have delved into the underlying reasons for this notable divergence. A key contributing factor to the disagreement lies in the utilization of different metrics by the ESG rating agencies. Berg et al., 2022b discovered that 56% of the rating variance could be attributed to differences in measurement methods, indicating that agencies employ various indicators when assessing identical attributes. Additionally, 38% of the disagreement arises from "scope divergence," where agencies evaluate different sets of attributes, while only 9% of the disagreement stems from "weight divergence"(Berg et al., 2022b).

Another significant factor influencing ESG rating disagreements is the level of ESG disclosure provided by companies. Evidence from studies on credit ratings and analyst forecasts suggests that increased disclosure reduces information asymmetry, leading to greater agreement and higher correlation (Christensen et al., 2022; Hope, 2003; Lang and Lundholm, 1996; Morgan, 2002). Surprisingly, Christensen et al., 2022 found that companies with higher levels of ESG disclosure tend to experience higher levels of disagreement in ESG ratings. The study attributes this effect primarily to disparities in environmental and social disclosures, while government-related disclosures contribute less to the overall rating divergence. This research emphasizes the importance of comprehensive and standardized ESG disclosure practices to enhance consistency and comparability in ESG ratings. Moreover, Liang and Renneboog, 2017 explores the relationship between corporate social responsibility (CSR) and a country's legal origin. The study reveals a strong correlation between these two variables, with firms from common law countries (e.g., England, the United States, Canada, India, and Australia) exhibiting lower average CSR ratings compared to firms from civil law countries (e.g., France, Germany, Italy, Spain, and Scandinavia). Scandinavian civil law firms stood out with the highest CSR rating. (Liang and Renneboog, 2017). This literature becomes relevant when examining the link between ESG rating disagreement and firm

performance in the Nordic region.

2.3 ESG Performance and Firm Performance

While our study focuses on exploring the relationship between ESG rating disagreement rather than ESG performance, we find it relevant to review previous literature on ESG performance. These prior findings offer valuable insights that can enhance our understanding and contribute to the significance of our study.

For decades, ESG responsibilities were believed to have no impact on financial performance and were perceived as a cost burden (Billio et al., 2021). However, in the past twenty years, ESG issues have demonstrated their influence on several firms' profitability and financial viability (Billio et al., 2021). In response, the asset allocation process has evolved (Billio et al., 2021). Numerous studies have examined the relationship between ESG ratings, stock returns, and corporate financial performance (CFP). Most of these studies have found a significant positive relationship between ESG ratings and the financial performance of companies (Eccles et al., 2014; Fischer and Sawczyn, 2013; Friede et al., 2015; Orlitzky et al., 2003; Velte, 2017). Additionally, there is evidence of a significant positive relationship between ESG performance and stock returns (Khan et al., 2016; Lins et al., 2017). However, there are also studies that find no significant relationship between ESG performance and CFP, as observed in the study by Velte, 2017, and even a negative relationship between the two variables (Duque-Grisales and Aguilera-Caracuel, 2021). Similar results have been found regarding the relationship between ESG performance and stock returns (Brammer et al., 2006).

Eccles et al., 2014 conducted an analysis of ESG performance and financial performance in the corporate sector in the United States, suggesting a positive relationship between ESG and financial outcomes. The study showed that high-sustainable companies, which voluntarily adopted sustainable practices and policies, outperformed low-sustainable companies, which were a matched sample of companies that had not adopted any sustainable practices or policies, in terms of long-term stock returns and accounting performance. Similarly,

Fischer and Sawczyn, 2013 explored the impact of ESG performance on return on assets (ROA) but in Europe on large German listed firms. The research indicated a positive association between high ESG ratings and ROA, suggesting that companies with strong ESG ratings are more likely to experience favorable financial outcomes. The results also indicated that innovation plays a role in the relationship between ESG performance and financial performance. A more recent paper that investigated the same relationship in German listed firms is the study by Velte, 2017. In contrast to Fischer and Sawczyn, 2013, Velte, 2017 used both ROA and Tobin's Q as financial performance measurements. The study found a positive relationship between ESG performance and ROA, but no relationship was found between ESG performance and Tobin's Q.

Furthermore, two research papers conducted meta-analyses on multiple empirical studies examining the relationship between ESG performance and financial performance. Firstly, Friede et al., 2015 provided a comprehensive review and meta-analysis of over 2,000 empirical studies on the relationship between ESG factors and financial performance. The findings showed a positive correlation between ESG performance and financial outcomes in the majority of the analyzed studies. Companies with strong ESG practices tended to exhibit better financial performance, indicating that sustainability and financial success can be aligned. The paper contributed valuable insights into the growing research on ESG integration and highlighted the potential benefits of considering ESG factors in investment decisions. Secondly, Orlitzky et al., 2003 presented a meta-analysis of studies examining the relationship between corporate social performance (CSP) and corporate financial performance (CFP). Orlitzky et al., 2003 found a positive relationship between CSP and CFP. The results indicated that, on average, companies with better social performance also tended to exhibit better financial performance. Furthermore, CSP reputation was found to be highly correlated with financial performance.

Khan et al., 2016 examined the link between ESG performance and stock returns. They used the Sustainability Accounting Standards Board (SASB) to categorize sustainability issues as either immaterial or material, taking industry input into account. The results revealed that companies with high ratings on material sustainability issues demonstrated superior future performance

compared to those with lower ratings in the same area. Conversely, companies with high ratings on immaterial issues did not outperform companies with poor ratings in those specific areas (Khan et al., 2016). Notably, the companies that achieved the most promising future performance were those with high ratings on material issues, even if they had poor ratings on immaterial issues (Khan et al., 2016).

Lins et al., 2017 contributes to the existing literature by examining the relationship between corporate social responsibility (CSR) and stock returns during the 2008-2009 financial crisis. Their study revealed that companies with higher CSR scores experienced higher stock returns during this turbulent period. These findings highlighted the significance of trust between companies, stakeholders, and investors. Specifically, the results suggested that higher levels of CSR can be beneficial when the market is facing a negative shock and there is a general lack of trust. This underscored the importance of CSR in building and maintaining trust in challenging market conditions.

In contrast to the majority of studies, Duque-Grisales and Aguilera-Caracuel, 2021 found a negative relationship between ESG ratings and financial performance. The results suggested that companies focusing on ESG practices and, as a result, having the highest ESG ratings were less profitable, resulting in a negative effect on financial outcomes measured by ROA. Furthermore, Brammer et al., 2006 found a negative relationship between corporate social performance and stock returns. Their research findings were that companies with higher social performance scores may face higher costs and reduced profitability, leading to a negative impact on stock returns.

2.4 ESG Rating Disagreement and Firm Performance

In this section, we review the existing literature that explores the relationship between ESG rating disagreement and firm performance, the topic of this study. The research conducted by Gibson et al., 2021 provides valuable insights into the impact of ESG rating disagreement on stock returns within the S&P 500 companies. The findings reveal a significant and robust positive association

between ESG rating disagreement and stock returns, indicating that greater levels of disagreement among rating agencies correspond to higher stock returns. Notably, this relationship is primarily driven by disagreements related to the environmental dimension of ESG ratings (Gibson et al., 2021). The authors suggest that increased ESG rating disagreement can be viewed as a source of uncertainty, leading risk-averse investors to seek higher expected returns as compensation for this uncertainty. These findings align with existing literature on heterogeneous beliefs within financial markets (Gibson et al., 2021).

Avramov et al., 2022 examines the implications of ESG uncertainty using U.S. common stocks data from 2002 to 2019. The findings indicate that ESG uncertainty has an impact on the risk-return trade-off, social impact, and economic welfare. Consistent with previous research, the study confirms significant variations in ESG ratings across different rating agencies, with an average rating correlation of 0.48 (Avramov et al., 2022). The variation found is used as the ESG uncertainty variable calculated by the standard deviation (Avramov et al., 2022). The study highlights two key findings. Firstly, it reveals that investor demand for stocks is negatively affected by ESG rating uncertainty, particularly among ESG-sensitive investors such as norm-constrained institutions who prioritize ESG investment, specifically in green stocks (Avramov et al., 2022). This suggests that when uncertainty surrounds ESG ratings, investors tend to be more hesitant in their investment decisions. Secondly, the study finds that the outperformance of brown stocks compared to green stocks is contingent upon the level of rating uncertainty (Avramov et al., 2022). Brown stocks tend to exhibit superior performance only when the uncertainty surrounding ESG ratings is low (Avramov et al., 2022). Additionally, the negative return predictability associated with ESG ratings is not observed for the remaining firms, indicating that the relationship between ESG ratings and returns varies depending on the level of uncertainty (Avramov et al., 2022).

2.5 Heterogeneous Beliefs and Firm Performance

In the study by Gibson et al., 2021, the concept of ESG rating disagreement is presented as a potential source of uncertainty and higher risk, which in turn may

lead to higher stock returns. This idea aligns with earlier research conducted by Miller in 1977, where he explored the relationship between risk and return. Miller's study highlighted that stocks with higher levels of risk and uncertainty often exhibit greater divergence of opinions among investors. According to Miller's findings, divergent perceptions and interpretations of risk among investors can result in varied investment decisions and subsequently impact market outcomes (Miller, 1977). In the context of ESG rating disagreement, the presence of heterogeneous beliefs about a company's environmental, social, and governance performance can contribute to differing assessments of risk and potential returns. Anderson et al., 2005 also contributed to this literature by exploring heterogeneous beliefs and asset pricing in the financial markets. He examined whether divergence beliefs are priced, factors of risk affecting return, and whether it affects asset pricing models. The results show that heterogeneous beliefs will have a significant impact on asset pricing, and to improve the performance of the asset pricing model, the analysts' forecasts should be included in the model. Further, the study by Atmaz and Basak, 2018 examines belief dispersion in the financial market. When investors have different expectations and opinions about future stock returns, it will lead to beliefs dispersion in the market. The authors show that when there are different opinions regarding a stock, the price will increase, and the mean return decrease when there is an optimistic view of the stock, and vice versa. Furthermore, the results indicate that the existence of belief dispersion contributes to higher trading volume and stock volatility, establishing a positive relationship between these two factors. In other words, different opinions about stock performance will cause uncertainty in the market.

Miller, 1977, Anderson et al., 2005 and Atmaz and Basak, 2018 are papers focusing on the divergence of beliefs and their implications in the financial markets. While not directly focused on ESG rating disagreement and firm performance, these papers offer valuable insights into investor beliefs, heterogeneous opinions, and market dynamics that have relevance to our research. By examining these concepts, we can gain a broader understanding of the implications of ESG rating disagreement. Such disagreement can give rise to diverse beliefs about a company's ESG performance, introducing uncertainty

and information asymmetry. Consequently, it can significantly impact the return, price, volatility, and trading activity of a stock.

2.6 Connecting Previous Research to This Thesis

This thesis builds upon the existing body of research on ESG rating disagreement in the financial markets. While previous studies have primarily focused on exploring the reasons behind ESG rating disagreement, our research focuses on how disagreement impacts firm performance measured by stock returns and return on assets (ROA). Our study is based on the framework presented in Gibson et al., 2021 paper. We adopt their methodology of using stock returns as the dependent variable but incorporate return on assets (ROA) as an additional performance metric. Differentiating from Gibson et al., 2021 focus on the U.S. market, our study narrows its scope to the Nordic region. This regional focus will enable us to uncover potential implications and patterns that may differ from those observed in broader American studies. Next, we will measure the variation between raters but with a different set of rating agencies. By connecting our research to the existing literature and extending it to the Nordic region, our thesis contributes to the growing body of knowledge on ESG rating disagreement, providing evidence on the relationship between ESG rating disagreement and firm performance.

3 Methodology and Hypothesis

To answer the research question:*"Whether the Nordic is experiencing ESG rating disagreement, and how it impacts firm performance of Nordic companies".*, we have formulated two hypotheses. In this section we discuss and provide explanations for these hypotheses.

3.1 Hypothesis 1 - ESG Disagreement

Prior research has extensively examined and identified ESG rating disagreement across diverse geographical regions, such as the United States, Asia, the U.K, and European countries (Berg et al., 2022a; Berg et al., 2022b; Christensen

et al., 2022; Gibson et al., 2021). These studies has consistently demonstrated a relatively low average correlation among different ESG rating agencies. This disparity in ratings can be attributed to the absence of a universally standardized framework, leading to imperfect measurement and resulting in divergent assessments (Berg et al., 2022b). Considering these findings, it is plausible to assume that a similar level of disagreement exists within the Nordic market. Therefore, our research aims to investigate the following hypothesis:

Hypothesis 1: *"There is a significant level of ESG rating disagreement in the Nordic market".*

This hypothesis will be tested by performing pairwise Pearson correlations on ESG ratings.

