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# ESG Ratings and the European Stock Market

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Oslo, July 2023

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# Abstract

In recent years, there has been a remarkable surge in stakeholders' interest in the socially and ethically responsible conduct exhibited by companies. This has prompted numerous companies to integrate Environmental, Social, and Governance (ESG) considerations into their overall business strategies, and as a result, third-party assessments by ESG rating agencies have emerged. This thesis examines the relationship between ESG ratings and stock returns in the European stock market. The findings reveal divergence among different rating providers and a significant impact of ESG scores on stock returns, with the social pillar playing a crucial role. Overall, the study indicates a positive relationship for ESG ratings and stock returns. Nevertheless, further examination is required to determine the applicability of these findings in real-world scenarios.

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# Abbreviations and Definitions

AMH: Adaptive Market Hypothesis

CFP: Corporate Financial Performance

CSA: Corporate Sustainability Assessment (S&P Global)

CSP: Corporate Social Performance

CSR: Corporate Social Responsibility

CSRD: Corporate Sustainability Reporting Directive

CSRP: Corporate Social Responsibility Performance

EHM: Efficient Market Hypothesis

ENV: Environmental (ESG)

ESG: Environmental, Social, Governance

ESGP: Environmental, Social, Governance Performance

EU: European Union

FINP: Financial Performance

GDP: Gross Domestic Product

GOV: Governance (ESG)

ROA: Return on Assets

ROC: Return on Capital

SOC: Social (ESG)

SDG: Sustainable Development Goals

VIF: Variance Inflation Factor

# List of Symbols

$risk_{i,t}$  Beta, Systematic Risk

$\beta_{fe}$  Coefficient Estimate of the Fixed Effects Model

$\beta_{re}$  Coefficient Estimate of the Random Effects Model

$lev_{i,t}$  Company Leverage, Idiosyncratic Risk

$C_i$  Country Specific Characteristics

$u_{i,t}$  Error Term

$ESG_{i,t}$  ESG Score

$size_{i,t}$  Firm Size

$u_i$  Individual Effects

$\alpha_i$  Intercept

$I_i$  Industry Specific Characteristics

$mktb_{i,t}$  Market-to-Book Ratio

$S_{P_i,t+1}$  Stock Return

$\sigma_u^2$  Variance of the Individual Effects

# 1 Introduction

In recent years, environmental, social and governance (ESG) considerations have gained significant attention as key drivers of sustainable and responsible investments practices. Investors and stakeholders are increasingly recognizing the importance of incorporating ESG factors into their decision-making processes, driven by the belief that such considerations can have a profound impact on financial performance and long-term value creation. Sustainable investing and the number of investors committing to integrating ESG into their investment decisions are growing rapidly (PRI, 2021). Furthermore, there is a substantial influx of capital into mutual funds that allocate investments based on ESG ratings (Hartzmark & Sussman, 2019). As a result of these trends, an increasing number of investors rely on ESG ratings to obtain a third-party assessment.

Nonetheless, the ESG ratings encounter several obstacles. These include lack of standardized methodologies for construction of weighted ESG scores, distinct input data and lack of transparency. Furthermore, empirical findings underscore the need for greater attention to how the data underlying ESG ratings is generated, as divergence of ESG ratings introduces uncertainty that permeates various aspects (Berg et al., 2022).

The European stock market stands at a pivotal arena for examining the integration of ESG ratings into investment strategies. The European Union's (EU) commitment to sustainability and the Paris Agreement emphasizes the importance of ESG considerations in the region. Europe has been at the forefront of promoting sustainable finance and responsible investing, with various regulatory initiatives and frameworks in place to encourage ESG integration (Redondo Alamillos & de Mariz, 2022). The European Green Deal, EU Taxonomy, Corporate Sustainability Reporting Directive (CSRD), and Sustainable Finance Package exemplify this effort. These initiatives exert influence on the ESG rating market, shaping the financial landscape in Europe.

Several studies seek to investigate the relationship between ESG news and the effect on stock prices, as well as ESG scores and the effect on financial

performance. However, the results lack consensus. This master thesis aims to contribute to the understanding of ESG ratings and their implications in the European stock market. Specifically, it seeks to explore the following key research question:

*“How does the relationship between ESG ratings and stock returns unfold in the European stock market?”*

By examining companies listed on the STOXX Europe 600 Index across different industries, the research aims to provide valuable insight into the relationship between ESG ratings and a company’s stock return, shedding light on potential benefits and limitations of ESG integration in the European stock market.

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## 2 Literature Review

This chapter delves into the pertinent background and existing research that forms the foundation of this thesis. Certain sections have been included from the preliminary report for their relevance. First, the concepts of Corporate Social Responsibility (CSR), ESG rating, and the divergence within it will be discussed. Second, the reporting standards and mandates in Europe will be presented. Finally, previous studies on the topics of ESG news and stock price, as well as ESG scores and financial performance are reviewed.

### 2.1 Introduction of CSR

Smith (2003) defines CSR as the examination of how a company's corporate policy practices impact its stakeholders. The notion of businesses' societal obligations can be traced back to the nineteenth century, although it gained substantial traction from the mid-1980s onwards. During the 1970's, CSR emerged as a crucial facet of corporate operations due to escalating pressure on companies to fulfill their social responsibilities. One of the pioneering studies in the field was conducted by Moskowitz (1972), who explored the relationship between CSR and corporate performance. Moskowitz specifically investigated whether social awareness, as measured by stock valuations, could confer a competitive advantage to corporations. The findings of Moskowitz's study suggested that socially aware companies exhibited a heightened sensitivity that enabled them to outperform their competitors. Additionally, his research highlighted a positive correlation between corporate value and the assumption of responsibility among the companies he examined. However, Vance (1975) presented contrasting results in a subsequent study, revealing a negative correlation between socially responsible ranking and stock market performance. Despite the conflicting findings, Moskowitz's research sparked discussions and a growing focus on CSR.

In recent years, the significance and prevalence of CSR has expanded even further. Moreover, heightened public awareness of the costs associated with detrimental behaviors has led to increased regulations and penalties for

inadequate environmental stewardship.

## 2.2 ESG Rating and Divergence

Traditionally, CSR encompasses the environmental and social aspect of a company's conduct, while ESG combines its environmental (ENV), social (SOC) and governance (GOV) performance, and can be seen as an extension of CSR (Gerard, 2019). In recent years, ESG rating providers have become influential institutions and the concern of stakeholders, investors and regulators about social responsibility has increased. In addition, the extent to which corporations and investors integrate ESG in their business model has become increasingly important (PRI, 2021).

In 2021, a significant milestone was reached as a total of 3,826 investors, collectively managing assets surpassing \$121 trillion, demonstrated their commitment to integrating ESG information into their investment decision-making process. These figures represent a notable growth of 26% in the number of investors and 17% in combined assets compared to the preceding year, underscoring a substantial expansion in this domain (PRI, 2021). Furthermore, research indicates a rapid growth in sustainable investing, with mutual funds aligned with ESG ratings experiencing sizeable inflows (Hartzmark & Sussman, 2019).

In general, the development of ESG ratings has made it easier for investors and other stakeholders to assess companies' social responsibility as it is expressed in measurable values (Gerard, 2019). Consequently, as the demand for information regarding companies' ESG information has grown rapidly, more ESG rating agencies have emerged in the market.

The report "Rate the Raters 2019: Expert Views on ESG ratings" reveals a substantial growth of ESG ratings, with an increase of over fivefold observed between 2012 and 2019. During the year 2019, the global landscape saw the presence of more than 600 distinct ESG rating agencies. Further, the key factors when determining their quality, was considered to be trustworthiness and transparency of the data sources, as well as the robustness of methodology. Overall, companies are increasingly demonstrating a stronger desire to achieve

a favorable ESG score, which acts as evidence of their overall excellence and commitment to ethical practices (Wong et al., 2019).

Notwithstanding the rapid growth and inherent utility of ESG ratings, several challenges arise in relation to the multitude of ESG rating providers. First, there is a lack of standardized methodologies employed by these providers to determine their weighted scores, as they all bring their own materiality matrix. This matrix assists in identifying and prioritizing the crucial ESG factors that hold the highest significance for the company's business operations and stakeholders. In general, ESG scores are intended to serve two purposes: indicating the quality of a company's ESG performance and offering an aggregated measure of the firm's ESG risk. Consequently, variations in the allocation of weights to quality versus risk among different raters lead to divergent aggregated ratings, even when utilizing the same input data. However, it should be noted that these providers do not utilize identical input data, thus inherently yielding significantly distinct scores for the same companies (Gerard, 2022).

Furthermore, there is a lack of consistency in the disclosure of ESG performance among companies. The level of information available on scope 1, 2, and 3 emissions can vary significantly. Similarly, the comprehensiveness of information provided in public sources such as annual or sustainability reports differs from one company to another. As a result, the information accessible to rating providers is subject to variation depending on the individual company. Thus, the rating providers are left with distinct input data.

