ESG and firm performance:
Analysis from Nordic countries' perspective

Habeeb Bolaji Yahya[*]

Department of Accounting and Finance, Turku School of Economics, University of Turku, Turku, Finland
e-mail: hbyahy@utu.fi

Mika Vaihekoski

Department of Accounting and Finance, Turku School of Economics, University of Turku, Turku, Finland
e-mail: mika.vaihekoski@utu.fi

Abstract: Using publicly listed firms in the Nordic countries from 2010 to 2020, we find that a positive relationship exists between firm valuation and all ESG score and its pillar scores. ESG score and its pillar scores are also positively related to firm profitability with the exception of the governance score. Further analysis shows that the direction of relationship between ESG and firm profitability or valuation can differ at country level. In addition, we find that ESG scores of environmentally sensitive firms are negatively related to profitability, but a positive relationship exists with firm valuation.

Keywords: ESG performance; financial performance; firm valuation; financial slack, environmentally sensitive industries; Nordic countries

JEL Classification: G3, Q5

[*] Corresponding author. We are grateful for useful comments and suggestions from Antti Miihkinen, Hannu Schadewitz, Luis Alvarez Esteban, Abu Chowdhury, Valtteri Peltonen, and other participants at the Research Seminar in Accounting and Finance at the Turku School of Economics October 2021 on earlier version of this paper. We also thank the participants at the EIFAS 2021: Green Finance and Accounting with ESG Virtual Round table, Mikko Leppämäki, Markku Kaustia and participants at the GSF presentation clinic, Henry Jarva, Eva Liljeblom, Jylhä Petri and participants at the Graduate School of Finance Winter Workshop November 2021 for the insightful comments. We appreciate the comments from Gamze Ozturk Danisman discussion and other participants at the World Finance Banking Symposium, Budapest 2021.
I appreciate the support of the Foundation for Economic Education-LSR through the working grant in the year 2021 that supported the realisation of this study.

1. Introduction

Sustainability issues have received increased attention during the past decade, as discussions on climate change, human right and social justice has taken the centre stage among wider public. For firms this has meant a tremendous challenge. Following public interest, investors have begun to direct investments into firms that align their operations to meet the sustainability goals. As a result, many studies have been carried out on the relationship between corporate social responsibility, and later corporate sustainability whereon it later has metamorphosed, firm performance. The results of these earlier studies are rather mixed, with some studies' findings indicating positive relationship (Cahan et al., 2015; Eccles et al., 2014; Fatemi et al., 2015; Filbeck et al., 2009; Lo and Sheu, 2007; Rodriguez-Fernandez, 2016; Wang and Sarkis, 2017) and others with negative relationship outcomes (Branco and Rodrigues, 2008, Brammer et al., 2006; Lee et al., 2009). A few others have found no relationship linking sustainability performance to financial performance and value of firms (Galema et al., 2008; Statman, 2006; Horváthová, 2010; Orlitzky et al., 2003).

These mixed results in empirical research on sustainability, firm profitability and valuation relationship are due to a number of issues. First, especially earlier studies suffered from measurement concerns and data constraints (Li et al., 2018). Namely, there was no commonly used measure for firms' actions and commitment towards sustainable operations. Luckily, more recently, a number of new measures have emerged, although still somewhat controversial, with one of the most used being the ESG scoring by Refinitiv. It considers firms' Environmental (E), Social (S), and Governance (G) performance. Second, studies using a single measure for firm performance can be myopic since the impact of sustainability can differ, e.g., for valuation and firm profitability. For example, using return on assets (ROA) as the only measure of firm performance can suggest a negative relationship because of the impactof firm's investment in sustainability on net income which is the numerator in ROA calculation.Third, studies that have used short sample period can be influenced by the fact that sustainability requires gradual shift or incorporation of sustainable practices into existing operations which may take some time before it is fully reflected in their ESG score.

There are also other explanations. For example, Miralles-Quirós et al. (2018) study the relationship between stock price and ESG performance which is a questionable approach from econometric perspective because non-stationarity of stock prices can inflate the t-statistics which then results in false interpretation. On the other hand, using aggregated data over several countries or large regions may ignore important country level differences in the ESG-firm performance relationship and significance.

In this study, we use ESG and financial data of publicly listed firms in the Nordic countries – a region with long history in sustainability – to study the relationship between ESG and financial performance of the firms. We use a long sample from 2010 to 2020 to capture the improvements in firm sustainability performance over longer periods of time. Due to availability of data, most of the earlier studies on ESG have utilized shorter samples. We utilise two measures of firm financial performance. The first one is return on assets (ROA) which reflect the historical profitability of the firm. The second is Tobin's Q which measure the valuation of the firm and, as such, it is more a forward looking measure of firm's financial performance. Our approach provides thus a robust conclusion that goes beyond the limitations a myopic interpretation caused by using only sort samples and one measure of firm performance. We also add to the understanding on this topic with our country level analysis to clarify the ambiguity that exist in earlier aggregated regional studies that only considered a region as one unit.

Most recent studies on the relationship between firms' valuation and financial performance with firms' ESG performance have been done on the US market or less-ESG-developed markets (see, e.g., Jayachandran et al., 2013; Fatemi et al., 2018; Buallay, 2019; Miralles-Quirós et al., 2018; Duque-Grisales and Aguilera-Caracuel, 2019; Ahsan and Qureshi, 2021). Our focus on the Nordic countries is motivated by the *ex-ante* expectation of good incorporation of the sustainability values in company practice as well as the unique regional similarities of these countries, which provide common yet individualistic national characteristics. These countries also share relatively similar welfare systems. A good welfare system in a country for example can influence a firm's decision to align with sustainability values such as employee's welfare, social inclusion, and gender equality.

Furthermore, the Nordic region have shared values and well-known interest in the ESG issues. Historically, the Nordic region has participated and contributed to global issues on sustainability. This includes the launch of the United Nations' Environmental Programme (UNEP) in Stockholm in 1972, the contribution of the Nordics in the formulation and launch of the sustainable development in the Brundland report (1987), the 1992 United Nations Conference on Environment and Development (UNCED) also known as the Earth Summit, the launch of the first Nordic strategy on Sustainable Development in 2001, and the adoption of Sustainable Development Goals (SDG) in 2015. The region has always taken a lead role in sustainability, and this is also seen, for example, in the Global Sustainable Competitiveness Ranking 2021, where all the Nordic countries occupy a position in the top six. The Nordic sends strong signals to the rest of the world through leadership on human rights issues, social

and welfare policies, and unwavering dedication to development aid. All these shows the homogeneity of the Nordic countries in pursuing these common goals. However, the Nordic countries also show differences in governance approaches that tickles down to the implementation of the SDG in their respective countries. Thus, this paper contributes to the literature on sustainability most notably in the uniqueness of the employed data which reflect the current state of the world on firm sustainability and set the pace for less sustainable regions.

Similarly, we add to existing literature by considering E, S, G and overall ESG score separately but with further analysis by dissecting the ESG scores into strong and weak performance to verify if there exist significant differences in link to firm profitability and valuation as a robustness test. Earlier studies on the topic have focused on the explanatory power of ESG on firm financial performance but this study offers more by analysing whether firm valuation as measured in Tobin's Q reflects the information to stakeholders on the ESG performance significance. Our choice of measures of firm profitability and valuation, ROA, and Tobin's Q, are both present-focused and forward-looking respectively. According to Horvathova (2012), despite mixed findings reported in underlying primary studies and well documented in meta-analysis, most of the studies takes less account of the possibility that the effect of environmental performance on financial performance is time-varying. This is to say the earlier studies pays less attention to differences in the direction of ESG-firm performance in the short-term and the long-term.

The result of this study shows that using the whole sample, ESG score and both environmental and social pillar scores of ESG is positively related to profitability. However, the governance pillar of ESG is related to decreased profitability as we found a negative and significant relationship between the governance pillar score and ROA. Firm valuation is found to be positively related to all individual ESG pillars and overall ESG score of ESI firms. For environmental sensitive industries, the results somewhat mixed. The results show a negative association between ESG score and profitability, but the firm valuation is found to be positively related to the ESG score. We also find financial slack to increases firm's ESG score impact on profitability and valuation. Finally, we observe that country level analysis shows interesting insights into how the Nordic countries differ in their ESG and firm performance.

The rest of the article is organised as follows. In Section 2 we review existing literature in this field of study in more detail and develop testable hypotheses. In Section 3 we discuss our research design. In Section 4 we present the main empirical results, additional considerations and discuss their implications while the final section sets out the conclusions and offer suggestions for further research.

2. Literature Review and Hypothesis Development

2.1 Motivation for Sustainability in Firms

Over the years, the world has witnessed several environmental disasters that can be said to be results of company actions.[1] However, it is the accumulated daily impact of companies that has the biggest impact on environment going forward. Especially the role of the companies in the environmental sensitive industry (ESI) will be critical for the development, ranging from emission issues (e.g., global greenhouse gas emissions) to resource use. Companies' environmental impact has also social and economic effects on our world. Social issues like employee welfare, community development and product responsibility are actions demanded from all companies regardless of their industry. The roadmap to keeping the environment safe, improving social and economic conditions of all, has been termed the UN sustainable development goals, more specifically as no poverty, good health and well-being, gender equality, affordable and clean energy, decent work and economic growth, industry, innovation and infrastructure, climate action, life below water and life on land.

The responsibility of achieving the UN sustainable development goals belong to individuals, firms, and the government. Individuals must imbibe the culture of sustainability through awareness and diligence, while the government is saddled with legislative responsibility, planning and implementation of sustainability policies and programmes. However, firms are at the centre of sustainability; they play a vital role in initiating, implementing, and maintaining a sustainability approach in and outside of operations. In fulfilling these responsibilities, the firm incurs costs in sustainability investments. The financial cost is a burden that may in the short-term affect their financial performance. Nevertheless, more and more firms are moving towards sustainability in recent years which may indicate that they do not see it only as impediment for their financial performance – in fact, for some firms, taking sustainability into consideration could be good for their business.

Companies' actions towards sustainability have at times been criticised for various reasons. First, the companies are being seen as only to greenwash their operations – no real development takes place in the end. Second, the companies can be seen as only to act in order to avoid the risk of sanctions or backlash from stakeholders. This claim is obviously not untrue because the firms owe this responsibility to the stakeholders and sanctions can be enforced when the guidelines and expectations to achieving more sustainable world are not followed by

[1] One could mention, for example, the 1986 Nuclear Power Plant Explosion in Chernobyl Ukraine, the Exxon Valdez Oil Spill of 1989, and the 2010 British Petroleum Oil Spill in the Gulf of Mexico.

companies. However, it must not overshadow the fact that the opportunities (e.g., inviting investors whose interest are more aligned with sustainable companies, or attracting new customers who prefer sustainable products) presented to firms who are performing excellently in sustainability issues are enormous.

2.2. Research hypothesis

Initial studies on corporate social responsibility investments (the root of ESG) suggested a negative relationship exist between ESG and firm's profitability and valuation (Vance, 1975; Wright and Ferris, 1997; Aupperle et al., 1985). These studies have supported their findings with the shareholder theory of Friedman (1970), who argued that the sole social responsibility of a firm is value maximization and that there are no commensurate rewards to ESG investments by firms. More recently, studies have found continued support for the negative relationship. For example, firms with good environmental performance experience negative abnormal returns (see, e.g., Fisher-Vanden and Thorburn, 2011; Jacobs et al., 2010; Lyon et al., 2013) and ROA (Duque-Grisales and Aguilera-Caracuel, 2019), implying that shareholders see investment in this sustainability approach as costly and they usually do not support it (Barnea and Rubin, 2010; Kim and Lyon, 2015; Fatemi et al., 2018).

On the other hand, some studies have found inconclusive results (see, e.g., Horvathova, 2010; McWilliams and Siegel, 2000; Renneboog et al., 2008a, 2008b) or evidence in favour of positive effect from ESG on both firm profitability and valuation (see, e.g., Margolis et al., 2009; Edmans, 2011; Eccles et al., 2014; Dimson et al., 2015; Fatemi et al., 2015; Ge and Liu, 2015; Krüger, 2015; Malik, 2015) although Orlitzky et al. (2003) argued that the positive relationship is small and decreasing over time. Other studies have also found similar relationship using different measures for firm performance. These measures include, for example, sustainable innovations, efficient process, reduced energy, and material consumption (Aras and Crowther, 2008; Porter and van der Linde, 1995; Russo and Fouts, 1997). Other such measures include conducive work environment for employees (Bhattacharya et al., 2008; Greening and Turban, 2000; Moskowitz, 1972), improving customer relations and loyalty (Ramlugun and Raboute, 2015), and general customer satisfaction (Pérez and del Bosque, 2015; Sen and Bhattacharya, 2001; Walsh and Bartikowski, 2013; Xie, 2014).

Some authors have seen the positive relationship between sustainability and firms' market value as evidence in favour of the Freeman (1984) stakeholder theory or value enhancing theory (Miralles-Quirós et al., 2018). This suggests that ESG ensures optimal

contracts between stakeholders which fosters growth and risk reduction (Fatemi and Fooladi, 2013). However, the topic of firms' ESG performance is beyond the argument of shareholder or stakeholder theory because it is a matter of collective interest to all stakeholders regardless of affiliations with a company. In addition, the performance of firms in ESG is not only motivated by the need to satisfy social responsibilities as the shareholder theory scrutinising CSR claims, but an opportunity for the firm to improve their financial and market performance through approaches and practices that benefits stakeholders. Hence, we argue that there is a positive relationship between firms' ESG and financial performance and state our first hypothesis as follows

> ***H1:*** There is a positive relationship between ESG, the individual pillar scores and firm profitability (ROA) or valuation (Tobin's Q).