3.2 Hypothesis 2 – Firm Performance

The increased awareness on the existence of ESG rating disagreement raises the question of whether this disagreement has any impact on firm performance. Prior studies have found contradicting results on this relationship. Several studies have found that companies with strong ESG performance tend to exhibit higher financial performance and stock returns compared to those with weaker ESG performance (Eccles et al., 2014; Khan et al., 2016; Lins et al., 2017; Velte, 2017), aligning with the stakeholder theory. According to the stakeholder theory, a firm's high performance requires satisfying stakeholders beyond financial returns, encompassing social and ethical concerns (Freeman, 1984). Given the significant positive relationship between high ESG ratings and ROA found by Eccles et al., 2014; Fischer and Sawczyn, 2013; Velte, 2017, and that CSP reputation is found to be positive correlated with the financial performance of a company (Orlitzky et al., 2003), it is reasonable to anticipate that ESG rating disagreement might negatively impact ROA. Discrepancies in ratings can potentially lead to adverse consequences for a company, including lower net income and reduced return on assets. This can be attributed to a diminished reputation among consumers and investors, resulting in decreased demand for the company's goods or services. Furthermore, previous studies have also demonstrated that ESG disagreement is associated with higher

stock returns (Gibson et al., 2021), which aligns with the risk-based theory. According to the risk-based theory, disagreement introduces uncertainty and increases risk, necessitating a risk premium for risk-averse investors (Anderson et al., 2005; Gibson et al., 2021). Considering the stakeholder theory, risk-based theory, and empirical findings, it is reasonable to expect that a higher level of ESG disagreement would impact a company's stock returns and return on assets. These considerations lead us to our second hypothesis:

Hypothesis 2a: *"Greater ESG rating disagreement leads to lower return on assets (ROA)"*
Hypothesis 2b: *"Greater ESG rating disagreement leads to higher stock returns."*

These hypothesis will be tested by performing fixed effects regression analysis.

3.3 Panel Data

This study examines changes in ESG ratings and their impact on firm performance across countries over a span of six years and is structured as panel data. Panel data refers to a dataset that combines both time-series and cross-sectional information, allowing for the analysis of the same entities over a time period to measure the same quantity (Brooks, 2019). The final sample, referred to as Common Sample 1 (section 4.3), consists of observations for each year from 2016 to 2021 and includes data from 59 unique companies. **Table 3.1** provides an excerpt from the dataset, illustrating the ESG ratings assigned to Carlsberg AS-B, a company based in Denmark, by three ESG rating agencies (Bloomberg, Refinitiv, and S&P Global) from 2016 to 2021.

Company Name	Year	Country	Bloomberg	Refinitiv	S&P Global
Carlsberg AS-B	2016	Denmark	58.87	69.61	38
Carlsberg AS-B	2017	Denmark	58.89	68.36	34
Carlsberg AS-B	2018	Denmark	59.86	73.26	30
Carlsberg AS-B	2019	Denmark	62.02	77.53	27
Carlsberg AS-B	2020	Denmark	62.47	75.64	51
Carlsberg AS-B	2021	Denmark	63.92	76.88	64

Table 3.1: A snippet from the final sample.

Panel data offers several advantages over cross-sectional or time-series data (Hsiao, 2007). By combining inter-individual differences and intra-individual dynamics, panel data analysis allows for more precise inference of model parameters (Hsiao, 2007). It also enables addressing a broader range of issues (Brooks, 2019). A single cross-section or time-series data has less capacity to capture the complexity of human behaviour compared to a broader range of data (Hsiao, 2007). However, panel data analysis comes with certain limitations. Controlling for the influence of unobserved heterogeneity is a major challenge in panel methodology, as it can hinder making causal inferences and accurately interpreting estimated coefficients (Hsiao, 2007). To mitigate the impact of unobserved heterogeneity, researchers often employ fixed-effect and random-effect models, which are valuable tools for limiting the challenges associated with panel data analysis. In the following section we will explain the choice of model and methods used to find the most suitable model for our data sample.

3.4 Model Building

To answer our research question, we consider various panel data models commonly used in the literature: Pooled OLS, fixed-effects model, and random-effects model (Brooks, 2019; Stock and Watson, 2020). Previous studies examining the relationship between ESG ratings and financial performance, as well as ESG rating disagreement and ESG disclosure, have predominantly utilized fixed-effects models (Berg et al., 2022b; Chen and Xie, 2022; Christensen et al., 2022; Gibson et al., 2021; Rahi et al., 2022; Velte, 2017). Therefore, we choose to employ a fixed-effects model, consistent with prior research.

To ensure robustness and cross-validate the results, we also estimate alternative models, including Pooled Ordinary Least Squares (OLS) and Random-effects models. The outcomes of these models are presented in Appendix 1. Additionally, we assess the accuracy and precision of the regression estimates through various tests, such as the Poolability test, Hausmann test, and Breusch-Pagan LM test, the results of which are provided in Appendix 1. These tests confirm the suitability of the fixed-effects model, which becomes the primary focus of our analysis.

3.4.1 Fixed Effects Model

We employ fixed effects regressions in panel data analysis to address the issue of omitted variables that exhibit variation across entities while remaining constant over time (Stock and Watson, 2020). This approach is valuable in capturing the individual-specific effects that may influence the relationship between ESG rating disagreement and firm performance.

Under the fixed effect framework, the regression model incorporates time-varying and cross-sectional intercepts, representing entity-specific effects unique to each firm (Brooks, 2019). Industry dummies are included to address variations in performance across different sectors, considering the distinct characteristics and ESG challenges faced by companies in different industries. Similarly, country dummies are used to control for country-specific factors, including regulatory environments, cultural norms, and institutional frameworks, which may impact both ESG practices and firm performance. Additionally, year dummies account for time-specific effects driven by macroeconomic conditions, policy changes, or other time-varying factors influencing ESG disagreement and firm performance.

In addition to fixed effects and dummy variables, our regression model incorporates key variables. The two main dependent variables are stock returns and return on assets (ROA), measuring firm performance. The extent of ESG disagreement is captured by the standard deviation of ESG ratings across the three rating agencies: Bloomberg, S&P Global, and Refinitiv. To ensure a comprehensive analysis, several financial control variables commonly used in empirical studies are included, capturing various aspects of a firm's financial characteristics (further discussed in section 4.2). By incorporating these fixed

effects, dummy variables, and control variables, our regression model aims to address omitted variable bias, account for entity-specific heterogeneity, and provide a more accurate understanding of the relationship between ESG rating disagreement and firm performance in the Nordic market. The equations for the fixed-effects models are shown below:

$$\begin{aligned} ROA_{i,t} = \alpha_i &+ \beta_{1_{ESGD,i,t}} + \beta_{2_{SIZE,i,t}} + \beta_{3_{LEV,i,t}} \\ &+ \beta_{4_{BETA,i,t}} + \beta_{5_{GP,i,t}} + \beta_{6_{BM,i,t}} + \beta_{7_{CR,i,t}} \\ &+ \beta_{8_{INDUSTRY,i,t}} + \beta_{9_{COUNTRY,i,t}} + \beta_{10_{YEAR,i,t}} + u_{i,t} \end{aligned} \tag{3.1}$$

$$\begin{aligned} StockReturns_{i,t} = \alpha_i &+ \beta_{1_{ESGD,i,t}} + \beta_{2_{SIZE,i,t}} + \beta_{3_{LEV,i,t}} \\ &+ \beta_{4_{BETA,i,t}} + \beta_{5_{GP,i,t}} + \beta_{6_{BM,i,t}} + \beta_{7_{CR,i,t}} \\ &+ \beta_{8_{INDUSTRY,i,t}} + \beta_{9_{COUNTRY,i,t}} + \beta_{10_{YEAR,i,t}} + u_{i,t} \end{aligned} \tag{3.2}$$

were $ROA_{i,t}$ is return on assets for firm i at time t; $StockReturns_{i,t}$ is the stock return for firm i at time t; α_i is the intercept for firm i at time t; $\beta_{1_{ESGD,i,t}}$ is ESG rating disagreement for firm i at time t; $\beta_{2_{SIZE,i,t}}$ is the market capitalization for firm i at time t; $\beta_{3_{LEV,i,t}}$ is the leverage for firm i at time t; $\beta_{4_{BETA,i,t}}$ is the market beta for firm i at time t; $\beta_{5_{GP,i,t}}$ is the gross profitability for firm i at time t; $\beta_{6_{BM,i,t}}$ is the book-to-market for firm i at time t; $\beta_{7_{CR,i,t}}$ is the current ratio for firm i at time t; $\beta_{8_{INDUSTRY,i,t}}$ is the ICB industry for firm i at time t; $\beta_{9_{COUNTRY,i,t}}$ is the country for firm i at time t; $\beta_{10_{YEAR,i,t}}$ is the year for firm i at time t; $u_{i,t}$ is the error term for firm i at time t.

3.5 Validity

3.5.1 Omitted Variable Bias

Omitted variable bias occurs when a relevant variable is excluded from the regression model, leading to biased inferences about the relationship among the included variables (Brooks, 2019). These omitted variables are important factors unintentionally left out of the analysis. When an omitted variable is correlated with both the independent and dependent variables, it can introduce

bias in the estimated coefficients, compromising their reliability and validity. To minimize omitted variable bias, we carefully consider and include all relevant variables in our regression model. In this study, we address omitted variable bias by incorporating control variables that have been shown to influence return on assets (ROA) and stock returns in previous research (Choi and Wang, 2009; Fischer and Sawczyn, 2013; Gibson et al., 2021; Orlitzky et al., 2003; Velte, 2017). By including these variables in our analysis, we aim to capture a comprehensive set of determinants of ROA and stock returns, reducing the likelihood of omitted variable bias. It is important to note that there may be other variables not included in our analysis that could potentially influence our dependent variables. For example, research and development (R&D) expenses have been found to relate to firm performance in some studies (Choi and Wang, 2009; Kogut and Zander, 1992; Velte, 2017). However, previous research on ESG performance, such as the study by Velte, 2017, did not find a significant relationship between R&D expenditures and financial performance. Additionally, the study by Fischer and Sawczyn, 2013 finds a positive relationship between corporate social performance (CSP) and R&D. Due to data limitations, we were unable to include R&D as a variable in our analysis, potentially introducing omitted variable bias.

3.5.2 Multicollinarity

There are two kinds of multicollinearity: perfect multicollinearity and imperfect multicollinearity. Perfect multicollinearity occurs when one or more variables are perfectly correlated, while imperfect multicollinearity arises when one or more variables are highly correlated (Stock and Watson, 2020). The presence of multicollinearity can lead to inflated R-squared values in the regression model, but the coefficients of individual variables will have large standard errors. Consequently, while the overall regression may appear favorable, the significance of the individual variables is diminished (Brooks, 2019). Moreover, even minor changes such as the inclusion or exclusion of a single variable can result in substantial modifications to the coefficient values and the statistical significance of the variables, indicating the high sensitivity of the regression model to multicollinearity (Brooks, 2019). To assess the potential issue of

multicollinearity, we conducted a Pearson correlation analysis of the dependent, independent, and control variables, presented in section 5.3. While most of the variables are not highly correlated, we further performed a Variance Inflation Factor (VIF) test to ensure that multicollinearity is not a concern. According to Velte, 2017, multicollinearity may be problematic if the VIF exceeds 10. The results of the VIF test, displayed in **Table 3.2** and **Table 3.3**, indicate that none of the variables have a VIF higher than 10. This suggests that multicollinearity is not a significant issue in our regression analysis.