Further, certain rating providers invite companies to contribute to the construction of their own scores, which introduces a potential concern of greenwashing. Greenwashing pertains to the misleading practices employed by companies to present their products and services as more environmentally friendly than they genuinely are (Delmas & Burbano, 2011). Finally, a notable lack of transparency and an unwillingness among the different rating providers to disclose the construction of their ESG scores further exacerbates the challenges. This, coupled with the discrepancies in scores assigned by various rating providers to the same company, makes it nearly infeasible to compare companies across different rating providers (Gerard, 2022)

The divergence of ESG ratings has been further investigated in the paper by Berg et al. (2022). The authors chose six different ESG rating agencies; KLD, Sustainalytics, Moody's ESG, S&P Global, Refinitiv Eikon, and MSCI in order to measure their divergence. By mapping out different methodologies onto a common taxonomy of categories, the authors were able to decompose the divergence into contributions of measurement, scope and weights. The results showed that measurement contributed to 56% of the divergence, scope contributed to 38%, and weights 6%. By analyzing the reasons for measurement divergence, the authors found that the rating agency's overall view of a firm influences the measurement of specific categories. Hence, the results call for greater attention to how the data underlying ESG ratings is generated (Berg et al., 2022).

The paper delves into how the divergence of ESG ratings creates uncertainty, which poses a challenge for decision-makers relying on such ratings. First, the divergence makes it difficult to assess the ESG performance of companies, portfolios, and funds, which is the primary purpose of ESG ratings. Second, the divergence reduces companies' motivation to improve their ESG performance because they receive conflicting signals from rating agencies about the expected actions valued by the market. Ultimately, the divergence observed among ESG ratings may reduce the likelihood of markets accurately reflecting firms' ESG performance ex post. ESG performance may affect asset processes through investor tastes or be fundamentally value-relevant (Berg et al., 2022).

The study by Christensen et al. (2022) also investigates the divergence across ESG rating providers. By examining data from MSCI, Thomson Reuters, and Sustainalytics spanning the years 2004 to 2016, the study revealed that greater ESG disclosure actually contributed to more pronounced discrepancies in ESG ratings. Upon closer examination of the components of ESG, it became evident that the environmental and social factors primarily drove this observed relationship. Interestingly, the study also discovered that rating agencies exhibited more dissension regarding ESG outcome metrics rather than input metrics. The term "inputs" encompasses the actions and strategies adopted by a company to attain specific goals, such as the implementation of diversity policies. On the other hand, "outcomes" refer to the tangible outcomes and

achievements that are observable, such as the percentage of women in the workforce (Christensen et al., 2022).

Moreover, the research extensively examined the outcomes of ESG disagreement and uncovered several noteworthy discoveries. First, elevated levels of ESG disagreement were linked to heightened volatility in returns, larger absolute price swings, and a reduced probability of external financing issuance. Second, these findings retained their significance even when considering firm fixed effects, implying that ESG disagreement carries significance for market participants and impacts stock prices. Lastly, the evidence indicates that these results were becoming more prominent over time, suggesting that ESG disagreement was exerting an increasingly substantial influence on financial markets (Christensen et al., 2022).

## 2.3 ESG related Reporting Requirements in Europe

Given our research focus on companies listed on the STOXX Europe 600 Index, the regulatory environment in Europe concerning ESG assumes significance in providing context for this thesis. Over the past decade, the European market has witnessed the establishment of a multifaceted and evolving regulatory framework addressing ESG-related matters. Notable milestones include the integration of the Sustainable Development Goals (SDGs) by the United Nations in 2015 and the subsequent adoption of the Paris Accord (Redondo Alamillos & de Mariz, 2022). These developments highlight the dynamic nature of the European regulatory landscape and its relevance to our study.

One significant initiative introduced by the EU in 2019 is the European Green Deal, aiming to transition the European economy toward sustainability. Consequently, EU law now mandates large- and listed companies to disclose information on what they evaluate to be risks and opportunities arising from social and environmental issues, as well as the impact of their activities on people and the environment (European Commission, n.d. b). As a result, this has a major impact on businesses both in and outside the EU, as all products sold in the EU have to meet higher sustainability standards (Redondo Alamillos

& de Mariz, 2022).

In the wake of the introduction of this strategy, several other initiatives have been developed by the EU. The EU Taxonomy entered into force in July 2020, and is a cornerstone of the EU's sustainable finance framework. To align with the EU's climate and energy targets for 2030 and fulfill the objectives outlined in the European Green Deal, it is imperative that investments are channeled towards sustainable projects and endeavors. The Taxonomy functions as a tool in achieving this objective, serving as a classification system of sustainable economic activities and precisely defining and delineating what constitutes as 'sustainable' (European Commission, 2023).

More recently introduced, is the Corporate Sustainability Reporting Directive (CSRD), which entered into force in January 2023. This new directive strengthens and modernizes the rules on the social and environmental information the companies must report on. The purpose is to ensure that investors and other stakeholders have access to the information they need in order to assess investment risks arising from climate change and other sustainability issues (European Commission, n.d.a).

The Green Deal, the Taxonomy and the CSRD establish the definitions of sustainable activities for the financial market in Europe. Thus, they impose pressure on ESG rating agencies to gather and analyze relevant data. According to the EU, ESG ratings are vital as they offer crucial information to investors and financial institutions about investment strategies and ESG risk management. However, as the current ESG rating market lacks transparency, the EU Commission proposes regulations to enhance reliability and transparency in ESG ratings activities. These regulations were presented in June 2023, as a part of the Sustainable Finance Package, and will establish organizational principles and clear rules to prevent conflicts of interest (European Union, 2023).

The transition towards a greener and more sustainable economy requires collective efforts from regulators, market participants, and other stakeholders. Empirical evidence finds that the relationship between ESG disclosures and firm value varies across countries in Europe. In general, ESG tends to be more promoted in countries with stronger nation-level institutions, and less present

in countries with weaker institutions, less press freedom, less commitment to an environmental agenda, and less democracy (Cahan et al., 2016). Consequently, for the transition to take place, it is essential to develop consistent frameworks, improve data availability, enhance transparency, and promote responsible and sustainable practices across Europe as a whole.

## 2.4 Previous Research

There is a substantial body of academic and professional literature exploring the relationship between ESG factors and their impact on financial aspects. However, a consensus has yet to be reached regarding the findings. This thesis aims to examine the relationship between ESG ratings and stock returns. The subsequent chapter will delve into relevant literature, focusing on two key areas: the influence of ESG news on stock prices and the impact of ESG ratings on financial performance. These areas are deemed crucial for the thesis. First, both the disclosure of ESG news and changes in ESG ratings can be regarded as significant events. Second, a company's financial performance is intricately linked to its stock price, hence stock returns. If a company generates substantial profits surpassing previous periods, it attracts interest from numerous investors, thereby driving up the stock price, hence also stock returns (Lee & Zhao, 2014).

### 2.4.1 ESG News and Stock Price

Krüger (2015) conducted a study examining how the market reacts to positive and negative events related to a company's CSR. The research found that investors responded strongly negatively to negative events and weakly negatively to positive events. Additionally, the results revealed that investors value offsetting CSR, meaning positive CSR news regarding companies with a history of poor stakeholder relations. Conversely, investors responded negatively to positive CSR news that was more likely to result from agency problems (Krüger, 2015).

Aouadi and Marsat (2018) aimed to investigate the relationship between ESG controversies and firm market value. ESG controversies referred to corporate ESG news stories that put a company in the media spotlight and captured

investors' attention. The primary analysis showed that ESG controversies were associated with increased firm value. However, the results changed when interacting with CSP (Corporate Social Performance), as the direct effect of ESG controversies on firm value became insignificant, while the interaction effect was strongly positive. Through a sample split analysis, the authors examined the channels through which CSP enhances market value. The results demonstrated that a higher CSP score positively influenced market value, but this effect was observed primarily for high-attention firms, which included larger companies, high-performing firms, those attracting more investor attention, or operating in countries with greater press freedom (Aouadi & Marsat, 2018).

Building on the research of Krüger (2015) and Aouadi and Marsat (2018), Capelle-Blancard and Petit (2019) emphasized that managers can no longer disregard the impact of CSR on firm value. Their study contributed to the literature by analyzing the stock market's reaction to over 33,000 ESG news items involving 100 multinational companies. The focus was on the period from 2002 to 2010, and the results showed that, on average, firms faced a 0.1% drop in market value following negative events, while positive announcements did not generate significant market gains. Furthermore, the research revealed that market participants were responsive to media coverage but did not react strongly to firms' press releases or disclosures from NGOs (Capelle-Blancard & Petit, 2019).

Serafeim and Yoon (2022a) recently published a paper that analyzed 109,014 firm-day observations of 3,109 companies to examine market reactions to different types of ESG news. This study extended previous literature by providing new evidence on which ESG news items triggered market reactions and the underlying reasons. The findings revealed that stock prices only reacted to financially material ESG news, with materiality defined by the Sustainability Accounting Standards Board (SASB). The market reaction was more pronounced for positive news that received greater news coverage and pertained to social capital issues. Additionally, the paper differentiated between expected and unexpected news based on existing ESG ratings, and concluded that the market reaction primarily stemmed from unexpected news (Serafeim & Yoon, 2022a).