The relationship does not have to be the same across all companies or industries. For example, the demand by stakeholders for a sustainable approach on environmental issues can differ between business sectors (Da Rosa et al., 2015; Garcia et al., 2017). The firm in environmental sensitive industries have arguably more impact in environmental issues such as climate change, water pollution, and biodiversity. This means that they face more often the requirement to compensate for this impact through different approaches and targeted programmes such as reduced waste and use and production of more eco-friendly products. As such, for the purpose of this study, we focus on the environmental sensitive industries because of the clear distinction between these firms and those in the other industries with regards to their weighty responsibility in all ESG issues. The ESI companies are those in energy, mining, chemicals, oiland gas, steel manufacturing, paper and cellulose industry because of their significant impact on the environment (Miralles-Quirós et al., 2018).[2] We follow this categorisation and state oursecond hypothesis as follows

> ***H2:*** The positive significance of ESG-firm performance relationship of environmental sensitive industry firms is stronger than firms in other industries.

[2] Our focus on ESI companies is not disregarding the significance of social performance of firms particularly those in services industries where issues of race, gender equality and similar are most pressing, the environmental sensitive industries like other industries are also challenged to be excellent in other sustainability issues including to employee's support and welfare, product responsibility and community development.

Similarly, some studies have found the availability of financial resources as an important factor on how firms invest in ESG issues (Waddock and Graves, 1997; Allouche and Laroche, 2005; Surroca et al., 2010; Aguilera-Caracuel et al., 2015). These studies suggest that firms with better financial resources have higher ESG scores. Thus, we examine the effect of firm's financial slack (measured here with the current ratio as in Duque-Grisales and Aguilera-Caracuel, 2021) on the relationship between the ESG and firm profitability and valuation. We expect firms with higher financial slack to invest more in sustainability. Thus, higher score and financial slack should interact, and their joint effect should be accompanied by positive impact on profitability and valuation. The implication is that if a positive relationship exists between ESG scores and firm's profitability and valuation, the moderating effects of the interaction between financial slack and ESG score strengthens the impact. Our third hypothesis is thus

> ***H3:*** Financial slack and ESG score interact to create a positive impact on profitability and valuation.

As our final hypothesis we explore the difference between firms with strong ESG rating and those with weak performance. We argue that the relationship between ESG score and firm valuation is not necessarily linear. Especially for those companies that act first and make strong investments in sustainability, there might be first mover advantage which is reflected in their valuation and profitability. In practice, we study companies below and above sample median score. Thus, we expect that a stronger positive relationship between above median ESG performance and firms' financial performance. Thus, our hypothesis is:

> ***H4:*** There is a positive relationship between high ESG, high individual pillar scores and firm profitability (ROA) or valuation (Tobin's Q).

3. Research data and design

3.1 The ESG scores controversy

The performance of firms in ESG has gained prominence in the last two decades. As one of the main drivers of the development has been investors' desire to base their investment decision on objective measures on sustainability. Though no standardised ratings have been confirmed, several agencies have begun to provide these ESG ratings in to 2010s. One of the first

companies to enter this market was Asset4, which was later bought by Thomson Reuters and more recently as part of Refinitiv. Other top rating agencies are Sustainalytics, RepRisk and the new entrant, Institutional Shareholder Services (ISS). The Thomson Reuters database is among the largest in terms of history and companies covered (Dorfleitner et al., 2015). In 2021, the Thomson Reuters/Refinitiv database provides a wide coverage on ESG ratings for over 6000 firms across the globe with financial data that allows for detailed firm performance analysis. As such, it is renowned in the literature on ESG (e.g., Bofinger et al., 2021; Flammer, 2021; Hawn and Ioannou, 2016; Cheng et al., 2014; Ioannou and Serafeim, 2012).

The sustainability rating agencies are mainly designed to measure a company's exposure to ESG risks and how the risks are managed relative to their peers. Similarly, the Refinitiv database used in this study provides performance-based scores of firms relative to their peers. Their rating gives information to all stakeholders including shareholders and investors alike, customers, creditors, employees, and policy makers on the impact of firms in achieving the World Sustainable Development Goals. According to Refinitiv, these ESG scores are calculated from publicly available sustainability information sources including annual reports, company websites, NGO websites, CSR reports, Stock exchange fillings and other news sources. As a result, they claim that the ESG performance in sustainability that is free from self-score reporting bias that may exist if the scores are based on direct firm reporting.

More recently, the unstandardized nature of the ratings has led researchers to question the reliability, consistency, and overall quality of the ESG databases. Large disagreement has been found in the evaluations of firms' ESG quality across major ESG ratings providers (Berg et al., 2021 and Gibson et al., 2019). For example, the Kinder, Lydenberg and Domini (KLD) of Morgan Stanley Capital International (MSCI) is among the most influential sustainability rating agencies in the US stock market and Tang et al. (2021) find that they score firms connected to them through institutional ownership than others who are not. Perhaps even more severe is the concern of the SEC's Asset Management Advisory Committee that stresses the backfilling bias of the data on ESG scores arising from limited historical data on this sustainability measures. In fact, there is documented evidence that there are a widespread and repeated changes to the historical ESG scores provided by Refinitiv (Berg et al., 2021). This is due to the way the score is calculated. If a new company is added to the database with historical analysis, the peer scores are changed retrospectively. Berg et al. (2021) confirmed that the implications of this data rewriting are significant for ESG research and investment. The implication for research is notably in the reliability of research findings conducted using the data or the replicability of similar studies by other researchers. Perhaps, the score controversies

explain some of the differences in the direction of the ESG-firm performance relation in earlier studies. Thus, it is important that studies using this data source(s) document the time of obtaining the data used and possibly perform back-testing strategies to ascertain the potential result differences. Nevertheless, the Refinitiv ESG scores remains one of the mostly used ESG ratings with over 1,500 academic articles to have either used or referenced this source since 2003 (Berg et al., 2021). For this study, the backfilling issue is not as important as, say, event studies, as we focus on the significance of the direction of ESG-firm performance rather than the market reaction or the magnitude of such significance.

3.2 Sample and Data

This study uses both the financial and ESG ratings data of publicly listed firms on a Nordic (Finland, Sweden, Norway, Denmark, and Iceland) stock exchange downloaded from the Thomson Reuters Eikon's database on November 19, 2021, for the period from 2010 to 2020. The sample includes all main stock exchanges (Nasdaq Helsinki Ltd, Nasdaq Stockholm AB, Nasdaq Copenhagen A/S operated exchange in Finland, Sweden, and Denmark respectively and the Oslo Børs ASA in Norway) and the multilateral trading facilities (MTF) operated by them, i.e., the First North Sweden, First North Finland, and Nordic SME. The inclusion of MTFs, which are commonly used by growth companies in their early stages of growth and development, is to ensure all publicly listed firms in the Nordics with ESG ratings during the sample period are captured in the study. This is particularly important given the significance of sustainability in company practices that goes beyond size and status of the firm.

The initial collected data includes 1782 Nordic firms (active or delisted during the sample period) with 501 having both financial and ESG data over the sample period. The loss in observations is because the data on ESG are not available for any year during the sample period and the exclusion of banks and insurance companies from the sample. The remaining 501 firms with at least one year with the ESG ratings available (of these, 68 are coming from Finland, 290 from Sweden, 84 from Norway, 53 from Denmark and 6 from Iceland). As such, we believe that the sample size and coverage provide enough observations for a representative sample in the study. Overall, 1958 rating observations are obtained over the sample period in an unbalanced panel data. Our eleven-year sample period is longer when compared with prior studies. The sample period covers both the early, yet minor interest in sustainability as well as the recent surge in global interest in sustainability.

3.3 Variables

Our study is concerned with how the opportunity presented by ESG performance of firms is associated with their profitability and valuation. As such, we limit our research to establishing the direction of relationship between ESG and firm performance for continuous understanding and efforts towards developing a system that incorporates this non-financial performance measure as much as the established financial performance measures of firms.

The dependent variables, i.e., measures of firm performance in this study are return on assets (ROA) and Tobin's Q. Many studies have used Tobin's Q, the market valuation of a company divided by its replacement cost (see, e.g., Hart and Ahuja, 1996; Anderson and Reeb, 2003; Elsayed and Paton, 2005; Rassier and Earnhart, 2010; Tang et al., 2012, Fatemi et al., 2018; Ahsan and Qureshi, 2021) and ROA, derived by dividing a company's net income by its total asset (see e.g., Choi and Wang, 2009; Tang et al., 2012; Velte, 2017; Fatemi et al., 2018; Duque-Grisales and Aguilera-Caracuel, 2021; Ahsan and Qureshi, 2021) as measures of firms financial performance.

Tobin's Q is a measure of firm valuation said to represent a firm's investment or growth opportunities (Fu et al., 2016) and ROA reflects current period profitability (Jayachandran et al., 2013). The choice of Tobin's Q and ROA in this study is particularly motivated by the nature of sustainability issues which are both forward-looking and present assessment focused; as such, the choice of these variables aligns well as a measure of firm performance in this subject matter.[3] For instance, in improving sustainable approaches of a firm, costs are incurred which may in the interim affect profitability but can propel the company to future success in value. Hence, we expect that while ROA may have a negative relationship with a pillar or the overall ESG performance, the relationship should be positive with Tobin's Q.

Our main independent variable of interest is the ESG rating score collected from Thomson Reuters/Refinitiv Eikon terminal as a measure of firm sustainability performance. In effect, we have time-series ESG scores for the firms in our sample. Besides the overall score, the ESG performance in three sub-areas (referred to as pillars) environment, social and governance is included. According to the Refinitiv's definition, overall ESG scores are an aggregated scores based on 10 category weights based on the Refinitiv's magnitude matrix. A category weight is the magnitude weight of a category divided by the sum of magnitudes of all categories and the magnitude matrix is calculated using numeric and Boolean data points. The

[3] We also tested the model using the Market-to-Book ratio in place of Tobin's Q for robustness and the results are basically similar.

pillar scores are the relative sum of the category weights. This pillar scores are composed of sustainability categories: resource use, emissions, product innovation, human rights, product responsibility, workforce, community, and management, shareholders, and CSR strategy.

As our main control variables, we use firm size as in Buallay (2019) and financial leverage (debt-to-equity ratio) as in Grewal et al. (2008) as control variables. These variables are particularly important to mitigate the effect of individual firm's characteristics that are due to size and financial strength. Firm size is proxied by the logarithm of total assets and leverage is the ratio of total debts to book value of equity. Leverage and size are expected to be negatively related to Tobin's Q (McConnell and Servaes, 1990) but only leverage should be negatively related to ROA. As pointed by Buallay (2019), in economics-based integrated report research, endogeneity concern is often an issue and this includes correlated variables, reverse causality and simultaneity (Nikolaev and van Lent, 2005; Larcker and Rusticus, 2010). For this reason, we also include a macroeconomic variable, the GDP growth (i.e., change in the GDP for country of the firm in question) which captures difference in technological advancement, economic development, intellectual property regimes and other geographical differences (Contractor et al., 2016). We use year, firm and country fixed effects to control time and group specific characteristics.

We also include a variable for financial slack. Following Duque-Grisales and Aguilera-Caracuel (2021), we measure financial slack using current ratio, which is the liquidity level of a firm e.g., cash that is not tied to any specific but wide range of activities in a company (Kraatz and Zajac, 2001). It is calculated by dividing current assets by current liabilities of a firm in a particular period. This variable is important to our research as sustainability performance involves additional expenses that may benefit more when a company has a better financial slack. We expect slack to positively improve the ESG score relationship with firm profitability and valuation. Similarly, we follow studies that suggest differences in sustainability demand by stakeholders across business sectors (Da Rosa et al., 2015 and Garcia et al., 2017) and include a dummy variable to capture firms in environmental sensitive industries like energy, mining, oil and gas, chemicals, paper & forest products among others that have more impact on the environment.

4. Empirical Results

4.1 Descriptive statistics

Panel A of Table 1 provides descriptive statistics for the variables in this study. The mean ESG score is over 50 on average while the social pillar score is better on average compared with the environmental and governance pillar scores which is 47.8 and 49.07 respectively. Environmental scores for a very small number of firms are reported as zero, hence the zero minimum in our sample.

Table 1 approximately here

Panel B of Table 1 provides us an insight to the correlation between our variables of interest in this research. The overall ESG score and individual pillar scores have positive correlation with return on assets (ROA) while the correlation with Tobin's Q (Our measure of valuation) is negative.

In Table 2, we observe the distribution of our sample across the eleven global industry classification standards (GICS). ESI industries are marked with an asterisk. Industrials represent the highest fraction of the companies with 30.13 % share, whereas utilities the lowest, only 1.33 % of the companies. Banks and Insurance companies are excluded from this study because of high leverage which is normal for this type of firms given their industries but is not the same for firms in other industries where high leverage could mean distress (Fama and French, 1992). The score values are between 0 and 100 with scores below 50 regarded as weak and those above 50 as strong ESG (sustainability) performance for firms in the Thomson Reuters Refinitiv ESG scores methodology.

Table 2 approximately here

Table 2 presents also the average ESG scores and the rank of each industry sector within each ESG pillar score. The materials sector is ranked 1st in the overall EGS score. This is a sector for environmental sensitive industries are not only paying attention to sustainability issues but also ensuring top performance with 66.6 overall ESG score, 69.7 environmental, 69.3 social, 57.3 and governance averages. If we calculate the average ESG score for the ESI firms and non-ESI firms, we can see that ESI firms score, on average, 53.53 which higher than non-ESI firms' 49.48 suggests that our sample is robust for the ESI firms' analysis.