VIF test

Dependent Variable: Return on Assets

Model	Total (ESG)	Environmental	Social	Governance
	(1)	(2)	(3)	(4)
ESGD	1.663	1.442	2.815	1.593
LEV	2.009	2.027	2.023	2.062
SIZE	1.766	1.751	1.778	1.752
BETA	1.689	1.672	1.694	1.707
CR	1.291	1.291	1.291	1.298
GP	1.488	1.479	1.482	1.468
BM	1.506	1.508	1.541	1.521
Firms included	59			
Sample period	2016-2021			
Rating agencies	Bloomberg, Refinitiv, S&P			

Table 3.2: Variance Inflation Factor (VIF) test

VIF test

Dependent Variable: Stock Returns

Model	Total (ESG)	Environmental	Social	Governance
	(1)	(2)	(3)	(4)
ESGD	1.663	1.442	2.815	1.593
LEV	2.009	2.027	2.023	2.062
SIZE	1.766	1.751	1.778	1.752
BETA	1.689	1.672	1.694	1.707
CR	1.291	1.291	1.291	1.298
GP	1.488	1.479	1.482	1.468
BM	1.506	1.501	1.541	1.521
Firms included		59		
Sample period		2016-2021		
Rating agencies		Bloomberg, Refinitiv, S&P		

Table 3.3: Variance Inflation Factor (VIF) test

3.5.3 Selection Bias

Selection bias arises when the availability of data is influenced by a selection mechanism that is related to the value of the dependent variable (Stock and Watson, 2020). To minimize selection bias, it is important to have a randomly selected sample that is representative of the population of interest. However, in this study, there is a potential for selection bias due to the non-random selection of companies in the Nordic market and the availability of ESG ratings from Bloomberg, S&P Global, and Refinitiv. One source of potential bias is the cost associated with obtaining and disclosing ESG information. The expenses involved in conducting ESG assessments, implementing sustainable initiatives, and meeting reporting standards can pose challenges for smaller and financially constrained companies. As a result, these companies may be less likely to participate in ESG disclosure practices, leading to an imbalanced representation of the overall ESG landscape. Moreover, the voluntary nature of ESG reporting allows companies to decide whether or not to disclose their ESG information. This lack of mandatory reporting requirements means that companies, especially those with limited resources, may opt not to disclose their ESG performance. Consequently, the pool of companies disclosing ESG

information may be biased towards larger and financially robust firms that have the necessary resources for ESG reporting. This selective disclosure can create a distorted impression of the overall ESG practices within the Nordic market, potentially overestimating the ESG performance among the disclosed companies.

The variation in country and industry composition also introduces potential selection biases. The distribution of companies in our sample is not evenly spread across all Nordic countries or industries. This imbalance in representation increases the risk of selection biases. Overrepresentation or underrepresentation of certain countries or industries in the sample can distort the findings and limit the generalizability of the results to a broader context. For instance, in our analysis (section 4.3), we find that 47% of the companies in the final sample are from Sweden, which indicates an uneven distribution. This disproportionate representation of Swedish companies may influence the results by reflecting the unique characteristics or dynamics specific to Sweden. Therefore, the findings may not be fully applicable or representative of companies from other Nordic countries or industries, potentially leading to biased conclusions.

4 Data Description

This section provides an overview of the screening process, the data sample, descriptive statistics, and variable descriptions.

4.1 Data Sample and Screening

This analysis faced limitations in terms of data availability, as the initial objective was to include a comprehensive sample of five major rating agencies. However, due to restricted access via the school's database and insufficient data points, the final sample was narrowed down to three rating agencies: Bloomberg, Refinitiv, and S&P Global. Encountering such challenges in obtaining ESG data is not uncommon, as highlighted in the research by Gibson et al., 2021. Furthermore, the focus on companies in the Nordic region further constrained the sample size.

Bloomberg, Refinitiv and S&P Global rates a firm's ESG disclosure on three dimensions: environmental, social and governance. ESG ratings provided by Refinitiv, and all financial data, were sourced from Refinitiv Eikon. ESG ratings provided by Bloomberg and S&P Global were obtained from the Bloomberg Terminal. The selected rating agencies in our sample are well-known and have been extensively examined in various studies that explore ESG rating disagreement and ESG uncertainty (Berg et al., 2022a; Berg et al., 2022b; Gibson et al., 2021). A detailed description of the rating agencies can be found in Appendix 3. **Table 4.1** presents an overview of the rating agencies included in the dataset, specifying their origin, scoring scale, sample period, and their four ESG disclosure dimensions (ESG, E, S, G). The impact of the different dimensions will be analysed separately in this thesis. To maintain consistency and minimize potential errors, no adjustments or conversions were made to the ratings. The inclusion of current and previous names is to ensure clarity and understanding of previous studies on this topic.

Rating Agency	Previous Name	Origin	Scoring	Sample Period	Dimension
Bloomberg	Bloomberg	US	0-100	2012-2021	ESG, E, S, G
S&P Global	RobecoSAM	US	0-100	2016-2021	ESG, E, S, G
Refinitiv	Asset4	CH	0-100	2012-2021	ESG, E, S, G

Table 4.1: Overview of data sample

Our data sample includes Nordic public listed companies, covering a timespan ranging from 2012 to 2021. To ensure significance, avoid selection bias, and create a representative dataset, companies without ESG ratings in the given timespan were excluded. Similarly, companies without annual return on assets (ROA) or stock returns data were also omitted, as this information is crucial for examining the relationship between ESG ratings, and firm performance. These exclusions were particularly important for panel data regressions, which require complete data for analysis. Furthermore, due to variations in the agencies' respective sample periods with S&P Global starting from 2016, we obtained a final sample of 59 firms operating in 4 Nordic countries across 11 different industries. Iceland was excluded from the analysis due to the limited number of observations and firms with ESG ratings.

To address the potential impact of the limited sample size on the results, a supplementary sample referred to as Common Sample 2 was constructed by excluding S&P Global. This additional sample yielded a larger number of data points and extended the time span, allowing for a more comprehensive analysis. Moreover, to capture a wide range of observations and variations, pairwise correlations between the rating agencies will be performed from the beginning of their respective sample periods. Bloomberg and Refinitiv share a common sample of 10 years, enabling a robust analysis of the relationships between the agencies, while S&P Global has a common sample of 6 years with the other two agencies. Finally, to ensure accurate matching of the ESG ratings from each agency during data merging, we use the unique ISIN number for each distinct firm and the company name as a common identifier.

4.2 Variable Description

4.2.1 Dependent Variables - ROA and Stock Returns

The dependent variables we will use in this study are stock returns and return on assets (ROA). ROA seems to be an appropriate indicator for financial performance as it captures the profitability of a firm relative to its total assets, offering a comprehensive measure of the firm's overall performance. Moreover, it is one of the most frequently used accounting-based financial performance measures and is widely used in literature such as in the study by Fischer and Sawczyn, 2013 and Velte, 2017. ROA is retrieved from Refinitiv Eikon on a yearly-basis and is calculated using the following formula:

$$\text{Return on Assets (ROA)} = \frac{\text{Net Income}}{\text{Total Assets}}$$

A one-year time lag was first introduced on ROA in the fixed-effects regression model consistent with previous studies which argues that the effect of ESG performance on financial performance will not occur at once (Velte, 2017). However, this did not influence the results and was ultimately dropped.

In compliance with Gibson et al., 2021 we also apply stock returns as the dependent variable. Stock returns reflects a company's ability to generate profits for its shareholders and how the market perceives a company's potential

future growth, and is a common used measurement to examines a company's performance. Stock returns are retrieved from Refinitiv Eikon on a yearly-basis and is calculated using the following formula:

$$\text{Stock Returns} = \left(\frac{\text{Ending Stock Price} - \text{Initial Stock Price}}{\text{Initial Stock Price}}\right) \times 100$$

4.2.2 Independent Variable – ESG Disagreement

The independent explanatory variable we will use in this study to measure ESG disagreement is the standard deviation. Using the standard deviation as an indicator for disagreement, rather than using the coefficient of variation, was influenced by the research conducted by Gibson et al., 2021 and Christensen et al., 2022 which investigates ESG rating disagreement and uses the standard deviation as a measure of disagreement.

The disagreement is measured by calculating the standard deviation for the aggregate rating (ESG) and the individual dimensions (E, S, G) within each rating agency (Refinitiv, Bloomberg, and S&P Global). By computing the standard deviation for all the ESG dimensions, we obtain a quantitative measure of the variability within the ratings across rating agencies, providing insights into the level of agreement or disagreement among these assessments. The standard deviation is given by:

$$\text{Standard Deviation} = \sqrt{\frac{1}{n-1}\sum_{i=1}^{n}(x_i - \bar{x})^2}$$

To ensure the robustness of our measures we also measured ESG disagreement as distance between the top and bottom rating (range). This method involves calculating the difference between the highest and lowest ESG ratings and neglecting the middle scores. However, this did not yield different outcomes compared to the standard deviation measure. Therefore, the standard deviation method was preferred.

4.2.3 Control Variables

Control variables are included in this study to test significance and ensure internal validity. The data for these control variables are retrieved from Refinitiv Eikon database, and calculations are based on Gibson et al., 2021.

Variables	Description	Method
Size	Stock price * Shares outstanding	Retrieved*
Beta	Firms' market beta	Retrieved*
Leverage	(Long-term debt + Debt in current liabilities) / Total assets	Calculated
Current Ratio	Current assets / Current liabilities	Calculated
Book-to-Market	Total assets / Market capitalization	Calculated
Gross Profitability	(Total revenues - Cost of goods sold) / Total assets	Calculated

Table 4.2: Description of Control Variables

The selection of control variables is based on previous research investigating the relationship between ESG ratings, stock returns and financial performance (Choi and Wang, 2009; Christensen et al., 2022; Fischer and Sawczyn, 2013; Gibson et al., 2021; Khan et al., 2016; Orlitzky et al., 2003; Velte, 2017). Hence, their inclusion can be justified as crucial for a comprehensive analysis of the relationship between ESG disagreement and firm performance. These studies have identified specific variables that are known to influence stock returns and financial performance. By including these relevant control variables in our analysis, we aim to account for their potential impact on the relationship between ESG ratings, stock returns and ROA. This is important in order to control for omitted variable bias as discussed in section 3.5.1. The control variables include a firms market beta, leverage, size (market capitalization), book-to-market ratio (BM), gross profitability (GP) and current ratio (CR). A detailed description of all variables used in this study can be found in Appendix 2 Table 7.8.

Controlling for firm size, a firms market beta, leverage, and industry are commonly used in literature (Choi and Wang, 2009; Fischer and Sawczyn, 2013; Khan et al., 2016; Orlitzky et al., 2003; Velte, 2017). To control for financial risk we employ beta as a measure of systematic risk, leverage as a measure of unsystematic risk and market capitalization as a measure of firm size, as done by (Velte, 2017). Since higher ESG performance could indicate lower risk, as argued by Velte, 2017, and ESG rating disagreement could indicate higher risk, as argued by both Gibson et al., 2021 and Avramov et al., 2022, controlling for risk is essential. The inclusion of the control variable size is justified due to

the potential benefits that arise from larger size, such as economies of scale or scope (Roberts and Dowling, 2002). Moreover, larger companies may have more resources to devote to ESG initiatives than smaller companies, which could affect their firm performance. Firm size is in this study represented by the natural logarithm of total assets. We expect firm size to be positively related to stock returns and ROA. Furthermore, in order to address the variations in ESG ratings across different industries and countries, we included industry and country dummies as control variables in our analysis. These dummies enable us to capture the influence of industry- and country-specific factors on the relationship between ESG rating disagreement and firm performance. These factors may include the level of regulatory requirements and the extent of socially responsible behavior expected within each industry and country (Choi and Wang, 2009; Fischer and Sawczyn, 2013). By controlling for country effects, we account for the differences and similarities among the Nordic countries, as each country may have its own unique regulatory framework and cultural norms related to ESG practices.

Additionally, the Nordic region encompasses a diverse range of industries, as illustrated in **Table 4.4**, each with potentially varying levels of exposure to ESG factors and their impact on firm performance. Controlling for industry effects allows us to isolate the specific effect of ESG rating disagreement on stock returns and financial performance within each industry. Different industries may exhibit distinct stakeholder management practices and performance outcomes, as argued by (Velte, 2017). Therefore, considering industry effects helps us examine the relationship between ESG rating disagreement and firm performance within the context of specific industries, providing a more nuanced analysis of the impact. Finally, we incorporate year-fixed effects into our analysis. The Nordic region has experienced economic, political, and environmental changes over time, which can potentially influence the relationship between ESG rating disagreement and firm performance. By including year-fixed effects, we account for the temporal dynamics and trends that may impact this relationship, such as shifts in investor preferences.

4.3 Descriptive Statistics

Table 4.3 provides descriptive statistics for the three rating agencies and is divided into three panels: Panel A, Panel B and Panel C.

Panel A: Full Sample	Bloomberg	Refinitiv	S&P Global
Sample Period	2012-2021	2012-2021	2016-2021
No. of Firms	184	111	65
Mean	40.82	60.74	67.75
Median	40.59	63.09	72.00
Minimum	4.31	5.64	6.00
Maximum	78.10	93.21	100
Standard Dev.	13.67	17.91	22.41

Panel B: Common Sample 1	Bloomberg	Refinitiv	S&P Global
Sample Period	2016-2021	2016-2021	2016-2021
No. of Firms	59	59	59
Mean	53.66	72.08	65.56
Median	53.61	74.95	70.00
Minimum	28.08	19.21	6.00
Maximum	78.10	93.21	100
Standard Dev.	10.81	13.68	23.38

Panel C: Common Sample 2	Bloomberg	Refinitiv
Sample Period	2012-2021	2012-2021
No. of Firms	103	103
Mean	45.93	62.02
Median	45.71	64.73
Minimum	7.91	5.64
Maximum	78.10	93.21
Standard Dev.	12.58	17.31

Table 4.3: Descriptive Statistics

In Panel A, we present the full sample after removing missing values, with the number of firms ranging from 65 to 184. Panel B displays Common Sample 1 consisting of 59 firms when including all three rating agencies. Lastly, Panel C

represents Common Sample 2 with only Bloomberg and Refinitiv, with a total of 103 firms in common. Analysing the data in **Table 4.3**, we observe that S&P Global exhibits a higher standard deviation compared to the other two agencies. This indicates a greater degree of variability in the ESG ratings provided by S&P Global. This could be the result of differences in data collection methods, or the specific firms included in the dataset. Additionally, S&P Global reaches the maximum rating of 100, whereas Refinitiv and Bloomberg have lower maximum ratings of 93 and 78, respectively. This is visually illustrated in section 4.4.