In another recent paper by Serafeim and Yoon (2022b), the authors investigated whether ESG ratings can predict future ESG news and the corresponding market reactions. The findings indicated that consensus ESG ratings were predictive of future ESG news. However, this relationship was influenced by the level of disagreement among raters. The paper also observed a positive market reaction to positive ESG news and a negative market reaction to negative news. The market reaction to positive news was attenuated for firms with high ESG ratings, suggesting that such news was already reflected in the stock prices. Additionally, when ratings disagreement was low, creating stronger expectations about future news, the stock price reaction was further magnified. The study also highlighted that ESG ratings from different providers had varying predictive abilities, and the rating from the most predictive provider forecasted future stock returns in the presence of high ratings disagreement. Overall, the findings suggested that ratings serve as a proxy for market expectations of future performance, and despite disagreements, they still predicted future news and stock returns (Serafeim & Yoon, 2022b).

### **2.4.2 ESG score and Financial Performance**

Empirical studies examining the impact of ESG scores on a company's financial performance exhibit a higher level of disagreement and lack of consensus compared to studies on the relationship between ESG news and stock prices.

Fischer and Sawczyn (2013) conducted a study that supported a positive and significant interaction between CSP and Corporate Financial Performance (CFP) for large German listed firms. The research also found that the degree of innovation influenced the CSP-CFP relationship, and there was evidence of a causal relationship from previous CFP to subsequent CSP (Fischer & Sawczyn, 2013).

Building on Fischer and Sawczyn (2013), Velte (2017) investigated the impact of ESG performance (ESGP) on financial performance (FINP) specifically in terms of returns on assets (ROA) and Tobin's Q for companies listed on the German Prime Standard from 2014 to 2020. The study utilized ESG scores from the Thomson Reuters Datastream database and discovered that a company's ESG level had a positive impact on ROA. Additionally, this positive relationship

held true for ENV-, SOC- and GOV performance, with governance having the strongest impact on FINP (Velte, 2017).

In contrast, Langeland and Ugland (2019) examined the relationship between ESGP and FINP in the Nordics, deconstructing the ESG score. Using Thomson Reuters as an independent variable and ROA as the dependent variable, the research concluded that the relationship was significant and negative for firms in the Nordics. Moreover, the study indicated a one-directional causal relationship where the ESG rating negatively affected financial performance in the subsequent period (Langeland & Ugland, 2019)

A recent study by Giannopoulos et al. (2022) focused on the effects of ESG initiatives on the financial performance of Norwegian listed companies from 2010 to 2019. Similar to Langeland and Ugland (2019), the findings suggested a strong significant relationship between ESG initiatives and financial performance, with ESG initiatives showing a clear negative impact (Giannopoulos et al., 2022).

Nollet et al. (2016) examined the relationship between CSP and CFP using ROA, Return on Capital (ROC), and excess stock returns. The study encompassed companies in the S&P Global for the period 2007-2011, with ESG data obtained from Bloomberg. The results indicated no significant relationship between CSP and CFP. However, evidence was provided for a U-shaped relationship between CSR performance (CSRP) and accounting-based CFP. This suggests that CSR only pays off after a certain threshold of investment achievements in CSP has been reached, with CSR investments impacting financial performance negatively before that point (Nollet et al., 2016).

Finally, Xie et al. (2019) investigated the relationship between corporate efficiency, corporate sustainability, and ESG issues to determine if firms concerned with ESG also exhibit efficiency and profitability. The study found that moderate levels of corporate transparency had a significant and positive effect on corporate efficiency, but this effect was not observed at high or low disclosure levels. Additionally, governance disclosure exhibited the strongest positive linkage with corporate efficiency, followed by social and environmental

information disclosure. Most ESG activities showed a non-negative relationship with CFP, with some activities being positively related to CFP. Examples included green building policies and sustainable packaging for environmental activities, equal reduction of demographic discrimination and equitable training programs for social activities, and gender diversity on boards for governance activities (Xie et al., 2019).

## 3 Theory

In this section, various theories are delved into that shed light on the relationship between ESG scores and stock returns. The theories under consideration include shareholder theory, stakeholder theory, efficient market hypothesis, intrinsic value theory, adaptive market hypothesis, and virtuous cycle theory.

### 3.1 Shareholder Theory versus Stakeholder Theory

Shareholder theory posits that the primary responsibility of businesses is to maximize profit while engaging in fair and transparent competition, as stated by Friedman (1962). This perspective views corporations as inefficient agents of social change and argues against voluntary contributions to social causes, considering them as misappropriations of shareholders' funds. Additionally, Barnett (2007) argues that it is not possible to conclude whether a one-dollar investment in social initiatives returns more or less than one dollar in benefit to the shareholder. Shareholder theory suggests that engaging in CSR activities can give rise to agency problems and may not align with the best interests of shareholders.

In contrast, stakeholder theory emerged as an alternative approach, suggesting that businesses must align with society's prevailing norms and ethics to achieve success (Metcalf, 1998). According to Freeman (1984), stakeholders encompass not only shareholders but also any group or individual who can impact or be affected by the organization's objectives. This perspective emphasizes the significance of developing relationships with various stakeholders beyond just shareholders. Moreover, stakeholder theory emphasizes how CSR activities contribute to building trust, enhancing the firm's reputation, and fostering strong relationships with important stakeholders (Barnett, 2007).

The connection between shareholder theory and stakeholder theory is pertinent to the exploration of the relationship between ESG ratings and stock returns in the European stock market. Shareholder theory asserts that the primary responsibility of businesses is profit maximization, discouraging extensive

engagement in CSR activities. In contrast, stakeholder theory emphasizes the compatibility of businesses with prevailing societal norms and ethics, recognizing CSR initiatives as investment opportunities that enhance social value and, consequently, boost stock returns. Within this context, stakeholder theory perceives ESG factors as integral components of firm value. By examining the unfolding dynamics between ESG ratings and stock returns, valuable insights can be gained into the interplay of these theoretical perspectives and their implications for corporate behavior and financial outcomes.

## 3.2 Efficient Market Hypothesis versus Intrinsic Value Theory

The Efficient Market Hypothesis (EMH) states that the stock price of a company accurately reflects a company's true value at any given moment. In an informationally efficient market, information is rapidly disseminated and incorporated into stock prices. Consequently, positive expectations of future performance are immediately reflected in current performance as market participants seek to capitalize on potential price increases. This suggests that, given all available information, stock prices only respond to new and unpredictable information. In other words, stock prices exhibit a random walk pattern, characterized by randomness and unpredictability (Bodie et al., 2021).

On the other hand, Fundamental Analysis presents an alternative approach. It involves assessing a firm's earnings and dividend prospects, evaluating future interest rates, and conducting a risk assessment to determine the intrinsic value of a stock. If the intrinsic value exceeds the current stock price, it is advisable to buy the stock. Fundamental analysis recognizes that companies may trade at prices that deviate from their intrinsic value, and the goal is to identify future performance insights that are not yet recognized by the broader market. However, it is important to note that conducting a thorough analysis alone is insufficient for generating profits. Outperforming the market requires having superior analysis compared to competitors, as the market price already reflects commonly recognized information (Bodie et al., 2021).

Regarding the relationship between ESG ratings and stock returns, the two

theories offer contrasting perspectives. According to EMH, stock prices already reflect all available information, including ESG factors. In an informationally efficient market, ESG scores would be incorporated into stock prices in a timely manner, rendering them irrelevant for gaining a competitive advantage or consistently outperforming the market. From an EMH standpoint, ESG ratings would have limited impact on stock returns. In other words, if EMH holds, ESG is either irrelevant or already priced in. Thus, investors can not gain a competitive advantage or consistently outperform the market by solely relying on ESG scores.

Conversely, Fundamental Analysis recognizes the importance of considering ESG factors in evaluating a company's intrinsic value and potential future performance. ESG ratings enables analysts and investors to consider the company's broader impact, regarding long-term sustainability, risk management, reputation, and potential regulatory risks, which can significantly affect financial performance and value.

### 3.3 Adaptive Market Hypothesis

The Adaptive Market Hypothesis (AMH) presents an alternative perspective to the EMH, suggesting that financial markets are not constantly efficient but rather adaptive systems that continually evolve in response to new information and participants' behavior (Lo, 2017). According to this theory, market participants adapt their strategies and decision-making processes in order to thrive and survive in the marketplace. However, the AMH has faced criticism due to limited empirical evidence and a lack of clarity regarding the mechanisms and measurement of adaptability. Additionally, the theory does not provide explicit guidance for investors to identify opportunities and manage risks in inefficient markets (Jaye, 2017).

In relation to ESG, the AMH recognizes the capacity of investors to adjust their investment approaches in response to ESG scores and integrate them into their decision-making processes. This acknowledgment stems from the theory's proposition that market participants can learn and adapt to evolving market dynamics, thereby influencing stock returns. In other words, according to the

AMH, ESG ratings are believed to exert an influence on stock returns.

### 3.4 Virtuous Cycle Theory

The Virtuous Cycle Theory is supported by Waddock and Graves (1997), who found that CSP and CFP have a mutual relationship, where CSP affects future CFP, and past CFP also impacts CSP. Although the starting point of this cycle is uncertain, the authors propose an interesting theory. They suggest that managers initially improve CSP to boost employee morale, gain positive publicity, and strengthen community relationships, recognizing the financial benefits involved. Despite their motives being secondary, Waddock and Graves (1997) argue that firms eventually incorporate CSP into their business culture due to its financial advantages. Thus, the cycle initiates (Waddock & Graves, 1997).