4.2 ESG score and firm financial performance

To test our first hypothesis, we estimate the following regression to study the relationship between firms' ESG and financial performance.[4] Estimation is conducted using fixed effect unbalanced panel regression model with clustered standard errors.

$$ROA_{i,t} = \alpha + \beta_1 ESG_{i,t} + \beta_2 LnAssets_{i,t} + \beta_3 Leverage_{i,t} + \beta_4 GDPgrowth_{j,t} + \gamma_i + \eta_t + \epsilon_{i,t}, \quad (1)$$

where $ROA_{i,t}$ is the return on assets, $ESG_{i,t}$ is the overall ESG score, both for firm i at year t. α is the common constant, γ_i is the fixed effects for firm i and η_t is the time fixed effects. As control variables we use $LnAssets_{i,t}$, the natural logarithm of total assets, $Leverage_{i,t}$, the debt-to-equity ratio, and $GDPgrowth_{j,t}$ the change in gross domestic product in country j at year t. We also estimate the model using the ESG's sub-category scores by replacing ESG score with pillar score for environmental ($E_{i,t}$), social ($S_{i,t}$), and governance ($G_{i,t}$) performance.

The result in Table 3 shows that both the overall ESG score and the pillar scores are significantly related to firm profitability. The relationship between the scores and profitability is positive except for the governance pillar score. The positive and significant relationship between the environmental score and return on asset shows that environmental performance is beneficial for firms' profitability. It is thus important that as issues of the environment have become even more pressing at this time, the effect of firm's environmental performance is reflected in the performance almost immediately. Similarly, the social score relationship with profitability implies that the social practice of firms is associated with improved profitability. This is understandable as social issues of ESG have to do with workforce, community, product responsibility and the community and they all have direct and immediate impact on firm performance. The result is corroborating the finding of Cordeiro and Tewari (2015), which shows that socially responsible firms witness sound financial performance (operational profitability and market value) based on a review of 52 studies.

On the other hand, the results show that governance score has a negative and significant relationship with ROA. The governance score relationship could be down to the fact

[4] For each model in this study, we conduct the Hausman test of panel regression and variance inflation factors (VIF). Hausman test conducted to confirm the choice between random and fixed effects model shows that the fixed effect is appropriate for our models except the models testing differences between weak and strong ESG link to firm performance. The test of multicollinearity using the variance inflation factors (VIF) shows lower than 5 for all the models. This means our results are not biased due to issues of multicollinearity (Hair et al., 2012).

that companies have invested hugely in related issues such as the gender quotas system that is quite pronounced in the Nordic countries. This could affect the profitability of firms in the short-term as found by Ahern and Dittmar (2012) who suggested that gender quotas led to younger and less-experienced board and the accompanying poor firm performance. Generally, the result of our analysis aligns with studies that found positively significant relationship between ESG and profitability. This further confirms the limitations of studies like Duque-Grisales and Aguilera-Caracuel (2019) that found negative relationship between ESG and profitability (ROA) using short sample of 5-years between 2011 and 2015.

Table 3 approximately here

To study the relationship between the ESG scores and firm valuation, we re-estimate the model with Tobin's Q as our dependant variable. Models 5-8 of Table 3 present the results. The ESG score and individual pillar scores have a positive and highly significant relationship with Tobin's Q as postulated by our hypothesis. This ultimately shows that ESG performance is valued in the market. Our result are basically in line with the findings of Yoon et al. (2018) even though our measure of firm valuation differs from theirs (share price level). The adjusted R^2 is also higher than with ROA suggesting that there is a stronger relationship between ESG and firm valuation than firms' financial performance which is consistent with the forward looking idea of the market valuation.

To study the relationship further, we dissect our sample by examining at country level, how firms' ESG performance affects their profitability and valuation. The descriptive statistic of each country is presented in Table 4 and relative performance of these countries in ESG practices in Figures 1 to 8. Generally, Finnish firms are doing better on average when compared to other countries in all ESG pillars and the overall ESG score while the Iceland firms have the lowest averages among the countries. Though this is partly due to low observation the fact that the ESG scores is only available for the firms in 2020. However, looking at the mean and average scores alone may not be enough to represent the relative performances in these countries, especially because the sample is over time. So, we plot a time-series graph of individual country E, S, G and overall ESG scores performance over time as shown in Figures 1 to 4. In both environmental and overall ESG scores, Finland leads on average for the period of our sample and in recent years for social and governance performances. Similarly, Norway has the lowest performances on average overtime in both environmental and overall ESG scores.

Figures 1 to 8 approximately here

The graph of average performance tells us more but not sufficient information to conclude on relative country performance given the nature of ESG issues. Firms begin ESG practices and reporting at different times and as expected, they go through gradual improvement in the different areas of sustainability. It is thus reasonable to see countries with more new firms joining ESG reporting tend to have lower average performance scores. To this effect, we use box plots as presented in Figures 5 to 8 to show, on a yearly basis, each country's performance using the number of observations and median score that can suggest the relative performance in comparison to other countries with different number of observations. For example, we can see from the box plot that Finnish firms are not always top in environmental performance and Norwegian firms are not always the weakest in performance relative to other countries. Hence, a combination of line graphs and box plots provide us adequate insight to the ESG performance of firms in the countries over the sample period and more importantly, it is useful in confirming our results.

Table 4 approximately here

The first four models in Table 5 looks at each country's firms' ESG performance relationship with ROA. ESG score is positively related to financial performance for Sweden, Finland, Denmark and Iceland. This is important to our study as we can see that our first hypothesis on ESG and firm profitability relationship is positive and significantly for only some of the countries in the region. A holistic conclusion (as, e.g., in Buallay, 2019; Duque-Grisales and Aguilera-Caracuel, 2019) as we have in the first hypothesis considering the region with only country control or fixed effects is not enough to generalise the relationship especially because Norway shows a negative though insignificant relationship with profitability. This may be due to country level characteristics which might not be captured in country control and fixed effect. As such, our analysis gives more insight on the understanding on the ESG-firm performance relationship on regional studies. Similarly, in ESG pillar scores, the environmental scores are positively and significantly related to ROA for only Sweden and Denmark, a negative relationship exists in the case of Norwegian firms. Though, social and governance scores follow a relationship similar pattern with our result in Table 3, we found that a positive but insignificant relationship exist between governance score and profitability

for Danish and Iceland firms. In the same vein, we examine the individual country firms' ESG performance relationship with firm valuation in models 5-8 of Table 5.

In general, the relationship between ESG score and all individual pillar scores is positive like the regional analysis of table 3. The Norwegian firms' environmental and governance performance have no significant relationship with firm valuation. The valuation of Swedish, Finnish and Danish firms is reflecting a positive relationship with ESG. This means stakeholders (especially shareholders expect and encourage firm's performance in ESG). Our models for both measures of firm performance are more robust as evident in the adjusted R^2.

Table 5 approximately here

4.3 Firms' investment in sustainability can differ.

Aside from the growing concerns and demand by stakeholders, authorities, shareholders, suppliers, creditors, employees, community and so on, firms have other reasons dictate how much they invest in sustainability practices. The climate change initiative launched by the Director-General of UNESCO, Ms Irina Bokova in 2009 is one of the many awareness schemes to educate all stakeholders of the need to improve environmental management and demand the same of others. The responsibilities of firms differ in this area because their engagement with the environment is not the same. Garcia et al. (2017) and Miralles-Quirós et al. (2018) found that firms in sensitive industries have better ESG performance using data on emerging markets. Our analysis is in line with these studies but differs in that our study uses data on developed markets. It is important to see if the results of the earlier studies hold in all cases especially in developed countries where all firms are expected to pay adequate attention to sustainability issues regardless of industry or sector. The following equation is designed to explore the performance of environmental sensitive industries in sustainability and whether it differs to firms in other industries.

$$ROA_{i,t} = \alpha + \beta_1 ESG_{i,t} + \beta_2 ESG_{i,t} \times ESI_{i,t} + \beta_3 LnAssets_{i,t} + \beta_4 Leverage_{i,t} + \beta_4 GDPgrowth_{j,t} + \gamma_{i,j} + \eta_t + \epsilon_{i,t}, \quad (2)$$

where $ESG_{i,t} \times ESI_{i,t}$ is the interaction between ESG score and a dummy for environmental sensitive industry firms, other variables are as defined earlier. As before, we estimate the

model with Tobin's Q as the left-hand side variable as well as replacing ESG score with its pillar scores.

In Table 6, we present regression results of equation 2 in models 1-8 using ROA and Tobin's Q as measure of firm profitability and valuation, respectively. There is a negative relationship between ESG score, environmental pillar score, social pillar score, governance pillar scores and firm profitability in environmentally sensitive industry (ESI) firms. Though the relationship is insignificant for the governance pillar, the relation between the ESG score, environmental and social scores is different to the firms in other industries as shown in models 1-3. This suggest that ESG and individual pillar scores is associated with decreased profitability in environmental sensitive firms. Our result differs from the findings of Miralles Quiros et al. (2018), that found positive ESG effects on valuation measured in share prices in the environmental sensitive industries using sample of Brazilian firms. However, our finding aligns with the result of Yoon et al. (2018), who found ESG practices of environmental sensitive industries to be associated with decreased valuation (also measured using company share prices). Our study differs from both earlier studies in the measure of performance adopted. We have used ROA as a measure of profitability to capture the present-focused firm performance and ensured that spurious significance that can result from non-stationarity of share price is not influencing our result.

Table 6 approximately here

Similarly, in models 5-8 of Table 6 we examine the relationship between ESG scores of ESI firms their valuation. Though significant for environmental and social scores only, the overall ESG and individual pillar scores is positively related to firm valuation. This implies that ESG practices is equally valued in the ESI as it is in other industries. The insignificance in overall ESG and social scores maybe as a result of higher expectation from stakeholder on this group of firms i.e., could mean that the ESG practices of ESI firms are already reflected in the valuation since it is demanded of them to deliver high and consistent ESG performance. In other words, it appears that the ESI firms are seen not to be doing enough to compensate for their operational effects and or in their social schemes to ease the troubles caused to the inhabitants. Our result contradicts the findings of Miralles-Quirós et al. (2018), who found that 'investors positively value CSR practices carried out by companies that due to their production activity, have direct impact on the environment. The very high sustainability demands of

developed nations would justify the difference in results as emerging market countries may appreciate little efforts of the companies in sustainability. Meanwhile, the positive relationship between governance pillar score of ESI firms and firm valuation implies that the activities of this firms in governance related issues are rewarded and appreciated. This means there is prospect for improvement in all areas of ESG since the governance score includes the decision makers (i.e., management, shareholders) who design and affect the projects and policy of the firm and a possible aggressive corporate social responsibility strategy.

Generally, the result on ESI firms' sustainability performance is important not only in environmental issues as a result of their direct impact but also in social aspects. These firms have a pivotal role in ensuring they are excellent in employees' welfare by providing tools and conditions that are safe and conducive, protecting human rights especially by avoiding operation effects that trample on it, delivering community initiatives and support programmes to directly compensate and protect the interests of inhabitant and invariably ensuring product responsibility in all levels and processes of production and distribution.

The quest for answers to varying levels of ESG investment and consequently firm performance (as our findings on high vs low ESG score analysis suggests) informed our interest in exploring the influence of financial strength of firms as earlier studied by Duque-Grisales and Aguilera-Caracuel (2019). We use a similar approach to examine the impact of financial slack of firms on ESG performance and consequently profitability and valuation as in equation 3.

$$ROA_{i,t} = \alpha + \beta_1 ESG_{i,t} + \beta_2\, ESG_{i,t} \times Slack_{i,t} + Slack_{i,t} + \beta_3 LnAssets_{i,t} + \beta_4 Leverage_{i,t} + \beta_4 GDPgrowth_{j,t} + \gamma_{i,j} + \eta_t + \epsilon_{i,t} \quad (3)$$

where $ESG_{i,t} \times Slack_{i,t}$ is the interaction between ESG score with the financial slack of the firms and slack is measured with the current ratio of the firm. As before, we estimate the model also with Tobin's Q and ESG pillar scores.

In models 1-4 of Table 7, we can see that financial slack is negative and significantly related to firm profitability. This is in line with the expectation that financial slack (current ratio) is not in active use by the firms as such, so cannot improve the profit of a company. However, as firms financial slack improves, the more the impact of ESG and all individual ESG pillars on profitability. Though, the effect of financial slack on governance pillar score is not significant, the economic significance can be seen in the positive coefficient of the interaction. The implication is that firms ESG score which is the relative performance of a firm

in the E, S or G and the weighted average of the pillar scores as in the over ESG scores with its peers is improved with better financial slack which may be due to increased investment in ESG practices by firms. Specifically, the influence of the financial slack on ESG scores significantly strengthen the positive ESG-profitability relationship of firms i.e., the better the financial slack of a firm, the more the ESG scores influence firm profitability. Interestingly, the insignificance of Governance-financial slack interaction would mean the slack of the firm have no impact on the influence of the pillar score on profitability. This is reasonable becausethe measures in governance score (management, shareholders and CSR strategy) are not directly linked to firm operation but the decision and policy making. The economic significance of governance-slack interaction thus suggest that financial slack is not negatively influencing the governance-profitability.