Further, we assess the variation in disagreement across different sectors. We employ the Industry Classification Benchmark (ICB) which categorizes the sample into 11 distinct sectors. **Table 4.4** presents the distribution of the sample across the different industries.

Industry	Frequency	Percentage
Basic Materials	9	15.25
Consumer Discretion	6	10.17
Consumer Staples	3	5.08
Energy	3	5.08
Financials	10	16.95
Health Care	6	10.17
Industrials	13	22.03
Real Estate	1	1.69
Technology	1	1.69
Telecommunications	5	8.47
Utilities	2	3.39
Total	59	100

Table 4.4: Overview of industry composition

As illustrated by **Table 4.4** the dominating industry in this sample is the Industrials sector which accounts for 22%, followed by Financials with 17%. Real Estate, Technology, Utilities and Energy represents the smallest portion. Considering the industry composition is crucial when evaluating the significance of the variation between sectors in this study. The final dataset consists of 4 Nordic countries. **Table 4.5** shows the sample distribution of firms across

countries.

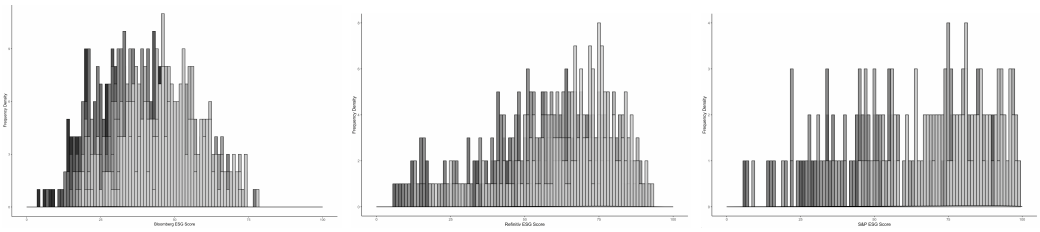
Country	Frequency	Percentage
Sweden	28	47.46
Finland	13	22.03
Denmark	12	20.34
Norway	6	10.17
Total	59	100

Table 4.5: Overview of country composition

The composition of our final sample is primarily influenced by the presence of Swedish companies, which represents 47.46%. The primary stock exchange in Sweden, Nasdaq Stockholm, is one of the largest stock exchanges in Europe ("Nasdaq Stockholm", n.d.), indicating a significant market capitalization and home to several large companies. A list of all the companies in the final sample is shown in Appendix 4. On the other hand, Norway has the lowest frequency of observations, representing only 10.17% of the sample. The variation in both the country and industry composition is important to consider since it makes our final sample skewed which can lead to selection biases.

4.4 Distribution of ESG Ratings

In **Figure 4.1**, the distribution of the aggregate ESG ratings provided by the three rating agencies is displayed in histograms.



((a)) Bloomberg **((b))** Refinitiv **((c))** S&P Global

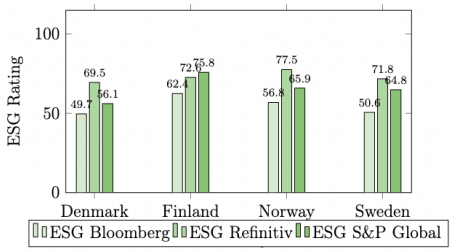
Figure 4.1: Distribution of the aggregate (ESG) rating

The ratings from Refinitiv and Bloomberg demonstrate a high concentration around their respective means. Ratings from S&P Global on the other hand,

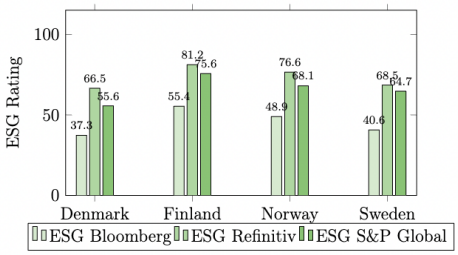
exhibit a positive skewness with a relatively higher concentration of ratings towards the upper end of the scale.

4.5 Average ESG Ratings

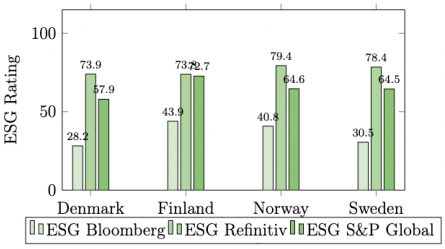
We plotted the average ESG ratings across the three rating agencies for each of the 4 countries and each of the 11 ICB industries. **Figure 4.2** displays average ESG ratings across countries. **Figure 4.2** reveals that, on average, Finnish firms demonstrate stronger performance across all four ESG dimensions compared to other Nordic countries, while Denmark exhibits the lowest averages among the countries. The figure also highlights significant variations in the average ESG ratings across different countries. Notably, the most pronounced divergence occurs between the ratings provided by Bloomberg and Refinitiv for both Sweden and Denmark, with an approximate difference of 50 points in the average social rating.



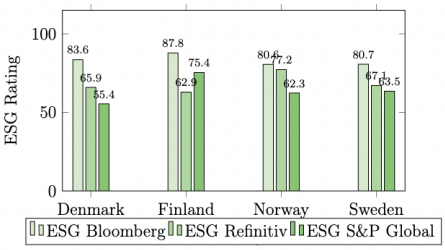
((a)) Aggregate (ESG) performance



((b)) Environmental performance



((c)) Social performance

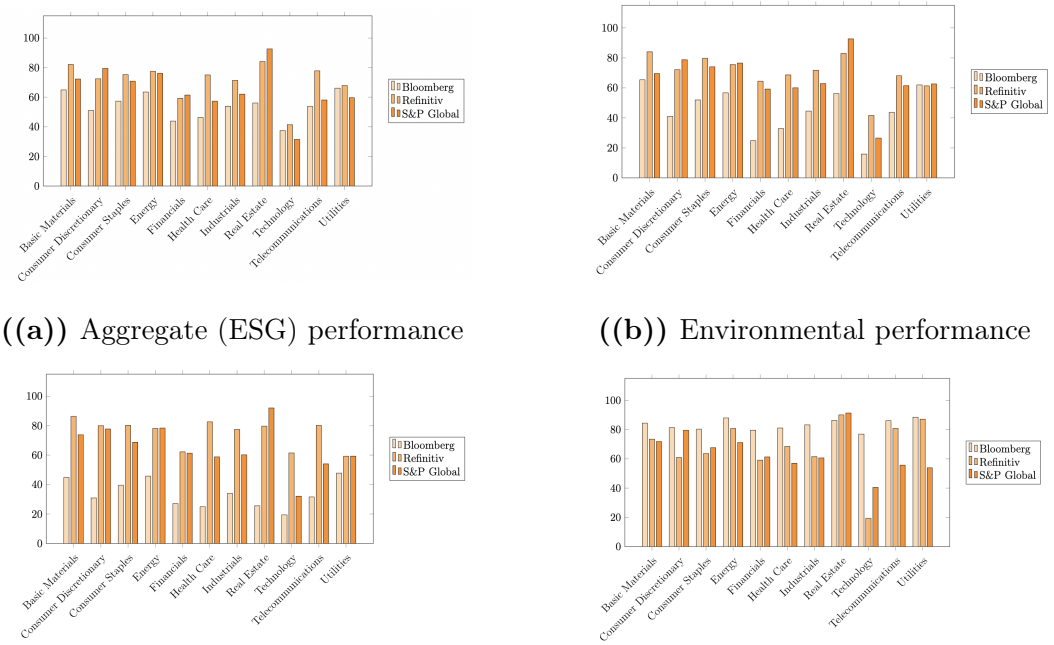


((d)) Governance performance

Figure 4.2: Average ESG rating performance by country

Moreover, notably Refinitiv's average ratings fall within the range of 60 to 80 across all dimensions for all countries. In contrast, Bloomberg's ratings exhibit a wider range, spanning from 28 to 87 on the same dimensions. Similarly, S&P Global's average ratings vary between 55 and 75, despite all agencies

utilizing the same scale of 0 to 100. Further, we assess the average ratings across industries as presented by **Figure 4.3** to see whether the same disagreement applies here.



((a)) Aggregate (ESG) performance

((b)) Environmental performance

((c)) Social performance

((d)) Governance performance

Figure 4.3: Average ESG rating performance by industry

The figures illustrate that the ESG ratings assigned to each industry exhibit variations across the three rating agencies, suggesting the presence of discrepancies. Notably, the discrepancies appear to be most pronounced in the environmental and social dimensions, like the findings across countries. In contrast, there is a higher level of agreement among the rating agencies in the governance dimension. These discrepancies in ratings across the agencies suggest a lack of consistency in the evaluation criteria, methodologies employed by each agency, differences in weighting and regulations.

Consequently, investors should exercise caution when relying solely on ESG ratings as a criterion for investment decisions and consider additional factors such as financial performance and risk. While average ESG ratings provide some insights, they alone are insufficient for drawing conclusions regarding the relative ESG performance. However, it is important to consider both the industry- and country composition described in section 4.3 as it influences the results.

4.6 Development of ROA and Stock Returns

Figure 4.4 illustrates the development of ROA over time for the period from 2012 to 2022.

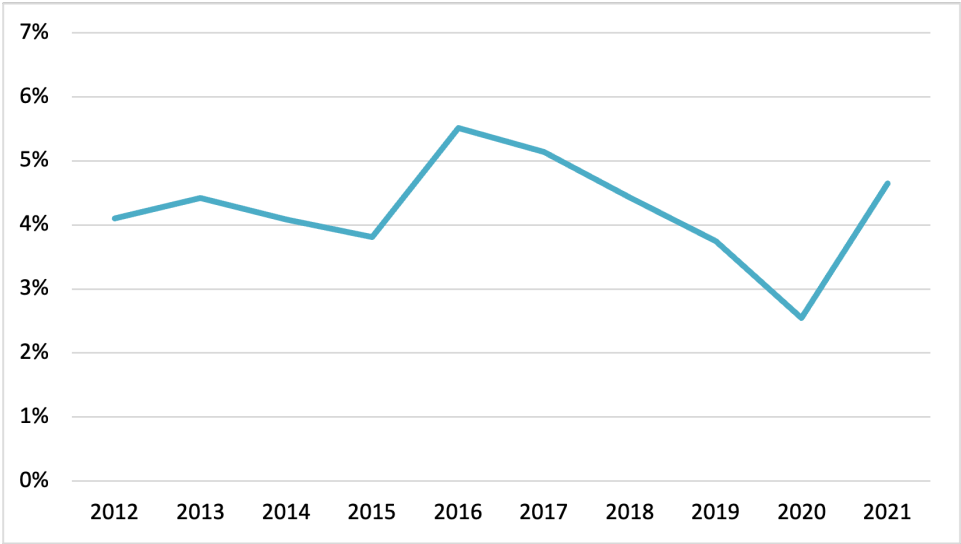


Figure 4.4: Average values of ROA

Figure 4.4 shows that the average ROA for Nordic companies has experienced fluctuations over the years, reaching a peak in 2016 and a low point in 2020. The decline in 2020 is likely attributed to the impact of the Covid-19 pandemic, which had adverse effects on global economies and businesses. Overall, a downward trend in ROA is observed throughout the period, suggesting a general decline in the profitability of Nordic companies over the years. It is important to note that these values represent averages, and individual companies within the Nordic region may exhibit significant deviations in their ROA values. **Figure 4.5** illustrates the development of stock returns over time for the period from 2012 to 2021.