In the context of ESG, the virtuous cycle theory states that companies excelling in ESG factors mitigate risks, attract responsible investors, and enhance their reputation. These positive outcomes will lead to better financial performance, including increased profitability, reduced costs and long-term sustainability. Consequently, market participants will perceive these companies as more valuable, resulting in higher stock returns. In summary, a strong ESG rating creates a positive feedback loop, driving financial performance, market valuation, and stock returns.

## 4 Hypotheses

Drawing upon the research conducted in the literature review and relevant theories, three hypotheses have been formulated. These hypotheses aim to address the research question of *"How does the relationship between ESG ratings and stock returns unfold in the European stock market?"*.

**Hypothesis 1:** Previous research finds that disagreement among ESG rating providers have important consequences that might have an effect on financial performance, hence stock returns. Berg et al. (2022) suggests that ESG performance can have a fundamental impact on asset prices or influence investor preferences. However, the divergence of ESG ratings creates a dispersion that mitigates this effect. In addition, Christensen et al. (2022) finds that higher levels of ESG disagreement are associated with increased return volatility and influence stock prices. Given the empirical evidence demonstrating the impact of divergence on stock returns, it is interesting to further investigate this to understand the relationship between ESG ratings and stock returns.

*H0<sub>1</sub> : There is no divergence in ESG score or pillar scores (ENV, SOC, GOV) from different providers.*

*HA<sub>1</sub> : There is divergence in ESG score or pillar scores (ENV, SOC, GOV) from different providers.*

**Hypothesis 2:** Sustainable investing and incorporation of ESG factors are attracting much attention, and many investors believe that this can have profound impact on financial performance. However, according to the Efficient Market Hypothesis, ESG scores should either be irrelevant or already priced in as information is rapidly disseminated and reflected in the prices. This view contradicts a large amount of empirical evidence and trends seen in the market, nonetheless it explores an interesting aspect of how the relationship between ESG ratings and stock returns unravel. The second hypothesis tests whether the EMH holds, hence if ESG ratings are insignificant in regard to stock returns.

*H0<sub>2</sub> : There is evidence that EMH holds, ESG ratings are insignificant for stock returns.*

*HA<sub>2</sub> : There is no evidence that EMH holds, ESG ratings are significant for stock returns.*

**Hypothesis 3:** The thesis seeks to explore the nature of the relationship between ESG ratings and stock returns in the European stock market, and at this point it should be evident whether the relationship exists or not. Hence, it is interesting to investigate which ESG dimension (ENV, SOC, GOV) drives the relationship. The European stock market is diverse, with different cultural values, investor preferences, economic priorities, and industry focus. Furthermore, empirical evidence finds that the relationship between ESG disclosures and firm value varies across countries in Europe (Cahan et al., 2016). However, despite these variations, it is noteworthy to investigate whether there is a consistent trend across Europe as a collective entity. The third hypothesis explores whether there is a difference in the effect of the pillar scores (ENV, SOC, GOV) on stock return.

*H<sub>03</sub> : There is no difference in effect of pillar scores (ENV, SOC, GOV) on stock return.*

*H<sub>A3</sub> : There is a difference in effect of pillar scores (ENV, SOC, GOV) on stock return.*

## 5 Methodology

This chapter presents the structure of the data sample and elaborates on the model selection process to determine the most suitable approach for addressing the research question. Additionally, the selected model, along with validity, will be introduced.

### 5.1 Data Sample

The data used in this thesis has been retrieved from the Refinitiv Eikon Terminal and the Bloomberg Terminal. More specifically, the ESG scores from Refinitiv Eikon have been collected from the Refinitiv Eikon Terminal, while the scores from Bloomberg and S&P Global have been collected from the Bloomberg Terminal. The stock return, control variables and industry- and country characteristics have been collected from the Refinitiv Eikon Terminal.

The ESG scores for all companies included in the thesis have been collected in the time span 2012-2022. Hence, we are able to observe a long-term trend whilst also providing sufficient data. The collection of stock returns spans from 2013 to 2023, with the inclusion of a one-year lag, which will be further elaborated on in 5.2 Model Building.

The companies chosen for our thesis are listed on the STOXX Europe 600 Index, which covers approximately 90% of the free-float market capitalization of the European stock market. Consequently, it will serve as an adequate way to investigate stock returns in Europe (STOXX Ltd, 2023). The index consists of total 600 companies, however, due to missing ESG information from both Refinitiv Eikon and Bloomberg, several companies have been excluded from the dataset. Another consequence of the missing ESG information is that the number of observations included in the regression analysis varies between years and rating agencies. The observations for ESG scores are particularly absent in 2022, which is a result of the final ESG score for the companies not being completed yet. In conclusion, the screening resulted in a final list of 471 companies operating in 11 different industries and in 17 different countries. The companies can be observed in Appendix 1. The data employed in this

thesis will be further elucidated in Chapter 6.

## 5.2 Model Building

As the data sample consists of time series for each cross-sectional member, the complete data sample is structured as panel data. In order to take full advantage of this structure, it is crucial to select the most appropriate model. According to Brooks (2019), the three most common models are pooled OLS, fixed-effect models, and random-effect models.

To evaluate the impact of ESG scores on stock returns, a one-year lag between stock returns and the explanatory variables is introduced. This is based on recent literature suggesting that ESG engagement may not immediately result in better performance but would be observed later (Fischer & Sawczyn, 2013). Consequently, in our regression analysis, the independent and control variables are assigned to year  $t$ , while the dependent variable was assigned to year  $t+1$  (Waddock & Graves, 1997).

### 5.2.1 Pooled Ordinary Least Squares (OLS)

The simplest way to handle panel data is to use a pooled regression, which involves estimating a single equation for the entire data set (Brooks, 2019). In other words, by stacking all cross-sectional and time-series data into one single column for the dependent variable, and similarly for the independent variables. However, using pooled regression comes with limitations. First, because it assumes that the average values of the variables and the relationship between them are constant over time and across cross-sectional units in the same sample (Woolridge, 2020). Moreover, pooled regression also assumes that there is no heterogeneity in the coefficients across individuals or over time. As a result, this might lead to biased and inconsistent estimates when there is such heterogeneity (Brooks, 2019). The OLS regression model is written as follows:

$$SR_{i,t+1} = \alpha + \beta_1 ESG_{i,t} + \beta_2 size_{i,t} + \beta_3 lev_{i,t} + \beta_4 risk_{i,t} + \beta_5 mktb_{i,t} + u_{i,t}$$

where  $i = 1, \dots, 471$  and  $t = 2012, \dots, 2022$ .

### 5.2.2 Fixed Effects

Fixed-effects model accounts for unobserved heterogeneity or individual-specific effects within the panel data. Each entity in the panel data has its own unique characteristic that remains constant over time which can capture unmeasured variables that may affect the outcome of being studied. The fixed-effects model effectively removes the influence of the fixed effects from the estimated coefficients which allows the model to analyze the within-entity variation or changes over time, while controlling for characteristics for each entity (Brooks, 2019). In the regression model, countries and industries are included as dummy variables and set as entity-fixed effects. Thus, it is possible to capture the individual effect of each country and industry that does not vary over time. The fixed-effects model is constructed as follows:

$$S_{Ri,t+1} = \alpha_i + \beta_1 ESG_{i,t} + \beta_2 size_{i,t} + \beta_3 lev_{i,t} + \beta_4 risk_{i,t} + \beta_5 mktb_{i,t} + \beta_6 C_i + \beta_7 I_i + u_{i,t}$$

where  $i = 1, \dots, 471$  and  $t = 2012, \dots, 2022$ .

### 5.2.3 Random Effects

Similar to the fixed-effects model, the random-effects model incorporates different intercept terms for each entity, and these intercepts remain constant over time (Brooks, 2019). However, the key distinction between the two models is that the random-effects model assumes that the entities are randomly selected and that the individual effects are random (Hill, et al., 2018). These effects arise from a random variable,  $\epsilon_i$ , which exhibits cross-sectional variation but remains constant over time. This random deviation,  $\epsilon_i$ , captures the unique variation of each entity's intercept from the overall intercept shared across all entities (Brooks, 2019). In general, the random effects model is preferred if the data is collected randomly (Brooks, 2019). However, our sample cannot uphold that the data sample is selected randomly as it is based on exclusion criteria's such as data availability and stock exchange. Nevertheless, the regression for

the random-effects model is expressed as follows:

$$SR_{i,t+1} = \beta_1 ESG_{i,t} + \beta_2 size_{i,t} + \beta_3 lev_{i,t} + \beta_4 risk_{i,t} + \beta_5 mktb_{i,t} + \beta_6 C_i + \beta_7 I_i + W_{i,t}$$

$$W_{i,t} = \epsilon_i + v_{i,t}$$

where  $i = 1, \dots, 471$  and  $t = 2012, \dots, 2022$ .

## 5.3 Model Specification Tests

To identify the most appropriate model for our data, a series of tests have been conducted to assess model specifications. Initially, a test for individual effects was performed to examine whether there are individual-specific factors present within the cross-sectional entities of the data that should be taken into account. Subsequently, a Breusch-Pagan Lagrange multiplier test was introduced to examine the variability of these individual effects. This step is crucial in determining whether the individual effects are random in nature. If the presence of individual effects is discovered, a Hausman test can be employed to ascertain whether the fixed-effects model or the random-effects model is better suited for the data.