Table 7 approximately here

Meanwhile, the results of the analysis of financial slack on firms ESG performance is mixed for firms' valuation. Financial slack as a variable measuring the current ratio of the firm is associated with increased valuation of firms in the social pillar of ESG as the positive and significant relationship suggest. This could be explained by the tendency of a better appeal to stakeholders who may see financial slack as a good indication of a firm's ability to meet its social demands. Though, the coefficient is insignificant for governance pillars, as more cash (Financial slack) is available to firms, the more the impact of ESG score and individual pillar score impact on firm valuation except for the social pillar score of ESG. The negative and significant interaction between social score and financial is particularly alarming. The direct interpretation would be that the firm would rather use the cash for other interests that appeals to their organisational goals than improve their social scores in the form of programs or policies that could be positively related to firm valuation. Perhaps the more interesting findings is that as a result of better financial slack, the ESG score, and individual pillar scores are positively associated with firm valuation. We could attribute this to the fact that the valuation of a firm with respect to ESG performance is also a moral issue which can be reflected in the market value of the firm as perceived by shareholders or investors alike. It is important to note that for governance scores as is the case in the profitability (ROA) measure of firms' performance, a firm's valuation is positively influenced by governance practices regardless of financial slack situations of the firm. This could be because most governance practices e.g., gender quotas system, equal pay structure are legislated are not dependent on firm discretions or preferences.

Our result on the moderating effect of financial slack on the relationship between ESG scores and profitability (ROA) contradicts the findings of Duque-Grisales and Aguilera-Caracuel (2019), that documented a negative and significant relationship between ESG and profitability. This corroborate our suggestion that studies using less-developed ESG regions (e.g., the Multilatinas) and short sample (e.g., 5 years) may not be robust enough for generalisation of ESG-firm performance relationship. This is because variables like financial slack in this region for example, are not yet a factor that could motivate the performance of firms in ESG given the developing status of countries and consequently local firms in the Latin America. We improve on their analysis by adding a future-oriented measure to capture the different dimensions to the impact of financial slack on the ESG-firm performance relationship.

4.4 Additional Considerations and Robustness Tests

The standard for firms' performance in ESG is expected to be higher than what was accepted three decades ago. Thus, it is not enough for firms to report ESG scores, it is important that this scores which shows their performance relative to others in specific and important areas of sustainability are meeting the needs of our time which includes rising change in climate, social injustice and inclusiveness. To this end, we look at how high or low ESG scores are rewarded in firm financial performance and valuation[5].

In Table 8, we test high or low ESG and the pillars scores relationship with ROA in models 1-8. High scores are those above the observation median in a year[6], signifying strong performance, while low scores are below the observation median in a year, implying weak ESG performance. The analysis is to find out if it is enough to have ESG score or high ESG score is the target for increased profitability and firm valuation. We conducted a Hausman test of panel regression to conclude that a random effects model is appropriate in testing these models. Though the relationship is insignificant, both high and low ESG score are positively associated with firm profitability which means economically, any level of ESG score is positively

[5] Albuquerque et al. (2020) study on ESG-firm performance explore potential reverse causality i.e., whether firms with better financial prospects can afford to engage in ESG activities or whether the ESG activities benefit firms using Covid-19 as an event. Their result is consistent with findings of Dimson et al. (2015) and Krüger (2015) which uses ESG events study to examine ESG-firm performance relationship that alleviate concerns about reverse causality and omitted variables.

[6] We conducted similar analysis using above and below 50 score to examine whether a general standard that can compete with ESG scores from the USA or like countries differs with our use of observation median and found our result to be consistent.

beneficial for the firm in terms of profitability. This is not particularly a good thing since it suggests that firms with high ESG score are not necessarily recording increased profitability.

Table 8 approximately here

More worrisome is the relationship of high and low environmental score with firm profitability because high environmental score though insignificant, is associated with decreased profitability while the low environmental score is related to increased profitability. The reverse of this relationship is what we expected for the improved ESG performance motivation of firms. However, it is not strange that the pillar is negatively related to profitability because it is evident that firms require investment in environmentally sustainable approaches to operations in and around the firm that may in the short-term reduce the net income which is used in the calculation of ROA (profitability). The social score is the closest to meet our expectation where high social score is positive and significantly related to profitability. The low social score is also positively related to profitability, but the insignificance suggest that this relationship is only economical and so may be for reasons that firms' social responsibilityis important regardless of how much of it done. However, high governance performance is negatively related to profitability and a positive relationship exist between low governance scores and profitability. The implication is that as firms engage more in governance practices such as improved management, implementing shareholders' policy and delivery of robust CSR strategy, it is not directly improving the profitability of the firm. Perhaps, such management practices maybe influenced by other personal interests of manager e.g., empire building or the aggressive CSR strategy that may in the short-term affect profitability.

Similarly, in Table 9, we repeat a test of the same hypothesis as in Table 8 but with the measure of firm valuation, Tobin's Q. High ESG performance is associated with positive firm valuation of a company and low performances in this is not encouraged by investors as the negative relationship with firm valuation suggests. Firms' high performance in environmental related issues is rewarded with increased firm valuation and low performance negatively related to firm valuation. This differs with the insignificant relationship between high and low environmental score and ROA. In addition, high firm performance in governance pillar score of sustainability associated with increased firm valuation while low performance is negatively related to firm valuation. This result is particularly interesting as it negates the earlier result in Table 7. As pointed out earlier, the ROA is a measure of performance that is presently focused but more so, it is reliant on the net income of the firm relative to assets employed. It is thus

possible that governance practices which of course involve investment in activities that are essential but not directly related to operations may not be profitable for the company especially in the short-term. In general, our analysis considering high vs low ESG firm performance relation provides tools for robust conclusion on this topic. This is a novel approach to understanding this relationship and it equips managers and other stakeholders about the need and possibility to improve on ESG performance.

Table 9 approximately here

We examine the improvement of firms in sustainability over time and confirm the motivation that the Nordic region provides a useful data for generalisation on this topic. This is also because an important aspect of sustainability is continual improvement in sustainable practices of all economic agents (individuals, firms and governments). The firms have a significant role to play. This is apparent with the United Nation (UN) Sustainable Stock Exchange (SSE) initiative which requires all big companies to report their impact in environmental and social practice by 2030 at the latest (SSE, 2015). Therefore, we divide our sample period into two with the most recent five years 2016 to 2020 as latter years to see if this differs significantly from the former years (2010 to 2015) in sustainability performance of firms. Hence, our dummy variable takes the value 1 for observations in any of the latter years (2016 to 2020) or zero otherwise. We use the latter years dummy to test our expectation that the positive and significant relationship of each pillar and overall ESG score on firm profitability and valuation is improving over the years. This is in line with the assumption that ESG performance of firms is improving with awareness, legislation, and high sustainability demands by all stakeholders. The results are reported in table 10. It is visible that ESG performances have positive significant relation to firms' profitability except for governance score for which the relationship is negative but insignificant. This will imply that activities in governance score in recent years are not different from the former years of our sample. This may be as a result of general issues such as legislation and policy that means certain governance requirement e.g., gender quotas or CSR implementation roadmap must be always met. Meanwhile, all pillars and the overall ESG score show positive and very strong significant relationships in recent years with firm valuation. This is interesting because it directly indicates how shareholders and other stakeholders perceive firms' performance and consciousness of sustainability issues as a matter of collective interest that should not be compromised.

Table 9 approximately here

We find the results in our examination of ESG performance of firms in recent years quite intuitive and thus enquire further to see if we can have some information about future performance of a firm with its level of ESG performance today. To this end, we conduct an analysis using lagged scores of the overall ESG score of firms on their financial performance and valuation. Our results, as shown in models 5 and 10 of Table 10 for profitability and valuation respectively, suggest that firms with strong ESG performance last period is associated with increased profitability and valuation in the present period. This is incentive for managers to pursue projects and plans that are sustainable in other to meet shareholders' value maximisation demands and preserve other stakeholders' (sustainability) interest at the same time.

5. Conclusion

The debate on whether environmental, social, and governance practices of firms is consistent with the interests of the shareholders in value maximization has been largely explored in academic research. Over the years, this has better informed shareholders of the importance of sustainability practices as a corporate strategy. Expectedly, more research on this topic has been recorded in recent years. The studies have focused on developed nations and a few emerging markets to establish the relationship between sustainability and shareholders' value creation. The tendency of a lopsided conclusion stemming from too good firms or too poor firms is apparent given the advanced nature of firms in developed nations or otherwise in emerging markets. Hence, there is a need to use a balanced data that reflects fairly a middle point of economic, social, and political development. To this end, we analysed the Nordic casebecause it presents a unique economic, social, and political sphere to firms. Though, the economy of countries like Sweden, Denmark, Norway and Finland competes with some developed nations of the world, the development still varies within the region and the inclusionof Iceland meets the economic size of medium countries. The countries are politically similar as they all operate a parliamentary system which means legislation on sustainability issues arelikely to follow similar pattern but different approaches and implementation. All the Nordic countries are ranked in the top 10 world's happiest countries according to the 2019 UN WorldHappiness index. This is no coincidence as they share similar social values like good health and social care, high life expectancy, high incomes, low level of gender and wealth inequality.

Our research adds to the understanding of shareholders and other stakeholders on the impact of a firm's ESG performance on their profitability or valuation in the short-term using ROA (a measure of profitability) and the long-term with Tobin's Q (an accounting measure of firm valuation) especially with data on representative economies for valid generalisation. Our analysis extensively explored data from the Nordic countries from 2010 to 2020 via the panel regressions model. Similarly, using the ESG performance scores from Thomson Reuters based on a wide range of data points on ESG issues for firms collected from publicly available sources including firm websites, news, reports, and filings- our analysis is minimising the bias that exclusively self-reported information of the firm in sustainability can introduce. Though, this is not eradicating the data controversies that surround the rating agencies a result of unstandardised scoring methods or reporting, the Refinitiv scores is the widely used inacademic literature for research on firm sustainability performance. Thus, we were able to consider the environmental, social and governance pillars separately as well as the overall ESGand explored the different effects of weak and strong ESG scores on firm performance using the Nordic data.

The main result of our analysis revealed that, in the short-term, firm profitability is positively related to overall ESG and pillar scores whereas, the governance pillar score is negatively associated with firm profitability. The direction of the relationship for governance score is justified by the impact of the investments in these sustainability practices on the net income of the firm which is a variable used in ROA (profitability) calculations. However, in the long-term as measured in Tobin's Q, all pillars and overall ESG performance have positive and statistically significant relationship with firm valuation. This implies that the incorporation of sustainability practices as a corporate strategy by a firm is associated with increased valuation i.e., the market value of firm's equity relative to its book value of equity, both in addition to total liabilities. In addition, our result generally supports the assumption that strong performance in a pillar or overall ESG increases firm profitability and valuation except for the governance related practices where we found that strong performance therein is associated with decreased firm profitability. This is in line with some findings on corporate governance see e.g., Ahern and Dittmar (2012) who found that gender quotas led to younger and less-experienced board and the accompanying poor firm performance.

In addition, we found that the more financially buoyant a firm is, the more the impact of ESG score on firm performance. However, this is not automatically translating to better performance in ESG in relation to a firm's profitability especially. Lastly, our study shows that the ESG scores of environmental sensitive industries firms is related to decreased profitability.

This shows a different relation when compared with that which exist between ESG scores and firm profitability in other industries. The relationship between ESG scores and firm valuation is not different for environmental sensitive industry firms as in the other industries except that it is insignificant for environmental and social scores. The findings of our research have important implications on all stakeholders as far as sustainability is concerned. This study emphasises the significance of protecting shareholders' interest, that is, to increase profit and deliver value. Where the strategies of a company align with the wealth creation interest of shareholders', managers can make informed decisions of implementing sustainability practices. Also, the incorporation of sustainable environmental, social and governance practices is a distinctive strategy for business that appeals to all stakeholders and can improvetheir value essence. Hence, strong ESG practices should be the target of brilliant managers whowould want to deliver on their promise to investors. Policymakers are also guided by the submissions of this research to improve legislation that encourages a sustainable approach forfirms.

A good idea for future research is to examine how different types of shareholders affect the performance of firms in ESG and consequently firm profitability and valuation. This is particularly important because of the fundamental role shareholders play in promoting sustainable development globally. Similarly, it would be interesting to see how within firm ESG performance has improved overtime time where there is a balanced panel data with as many has 10 years period at least. This should include back-testing strategies to verify the backfilling bias that occurs due to low reliability of historical data on ESG scores. Finally, a comparative study of developed and emerging markets will provide a useful tool to understand what aspect of sustainability is important at the different level of developments especially as sustainability issues are fast spreading across borders.

References

Aboud, A., & Diab, A. (2018). The impact of social, environmental and corporate governance disclosures on firm value: evidence from Egypt. *Journal of Accounting in Emerging Economies, 8(4),* 442-458.

Aguilera-Caracuel, J., Guerrero-Villegas, J., Vidal-Salazar, M. D., & Delgado-Márquez, B. L. (2015). International cultural diversification and corporate social performance in multinational enterprises: The role of slack financial resources. *Management International Review*, *55*(3), 323-353.

Ahern, K. R., & Dittmar, A. K. (2012). The changing of the boards: The impact on firm valuation of mandated female board representation. *The Quarterly Journal of Economics*, *127*(1), 137-197.

Albuquerque, R., Koskinen, Y., Yang, S., & Zhang, C. (2020). Resiliency of environmental and social stocks: An analysis of the exogenous COVID-19 market crash. *The Reviewof Corporate Finance Studies*, *9*(3), 593-621.

Ahsan, T., & Qureshi, M. A. (2021). The nexus between policy uncertainty, sustainability disclosure and firm performance. *Applied Economics*, *53*(4), 441-453.

Allouche, J., & Laroche, P. (2005). A meta-analytical investigation of the relationship between corporate social and financial performance. *Revue de gestion des resources humaines*, (57), 18.

Anderson, R. C., & Reeb, D. M. (2003). Founding-family ownership and firm performance: evidence from the S&P 500. *The Journal of Finance*, *58*(3), 1301-1328.