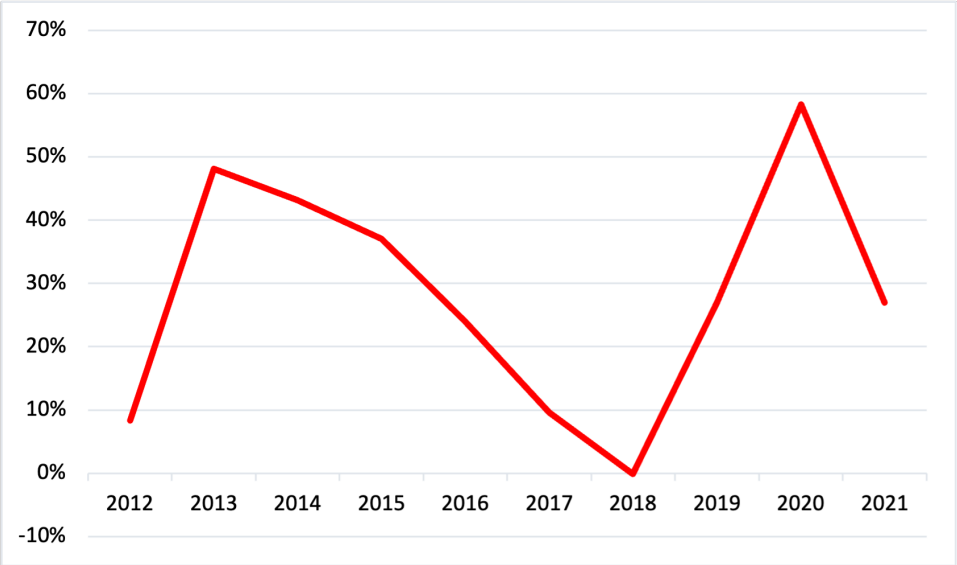


Figure 4.5: Average values of Stock Returns

Figure 4.5 shows the average stock returns of Nordic companies, demonstrating notable fluctuations throughout the years. Remarkably, there were peaks observed in both 2013 and 2020, while a bottom (negative) occurred in 2018. The increase in 2020 could be the result of different sectors of the economy experiencing varying impacts during the COVID-19 pandemic. Some sectors, such as technology, e-commerce, or healthcare, benefited from the crisis due to increased demand or favorable market conditions. Understanding the development of ROA and stock returns within our sample period provides us with a broader context to examine the relationship between ESG rating disagreement and firm performance in the Nordic market.

5 Results and Discussion

In this section, we present and discuss the results of our analysis. First, we address the correlation results, addressing the first part of the research question: *"Whether the Nordic region is experiencing ESG rating disagreement."* Next, we present the panel regression results, addressing the second part of the research question: *"How ESG rating disagreement impacts firm performance of Nordic companies."* Finally, we discuss the findings and provide plausible theoretical explanations.

5.1 Correlation between ESG Ratings

Table 5.1 displays the correlations between ESG ratings at the aggregate rating level (ESG) and the environmental (E), social (S), and governance (G) dimensions. The abbreviations BL, RE, and SP correspond to Bloomberg, Refinitiv, and S&P Global, respectively. The Pearson correlation method was used to calculate the correlations presented in **Table 5.1** from column two to four. The fifth column, labeled "Average," represents the average Pearson correlation of the pairwise correlations among the three providers for all four dimensions.

Dimension	BL/SP	RE/SP	RE/BL	Average
ESG	0,41	0,34	0,65	0,46
E	0,35	0,46	0,62	0,46
S	0,42	0,30	0,47	0,40
G	0,14	0,05	0,34	0,18

Table 5.1: Correlations between ESG Ratings and Rating Agencies

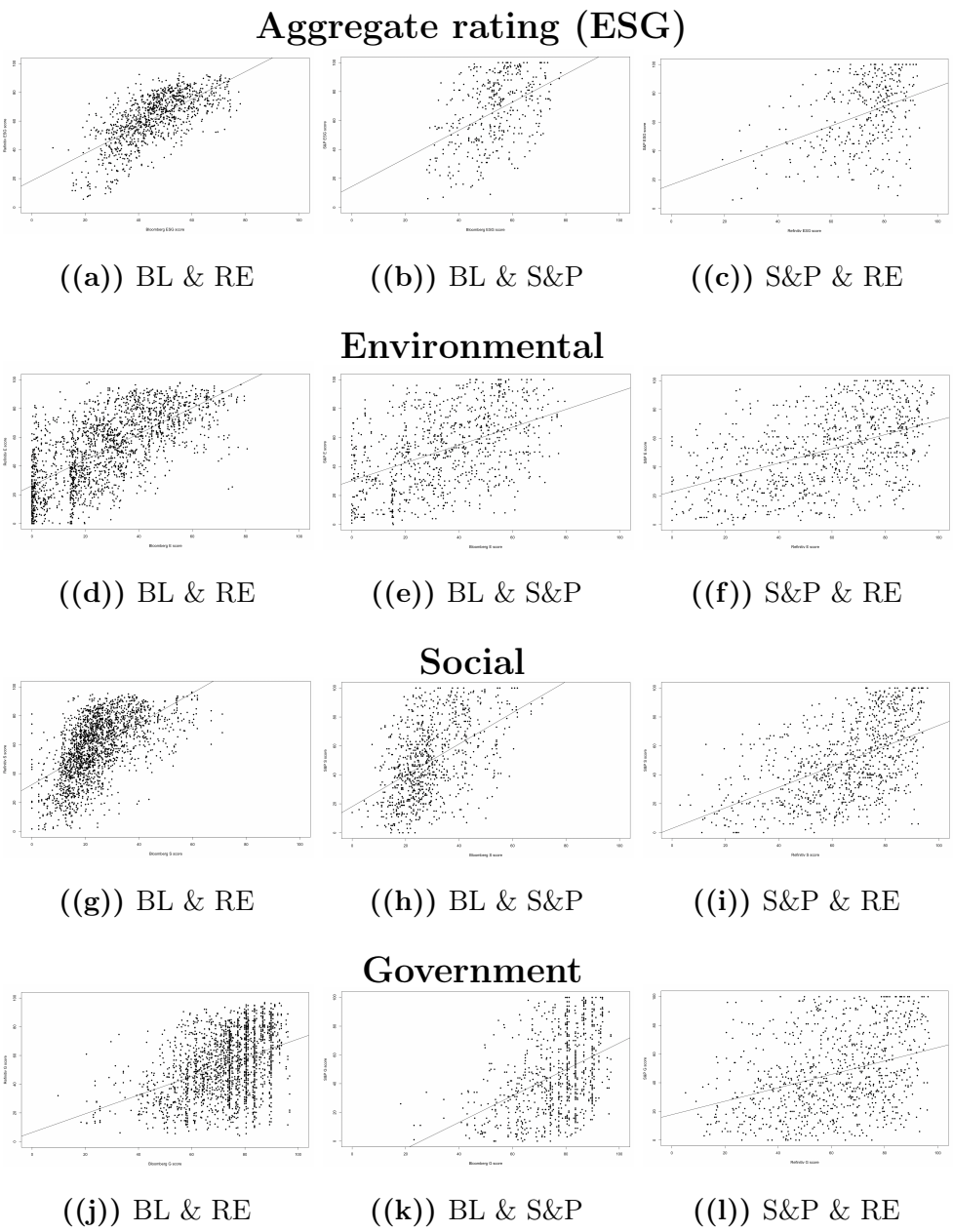
As illustrated, the average pairwise correlation among the aggregate level (ESG) ratings provided by Bloomberg, Refinitiv, and S&P Global is 0.46, indicating a moderate level of agreement. This value is presented in the last column. This moderate level of agreement is consistent with previous research, such as the study by Berg et al., 2022b and Gibson et al., 2021, which reported average correlations of 0.54 and 0.45, respectively. At the aggregate level (ESG), the lowest correlation is observed between Refinitiv and S&P Global (0.34), while the highest correlation is between Refinitiv and Bloomberg (0.65). These correlations provide insights into the degree of consensus among the rating providers' assessments of ESG performance.

We further analyzed pairwise correlations for each of the dimensions (E, S, and G). Among these dimensions, the governance dimension showed the lowest average pairwise correlation of 0.18, followed by the social dimension of 0,40. Specifically, the correlation in the governance dimension was notably low between Bloomberg and S&P Global (0.14) and Refinitiv and S&P Global (0.05). In contrast, the environmental dimension showed average correlation

of 0.46. Correlation in this dimension was particularly high between Refinitiv and Bloomberg (0.62).

Our findings regarding the individual correlation within each of the three dimensions align with the existing literature, as observed in the studies conducted by Berg et al., 2022b and Gibson et al., 2021. According to Gibson et al., 2021, the lower agreement in the governance dimension may stem from agencies having differing views on the most critical issues and facing challenges in quantifying them accurately. This highlights the difficulty in measuring governance, with rating agencies adopting varied approaches (Chatterji et al., 2016; Gibson et al., 2021). On the other hand, the higher correlation discovered in the environmental dimension can be attributed to the growing regulatory framework governing its measurement. Additionally, the environmental dimension lends itself more easily to quantification due to the availability of standardized metrics such as water usage and carbon emissions which are tangible, and there is no need for adopting varied approaches (Gibson et al., 2021). In contrast, the social and governance dimensions are more diffuse and challenging to quantify precisely due to intangible measurement. Thus, we conclude that this finding of a moderate level of agreement observed among the rating agencies supports our first hypothesis that there is a significant level of ESG rating disagreement in the Nordic market.

To visually support the findings presented in **Table 5.1** we plotted scatterplots which displays the linear relationships between the rating agencies for each ESG dimension (Aggregate (ESG), Environmental, Social, Governance). The scatterplots clearly demonstrate a low correlation between Refinitiv and S&P Global, as the ESG ratings provided by these two agencies exhibit significant variability in terms of spread. The scatterplots reveal that the governance dimension displays the most divergence.



((a)) BL & RE ((b)) BL & S&P ((c)) S&P & RE

((d)) BL & RE ((e)) BL & S&P ((f)) S&P & RE

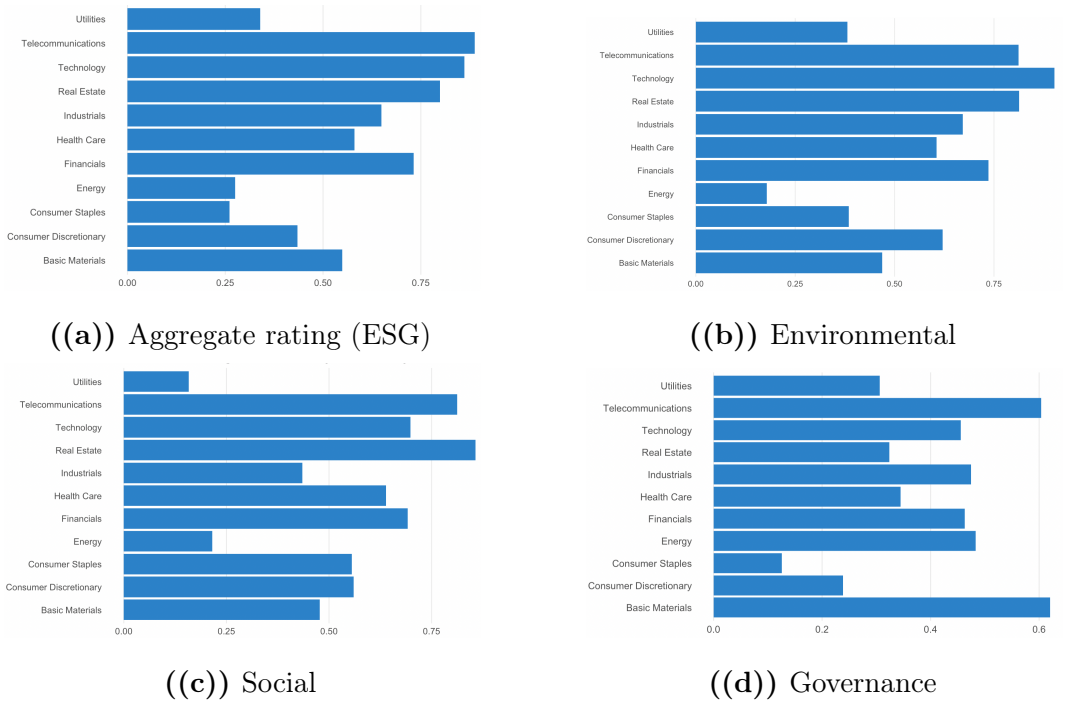
((g)) BL & RE ((h)) BL & S&P ((i)) S&P & RE

((j)) BL & RE ((k)) BL & S&P ((l)) S&P & RE

Figure 5.1: Scatterplots of ESG ratings

5.2 Correlation between Industries

Figure 5.2 shows whether the average pairwise correlations between ESG ratings vary across industries. We plotted the average correlations across the three rating agencies for each of the 11 ICB industries.