### 5.3.1 Poolability Test

To establish whether the best approach is a fixed-effects model or a pooled OLS, a poolability test is conducted. This involves determining the presence of individual effects,  $u_i$ , by performing a joint F-test (Kunst, 2009). If the null hypothesis is rejected, the individual effects present in the model are statistically different from zero. Hence, a fixed-effects model should be selected. If the null hypothesis holds, a pooled OLS model is preferred.

$$H_0: u_i = 0$$

$$H_1: u_i \neq 0$$

### 5.3.2 Breusch-Pagan Lagrange Multiplier Test

In order to determine the most appropriate approach between pooled OLS and a random-effects model, the Breusch-Pagan LM test is employed, a chi-

squared test for heteroscedasticity. Heteroscedasticity refers to the situation where the variance of the error term in a regression model is not constant across all levels of the independent variables. The tests examines whether the variance of the individual effects in the data,  $\sigma_{ui}^2$ , is statistically different from zero. If the null hypothesis is rejected, the conclusion is that there are random individual differences among sample members. Hence, the random effects model is appropriate. If the null hypothesis is not rejected, there is no evidence that random effects are present, and the pooled OLS model is preferred (Woolridge, 2020).

$$H_0 : \sigma_{ui}^2 = 0$$

$$H_A : \sigma_{ui}^2 \neq 0$$

### 5.3.3 Hausman Test

The Hausman test is conducted to determine whether a fixed-effects model or a random-effects model is the most appropriate for the dataset. The test compares the coefficient estimates of the fixed-effects model,  $\beta_{fe}$ , to the ones of the random-effects model,  $\beta_{re}$  (Hill, et. al., 2018). If the test is statistically significant, and the null hypothesis is rejected, the fixed-effects model is preferred.

$$H_0 : \beta_{fe} - \beta_{re} = 0$$

$$H_1 : \beta_{fe} - \beta_{re} \neq 0$$

## 5.4 Choice of Model

The model specification tests unequivocally indicate that the fixed-effects model is the most appropriate choice for the regression analysis. The poolability test initially favored the fixed-effects model over pooled OLS. Additionally, the Breusch-Pagan LM test preferred the random-effects model over pooled OLS. Finally, the Hausman test confirmed the superiority of the fixed-effects model for the thesis. The results of these model specification tests are presented in table 5.1, showcasing that the Breusch-Pagan LM test has a p-value of 0.024. Nonetheless. This value falls below the established threshold of significance ( $<0.05$ ), hence the rejection of the null hypothesis.

**Table 5.1:** Test Results and Preferred Model

Test	Hypothesis	Prob>F/Prob>Chi	Result	Preferred model
Poolability	$H_0$ : no individual effects $H_1$ : individual effects present	0	Reject $H_0$	FE Model
Breusch-Pagan LM	$H_0$ : no individual effects $H_1$ : individual effects present	0.024	Reject $H_0$	RE Model
Hausman	$H_0$ : RE model appropriate $H_1$ : FE model appropriate	0	Reject $H_0$	FE Model

The utilization of the fixed-effects model on the dataset results in the generation of 12 unique regression models. The distribution of these models across the diverse subcomponents of the ESG scores obtained from Bloomberg, Refinitiv Eikon, and S&P Global is presented in Table 5.2.

**Table 5.2:** Overview of Models

Rating Agency	Bloomberg				Refinitiv				S&P Global			
<i>Subcomponent Model</i>	ESG I	ENV II	SOC III	GOV IV	ESG V	ENV VI	SOC VII	GOV VIII	ESG IX	ENV X	SOC XI	GOV XII

## 5.5 Validity

This section aims to address and discuss the measures implemented to ensure the validity of the model. Specifically, it focuses on examining the potential presence of omitted variable bias, selection bias, multicollinearity, and reverse causality.

### 5.5.1 Omitted Variable Bias

Omitted variable bias occurs when a relevant variable that should be included in the true model is left out or excluded, leading to an underspecified model (Wooldridge, 2020). Consequently, the other variables could be assigned more relevance than they truly have, and as a result the output becomes biased. If present, the omitted variable bias will be visible as the error term is non-zero and exhibits correlation with both the independent and dependent variables. However, for this thesis the independent variables have been carefully selected based on recommendations from prior literature. Hence, it is not suspected that the model suffers from omitted variable bias.

Nevertheless, the question regarding whether to include R&D as a control variable might pose an omitted variable bias problem for this thesis. Several

studies conducted by Nollet et al. (2016), Velte (2017) and Xie et al. (2019) include R&D, and empirical evidence show that there is a high positive correlation between innovation, proxied by investments in R&D, and sustainability ranking (Fischer & Sawczyn, 2013). On the other hand, the same studies also show that the parameter is insignificant in most cases (Nollet et al., 2016; Xie et al., 2019). In conclusion, we have chosen to exclude R&D from our dataset but are aware that this might pose an omitted variable bias issue.

### 5.5.2 Selection Bias

Selection bias entails bias in the OLS estimator which is induced by using data that arise from endogenous sample selection (Wooldridge, 2020). This bias may occur if a selection process influences the availability of data, and when this selection process is linked to the response variable of the sample. The data for this thesis has not been selected randomly, hence selection bias might be present. More specifically, this is due to self-selection and the availability of ESG data.

Self-selection is a relevant consideration as the chosen data is derived from companies listed on the STOXX Europe 600 Index. However, it is important to note that the conclusions drawn from this dataset may not be universally applicable to the entirety of Europe. First, the dataset only represents 11 out of the 45 European countries, limiting its representativeness. Additionally, the data may exhibit overrepresentation of certain geographic regions or industries, as reporting requirements and standards vary across countries and sectors (Cahan et al., 2016).

Furthermore, the availability of ESG data has influenced the data selection process, potentially introducing selection bias. Companies with strong CSP are more likely to report their ESG information frequently, while firms with weaker CSP may be less inclined to report (Fischer & Sawczyn, 2013). Consequently, the data used in the thesis may be skewed towards companies with higher ESG scores, leading to a lack of representation from firms with lower ESG scores that may choose to avoid reporting them.

### 5.5.3 Multicollinearity

Multicollinearity arises when the explanatory variables are highly correlated with each other. This implies that they are not orthogonal to one another, and the theory distinguishes between perfect- and near multicollinearity. Near multicollinearity is present if there is a non-negligible, but not perfect relationship between the two variables. If this is present but disregarded, several outcomes can be anticipated. First, the model's  $R^2$  value would likely be high, indicating a good fit. However, the significance of the individual coefficients would be low, implying that the effects of the specific variables cannot be accurately assessed. Additionally, the standard errors for the coefficients would be inflated, leading to imprecise estimates. Consequently, significance testing would yield incorrect results, potentially leading to erroneous conclusions about the statistical significance of the variables (Brooks, 2019).

By conducting a thorough analysis of the correlation matrix, noteworthy correlations among our variables can be identified. In the case of strong correlations, it becomes essential to delve deeper into the matter by calculating their Variance Inflation Factor (VIF). This allows for the assessment of the extent to which multicollinearity may be influencing the regression analysis. A thorough analysis of the correlation matrix and collinearity test has been undertaken and will be further elaborated on in section 6.2 Descriptive Statistics and 7.1 Regression Results.

### 5.5.4 Simultaneous Causality

Simultaneous causality occurs when the explained variable has an effect on one or more of the explanatory variables. Failing to address this issue may lead to biased and inconsistent outcomes in the results (Brooks, 2019). More specifically, there could be a simultaneous equation bias if the causality between  $y$  and  $x$  runs in both directions. As many studies investigate the effect of ESG performance on financial performance, empirical evidence also shows that FINP influences ESGP (Waddock & Graves, 1997). This thesis is substantially affected by the presence of simultaneous causality in case it reveals that stock returns have an influence on companies' ESG scores. Consistent with the virtuous cycle

theory, it is plausible to infer that companies exhibiting high stock returns are likely to demonstrate robust financial performance. Consequently, the company is more likely to have resources available to invest in ESG factors and enhance their ESG rating. Nonetheless, there is a potential resolution to address this concern. Prior research conducted by Velte (2017) suggests that incorporating a one-year lag in the regression analysis can mitigate the occurrence of causality, wherein the change in ESG score primarily influences the subsequent year's stock return. Consequently, the introduction of a one-year lag can serve to diminish the likelihood of such causality.

## 6 Data

The forthcoming chapter presents an overview of the data utilized in this thesis, encompassing its source, collection process, and definitions of the variables. The first section will elaborate on the dependent, independent, and control variables. Subsequently, the second part will delve into a comprehensive analysis of the descriptive statistics.

### 6.1 Variable Description

In this section, a more detailed elaboration will be provided on the variables incorporated in the thesis. The independent variable comprises of ESG scores from Bloomberg, Refinitiv Eikon, and S&P Global, while the dependent variable is the stock return. It is important to note that all variables have been extracted and denominated in USD.