Aras, G., & Crowther, D. (2008). Evaluating sustainability: a need for standards. *Issues in Social and Environmental Accounting*, *2*(1), 19-35.

Aupperle, K. E., Carroll, A. B., & Hatfield, J. D. (1985). An empirical examination of the relationship between corporate social responsibility and profitability. *Academy of Management Journal*, *28*, 446–463.

Barnea, A., & Rubin, A. (2010). Corporate social responsibility as a conflict between shareholders. *Journal of Business Ethics, 97*(1), 71-86.

Barrena, J., López, M., & Romero, P. M. (2016). Corporate social responsibility: Evolution through institutional and stakeholder perspectives. *European Journal of Management and Business Economics, 25,* 8–14.

Berg, F., Fabisik, K., & Sautner, Z. (2021). *Is history repeating itself? the (un) predictable past of esg ratings*. ECGI Working Paper Series in Finance.

Bhattacharya, C. B., Sen, S., & Korschun, D. (2008). Using corporate social responsibility to win thewar for talent. *MIT Sloan Management Review*, *49*, 37–44.

Bofinger, Y., Heyden, K. J., & Rock, B. (2021). Corporate Social Responsibility and Market Efficiency: Evidence from ESG and Misvaluation Measures. *Journal of Banking & Finance*, 106322.

Brammer, S., Brooks, C., & Pavelin, S. (2006). Corporate social performance and stock returns: UK evidence from disaggregate measures. *Financial Management, 35*(3), 97–116.

Branco, M. C., & Rodrigues, L. L. (2008). Social responsibility disclosure: A study of proxies for the public visibility of Portuguese banks. *The British Accounting Review*, *40*(2), 161-181.

Buallay, A. (2019). Is sustainability reporting (ESG) associated with performance? Evidence from the European banking sector. *Management of Environmental Quality: An International Journal, 30(1),* 98-115.

Cahan, S. F., Chen, C., Chen, L., & Nguyen, N. H. (2015). Corporate social responsibility and media coverage. *Journal of Banking & Finance*, *59*, 409-422.

Cheng, B., Ioannou, I., & Serafeim, G. (2014). Corporate social responsibility and access to finance. *Strategic management journal*, *35*(1), 1-23.

Contractor, F., Yang, Y. and Gaur, A.S. (2016), "Firm-specific intangible assets and subsidiary profitability: the moderating role of distance, ownership strategy and subsidiary experience", *Journal of World Business, Vol. 51 No. 6*, pp. 950-964.

Cordeiro, J. J., & Tewari, M. (2015). Firm characteristics, industry context, and investor reactions to environmental CSR: A stakeholder theory approach. *Journal of Business Ethics*, *130*(4), 833-849.

Da Rosa, F.S.; Guesser, T.; Hein, N.; Pfitscher, E.D.; Lunkes, R.J. (2015). Environmental impact management of Brazilian companies: Analyzing factors that influence disclosure of waste, emissions, effluents, and other impacts. *Journal of Clean Production*, *96*, 148–160.

Dimson, E., Karakas, O., & Li, X. (2015). Active ownership. *Review of Financial Studies*, *28*, 3225–3268

Dorfleitner, G., Halbritter, G., & Nguyen, M. (2015). Measuring the level and risk of corporate responsibility–An empirical comparison of different ESG rating approaches. *Journal of Asset Management*, *16*(7), 450-466.

Duque-Grisales, E., & Aguilera-Caracuel, J. (2021). Environmental, social and governance (ESG) scores and financial performance of multilatinas: Moderating effects of geographic international diversification and financial slack. *Journal of Business Ethics*, *168*(2), 315-334.

Eccles, R. G., Ioannou, I., & Serafeim, G. (2014). The impact of corporate sustainability on organizational processes and performance. *Management Science*, *60*(11), 2835-2857.

Edmans, A. (2011). Does the stock market fully value intangibles? Employee satisfaction and equity prices. *Journal of Financial Economics*, *101*, 621–640.

Elsayed, K., & Paton, D. (2005). The impact of environmental performance on firm performance: static and dynamic panel data evidence. *Structural Change and Economic Dynamics*, *16*(3), 395-412.

Fama, Eugene F. and Kenneth R. French, 1992, The cross-section of expected stock returns, *Journal of Finance, 47,* 427-465.

Fatemi, A. M., & Fooladi, I. J. (2013). Sustainable finance: A new paradigm. *Global Finance Journal*, *24*(2), 101-113.

Fatemi, A., Fooladi, I., & Tehranian, H. (2015). Valuation effects of corporate social responsibility. *Journal of Banking & Finance, 59*, 182-192.

Fatemi, A., Glaum, M., & Kaiser, S. (2018). ESG performance and firm value: The moderating role of disclosure. *Global Finance Journal, 38*, 45-64.

Fisher-Vanden, K., & Thorburn, K. S. (2011). Voluntary corporate environmental initiatives and shareholder wealth. *Journal of Environmental Economics and Management, 62*(3), 430-445.

Flammer, C. (2021). Corporate green bonds. *Journal of Financial Economics, 142*, 499-516.

Freeman, R. E. (1984). Stakeholder management. A strategic approach. Marchfield, MA: Pitman.

Friedman, M. (1970). The social responsibility of business is to increase its profits. *New York Times Magazine* (September 13, reprinted from (1962)).

Fu, L., Singhal, R., & Parkash, M. (2016). Tobin's q ratio and firm performance. *International Research Journal of Applied Finance, 7*(4), 1-10.

Galema, R., Plantinga, A., & Scholtens, B. (2008). The stocks at stake: Return and risk in socially responsible investment. *Journal of Banking & Finance, 32*(12), 2646–2654.

Garcia, A.S.; Mendes-Da-Silva, W.; & Orsato, R.J. (2017**)** Sensitive industries produce better ESG performance: Evidence from emerging markets. *Journal of Clean Production*, *150*, 135–147.

Ge, W., & Liu, M. (2015). Corporate social responsibility and the cost of corporate bonds. *Journal of Accounting and Public Policy, 34*, 597–624.

Gibson, R., Krueger, P., & Schmidt, P. S. (2019). ESG rating disagreement and stock returns. *Swiss Finance Institute Research Paper*, (19-67).

Greening, D. W., & Turban, D. B. (2000). Corporate social performance as a competitive advantage in attracting a quality workforce. *Business & Society, 39*, 254–280.

Grewal R, Chakravarty A, Ding M, & Liechty J. (2008). Counting chickens before the eggs hatch: associating new product development portfolios with shareholder expectations in the pharmaceutical sector. *International Journal of Research in Marketing, 25*(4): 261–272.

Hair, J. F., Sarstedt, M., Ringle, C. M., & Mena, J. A. (2012). An assessment of the use of partial least squares structural equation modeling in marketing research. *Journal of the Academy of Marketing Science, 40*(3), 414–433.

Hart, S. L., & Ahuja, G. (1996). Does it pay to be green? An empirical examination of the relationship between emission reduction and firm performance. *Business strategy and the Environment, 5*(1), 30-37.

Hawn, O., & Ioannou, I. (2016). Mind the gap: The interplay between external and internal actions in the case of corporate social responsibility. *Strategic Management Journal, 37*(13), 2569-2588.

Horváthová, E. (2010). Does environmental performance affect financial performance? A meta-analysis. *Ecological Economics, 70*(1), 52–59.

Horváthová, E. (2012). The impact of environmental performance on firm performance: Short-term costs and long-term benefits? *Ecological Economics, 84*, 91-97.

Ioannou, I., & Serafeim, G. (2012). What drives corporate social performance? The role of nation-level institutions. *Journal of International Business Studies, 43*(9), 834-864.

Jacobs, B.W., Singhal, V. R., & Subramanian, R. (2010). An empirical investigation of environmental performance and the market value of the firm. *Journal of Operations Management, 28*, 430–441.

Jayachandran, S., Kalaignanam, K., & Eilert, M. (2013). Product and environmental social performance: Varying effect on firm performance. *Strategic Management Journal, 34*(10), 1255-1264.

Kim, E. H., & Lyon, T. P. (2015). Greenwash vs. brownwash: Exaggeration and undue modesty in corporate sustainability disclosure. *Organization Science, 26*(3), 705-723.

Kraatz, M. S., & Zajac, E. J. (2001). How organizational resources affect strategic change and performance in turbulent environments: Theory and evidence. *Organization Science, 12*(5), 632-657.

Krüger, P. (2015). Corporate goodness and shareholder wealth. *Journal of Financial Economics, 115*, 304–329.

Larcker, D.F. and Rusticus, T.O. (2010). On the use of instrumental variables in accounting research. *Journal of Accounting and Economics, Vol. 49 No. 3,* pp. 186-205.

Lee, D. D., & Faff, R. W. (2009). Corporate sustainability performance and idiosyncratic risk: A global perspective. *Financial Review, 44*(2), 213–237.

Li, Y., Gong, M., Zhang, X. Y., & Koh, L. (2018). The impact of environmental, social, and governance disclosure on firm value: The role of CEO power. *The British Accounting Review, 50*(1), 60-75.

Lo, S. F., & Sheu, H. J. (2007). Is corporate sustainability a value-increasing strategy for business? *Corporate Governance: An International Review, 15*(2), 345-358.

Lyon, T., Lu, Y., Shi, X., & Yin, Q. (2013). How do investors respond to green company awards in China? *Ecological Economics, 94*, 1–8.

Malik, M. (2015). Value-enhancing capabilities of CSR: A brief review of contemporary literature. *Journal of Business Ethics, 127*(2), 419-438.

Margolis, J. D., Elfenbein, H. A., & Walsh, J. P. (2009). Does it pay to be good... and does it matter? A meta-analysis of the relationship between corporate social and financial performance. *Available at SSRN 1866371*.

McConnell, J. J., & Servaes, H. (1990). Additional evidence on equity ownership and corporate value. *Journal of Financial Economics, 27*(2), 595-612.

McWilliams, A., & Siegel, D. (2000). Corporate social responsibility and financial performance: Correlation or misspecification? *Strategic Management Journal, 21*, 603–609.

Miralles-Quirós, M. M., Miralles-Quirós, J. L., & Valente Gonçalves, L. M. (2018). Thevalue relevance of environmental, social, and governance performance: The Brazilian case. *Sustainability, 10*(3), 574-588.

Moskowitz, M. R. (1972). Choosing socially responsible stocks. *Business and Society Review*, 71–75.

Nikolaev, V. and van Lent, L. (2005), "The endogeneity bias in the relation between cost-of-debt capital and corporate disclosure policy", *European Accounting Review, 14(4)*, 677-724.

Orlitzky, M., Schmidt, F. L., & Rynes, S. L. (2003). Corporate social and financial performance: A meta-analysis. *Organization Studies, 24*(3), 403–441.

Pérez, A., & del Bosque, I. R. (2015). Corporate social responsibility and customer loyalty: Exploring the role of identification, satisfaction, and type of company. *Journal of Services Marketing*, *29*, 15–25.

Porter, M. E., & van der Linde, C. (1995). Toward a new conception of the environment-competitiveness relationship. *Journal of Economic Perspectives*, *9*, 97–118.

Ramlugun, V. G., & Raboute, W. G. (2015). Do CSR practices of banks in Mauritius lead to satisfaction and loyalty? *Studies in Business and Economics*, *10*, 128–144.

Rassier, D. G., & Earnhart, D. (2010). Does the porter hypothesis explain expected future financial performance? The effect of clean water regulation on chemical manufacturing firms. *Environmental and Resource Economics*, *45*(3), 353-377.

Renneboog, L., Horst, J. T., & Zhang, C. (2008a). Socially responsible investments: Institutional aspects, performance, and investor behavior. *Journal of Banking & Finance*, *32*, 1723–1742.

Renneboog, L., Horst, J. T., & Zhang, C. (2008b). The price of ethics and stakeholder governance: The performance of socially responsible mutual funds. *Journal of Corporate Finance*, *14*, 302–322.

Rodriguez-Fernandez, M. (2016). Social responsibility and financial performance: The role of good corporate governance. *BRQ Business Research Quarterly*, *19*(2), 137-151.

Russo, M. V., & Fouts, P. A. (1997). A resource-based perspective on corporate environmental performance and profitability. *Academy of Management Journal*, *40*, 534–559.

Sen, S., & Bhattacharya, C. B. (2001). Does doing good always lead to doing better? Consumer reactions to corporate social responsibility. *Journal of Marketing Research,38*, 225–243.

Surroca, J., Tribo´, J. A., & Waddock, S. (2010). Corporate responsibility and financial performance: The role of intangible resources. *Strategic Management Journal*, *31*(5), 463–490.

Sustainable Stock Exchanges (SSE) (2015), "Sustainable stock exchanges initiative: model guidance on reporting ESG information to investors", available at: www.sseinitiative.org/wpcontent/uploads/2015/09/SSE-Model-Guidance-on-Reporting-SG.pdf

Statman, M. (2006). Socially responsible indexes: Composition, performance, and tracking error. *Journal of Portfolio Management*, *32*(3), 100–109.

Tang, A., Chiara, N., & Taylor, J. E. (2012). Financing renewable energy infrastructure: Formulation, pricing, and impact of a carbon revenue bond. *Energy Policy, 45*, 691–703. https ://doi.org/10.1016/j.enpol .2012.03.022.

Tang, D. Y., Yan, J., & Yao, C. Y. (2021). The determinants of ESG ratings: Rater ownership matters. *Available at SSRN 3889395*.

Tantalo, C., & Priem, R. L. (2016). Value creation through stakeholder synergy. *Strategic Management Journal*, *37*(2), 314-329.