((a)) Aggregate rating (ESG)

((b)) Environmental

((c)) Social

((d)) Governance

Figure 5.2: Average Pearson correlations by industries

Our findings highlight notable variations in the average pairwise correlations of ESG ratings across different sectors. Specifically, the consumer staples and energy sectors display the lowest level of agreement among the rating agencies, indicating significant divergence in their assessments. On the other hand, the telecommunications sector demonstrates the highest level of agreement, with minimal disagreement at the aggregate rating (ESG) level, as depicted in panel a. Examining the environmental ratings (panel b) and social ratings (panel c), we observe correlations similar to the aggregate rating (ESG) but with some variations. However, when considering the governance rating (panel d), we find a comparatively lower correlation overall, with the telecommunications and basic materials industries standing out as particularly distinct. These results shed light on the sector-specific dynamics influencing the agreement or disagreement among the rating agencies' assessments of ESG performance.

5.3 Correlation Matrix

Table 5.2 displays the Pearson correlation matrix between the dependent variable (ROA), independent variable (ESGD), and control variables for Common Sample 1.

	ROA	ESG RE	ENV RE	SOC RE	GOV RE	ESG SP	ENV SP	SOC SP	GOV SP	ESG BL	ENV BL	SOC BL	GOV BL	ESGD	SIZE	BETA	LEV	BM	GP	CR
ROA	1.0000																			
ESG RE	−0.5596*	1.0000																		
ENV RE	−0.5451*	0.8739*	1.0000																	
SOC RE	−0.2766	0.8991*	0.7703*	1.0000																
GOV RE	−0.6403*	0.7832*	0.4739*	0.5307*	1.0000															
ESG SP	−0.2640	0.4421	0.6455*	0.3855	0.1344	1.0000														
ENV SP	−0.2468	0.4414	0.6394*	0.3909	0.1326	0.9927*	1.0000													
SOC SP	−0.2559	0.4264	0.6182*	0.3681	0.1376	0.9949*	0.9825*	1.0000												
GOV SP	−0.2362	0.4193	0.6271*	0.3740	0.1061	0.9963*	0.9862*	0.9904*	1.0000											
ESG BL	−0.5222*	0.7016*	0.7566*	0.5143*	0.4884*	0.5883*	0.5543*	0.5902*	0.5615*	1.0000										
ENV BL	−0.5301*	0.7819*	0.8386*	0.6248*	0.5066*	0.5961*	0.5675*	0.5911*	0.5727*	0.9761*	1.0000									
SOC BL	−0.5379*	0.6534*	0.7090*	0.4618*	0.4706*	0.5870*	0.5470*	0.5951*	0.5611*	0.9805*	0.9398*	1.0000								
GOV BL	−0.2581	0.2552	0.2810	0.0481	0.2713	0.3320	0.3055	0.3436	0.3021	0.7295*	0.5883*	0.6924*	1.0000							
ESGD	0.0098	0.2247	0.0422	0.3356	0.2351	−0.1857	−0.1381	−0.2156	−0.1682	−0.4613*	−0.3296	−0.4985*	−0.6481*	1.0000						
SIZE	0.5061*	−0.3101	−0.2390	−0.2130	−0.3166	−0.1725	−0.1785	−0.1765	−0.1842	−0.2628	−0.3183	−0.2556	0.0129	−0.1485	1.0000					
BETA	−0.0760	0.0267	0.1190	−0.0069	−0.0599	0.2257	0.1763	0.2677	0.2139	0.3654	0.3134	0.3952	0.3341	−0.5131*	0.0067	1.0000				
LEV	−0.5245*	0.1554	0.0357	−0.0245	0.3948	−0.3611	−0.3552	−0.3966	−0.3785	−0.0181	0.0107	−0.0143	−0.1151	0.1643	−0.2352	−0.4320	1.0000			
BM	−0.0890	−0.2158	−0.1515	−0.1932	−0.1374	0.0768	0.0536	0.0952	0.0925	−0.1899	−0.1906	−0.1848	−0.1241	−0.0529	0.0251	0.0298	−0.2457	1.0000		
GP	0.8449*	−0.3658	−0.3831	−0.0641	−0.5149*	−0.1902	−0.1683	−0.1983	−0.1709	−0.4281	−0.4171	−0.4433	−0.2659	0.0984	0.3308	−0.1355	−0.4975	−0.0718*	1.0000	
CR	0.4100	−0.4726*	−0.5641*	−0.3967	−0.2727	−0.3323	−0.3008	−0.2797	−0.3216	−0.5336*	−0.5822*	−0.4974*	−0.2355	0.1042	0.0587	0.0793	−0.3930	−0.0571	0.2327	1.0000

The symbol * indicate significance at the 5% level.

Table 5.2: Pearson correlation matrix with ROA

The correlation matrix reveals interesting relationships between various variables. There is a consistent pattern of strong negative correlations between ROA and all ESG ratings and their respective dimensions (environmental, social, governance). This suggests that companies with higher ESG ratings tend to have lower ROA, or alternatively, companies with higher ROA tend to have lower ESG ratings. On the other hand, a positive and significant correlation is observed between size and ROA. This indicates that larger companies tend to have higher ROA, reflecting a positive association between company size and return on assets. This result was expected. Furthermore, a negative correlation is found between leverage (LEV) and ROA. This implies that companies with higher levels of leverage tend to have lower ROA, indicating a negative relationship between leverage and return on assets. The correlation between a firms market beta and ROA is weakly positive, indicating a small positive relationship between a firm's beta and return on assets. Moreover, there is a high correlation between gross profitability (GP) and ROA, indicating a strong positive relationship between these two measures of financial performance. The current ratio (CR) also exhibits a moderate correlation with ROA, suggesting a moderate positive association. Lastly, the correlation between book-to-market (BM) and ROA is weakly negative, indicating a slight negative relationship between these variables.

Table 5.3 displays the Pearson correlation matrix between the dependent variable Stock Returns, independent variable (ESGD), and control variables

for Common Sample 1.

	RETURN	ESG RE	ENV RE	SOC RE	GOV RE	ESG SP	ENV SP	SOC SP	GOV SP	ESG BL	ENV BL	SOC BL	GOV BL	ESGD	SIZE	BETA	LEV	BM	GP	CR
RETURN	1.0000																			
ESG RE	−0.1212*	1.0000																		
ENV RE	−0.1720*	0.7279***	1.0000																	
SOC RE	0.0527	0.8076***	0.5134***	1.0000																
GOV RE	−0.1926***	0.7023***	0.2192***	0.3313***	1.0000															
ESG SP	−0.0108	0.3917***	0.4707***	0.3088***	0.1740**	1.0000														
ENV SP	0.0086	0.3858***	0.4548***	0.3026***	0.1729**	0.9238***	1.0000													
SOC SP	0.0099	0.3777***	0.4190***	0.3041***	0.2001***	0.9481***	0.8430***	1.0000												
GOV SP	0.0242	0.3532***	0.4388***	0.2831***	0.1366*	0.9454***	0.8406***	0.8831***	1.0000											
ESG BL	−0.1339*	0.5859***	0.5408***	0.3888***	0.3721***	0.4609***	0.4133***	0.4573***	0.4190***	1.0000										
ENV BL	−0.1157*	0.6211***	0.6089***	0.4513***	0.3278***	0.4303***	0.3950***	0.4183***	0.3939***	0.9220***	1.0000									
SOC BL	−0.1808***	0.4708***	0.4173***	0.3079***	0.3317***	0.4181***	0.3512***	0.4308***	0.3886***	0.8781***	0.7036***	1.0000								
GOV BL	0.0032	0.2107***	0.1334*	0.0507	0.2456***	0.2321***	0.2230***	0.2263***	0.1912***	0.5820***	0.3360***	0.4075***	1.0000							
ESGD	0.0288	0.3228***	0.1685**	0.3173	0.2636***	0.0088	0.0537	−0.0193	0.0245	−0.2488***	−0.1400**	−0.2743***	−0.2755***	1.0000						
SIZE	0.3279***	0.0514	0.0871	0.0603	0.0326	0.0646	0.0574	0.0595	0.0216	−0.0019	−0.0722	0.0117	0.1507**	−0.0476	1.0000					
BETA	0.0270	0.1022	0.1060*	0.0843	0.0569	0.1645**	0.1116*	0.2010***	0.1412**	0.2591***	0.2159***	0.2584***	0.1566**	−0.1966***	0.0850	1.0000				
LEV	−0.3026***	0.0617	0.0087	−0.0614	0.2040***	−0.2157***	−0.1839***	−0.2407***	−0.2305***	−0.0440	−0.0302	−0.0249	−0.0721	0.0450	−0.0941	−0.2464***	1.0000			
BM	−0.0659	−0.0186	−0.0157	−0.0059	0.0489	0.1038	0.0764	0.1313*	0.1129*	−0.0550	−0.0531	−0.0637	−0.0018	−0.0128	0.0556	0.0554	−0.1585**	1.0000		
GP	0.5663***	0.0065	−0.0621	0.1719**	−0.1129*	0.0304	0.0551	0.0135	0.0222	−0.0971	−0.0995	−0.1013	−0.0069	0.0656	0.1542**	−0.0140	−0.2882***	-0.0275	1.0000	
CR	0.1907***	−0.0880	−0.1871**	−0.087	0.0354	−0.0916	−0.0338	−0.0087	−0.0954	−0.2079***	−0.2606***	−0.1522**	0.0005	0.0613	−0.0116	0.1216*	−0.2737***	-0.0631	0.0393	1.0000

The symbol "***", "**" and "*" indicates significance at the 0.1%, 1% and 5% level.

Table 5.3: Pearson correlation matrix with Stock Returns

The two correlation matrices, **Table 5.2** and **Table 5.3**, exhibit some similarities in the relationships between variables. Specifically, there are similar findings related to firm size, leverage (LEV), book-to-market (BM), gross profitability (GP), current ratio (CR), and stock returns. First, there is a positive and significant correlation between stock returns and firm size, indicating that larger companies tend to have higher stock returns. Similarly, there is a positive and significant correlation between stock returns and gross profitability, as well as the current ratio. These findings suggest a positive association between these financial performance measures and stock returns. On the other hand, there is a negative and significant relationship between stock returns and leverage, indicating that companies with higher levels of leverage tend to have lower stock returns. Additionally, there is a weak negative correlation between stock returns and book-to-market, suggesting a slight negative relationship between these variables.

The ESG ratings exhibit positive relationships with stock returns across various dimensions and from different sources. Specifically, we find positive associations between stock returns and the environmental dimension from S&P Global, the social dimension from Refinitiv and S&P Global, and the governance dimension from Bloomberg. Moreover, negative relationships are observed between stock returns and the overall ratings from Refinitiv, S&P Global, and Bloomberg, as well as the environmental dimension from Refinitiv and Bloomberg, the social

dimension from Bloomberg, and the governance dimension from Refinitiv.

The positive correlations within the same rating agency for different ESG ratings indicate that companies excelling in one ESG dimension tend to perform well in others. This suggests internal consistency within the rating agencies. For example, the correlation matrix for ROA reveals that the aggregate ESG ratings from Refinitiv, Bloomberg, and S&P Global have correlations ranging from 0.44 to 0.70. Similarly, the correlation matrix for stock returns ranges from 0.39 to 0.58. Notably, the strongest correlation is observed between Refinitiv and Bloomberg, with correlations of 0.70 and 0.58, respectively, corroborating the findings presented in **Table 5.1**. Furthermore, in the environmental dimension, the ROA correlation matrix shows robust correlations ranging from 0.57 to 0.84, while the correlation range in the stock return matrix is from 0.45 to 0.60. Conversely, the correlations in the governance dimension are weaker, ranging from 0.10 to 0.30 in the ROA correlation matrix, and from 0.13 to 0.25 in the stock return matrix. These findings align with existing literature and provide empirical evidence supporting the expected relationships between ESG ratings, financial performance indicators, and firm characteristics.

5.4 Regressions Results

In this section, we analyse the relationship between ESG rating disagreement, stock returns and return on assets (ROA) using a fixed effects regression model. This analysis addresses the second part of our research question: *"How disagreement impacts stock returns and financial performance of Nordic companies"*. ROA and stock returns are the dependent variables, while ESG rating disagreement (ESGD) is the independent variable, measured as the standard deviation. In addition, we include country, industry, and year-fixed effects.

5.4.1 ESG Disagreement on Firm Performance

Table 5.4 and **Table 5.5** illustrates the results of the fixed-effect models, presenting coefficient estimates and standard errors (in parentheses) for all the variables. These results pertain to Common Sample 1 (section 4.3). We

estimate the impact of ESG disagreement on ROA and Stock Returns separately for each of the four ESG dimensions, as shown in column (1) to column (4) in **Table 5.4** and **Table 5.5**.