#### 6.1.1 Independent Variable

##### ESG Scores

The independent variable of the model is the ESG score of the company. This variable is obtained from three distinct ESG rating providers, each of which incorporates three sub-components: Environmental (ENV), Social (SOC), and Governance (GOV). Table 6.1 offers a concise summary of the diverse rating agencies, their scoring methodology, coverage, components, and data source:

**Table 6.1:** Overview of ESG Rating Agencies

Rating Agency	Scoring	Scope	Components
Bloomberg	0-100	2012-2022	ESG, ENV, SOC & GOV
Refinitiv Eikon	0-100	2012-2022	ESG, ENV, SOC & GOV
S&P Global	0-100	2016-2022	ESG, ENV, SOC & GOV

### **Bloomberg**

Bloomberg’s extensive database encompasses more than 11,500 companies across 83 countries, spanning a 12-year timeframe. The ESG score incorporates over 900 fields, covering crucial sustainability topics. These include air quality, climate change, human capital, compensation, diversity, board independence, water and energy management, materials and waste, and shareholders’ rights. The ESG score comprises reported data, derived ratios, and sector-specific and country-specific fields. Bloomberg gathers data from various direct sources, such as CSR reports, annual reports, company websites, CDP data, proxy statements, and corporate governance reports. To ensure data quality, Bloomberg employs multi-layer quality control systems, carefully selecting only comparable data to be included in the ESG score (Bloomberg, 2019).

### **Refinitiv Eikon**

Refinitiv Eikon’s database encompasses ESG scores for over 12,500 companies globally, evaluating their ESG performance based on verifiable reported data from public sources, such as annual reports, company websites, stock exchange filings, and news. These scores are designed to provide transparent and objective measurements of a company’s ESG performance, commitment, and effectiveness across 10 key themes, including emissions, human rights, shareholders, and innovation. To ensure data quality, Refinitiv employs a combination of algorithmic and human processes, resulting in more than 630 ESG measures. The methodology is fully automated, data-driven, and transparent, aiming to standardize information and facilitate meaningful comparisons across the entire spectrum of companies (Refinitiv, n.d.).

## **S&P Global**

S&P Global maintains an extensive database encompassing approximately 8,000 companies, which accounts for roughly 90% of global market capitalization. The evaluation of ESG scores relies on a combination of publicly available information, verified company disclosures, media and stakeholder analysis, and in-depth company engagement. This evaluation process, known as the S&P Global Corporate Sustainability Assessment (CSA), categorizes firms into two groups; participating companies and non-participating companies. Participating companies undergo assessment based on the information they provide as active participants in the CSA, in addition to publicly available data. Non-participating companies, however, are evaluated solely based on publicly available information.

The ESG score developed by S&P Global is rule-based and employs a quantitative assessment methodology. It can be further dissected into 30 focus areas that span across different sub-industries. Moreover, the score is derived from 130 sustainability topics and encompasses up to 1,000 underlying data points per company. This score reflects a company's tangible performance concerning significant sustainability risks, opportunities, and controversies. Furthermore, the ESG score provides insights into the comprehensiveness and quality of a company's public disclosures, as well as its understanding of emerging and underreported ESG issues (S&P Global, n.d.).

### **6.1.2 Dependent Variable**

#### **Stock return**

The dependent variable chosen for analysis is stock return, which is derived from the stock price representing the market valuation of a company. Stock prices are influenced by various factors, including both internal company-specific factors and external global factors. Fluctuations in stock prices occur daily in response to economic news such as revised forecasts of gross domestic product (GDP), inflation rates, and interest rates. Past studies have identified several characteristics that have historically predicted stock prices, including volatility, accruals, earnings quality, growth, and profitability (Bodie et al., 2021).

The data for stock returns was collected using the Refinitiv Eikon Terminal.

Specifically, the stock price data, referred to as "price close" in the database, was retrieved. This represents the last traded price of a stock during a regular trading session. It is important to note that Refinitiv Eikon does not calculate these prices themselves; instead, they are obtained directly from the respective stock exchanges. The calculation method for determining the closing price may vary across exchanges, but one example is the weighted average of trade prices during the final thirty minutes of trading (Refinitiv, n.d.). Finally, to calculate the stock return, the annual change in stock prices was computed.

### 6.1.3 Control Variables

It is highly important to include control variables in order to ensure the internal validity of the study. To account for the different characteristics in our data sample, firm size, risk, beta and market-to-book value will be discussed. In addition, country- and industry specific characteristics will be elaborated on.

#### **Firm Size**

The first control variable included is firm size, which is the natural logarithm of total assets in million USD. Having firm size as a control variable makes it possible to observe how well a company can sustain a competitive advantage when effects such as economies of scope, economies of scale and learning are present (Roberts & Dowling, 2002). Drempetic et al. (2020) refers to evidence that larger firms have greater ESG scores because they are faced with additional public pressure and thus must report to a larger scale (Adams et al., 1998; Chauhan, 2014).

#### **Risk**

In order to control for idiosyncratic and systematic risk the company's leverage ratio and beta is included in the regression analysis. The leverage ratio is measured by total debt over total assets and controls for company specific risk, while historical beta is included to measure systematic risk. According to theory, firms with lower risk profiles have a stable return model, and as a result invest more in socially responsible activities (Makni et al., 2009; Fischer & Sawczyn, 2013; Velte, 2017).

### Market-to-book Value

The market-to-book value reflects the relationship between the market price of a share of the firm's common stock and shareholders' equity per share. The ratio indicates a measure of growth opportunities, where firms with greater growth opportunities will tend to show higher multiples of market price to book value (Bodie et al., 2021). Market-book value ratio:

$$\frac{\text{Price per share}}{\text{Book value per share}}$$

### Country- and Industry Specific Characteristics

Finally, to control the impact on accounting performance of a company, country- and industry specific characteristics are included as dummy variables. When categorizing the companies with industry specific characteristics, the Industry Classification Benchmark (ICB) was applied. The ICB is a transparent classification methodology that categorizes companies by 11 industries consisting of technology, telecommunications, health care, real estate, consumer discretionary, consumer staples, industrials, basic materials, energy, and utilities (FTSE Russell, 2023). By categorizing the companies into countries and industries, it is possible to control regulations affecting specific countries or industries directly.

## 6.2 Descriptive Statistics

The following section provides an overview of the characteristics of the data set. The first part focuses on the sample distribution while the second part concerns the regression variables. Finally, the third part investigates the relationship between the variables through correlation analysis and collinearity statistics.

### 6.2.1 Sample Distribution

Table 6.2 presents the distribution of observations across sample periods, drawing from data provided by Bloomberg, Refinitiv Eikon, and S&P Global. Due to variations in data availability among these providers, the coverage

period for the regression analysis varies. Both Bloomberg and Refinitiv Eikon offer ESG ratings spanning from 2012 to 2022, with the maximum number of observations occurring in 2021 for Refinitiv Eikon and in 2022 for S&P Global. However, S&P Global only provides ESG ratings for the period from 2016 to 2022, with the minimum number of observations (304) recorded in 2016.

As the table displays, there is a yearly increase in observations of ESG scores across all three providers, except for 2022, where Bloomberg and Refinitiv Eikon exhibit a significant decrease in the number of observations. One plausible explanation for this decline in 2022 is that the data collected for the thesis was acquired prior to the completion of publication of annual ESG scores. Furthermore, the rising number of observations can be attributed to the growing emphasis on ESG reporting in Europe, which influences stakeholder demands, investor considerations, regulatory requirements, risk management practices, and value creation.

**Table 6.2:** Observations of ESG Score Across Sample Period

Rating Agency	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Bloomberg	387	396	398	421	441	446	456	461	466	468	215
Refinitiv Eikon	371	376	386	402	411	440	453	465	468	471	141
S&P Global	0	0	0	0	304	379	406	440	455	468	471
Total	758	772	784	823	1156	1265	1315	1366	1389	1407	827

Table 6.3 offers a depiction of the distribution of companies throughout Europe. The sample comprises a total of 471 companies listed on the STOXX Europe 600 Index. The findings in table 6.3 reveal that the United Kingdom contributes approximately 21% of the observations, followed by France with 14%, Germany with 12.5%, and Sweden with 9% of the observations. However, it is important to acknowledge a limitation in the data sample, namely the lack of an even distribution of percentages across countries. Furthermore, the dataset only encompasses a representation from 16 out of the 44 countries in Europe. Consequently, the findings may not accurately reflect the entirety of Europe.

**Table 6.3:** Distribution Across Countries

Country	% of total sample
United Kingdom	21%
France	14%
Germany	13%
Sweden	9%
Switzerland	9%
Italy	7%
Netherlands	6%
Spain	4%
Denmark	4%
Finland	3%
Belgium	3%
Norway	3%
Poland	2%
Ireland; Republic of	1%
Austria	1%
Portugal	1%
Total	100%

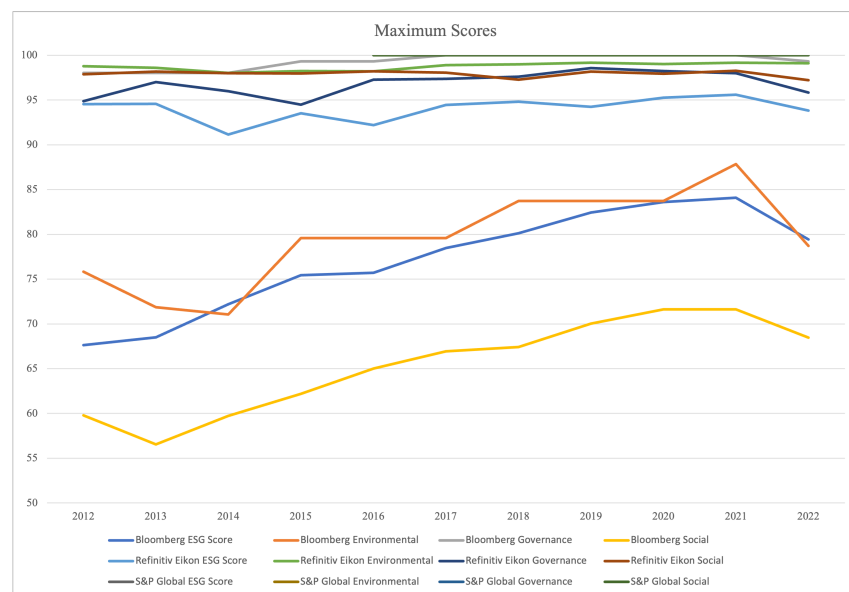
As depicted in Table 6.4, the dataset exhibits a representation across all 11 industry categories, defined in accordance with the Industry Classification Benchmark (ICB). Notably, the Industrials sector constitutes the largest proportion, comprising 21% of the total data sample and thus emerging as the predominant industry. It is closely trailed by the Financials-, Consumer Discretionary-, and Health Care-sectors, which collectively contribute approximately 18%, 15%, and 9% of the total data sample, respectively.