United NationsWorld Commission on Environment and Development. Our common future, The Brundtland Report, Report of the World Commission on Environment, and Development, 1987, General Assembly Resolution 42/187. Available online: http://www.un-documents.net/our-common-future.pdf (accessed on 24 May 2021).

Vance, S. G. (1975). Are socially responsible corporation good investment risks? *Management Review*, *64*, 18–24.

Velte, P. (2017). Does ESG performance have an impact on financial performance? Evidence from Germany. *Journal of Global Responsibility, 8*(2), 169–178.

Waddock, S. A., & Graves, S. B. (1997). The corporate social performance–financial performance link. *Strategic management journal*, *18*(4), 303-319.

Walsh, G., & Bartikowski, B. (2013). Exploring corporate ability and social responsibility associations as antecedents of customer satisfaction cross-culturally. *Journal of Business Research*, *66*, 989–995.

Wang, Z., & Sarkis, J. (2017). Corporate social responsibility governance, outcomes, and financial performance. *Journal of Cleaner Production*, *162*, 1607-1616.

Wright, P., & Ferris, S. P. (1997). Agency conflict and corporate strategy: The effect of divestment on corporate value. *Strategic Management Journal*, *18*, 77–83.

Xie, Y. (2014). The effects of corporate ability and corporate social responsibility on winning customer support: An integrative examination of the roles of satisfaction, trust, and identification. *Global Economic Review*, *43*, 73–92.

Yoon, B., Lee, J. H., & Byun, R. (2018). Does ESG performance enhance firm value? Evidence from Korea. *Sustainability*, *10*(10), 3635.

Table 1. Sample descriptive statistics and correlation matrix.

Panel A: Descriptive statistics

	N	*Mean*	*Median*	*Std. Dev.*	*Min*	*Max*
ESG score	1,958	51.496	53.394	20.158	1.24	92.517
Environmental score	1,958	47.805	51.253	26.932	0	96.745
Social score	1,958	55.044	57.134	22.992	0.628	96.413
Governance score	1,958	49.074	48.670	22.943	1.242	98.402
Ln(Tobin's Q)	1,958	0.556	0.420	0.655	-3.297	3.409
Return on Asset(%)	1,953	0.044	0.050	0.141	-2.029	0.973
Leverage	1,958	1.130	0.540	13.950	-46.196	570.505
GDP growth	1,958	0.007	0.008	0.050	-0.157	0.181
Financial Slack	1,949	1.853	1.345	3.173	0.023	83.333
Ln(Total Asset)	1,958	21.291	21.471	1.686	15.273	25.424

Panel B: *Correlation matrix*

	ROA	Ln(Tobin's Q)	Leverage	Ln(Total Asset)	Financial Slack	GDP growth	ESGScore	Environmental	Social
ROA	1								
Ln(Tobin's Q)	0.166	1							
Leverage	-0.077	-0.037	1						
Ln(Total Asset)	0.202	-0.390	-0.01	1					
Financial Slack	-0.005	0.150	-0.023	-0.168	1				
GDP Growth	0.132	-0.030	-0.028	0.191	-0.02	1			
ESG_Score	0.150	-0.074	0.012	0.594	-0.121	0.094	1		
Environmental	0.162	-0.137	0.004	0.583	-0.167	0.136	0.864	1	
Social	0.179	-0.052	0.025	0.536	-0.08	0.082	0.894	0.727	1
Governance	0.029	-0.031	0.0004	0.379	-0.039	0.002	0.702	0.407	0.432

This table shows the descriptive statistics (Number of observations, mean, standard deviation maximum, and minimum) and the correlation matrix of the financial variables: Return on assets (ROA), Tobin's Q, Leverage, Natural log of total assets (Ln Total Asset), Current ratio (Financial slack) and the environmental, social, and corporate governance performance variables, as well as a general ESG performance measure obtained from the arithmetic mean of the previous three.

Table 2. Average environmental, social, governance and overall ESG scores performance by sectors.

Sector	*% of sample*	*Overall ESG*	*Rank*	*Environ-mental*	*Rank*	*Social*	*Rank*	*Govern-ance*	*Rank*
Communication Services	6.33	53.7	4th	43.9	7th	55.3	4th	56.5	3rd
Consumer Discretionary	9.19	50.9	7th	48.2	6th	53.4	6th	50.4	5th
Consumer Staples	6.54	60.6	3rd	60.2	3rd	65.4	2nd	53.4	4th
Energy*	8.99	45.8	9th	43.1	8th	47.3	10th	47.5	7th
Financials	4.34	34.8	12th	21.6	12th	42.0	11th	43.2	11th
Health Care	11.29	45.0	10th	32.6	11th	50.3	9th	44..6	10th
Industrials*	30.13	51.2	6th	49.8	5th	55.7	3rd	46.2	9th
Information Technology	7.30	47.3	8th	40.5	9th	52.4	7th	46.3	8th
Materials *	9.55	66.6	1st	69.7	1st	69.3	1st	57.3	2nd
Others	0.15	37.6	11th	33.3	10th	37.5	12th	40.5	12th
Real Estate	5.01	52.7	5th	55.6	4th	53.9	5th	48.6	6th
Utilities*	1.17	63.3	2nd	68.2	2nd	51.6	8th	70.2	1st

This tables ranks the average performance of Nordic firms in individual pillars and overall ESG score by sector between 2010 and 2019 in our study. Industry sectors that are considered to be among the Environmentally Sensitive Industries are marked with an asterisk.

Table 3. ESG and firm performance.

	ROA				Ln(Tobin's Q)			
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ln(Total Asset)	0.011***	0.011***	0.009***	0.015***	-0.210***	-0.181***	-0.199***	-0.176***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.011)	(0.010)	(0.010)	(0.010)
Leverage	-0.001***	-0.001***	-0.001***	-0.001***	-0.002**	-0.002*	-0.002**	-0.002*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
GDP growth	0.231***	0.232***	0.217**	0.246***	1.213***	1.353***	1.196***	1.402***
	(0.089)	(0.089)	(0.089)	(0.089)	(0.380)	(0.385)	(0.381)	(0.384)
ESG_Score	0.038**				0.772***			
	(0.019)				(0.082)			
Environmental		0.037***				0.329***		
		(0.014)				(0.061)		
Social			0.063***				0.618***	
			(0.016)				(0.069)	
Governance				-0.025*				0.385***
				(0.015)				(0.064)
Fixed effects								
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country	No	No	No	No	No	No	No	No
Observations	1953	1953	1953	1953	1958	1958	1958	1958
Adjusted R2	0.027	0.029	0.033	0.027	0.172	0.147	0.168	0.15
F Statistic	17.244***	17.968***	20.120***	16.990***	105.068***	87.839***	102.511***	89.810***

This table shows the results of the models' estimation of ESG impact on firm profitability and valuation. ROA is net income over total assets of the firm and Tobin's Q is market value of the firm divided by the replacement cost. Ln(Total Asset) is the natural logarithm of book value of total assets of a firm, Leverage is the debt to equity ratio of the firm, GDP growth is the change in GDP in a country and the main explanatory variables are the individual pillar scores (environmental, social and governance) of ESG and ESG_score is the overall score for the individual pillars measured as combined weighted average of the pillars. The ESG coefficients are scaled up by 100 for reporting. The last rows include the fixed effects, number of observations in the models estimated, adjusted R2 and the F statistic., Firm-level clustered standard errors are given in parentheses and *** (**, *) denotes significance at the 1% (5%, 10%) level (two-sided test). Separate intercept is fitted for each unit in the panel data.

Table 4. Descriptive statistics by country

	N	*Mean*	*Median*	*Std. dev.*	*Min*	*Max*
Panel A: Denmark						
ESGScore	307	53.444	54.697	15.587	1.240	84.224
Env	307	49.593	52.611	22.085	0	90.080
Soc	307	56.497	57.630	18.941	1.678	94.723
Gov	307	50.553	52.297	22.156	1.242	92.213
LnQ	307	0.735	0.540	0.822	-3.297	3.377
ROA	307	0.076	0.054	0.127	-0.504	0.596
Leverage	307	0.604	0.399	1.048	0	14.825
Slack	307	1.849	1.314	2.259	0.170	18.524
LnAsset	307	21.408	21.319	1.439	15.801	24.786
Panel B: Finland						
ESGScore	321	59.391	60.735	17.456	5.87	92.517
Env	321	62.523	67.587	22.526	0	96.498
Soc	321	62.249	65.472	19.452	4.732	94.361
Gov	321	50.729	49.874	22.646	8.611	94.698
LnQ	321	0.469	0.415	0.431	-0.337	2.114
ROA	321	0.053	0.047	0.062	-0.187	0.281
Leverage	321	0.669	0.575	0.628	0.013	8.328
Slack	321	1.523	1.340	0.800	0.152	5.475
LnAsset	321	21.622	21.740	1.337	17.522	24.780
Panel C: Norway						
ESGScore	353	47.694	49.526	20.733	2.929	90.590
Env	353	43.324	47.546	25.573	0	96.745
Soc	353	51.352	51.582	24.132	0.628	96.413
Gov	353	46.579	44.429	22.849	1.748	95.149
LnQ	353	0.307	0.224	0.514	-2.283	3.014
ROA	352	0.011	0.029	0.141	-1.005	0.415
Leverage	353	3.064	0.603	32.543	-46.196	570.505
Slack	353	1.768	1.431	1.679	0.119	22.678
LnAsset	353	21.595	21.533	1.415	16.880	25.424

Table 4. (*Continued*)

	N	*Mean*	*Median*	*Std. dev.*	*Min*	*Max*
Panel D: Sweden						
ESGScore	971	49.714	50.922	21.323	1.693	92.289
Env	971	44.036	44.272	28.434	0	94.978
Soc	971	53.630	55.488	24.304	0.916	95.530
Gov	971	48.986	49.155	23.242	1.479	98.402
LnQ	971	0.619	0.443	0.674	-0.79	3.409
ROA	967	0.044	0.057	0.161	-2.029	0.973
Leverage	971	0.747	0.553	2.477	-20.07	33.740
Slack	962	1.999	1.329	4.180	0.023	83.333
LnAsset	971	21.043	21.371	1.9	15.273	24.765
Panel E: Iceland						
ESGScore	6	41.414	40.149	14.44	26.306	64.838
Env	6	42.339	41.854	19.341	21.230	67.968
Soc	6	41.462	38.433	10.295	28.612	56.593
Gov	6	45.764	40.833	29.062	16.250	82.500
LnQ	6	0.464	0.391	0.291	0.144	0.963
ROA	6	0.027	0.024	0.019	0.008	0.056
Leverage	6	0.895	0.972	0.492	0.296	1.512
Slack	6	1.193	1.147	0.121	1.090	1.399
LnAsset	6	19.911	20.099	1.066	18.189	21.319

This table presents country level summary statistics for ESG and financial variables between 2010 to 2020.

Table 5. ESG and firm performance at country level.

	ROA				Ln(Tobin's Q)			
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ln(Total Asset)	0.012***	0.011***	0.010***	0.017***	-0.206***	-0.181***	-0.196***	-0.169***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.010)	(0.010)	(0.010)	(0.010)
Leverage	-0.001***	-0.001***	-0.001***	-0.001***	-0.002*	-0.002*	-0.002*	-0.002*
	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.001)	(0.001)	(0.001)	(0.001)
GDP Growth	0.107	0.154	0.082	0.110	0.502	0.708*	0.379	0.788*
	(0.096)	(0.095)	(0.095)	(0.095)	(0.402)	(0.404)	(0.402)	(0.409)
ESG_Score-Sweden	0.044**				0.785***			
	(0.020)				(0.085)			
ESG_Score-Finland	0.024				0.631***			
	(0.021)				(0.090)			
ESG_Score-Denmark	0.080***				1.218***			
	(0.024)				(0.099)			
ESG_Score-Norway	-0.024				0.528***			
	(0.025)				(0.103)			
ESG_Score-Iceland	0.124				0.345			
	(0.133)				(0.559)			
Env-Sweden		0.048***				0.350***		
		(0.016)				(0.066)		
Env-Finland		0.022				0.241***		
		(0.017)				(0.071)		
Env-Denmark		0.070***				0.784***		
		(0.020)				(0.086)		
Env-Norway		-0.006				0.087		
		(0.021)				(0.088)		
Env-Iceland		0.129				-0.096		
		(0.125)				(0.534)		

Table 5. *(continued)*

	ROA				Ln(Tobin's Q)			
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Soc-Sweden			0.069***				0.638***	
			(0.017)				(0.071)	
Soc-Finland			0.053***				0.511***	
			(0.019)				(0.079)	
Soc-Denmark			0.111***				1.056***	
			(0.020)				(0.086)	
Soc-Norway			0.004				0.361***	
			(0.021)				(0.088)	
Soc-Iceland			0.152				0.021	
			(0.135)				(0.571)	
Gov-Sweden				-0.020				0.370***
				(0.016)				(0.068)
Gov-Finland				-0.041**				0.234***
				(0.020)				(0.084)
Gov-Denmark				0.011				0.705***
				(0.019)				(0.084)
Gov-Norway				-0.094***				0.131
				(0.020)				(0.090)
Gov-Iceland				0.038				0.065
				(0.108)				(0.465)
Fixed effects								
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1953	1953	1953	1953	1958	1958	1958	1958
Adjusted R2	0.040	0.035	0.048	0.039	0.202	0.175	0.202	0.169
F Statistic	12.291***	11.225***	14.458***	12.119***	64.325***	54.195***	64.157***	51.995***

This table shows the results of the country-level models estimation of ESG impact on firm profitability and valuation. The country dummy takes the value of 1 if firm is in the country or zero otherwise. ROA is net income over total assets of the firm and Tobin's Q is market value of the firm divided by the replacement cost. Ln(Total Asset) is the natural logarithm of book value of total assets of a firm, Leverage is the debt-to-equity ratio of the firm, GDP growth is the change in GDP in a country and the main explanatory variables are the individual pillar scores (environmental, social and governance) of ESG and ESG_score is the overall score for the individual pillars measured as combined weighted average of the pillars. The ESG coefficients are scaled up by 100 for reporting. The last rows include the fixed effects, number of observations in the models estimated, adjusted R2 and the F statistic., Firm-level clustered standard errors are given in parentheses and *** (**, *) denotes significance at the 1% (5%, 10%) level (two-sided test). Separate intercept is fitted for each unit in the panel data.