Fixed effects model: Common Sample 1

Dependent Variable: Return on Assets

Variable	Total (ESG)	Environmental	Social	Governance	
	(1)	(2)	(3)	(4)	
ESGD	0.001	0.001	0.000	-0.001	
	(0.001)	(0.001)	(0.001)	(0.001)	
LEV	-0.055	-0.047	-0.064	-0.062	
	(0.046)	(0.046)	(0.045)	(0.044)	
SIZE	0.037	0.037	0.038	0.038	***
	(0.009)	(0.009)	(0.009)	(0.009)	
BETA	0.009	0.008	0.008	0.006	
	(0.012)	(0.012)	(0.012)	(0.012)	
CR	0.005	0.006	0.005	0.005	
	(0.005)	(0.005)	(0.005)	(0.005)	
GP	0.095	0.095	0.097	0.098	***
	(0.019)	(0.019)	(0.019)	(0.019)	
BM	0.000	0.000	0.000	0.000	
	(0.000)	(0.000)	(0.000)	(0.000)	
Adj. R-squared	0.3%	0.8%	-0.2%	0.8%	
N	300	300	300	300	
Country FE	Yes	Yes	Yes	Yes	
Industry * Year FE	Yes	Yes	Yes	Yes	
Firms included		51			
Sample period		2016-2021			
Rating agencies		Bloomberg, Refinitiv, S&P			

Table 5.4: Fixed effects Common Sample 1 ROA

This table presents the results of the fixed effect model, with double clustered errors, using Common Sample 1, enveloping ratings from Bloomberg, Refinitiv and S&P Global during the period from 2016 to 2021. The dependent variable in the model is the return on assets (ROA), while the independent variable is ESGD, representing the standard deviation of the ratings. Additionally, several control variables are included: Leverage, Size, Beta, CR (Current Ratio), GP (Gross Profitability), and BM (Book to Market). The model accounts for fixed effects at the industry, year, and country levels. The symbols ** and *** indicate significance at the 5% and 1% levels, respectively.

Fixed effects model: Common Sample 1

Dependent Variable: Stock Returns

Variable	Total (ESG)	Environmental	Social	Governance	
	(1)	(2)	(3)	(4)	
ESGD	0.000	-0.004	0.001	0.002	
	(0.005)	(0.003)	(0.005)	(0.003)	
LEV	-0.005	-0.107	0.000	-0.016	
	(0.317)	(0.084)	(0.313)	(0.310)	
SIZE	0.376	0.380	0.377	0.374	***
	(0.061)	(0.009)	(0.061)	(0.061)	
BETA	-0.067	-0.068	0.066	-0.062	
	(0.085)	(0.012)	(0.085)	(0.085)	
CR	-0.051	-0.053	-0.051	-0.051	
	(0.038)	(0.005)	(0.038)	(0.038)	
GP	0.028	0.035	0.031	0.024	
	(0.133)	(0.019)	(0.133)	(0.133)	
BM	-0.000	-0.000	-0.000	-0.000	
	(0.000)	(0.000)	(0.000)	(0.000)	
Adj. R-squared	8.8%	9.4%	8.8%	8.9%	
N	300	300	300	300	
Country FE	Yes	Yes	Yes	Yes	
Industry * Year FE	Yes	Yes	Yes	Yes	
Firms included		51			
Sample period		2016-2021			
Rating agencies		Bloomberg, Refinitiv, S&P			

Table 5.5: Fixed effects Common Sample 1 Stock Returns

This table presents the results of the fixed effect model, with double clustered errors, using Common Sample 1, enveloping ratings from Bloomberg, Refinitiv and S&P Global during the period from 2016 to 2021. The dependent variable in the model is stock returns, while the independent variable is ESGD, representing the standard deviation of the ratings. Additionally, several control variables are included: Leverage, Size, Beta, CR (Current Ratio), GP (Gross Profitability), and BM (Book to Market). The model accounts for fixed effects at the industry, year, and country levels. The symbols ** and *** indicate significance at the 5% and 1% levels, respectively.

Our findings indicate that a positive and statistically significant relationship exists between return on assets and both size and gross profitability.

Additionally, we observe a positive and statistically significant relationship between stock returns and size. However, to our surprise, the results of the regression analysis reveal that there is no statistically significant relationship between any of the four ESG dimensions and firm performance, as measured by ROA and stock returns. In fact, the ESG disagreement coefficient is nearly 0, implying that ESG disagreement only has a marginally positive effect on ROA and stock returns. The results obtained are not consistent with previous studies, such as those conducted by Gibson et al., 2021 which indicate a significant relationship between the total and environmental dimension and stock returns. However, consistent with our findings they also find no significant relationship for the two remaining dimensions, social and governance. As a result, we can reject the hypothesis that greater ESG disagreement leads to lower ROA or higher stock returns, as our findings suggest that ESG rating disagreement does not play a role in determining a firm's ROA or stock returns.

5.4.2 Robustness Check

To test the robustness of our findings, we conduct a fixed effects regression with Common Sample 2, which excludes S&P Global from the sample. This exclusion allows us to increase the number of observations and extend the sample period. As a result, the adjusted R-squared value shows a significant increase, indicating a better fit of the regression models. Additionally, the number of observations more than doubles. These results are presented in Appendix 1 **Table 7.1** with return on assets (ROA) as the dependent variable and in **Table 7.2** with Stock Returns as the dependent variable. Surprisingly, excluding S&P Global from the sample does not appear to have any substantial effect on the significance of the ESG disagreement variable. However, upon examining the coefficient estimates, we find that the variables size, gross profitability, and current ratio demonstrate significant effects on ROA, as evidenced by the p-values. These findings highlight the influential role of these variables in determining a firm's return on assets (ROA). In contrast, only leverage demonstrate a significant effect on stock returns.

5.4.3 Possible Theoretical Explanations and Implications

Based on our analysis, the overall findings reveal no significant correlation between ESG rating disagreement, ROA and stock returns. Our results indicate that differences in ESG ratings do not have an impact on firm performance within the Nordic region. These findings contrast with the conclusions drawn by Gibson et al., 2021 and Avramov et al., 2022, who propose a positive and significant relationship between ESG rating disagreement and stock returns. The divergence between our findings and prior research can be attributed to specific characteristics present in the Nordic market, such as regional norms, robust regulations, and a strong emphasis on ESG factors. The Nordic market has a long-standing history of socially responsible investing (SRI) and sustainable practices (Scholtens and Sievänen, 2013). This market maturity, along with shared norms surrounding sustainability, may have integrated ESG considerations into investment decisions and corporate practices. As a result, there might be a relatively high level of agreement on ESG issues in the region. This agreement reduces the impact of rating disagreement on firm performance.

Another plausible reason for the divergence may be the strong correlation between a country's CSR rating and legal origin as discussed in section 2 (Liang and Renneboog, 2017). These findings show that regulatory and legal factors play a significant role in CSR ratings, which can influence the explanation for different findings. The United States follows a common law legal system, whereas the Nordic countries adhere to a civil law system, resulting in distinct legal origins between the two regions (Liang and Renneboog, 2017). One could expect these findings to be influential when replicating and comparing different papers regarding ESG rating disagreement, stock returns, and financial performance in countries with different legal origins.

Further, one could argue that ESG rating disagreement creates heterogeneous beliefs of a company's ESG performance among investors, resulting in uncertainty and risk leading to higher return, price, volatility, and trading activity of a stock (Anderson et al., 2005; Atmaz and Basak, 2018; Miller, 1977). At the same time, it is worth noting that the Nordic market operates on a foundation of trust, with a high level of trust in the legal system (Ervasti

and Ervasti, 2008). This aspect can influence the perception of ESG rating disagreement and its potential impact on investment decisions. Gibson et al., 2021 argues that in the United States, positive findings between ESG rating disagreement and stock returns have created ESG uncertainty, leading risk-averse investors to demand a risk premium. However, in the context of the Nordic market, it can be argued that investors may not view ESG rating disagreement as an additional source of risk or uncertainty that commands a risk premium. This is due to the high level of trust among investors and in the Nordic market. The Nordic market boasts a low corruption rate and high transparency, which further contributes to the trustworthiness and reliability of the institutions and systems. Consequently, investors in the Nordic market are more likely to trust the ESG rating agencies they have chosen to use, without having doubts regarding the accuracy or reliability of the ratings. Therefore, it can be expected that investors place a higher level of confidence in the ESG ratings they rely on, minimizing concerns related to ESG rating disagreement. As a result, the impact of ESG rating disagreement on investment decisions and perceived risk may be less pronounced in the Nordic context compared to other markets, and results in no significant relationship between ESG rating disagreement and stock returns. When interpreting the insignificance of the relationship between ROA and ESG disagreement, one possible explanation is that the discrepancies in ESG ratings may not significantly impact the CSP reputation of Nordic firms. While prior research established a correlation between CSP reputation and financial performance (Orlitzky et al., 2003), our results do not support the idea that variations in ESG ratings directly lead to diminished CSP reputation and consequently lower return on assets. It is plausible that the firms in this sample prioritize their highest ESG rating, potentially minimizing the impact of ESG rating disagreements on consumers.

5.5 Limitations and Further Research

We acknowledge that there are some limitations that should be considered when interpreting the results. Firstly, the sample size is relatively small due to the limited availability of ESG data, which restricts our ability to generalize the findings. Moreover, to enhance the robustness of the study, it would be

beneficial to include a broader sample, such as companies from across Europe, to validate the results in a wider context. Additionally, this study focuses solely on three ESG rating agencies, which may not fully represent the entire landscape of ESG ratings and introduce potential measurement errors. Including more rating agencies would provide a more comprehensive perspective. Further, the measurement of ESG rating disagreement itself could introduce limitations. The methodology used to calculate ESG rating disagreement may not fully capture the nuanced aspects of disagreement within the ratings. Different methodologies or alternative measures of ESG rating disagreement could yield different results. It is important to consider the limitations of the measurement approach and explore alternative methods to validate the findings.

It is worth noting that the ESG landscape is continuously evolving, with the introduction of new laws and regulations. For example, in 2023, the EU launched the Corporate Sustainability Reporting Directive (CSRD), which are rules about what information companies have to report on regarding environmental and social information (European Commission, n.d.). This information has to be reported according to European Sustainability Reporting Standards (ESRS) (European Commission, n.d.). Exploring the impact of such regulations on ESG disclosure in Europe and whether they contribute to reducing disagreement among rating agencies would be an interesting avenue for future research. Considering the challenges faced in this study, it is important for future research to be mindful of these limitations. The lack of data available suggests that investigations using small samples may be premature. Therefore, efforts should be made to gather more extensive and diverse datasets to improve the generalizability of findings. Furthermore, it is worth considering the influence of sustainability reporting legislation implemented in Sweden and other Nordic countries in 2017, which coincides with the studied period. This legislation may have prompted firms to invest in ESG initiatives, potentially incurring higher costs during that time. Exploring the effects of such legislation on ESG performance and its implications for financial outcomes could be a valuable area for further investigation.

6 Conclusion

This study aimed to analyze the relationship between ESG rating disagreement and firm performance of Nordic listed companies. Using a fixed effects regression model and incorporating country, industry, and year-fixed effects, we investigated the impact of ESG disagreement on a firms return on assets (ROA) and stock returns across different ESG dimensions. The results of the regression analysis indicate that there is no statistically significant relationship between any of the four ESG dimensions and the dependent variables. To further test the robustness of our results, a robustness check was conducted by excluding S&P Global from the sample. The exclusion did not substantially affect the significance of the ESG disagreement variable. However, other variables such as size, leverage, gross profitability, and current ratio demonstrated significant effects. Possible theoretical explanations for the divergence in findings between this study and prior research include specific characteristics of the Nordic market, such as regional norms, robust regulations, and a strong emphasis on ESG factors. The Nordic market's long-standing history of socially responsible investing (SRI) and sustainable practices, along with high levels of trust in the legal system and transparency, may have integrated ESG considerations into investment decisions and corporate practices, reducing the impact of rating disagreement on firm performance. Future research should address the limitations discussed and expand the scope to include larger and more diverse samples to enhance the generalizability of findings and explore the effects of evolving ESG regulations on financial outcomes.