**Table 6.4:** Distribution Across Industries

Industry	% of total sample
Industrials	21%
Financials	18%
Consumer Discretionary	15%
Health Care	9%
Consumer Staples	8%
Basic Materials	7%
Utilities	5%
Technology	5%
Real Estate	5%
Energy	3%
Telecommunications	3%
Total	100%

### 6.2.2 Regression Variables

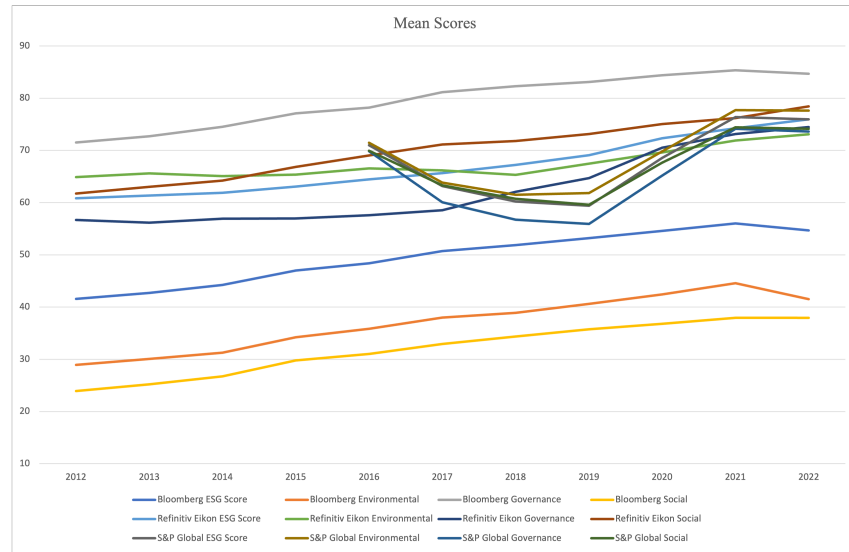
Figures 6.1-6.4 provide an overview of the descriptive statistics for all the study variables included in the thesis across the sample period. When examining the maximum scores, it becomes apparent that S&P Global consistently records the highest values, with a score of 100 across all years. Furthermore, Refinitiv Eikon exhibit high maximum values in the environmental pillar score. In contrast, Bloomberg generally displays lower values across all pillar scores, with the social pillar score recording the absolute lowest value of 56.55. The reasons behind this could be attributed to differences in methodologies, data sources, and weightings utilized by Bloomberg compared to other rating providers. Bloomberg's scoring methodology might place greater emphasis on specific indicators or dimensions within the ESG framework, which could result in lower overall scores.



**Figure 6.1:** Maximum Scores

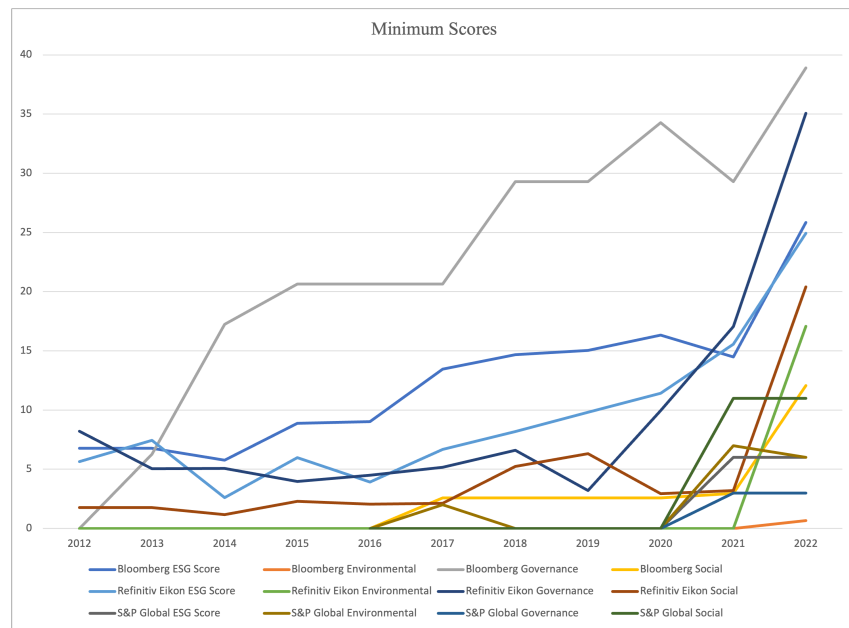
When considering the mean scores, Bloomberg exhibits significant internal variation. It consistently displays lower mean scores for the total ESG, social, and environmental scores compared to Refinitiv Eikon and S&P Global's pillar scores. However, Bloomberg's governance score surpasses the other agencies and their respective pillar scores with higher values. Notably, the internal divergence of Bloomberg's mean-scores ranges from 23.89 (SOC) to 85.37 (GOV). Moreover, a notable trend observed across all rating agencies is that

all scores exhibit improvement over time.



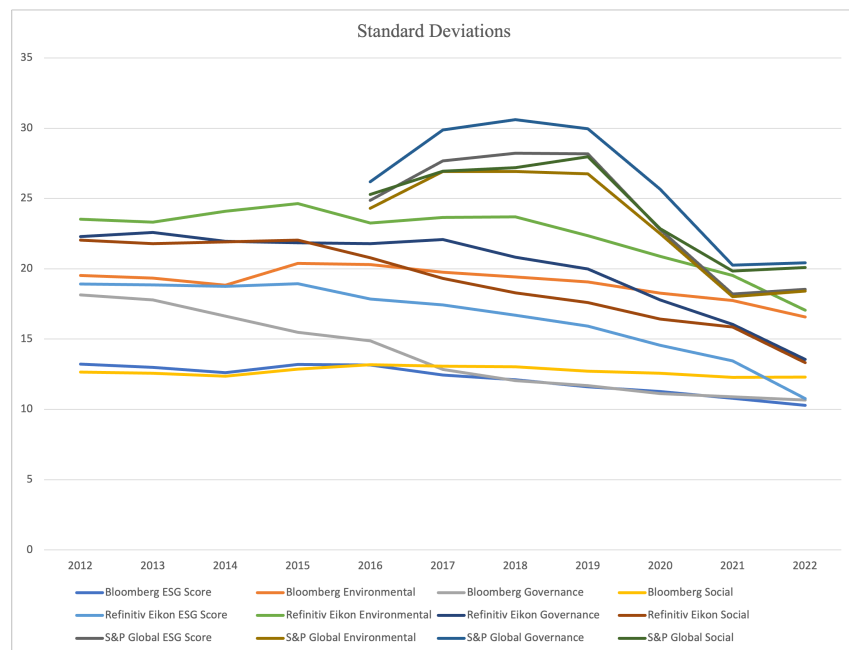
**Figure 6.2:** Mean Scores

When examining the minimum scores, it is noteworthy that Bloomberg's governance is the pillar score with generally higher minimum values. In addition, the pillar also exhibits the highest minimum value of 39.9. Both Bloomberg and Refinitiv Eikon's environmental scores stand out with multiple years registering the lowest minimum value of 0.00. This value is also observed in S&P Global's total ESG score and all its pillar scores. An intriguing observation is the visible shift from 2021 to 2022, where there is significant improvement in all scores for Bloomberg and Refinitiv. A similar shift is observed for S&P Global from 2020-2021, although with slightly smaller differences compared to Bloomberg and Refinitiv.



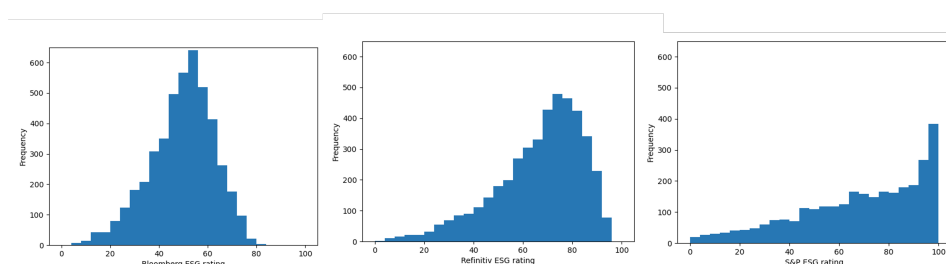
**Figure 6.3:** Minimum Scores

Upon comparing the ESG providers, another noticeable pattern emerges, with Bloomberg exhibiting the lowest standard deviation, while S&P Global demonstrates the highest standard deviation. In terms of pillar scores, Refinitiv Eikon display notably higher values in the environmental pillar compared to the other pillars. Furthermore, a discernible trend across all rating agencies is the gradual improvement in standard deviation over time.