Table 6. ESG and firm performance in environmental sensitive industries.

		ROA			Ln(Tobin's Q)			
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ln(Total Asset)	0.012***	0.011***	0.010***	0.016***	-0.201***	-0.176***	-0.189***	-0.165***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.010)	(0.010)	(0.010)	(0.010)
Leverage	-0.001***	-0.001***	-0.001***	-0.001***	-0.002**	-0.002**	-0.002**	-0.002*
	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.001)	(0.001)	(0.001)	(0.001)
GDP Growth	0.236***	0.237***	0.226**	0.234***	1.032***	1.131***	1.035***	1.239***
	(0.089)	(0.089)	(0.089)	(0.089)	(0.375)	(0.379)	(0.376)	(0.378)
ESGScore	0.106***				0.666***			
	(0.025)				(0.107)			
Env		0.103***				0.260***		
		(0.018)				(0.079)		
Soc			0.121***				0.561***	
			(0.021)				(0.090)	
Gov				-0.023				0.176***
				(0.021)				(0.088)
ESGScore:ESI	-0.125***				0.208			
	(0.031)				(0.130)			
Env:ESI		-0.119***				0.249**		
		(0.023)				(0.100)		
Soc:ESI			-0.116***				0.096	
			(0.027)				(0.114)	
Gov:ESI				-0.009				0.343***
				(0.027)				(0.115)
Fixed effects								
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm & Country	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1953	1953	1953	1953	1958	1958	1958	1958
Adjusted R2	0.039	0.046	0.046	0.031	0.200	0.180	0.194	0.178
F Statistic	15.964***	18.481***	18.186***	13.070***	83.984***	74.479***	81.075***	73.097***

This table shows the results of the models' estimation of ESG impact on firm profitability and valuation. ROA is net income over total assets of the firm and Tobin's Q is market value of the firm divided by the replacement cost. Ln(Total Asset) is the natural logarithm of book value of total assets of a firm, Leverage is the debt to equity ratio of the firm, GDP growth is the change in GDP in a country and the main explanatory variables are the individual pillar scores (environmental, social and governance) of ESG and ESG_score is the overall score for the individual pillars measured as combined weighted average of the pillars. In interaction, ESI is environmental sensitive industry dummy that takes the value of 1 if a firm belongs to the ESI or zero otherwise. The ESG coefficients are scaled up by 100 for reporting. The last rows include the fixed effects, number of observations in the models estimated, adjusted R2 and the F statistic., Firm-level clustered standard errors are given in parentheses and *** (**, *) denotes significance at the 1% (5%, 10%) level (two-sided test). Separate intercept is fitted for each unit in the panel data.

Table 7. ESG performance, financial slack, and firm performance.

		ROA			Ln(Tobin's Q)			
Models	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ln(Total Asset)	0.011***	0.013***	0.008***	0.016***	-0.204***	-0.168***	-0.191***	-0.170***
	(0.003)	(0.002)	(0.002)	(0.002)	(0.011)	(0.010)	(0.010)	(0.010)
Leverage	-0.001***	-0.001***	-0.001***	-0.001***	-0.002*	-0.001	-0.002**	-0.002*
	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.001)	(0.001)	(0.001)	(0.001)
GDP Growth	0.227**	0.226**	0.218**	0.240***	1.174***	1.374***	1.124***	1.344***
	(0.089)	(0.088)	(0.089)	(0.089)	(0.378)	(0.378)	(0.380)	(0.384)
ESG	0.043**				0.793***			
	(0.019)				(0.082)			
Env		0.049***				0.387***		
		(0.014)				(0.061)		
Soc			0.064***				0.609***	
			(0.016)				(0.069)	
Gov				-0.025*				0.384***
				(0.015)				(0.064)
Slack	-0.009***	-0.002*	-0.008***	-0.002	-0.016	0.003	0.037***	0.011
	(0.002)	(0.001)	(0.002)	(0.003)	(0.010)	(0.005)	(0.011)	(0.011)
ESG:Slack	0.032***				0.106***			
	(0.007)				(0.028)			
Env:Slack		0.044***				0.196***		
		(0.006)				(0.024)		
Soc:Slack			0.020***				-0.039**	
			(0.005)				(0.019)	
Gov:Slack				0.008				0.017
				(0.005)				(0.022)
Fixed effects								
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm & Country	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,944	1,944	1,944	1,944	1,949	1,949	1,949	1,949
Adjusted R2	0.039	0.055	0.042	0.028	0.184	0.181	0.175	0.156
F Statistic	15.847***	21.368***	16.836***	12.059***	76.070***	74.659***	71.410***	62.499***

This table shows the results of the models' estimation of ESG impact on firm profitability and valuation. ROA is net income over total assets of the firm and Tobin's Q is market value of the firm divided by the replacement cost. Ln(Total Asset) is the natural logarithm of book value of total assets, Leverage is the debt to equity, GDP growth is the change in GDP in a country and the main explanatory variables are the individual pillar scores (environmental, social and governance) of ESG and ESG_score is the overall score for the individual pillars measured as combined weighted average of the pillars. Slack (Financial slack) is a firm's current assets divided by current liabilities. The financial slack variable is demeaned and ESG coefficients are scaled up by 100 for reporting. The last rows include the fixed effects, number of observations in the models estimated, adjusted R2 and the F statistic., Firm-level clustered standard errors are given in parentheses and *** (**, *) denotes significance at the 1% (5%, 10%) level (two-sided test). Separate intercept is fitted for each unit in the panel data.

Table 8. ESG score level and firm profitability.

	ROA							
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ln(Total Asset)	0.014***	0.015***	0.016***	0.017***	0.013***	0.015***	0.016***	0.015***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Leverage	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***
	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)
GDP Growth	0.244***	0.243***	0.273***	0.280***	0.270***	0.263***	0.243***	0.241***
	(0.070)	(0.072)	(0.064)	(0.064)	(0.064)	(0.065)	(0.068)	(0.070)
ESGScore-HighESG	(0.009)							
	(0.011)							
ESGScore-LowESG		0.006						
		(0.016)						
Env-HighEnv			-0.006					
			(0.010)					
Env-LowEnv				0.085***				
				(0.019)				
Soc-HighSoc					0.021***			
					(0.009)			
Soc-LowSoc						0.002		
						(0.015)		
Gov-HighGov							-0.019**	
							(0.009)	
Gov-LowGov								0.031*
								(0.019)
Constant	-0.246***	-0.267***	-0.295***	-0.334***	-0.243***	-0.278***	-0.290***	-0.279***
	(0.047)	(0.045)	(0.045)	(0.042)	(0.044)	(0.043)	(0.043)	(0.043)
Observations	1953	1953	1953	1953	1953	1953	1953	1953
Adjusted R2	0.049	0.047	0.053	0.063	0.055	0.052	0.052	0.050
F Statistic	87.513***	83.121***	113.457***	134.543***	118.693***	103.937***	96.506***	89.641***

This table shows the results of the models' estimation of ESG-level impact on firm profitability. ROA is net income over total assets of the firm. Ln(Total Asset) is the natural logarithm of book value of total assets of a firm, Leverage is the debt-to-equity ratio of the firm, GDP growth is the change in GDP in a country and the main explanatory variables are the individual pillar scores (environmental, social and governance) of ESG and ESG_score is the overall score for the individual pillars measured as combined weighted average of the pillars. In interaction, individual pillars and overall ESG scores above 50 are categorised as high scores and below 50 scores are categorised as low scores. The ESG coefficients are scaled up by 100 for reporting. The last rows include number of observations in the models estimated, adjusted R2 and the F statistic., Firm-level clustered standard errors are given in parentheses and *** (**, *) denotes significance at the 1% (5%, 10%) level (two-sided test).

Table 9. ESG score level and firm valuation.

	Ln(Tobin's Q)							
Model	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Ln(Total Asset)	-0.200***	-0.171***	-0.178***	-0.157***	-0.191***	-0.166***	-0.174***	-0.162***
	(0.010)	(0.009)	(0.010)	(0.009)	(0.009)	(0.009)	(0.009)	(0.008)
Leverage	-0.002**	-0.002*	-0.002**	-0.002*	-0.002**	-0.002**	-0.002**	-0.002**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
GDP Growth	0.631**	0.589**	0.870***	0.926***	0.731**	0.687**	0.915***	0.817***
	(0.290)	(0.288)	(0.331)	(0.333)	(0.313)	(0.307)	(0.318)	(0.307)
ESGScore:HighESG	0.413***							
	(0.045)							
ESGScore:LowESG		-0.423***						
		(0.071)						
Env:HighEnv			0.217***					
			(0.044)					
Env:LowEnv				-0.161*				
				(0.082)				
Soc:HighSoc					0.346***			
					(0.040)			
Soc:LowSoc						-0.353***		
						(0.066)		
Gov:HighGov							0.268***	
							(0.040)	
Gov:LowGov								-0.457***
								(0.081)
Constant	4.678***	4.270***	4.260***	3.911***	4.485***	4.140***	4.166***	4.060***
	(0.198)	(0.189)	(0.206)	(0.193)	(0.196)	(0.190)	(0.190)	(0.185)
Observations	1958	1958	1958	1958	1958	1958	1958	1958
Adjusted R2	0.174	0.157	0.147	0.138	0.167	0.148	0.155	0.150
F Statistic	445.746***	394.761***	355.478***	331.195***	419.562***	370.364***	383.016***	375.048***

This table shows the results of the models' estimation of ESG-level impact on firm valuation. Tobin's Q is market value of the firm divided by the replacement cost. Ln(Total Asset) is the natural logarithm of book value of total assets of a firm, Leverage is the debt-to-equity ratio of the firm, GDP growth is the change in GDP in a country and the main explanatory variables are the individual pillar scores (environmental, social and governance) of ESG and ESG_score is the overall score for the individual pillars measured as combined weighted average of the pillars. In interaction, individual pillars and overall ESG scores above 50 are categorised as high scores and below 50 scores are categorised as low scores. The ESG coefficients are scaled up by 100 for reporting. The last rows include number of observations in the models estimated, adjusted R2 and the F statistic., Firm-level clustered standard errors are given in parentheses and *** (**, *) denotes significance at the 1% (5%, 10%) level (two-sided test).

Table 10. ESG performance in recent years.

	ROA					Ln(Tobin's Q)				
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Ln(Total Asset)	0.010***	-0.002	0.009***	0.010***	0.014***	-0.199***	-0.210***	-0.176***	-0.186***	-0.177***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.011)	(0.012)	(0.010)	(0.010)	(0.010)
Leverage	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.002**	-0.002**	-0.002**	-0.002**	-0.002**
	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
GDP Growth	0.229**	0.227**	0.228**	0.244***		1.281***	1.377***	1.326***	1.390***	
	(0.089)	(0.089)	(0.089)	(0.089)		(0.383)	(0.386)	(0.384)	(0.384)	
ESG:LatterYears	0.062***					0.733***				
	(0.023)					(0.097)				
Env:LatterYears		0.066***					0.300***			
		(0.017)					(0.074)			
Soc:LatterYears			0.063***					0.533***		
			(0.019)					(0.084)		
Gov:LatterYears				-0.005					0.461***	
				(0.018)					(0.087)	
ESGScore_1					0.033***					0.777***
					(0.019)					(0.077)
Fixed effects										
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm & Country	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1953	1953	1953	1953	1455	1958	1958	1958	1958	1457
Adjusted R2	0.029	0.033	0.031	0.025	0.006	0.159	0.142	0.152	0.150	0.168
F Statistic	18.147***	20.113***	18.969***	16.247***	7.100***	96.047***	84.270***	91.139***	89.861***	101.655***

This table shows the results of the models' estimation of ESG impact on firm profitability and valuation. ROA is net income over total assets of the firm and Tobin's Q is market value of the firm divided by the replacement cost. Ln(Total Asset) is the natural logarithm of book value of total assets of a firm, Leverage is the debt to equity ratio the firm, GDP growth is the change in GDP in a country and the main explanatory variables are the individual pillar scores (environmental, social and governance) of ESG and ESG_score is the overall score for the individual pillars measured as combined weighted average of the pillars. In interaction, Latter_Years (2015-2019) is the most recent five years in our observation with dummy value that takes 1 for firm ESG scores in Latter_Years or zero otherwise. The ESG coefficients are scaled up by 100 for reporting. The last rows include the fixed effects, number of observations in the models estimated, adjusted R2 and the F statistic., Firm-level clustered standard errors are given in parentheses and *** (**, *) denotes significance at the 1% (5%, 10%) level (two-sided test). Separate intercept is fitted for each unit in the panel data.