7 Appendix

7.1 Appendix 1: Robustness Check

Fixed effects model: Common Sample 2

Dependent Variable: Return on Assets

Variable	Total (ESG)	Environmental	Social	Governance	
	(1)	(2)	(3)	(4)	
ESGD	0.000	-0.001	0.001	0.001	
	(0.001)	(0.001)	(0.001)	(0.001)	
LEV	-0.732	-0.737	-0.732	-0.739	***
	(0.053)	(0.053)	(0.053)	(0.053)	
SIZE	0.065	0.063	0.067	0.063	***
	(0.013)	(0.013)	(0.013)	(0.013)	
BETA	-0.011	-0.009	-0.012	-0.012	
	(0.015)	(0.015)	(0.015)	(0.015)	
CR	0.021	0.021	0.021	0.021	**
	(0.007)	(0.007)	(0.007)	(0.007)	
GP	0.078	0.077	0.080	0.079	**
	(0.024)	(0.024)	(0.024)	(0.024)	
BM	-0.000	-0.000	-0.000	-0.000	
	(0.000)	(0.000)	(0.000)	(0.000)	
Adj. R-squared	27.9%	27.95%	28.2%	27.98%	
N	618	618	618	618	
Country FE	Yes	Yes	Yes	Yes	
Industry * Year FE	Yes	Yes	Yes	Yes	
Firms included		90			
Sample period		2012-2021			
Rating agencies		Bloomberg and Refinitiv			

Table 7.1: Fixed effects Common Sample 2 ROA

The table presents the results of the fixed effect model, with double clustered errors, using Common Sample 2, enveloping ratings from Bloomberg and Refinitiv during the period from 2012 to 2021. The dependent variable in the model is the return on assets (ROA), while the independent variable is ESGD, representing the standard deviation of the ratings. Additionally, several control variables are included: Leverage, Size, Beta, CR (Current Ratio), GP (Gross Profitability), and BM (Book to Market). The model accounts for fixed effects at the industry, year, and country levels. The symbols ** and *** indicate significance at the 5% and 1% levels, respectively.

Fixed effects model: Common Sample 2

Dependent Variable: Stock Returns

Variable	Total (ESG)	Environmental	Social	Governance	
	(1)	(2)	(3)	(4)	
ESGD	0.000	0.000	-0.001	-0.003	
	(0.001)	(0.003)	(0.004)	(0.003)	
LEV	-0.732	-0.005	-0.001	-0.000	***
	(0.053)	(0.317)	(0.311)	(0.309)	
SIZE	0.065	0.376	0.374	0.381	
	(0.013)	(0.061)	(0.062)	(0.061)	
BETA	-0.011	-0.067	-0.070	-0.082	
	(0.015)	(0.085)	(0.086)	(0.086)	
CR	0.021	-0.051	-0.051	-0.046	
	(0.007)	(0.038)	(0.038)	(0.038)	
GP	0.078	0.028	0.027	0.015	
	(0.024)	(0.133)	(0.133)	(0.133)	
BM	-0.000	-0.000	-0.000	-0.000	
	(0.000)	(0.000)	(0.000)	(0.000)	
Adj. R-squared	27.9%	8.8%	8.8%	9.2%	
N	618	618	618	618	
Country FE	Yes	Yes	Yes	Yes	
Industry * Year FE	Yes	Yes	Yes	Yes	
Firms included		90			
Sample period		2012-2021			
Rating agencies		Bloomberg and Refinitiv			

Table 7.2: Fixed effects Common Sample 2 Stock Returns

This table presents the results of the fixed effect model, with double clustered errors, using Common Sample 2, enveloping ratings from Bloomberg and Refinitiv, during the period from 2012 to 2021. The dependent variable in the model is the stock returns, while the independent variable is ESGD, representing the standard deviation of the ratings. Additionally, several control variables are included: Leverage, Size, Beta, CR (Current Ratio), GP (Gross Profitability), and BM (Book to Market). The model accounts for fixed effects at the industry, year, and country levels. The symbols ** and *** indicate significance at the 5% and 1% levels, respectively.

Random effects regression: Common Sample 1

Dependent Variable: ROA

Variable	Coefficient (Total)	Std. Errrors	
ESGD	-0.000	0.001	
BETA	0.002	0.011	
SIZE	0.024	0.006	***
LEV	-0.060	0.039	
GP	0.100	0.016	***
BM	0.000	0.000	
CR	0.001	0.003	
Consumer Discretionary	0.010	0.023	
Consumer Staples	-0.022	0.029	
Energy	-0.037	0.029	
Financials	0.048	0.034	
Health Care	0.054	0.028	
Industrials	-0.024	0.019	
Real Estate	0.051	0.046	
Technology	-0.011	0.044	
Telecommunications	-0.048	0.024	*
Utilities	-0.009	0.034	
Finland	-0.019	0.022	
Norway	-0.047	0.026	
Sweden	-0.028	0.020	

Table 7.3: Random effects Common Sample 1 ROA

The table presents the results of the random effects regression, with double clustered errors, using Common Sample 1, enveloping ratings from Bloomberg, Refinitiv, and S&P Global during the period from 2016 to 2021. The dependent variable in the model is ROA, while the independent variable is ESGD, representing the standard deviation of the ratings. Additionally, several control variables are included: Leverage, Size, Beta, CR (Current Ratio), GP (Gross Profitability), and BM (Book to Market). The model accounts for fixed effects at the industry and country levels. The symbols ** and *** indicate significance at the 5% and 1% levels, respectively.

Random effects regression: Common Sample 1

Dependent Variable: Stock Return

Variable	Coefficient (Total)	Std. Errrors	
ESGD	-0.001	0.003	
BETA	0.029	0.060	
SIZE	0.078	0.024	**
LEV	-0.016	0.204	
GP	0.072	0.083	
BM	-0.000	0.000	
CR	-0.000	0.010	
Consumer Discretionary	-0.021	0.077	
Consumer Staples	0.004	0.098	
Energy	-0.008	0.096	
Financials	-0.079	0.109	
Health Care	-0.091	0.095	
Industrials	-0.056	0.061	
Real Estate	0.076	0.162	
Technology	-0.033	0.140	
Telecommunications	-0.139	0.086	
Utilities	-0.036	0.114	
Finland	0.004	0.072	
Norway	-0.115	0.084	
Sweden	-0.008	0.067	
Intercept	-1.554	0.583	**

Table 7.4: Random effects Common Sample 1 Stock Return

The table presents the results of the random effects regression, with double clustered errors, using Common Sample 1, enveloping ratings from Bloomberg, Refinitiv and S&P Global during the period from 2016 to 2021. The dependent variable in the model is stock returns, while the independent variable is ESGD, representing the standard deviation of the ratings. Additionally, several control variables are included: Leverage (LEV), Size, Beta, CR (Current Ratio), GP (Gross Profitability), and BM (Book-to-Market). The model accounts for fixed effects at the industry and country levels. The symbols ** and *** indicate significance at the 5% and 1% level, respectively.

OLS Pooled regression: Common Sample 1

Dependent Variable: ROA

Variable	Coefficient (Total)	Std. Errrors	
ESGD	0.000	0.000	
BETA	-0.004	0.010	
SIZE	0.021	0.004	***
LEV	-0.088	0.034	**
GP	0.138	0.015	***
BM	-0.000	0.000	*
CR	0.005	0.002	*
Observations	300		

Table 7.5: OLS Pooled Common Sample 1 ROA

The table presents the results of the OLS Pooled regression, with double clustered errors, using Common Sample 1, enveloping ratings from Bloomberg, Refinitiv and S&P Global during the period from 2016 to 2021. The dependent variable in the model is ROA, while the independent variable is ESGD, representing the standard deviation of the ratings. Additionally, several control variables are included: Leverage, Size, Beta, CR (Current Ratio), GP (Gross Profitability), and BM (Book-to-Market).

OLS Pooled regression: Common Sample 1

Dependent Variable: Stock Return

Variable	Coefficient (Total)	Std. Errrors	
ESGD	0.001	0.005	
BETA	-0.031	0.090	
SIZE	0.344	0.054	***
LEV	0.097	0.327	
GP	0.047	0.138	
BM	-0.000	0.000	
CR	-0.032	0.040	
Observations	300		

Table 7.6: OLS Pooled Common Sample 1 Stock Return

The table presents the results of the OLS Pooled regression using Common Sample 1, enveloping ratings from Bloomberg, Refinitiv and S&P Global during the period from 2016 to 2021. The dependent variable in the model is stock returns, while the independent variable is ESGD, representing the standard deviation of the ratings. Additionally, several control variables are included: Leverage, Size, Beta, CR (Current Ratio), GP (Gross Profitability), and BM (Book-to-Market).

Model Building Tests

Test	**Hypothesis**	**Prob>Chi**	**Preferred Model**
Breusch-Pagan test	H0: No individual effects H1: Individual effects are present	Reject H0	Fixed-effects model
Test	**Hypothesis**	**Prob>Chi**	**Preferred Model**
Hausman test	H0: Random-effects model is consistent H1: Fixed-effects model is consistent	Reject H0	Fixed-effects model
Test	**Hypothesis**	**Prob>F**	**Preferred Model**
Poolability test	H0: No individual effects H1: Individual effects are present	Reject H0	Fixed-effects model

Table 7.7: Model Building Test Results: Common Sample 1

This table presents the results from the Breusch-Pagan test, Hausman test, and Poolability test that we conducted to find the appropriate model for our study. The preferred model is the fixed-effects model.

7.2 Appendix 2: Variables Overview

Variables	Description	Details	Source
ESGD	ESG Disagreement	The standard deviation of ESG ratings that a firm received for year t's ESG performance.	Bloomberg, Refinitiv Eikon
ROA	Return on Assets	Net income divided by total assets.	Refinitiv Eikon
Return	Stock Returns	Yearly-basis stock returns.	Refinitiv Eikon
Leverage	Leverage	Total long-term debt plus debt in current liabilities divided by total assets	Refinitiv Eikon
Size	Market Capitalization	Stock price multiplied by total shares outstanding. We apply the natural logarithm as used by Velte (2017).	Refinitiv Eikon
Book-to-Market	Book-to-Market	Total assets divided by the market capitalization.	Refinitiv Eikon
Gross Profitability	Gross Profitability	Total revenues minus cost of goods sold divided by total assets.	Refinitiv Eikon
Beta	Beta	Firms market beta.	Refinitiv Eikon
Current Ratio	Current ratio	Current assets divided by current liabilities.	Refinitiv Eikon

Table 7.8: Description of Variables

The calculations of all the variables are based on Gibson et al., 2021, except for the variable ROA, which is calculated based on Velte (2017).

7.3 Appendix 3: Description of Rating Agencies

Rating Agency	Description
Bloomberg	Bloomberg started with ESG Disclosure Score in 2010 (Bloomberg L.P., 2023). The ESG scores encompass a comprehensive set of ESG data points within five primary categories: environmental, social, governance, controversial business activities, and board composition. (Bloomberg L.P., 2023). These scores are generated through a proprietary algorithm, which considers various factors including the magnitude of ESG risks and the effectiveness of a company's risk management practices in addressing them (Bloomberg L.P., 2023). In 2022, Bloomberg updated their methodology on the ESG Disclosure score and the changes were implemented for all companies for all years available (Bloomberg L.P., 2023).
S&P Global	S&P Global uses a proprietary ESG scoring system called the S&P Global ESG Score. This score is based on data from the company's Corporate Sustainability Assessment (CSA), which evaluates companies on a range of ESG factors across a variety of industries (S&P Global, n.d.-a). CSA is an evaluation of firms' sustainability practices that is done annually(S&P Global, n.d.-a). The ESG score is a percentile ranking, with a score of 100 indicating the best ESG performance relative to peers(S&P Global, n.d.-c). S&P Global acquired RobecoSAM in 2019 (S&P Global, n.d.-b).
Refinitiv Eikon	Refinitiv Eikon provides historical ESG data since 2002 (Refinitiv, n.d.). The ESG scores are calculated based on publicly reported information by companies, employing an extensive analysis that incorporates over 630 ESG metrics (Refinitiv, 2022). The assessment process utilizes a subset of 186 highly comparable measures grouped into 10 categories, forming three pillar scores: environmental, social, and governance (Refinitiv, 2022). The weighting of these scores varies across industries (Refinitiv, 2022), and a percentile rank scoring approach is adopted to ensure transparency and eliminate hidden factors (Refinitiv, 2022). The resulting ESG score ranges from 0 to 100, with potential letter grades provided as applicable (Refinitiv, 2022).

Table 7.9: Description of Rating Agencies

7.4 Appendix 4: List of Companies

Company name	
Carlsberg	Svenska Handelsbanken
Genmab	Hexagon
DSV	Atlas Copco
Pandora	Modern Times Group
Coloplast	AP Moller-Maersk
Tryg	Danske Bank
Kesko	Christian Hansen Holding
Outokumpu	Novosymes
Wartsila	Novo Nordisk
Stora Enso	Vestas Wind Systems
Fortum	Nokia
Kone	Sampo
Nordea Bank	Nokian Renkaat
Orkla	UPM-Kymmene
Telenor	Neste
Yara International	Metso Outotec
SKF	Storebrand
Svenska Cellulosa	Norsk Hydro
Trelleborg	Equinor
Skandinaviska Enskilda	H&M
Elekta	Ericsson
Swedbank	Skanska
Sandvik	Volvo
Alfa	Securitas
Billerud	Industrivarden
Tele2	Castellum
Telia	Orron Energy
Husqvarna	Assa Abloy
Investor	Electrolux
Boliden	

Table 7.10: List of Companies within Common Sample 1 (59)

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