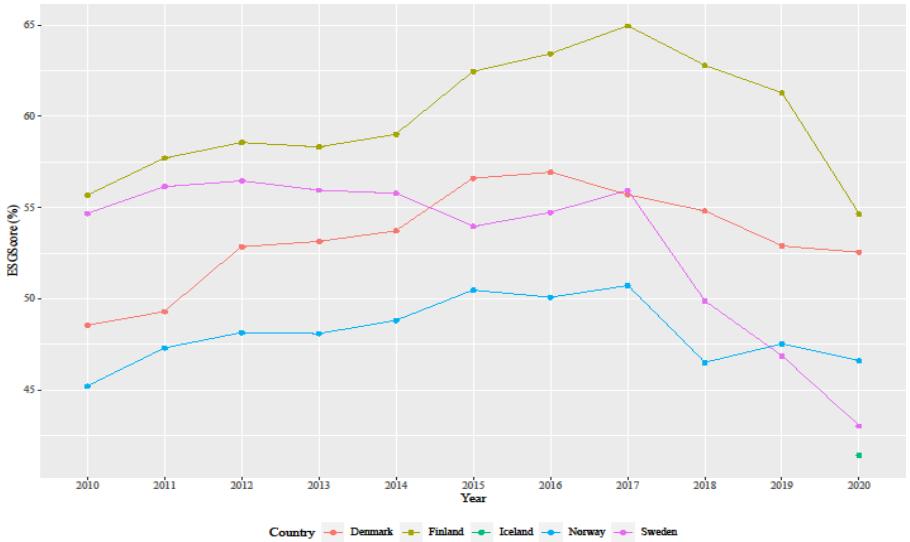

Figure 1. *Average ESG Score performance by Country overtime*

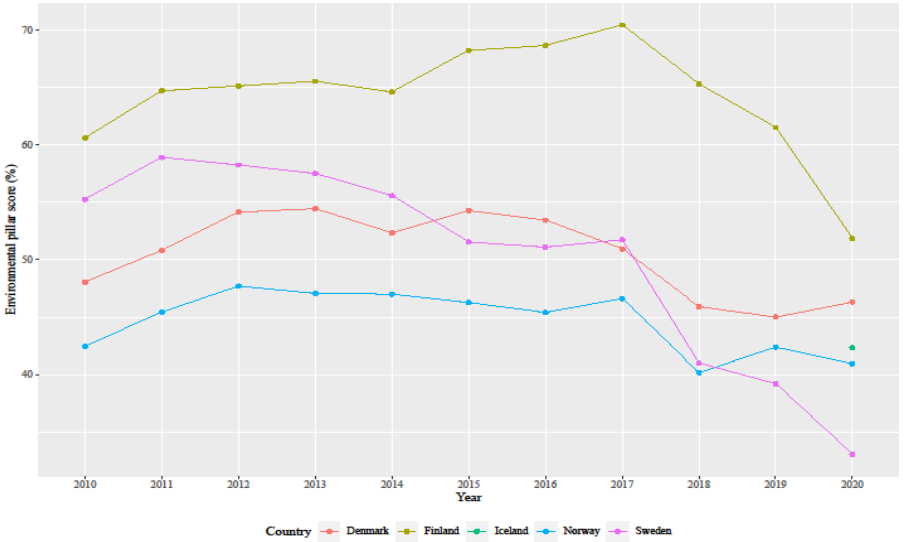

Figure 2. *Average Environmental Score performance by Country overtime*

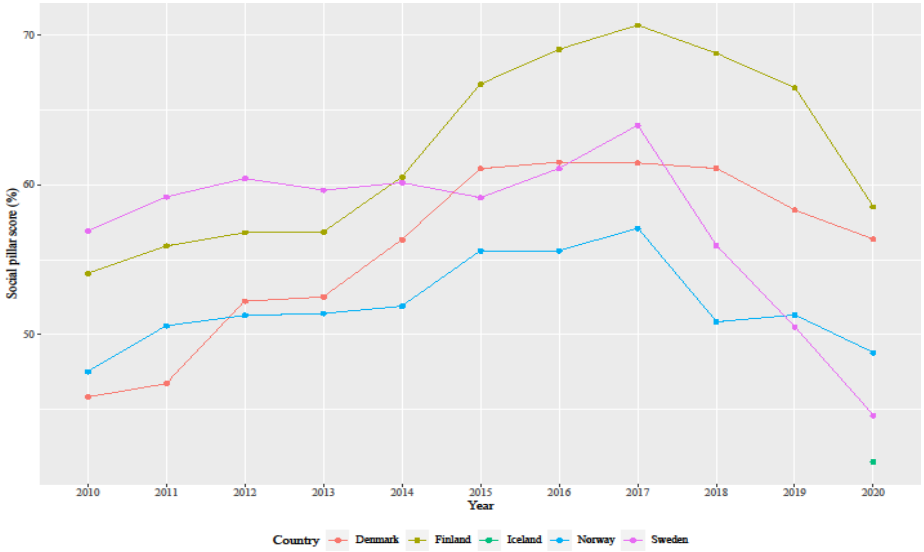

Figure 3. *Average Social Score performance by Country overtime*

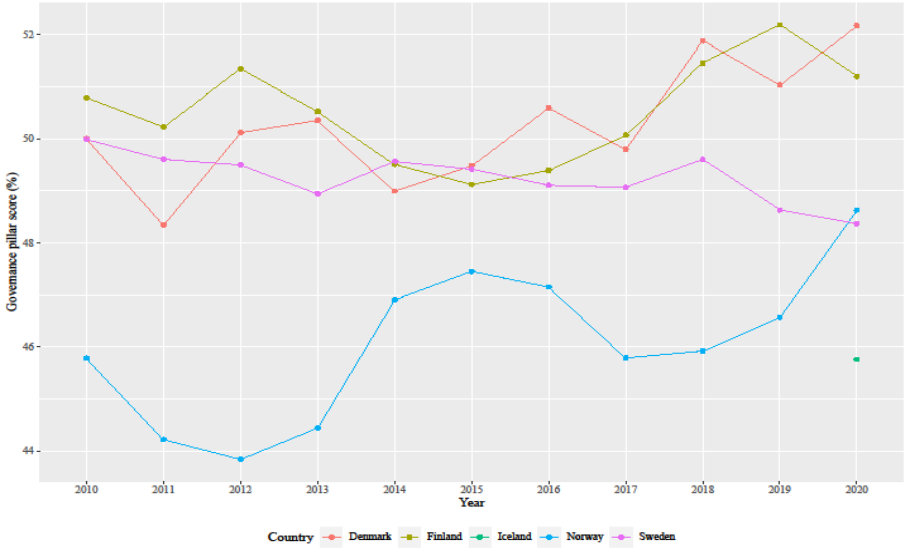

Figure 4. *Average Governance Score performance by Country overtime*

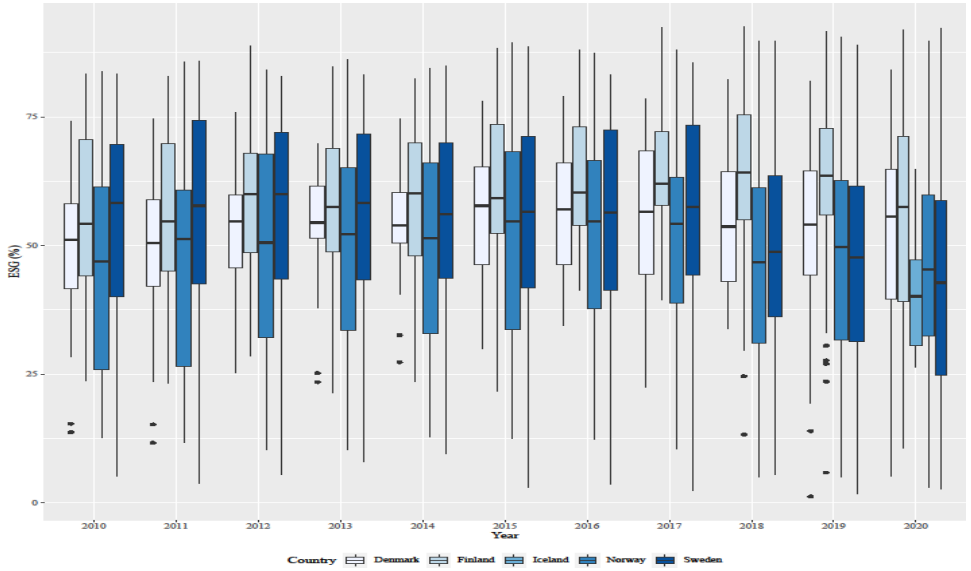

Figure 5. *ESG Score Performance*

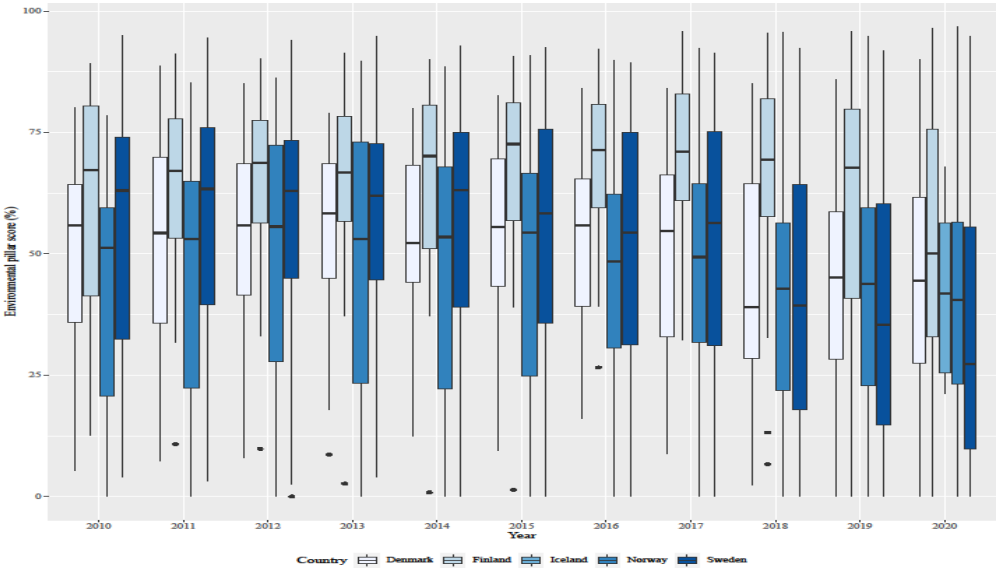

Figure 6. *Environmental Score Performance*

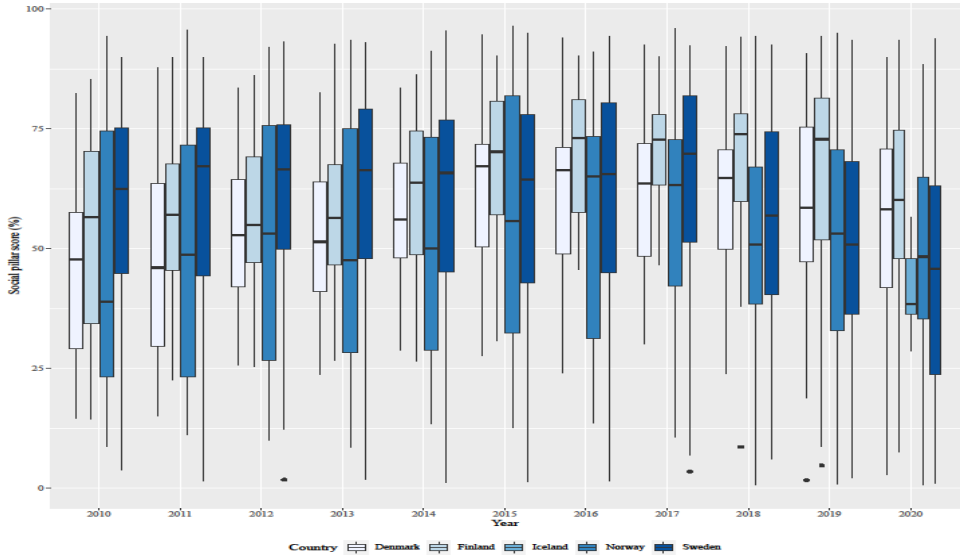

Figure 7. *Social score performance*

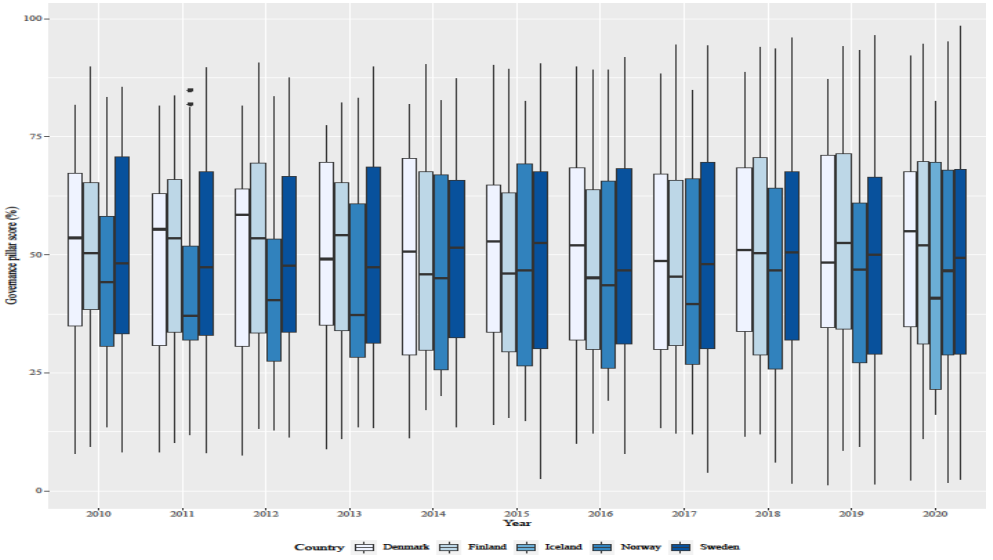

Figure 8. *Governance score performance*