**Figure 6.4:** Standard Deviations

Figure 6.5 showcases the distribution of ESG scores provided by Bloomberg, Refinitiv Eikon, and S&P Global. The frequencies of ESG scores exhibit notable variations among the providers. Bloomberg demonstrates a higher frequency of lower scores compared to the other two, whereas S&P Global demonstrates a higher frequency of higher scores. Furthermore, the ESG scores provided by Bloomberg and Refinitiv Eikon display greater clustering than those provided by S&P Global. This discrepancy in frequency and clustering may stem from the data collection approach employed by S&P Global. In addition to utilizing publicly available information, their inclusion of in-depth company engagement allows for the possibility of companies attaining higher scores.



**Figure 6.5:** Histogram with Distribution of ESG Scores Depending on Rating Agency

Tables 6.5-6.8 present a summary of the total ESG scores, as well as pillar scores, across eleven industries categorized by the Industry Classification Benchmark (ICB). The table incorporates data from the years 2019 to 2022, as they encompass the most up-to-date observations. For data from the years 2012 to 2018, refer to Appendix 2.

The analysis of the data reveals several significant findings regarding the ESG performance of different industries. First, the technology sector consistently demonstrates the lowest total ESG scores and pillar scores among the industries examined. This suggests that the technology industry faces challenges in integrating robust environmental, social, and governance practices into its operations. It is reasonable to assume that due to the sector's rapid innovation and competitive nature, it often prioritizes short-term financial gains over long-term sustainability considerations. Additionally, the resource-intensive manufacturing processes, energy consumption, and electronic waste generation associated with the technology sector contribute to its relatively lower ESG performance.

Conversely, the telecommunication, energy, and utilities industries emerge as the frontrunners with the highest total ESG scores and pillar scores. These industries have a significant impact on environmental and social factors, allowing them to implement comprehensive ESG strategies. Telecommunication companies invest in sustainable infrastructure and contribute to connectivity in underserved regions, while the energy and utilities sectors focus on renewable energy generation, efficient resource management, and carbon emissions reduction. The commitment of these industries to sustainable practices and their ability to integrate ESG considerations into their core operations contribute to their higher ESG performance.

Moreover, a positive trend is observed in the total ESG scores and pillar scores across all industries in 2020, with the exception of the social pillar. This positive shift indicates an overall improvement in environmental and governance practices. Factors contributing to this trend may include increasing awareness of ESG issues, regulatory changes promoting sustainable practices, and companies taking proactive measures to mitigate their environmental impacts. However, the social pillar lags behind, highlighting the challenges organizations face in effectively addressing social issues. The subjective nature of social performance evaluation and the need for more robust methodologies to assess social factors consistently may contribute to this disparity in performance.

In general, Bloomberg tends to provide the lowest total ESG scores, environmental scores, and social scores across all industries. However, it is worth noting that Bloomberg's governance pillar consistently receives the highest scores across industries and rating providers. This could be because corporate governance practices often have clearer and more standardized metrics, allowing more consistent evaluation and scoring across companies and sectors.

Furthermore, it is worth noting that Bloomberg's scores consistently rank the lowest across industries. This trend is observed across all industries, with the technology sector consistently receiving the lowest scores in both the total ESG score and pillar scores.

**Table 6.5:** Average ESG Scores and Pillar Scores Across Industry (2019)

Industry	Bloomberg				Refinitiv Eikon				S&P Global			
	ESG Score	Environmental	Governance	Social	ESG Score	Environmental	Governance	Social	ESG Score	Environmental	Governance	Social
Basic Materials	61.8128	57.3014	84.6318	43.4127	74.1549	72.7246	67.1913	80.2478	57.1875	56.1563	54.1250	58.5000
Consumer Discretionary	51.9792	37.7719	83.8126	34.2314	69.4444	68.0768	63.7680	73.7278	65.1905	68.7619	60.5079	65.1587
Consumer Staples	55.8558	48.7017	82.4366	36.3232	68.7043	70.1286	62.4794	71.1800	61.5313	62.7188	59.1875	59.8750
Energy	63.7850	57.8556	83.1447	50.2781	77.4451	76.8575	75.1343	79.5957	71.4000	73.1333	62.0667	72.7333
Financials	49.3237	31.8045	82.6947	33.3605	66.9952	67.4725	66.2353	68.5566	56.8795	58.9398	55.5060	58.1687
Health Care	51.4629	38.2698	83.7393	32.2551	72.3915	63.2059	67.2122	80.4237	55.2143	61.2857	48.3810	57.5476
Industrials	52.7741	40.8937	82.6899	34.7148	68.6700	66.8298	64.1544	73.7210	56.8936	57.9787	54.4362	55.9681
Real Estate	48.5709	33.6284	81.8430	30.1995	61.3088	62.8651	58.3767	61.2460	55.3684	57.2105	52.1053	54.0000
Technology	43.4555	23.9807	77.8486	28.4094	59.8007	52.4873	55.2016	66.5385	53.8947	60.3158	47.2632	60.0000
Telecommunications	55.2812	43.0988	85.0241	37.6058	73.5056	71.8732	68.0753	76.8971	57.3125	61.3750	54.5625	54.0625
Utilities	64.7899	58.2676	86.5780	49.4377	73.7637	75.8976	65.6596	76.9580	71.5200	73.8400	68.7600	67.9200

**Table 6.6:** Average ESG Scores and Pillar Scores Across Industry (2020)

Industry	Bloomberg				Refinitiv Eikon				S&P Global			
	ESG Score	Environmental	Governance	Social	ESG Score	Environmental	Governance	Social	ESG Score	Environmental	Governance	Social
Basic Materials	62.3145	57.1268	86.1275	43.5932	76.0595	73.4826	72.4708	81.1492	63.1875	62.4063	62.2500	64.7500
Consumer Discretionary	53.2859	39.0782	85.3945	35.2619	71.0781	68.9009	66.9584	74.5478	67.9545	71.4242	63.1970	67.0606
Consumer Staples	56.9105	50.1183	83.1853	37.3228	73.1271	73.4006	69.8284	74.6912	67.3824	69.5588	64.3235	65.1176
Energy	63.9542	58.7153	82.1117	50.9636	78.5747	77.1426	76.9488	80.9667	73.8000	72.9333	65.7333	74.4000
Financials	50.7854	33.6616	83.7832	35.0243	71.2890	70.1238	73.0991	70.9088	70.3452	70.6667	69.5952	68.3571
Health Care	53.3863	40.8404	85.4982	33.6959	75.9783	66.7456	72.9549	82.2858	66.7045	70.7045	57.2727	70.5000
Industrials	54.4854	43.6695	84.2944	35.2318	71.3633	68.5124	70.0978	74.9068	68.3684	67.9053	66.1895	67.2947
Real Estate	51.0608	36.3151	84.7054	32.1014	66.0966	67.6621	64.8825	64.8008	72.3000	74.0000	67.8500	68.0000
Technology	43.9618	26.1214	77.2980	28.3410	66.6159	56.2956	65.5542	71.6277	62.0000	61.7917	59.1250	63.3333
Telecommunications	57.2289	44.6749	87.2347	39.6614	76.4671	71.1907	77.0702	78.0308	68.6250	72.3125	67.3750	63.4375
Utilities	66.2388	59.5808	87.8736	51.1765	75.9255	78.3127	68.5524	78.4443	76.7200	78.6000	72.4800	73.0000

**Table 6.7:** Average ESG Scores and Pillar Scores Across Industry (2021)

Industry	Bloomberg				Refinitiv Eikon				S&P Global			
	ESG Score	Environmental	Governance	Social	ESG Score	Environmental	Governance	Social	ESG Score	Environmental	Governance	Social
Basic Materials	63.4874	59.3665	87.1115	43.8879	77.4745	74.1676	75.6967	82.2191	74.4688	74.1563	72.9688	75.1875
Consumer Discretionary	54.4001	41.2600	85.6629	36.1570	73.6001	71.1076	71.3518	76.1309	73.3478	77.8986	70.1884	71.6087
Consumer Staples	57.9315	52.1469	83.0273	38.5194	76.2772	77.1164	71.6488	78.3187	75.8333	77.9722	73.9444	72.6944
Energy	65.4795	60.3745	83.4023	52.5903	80.3660	78.6256	79.6696	82.3801	78.5000	82.7500	70.6250	79.5000
Financials	51.9747	34.0883	85.8225	35.9252	72.1120	73.3596	73.1494	71.2745	77.7209	77.6744	77.3372	75.3605
Health Care	55.2668	42.9731	87.3987	35.3035	77.2787	69.2070	75.2828	82.1751	77.4091	79.2500	71.2955	77.9091
Industrials	56.1093	46.6639	84.9873	36.6101	73.4432	69.8263	72.9591	76.5169	75.8750	76.9458	74.5625	73.4167
Real Estate	52.2789	37.9473	86.0561	32.7809	68.0846	70.7086	68.0591	66.3477	77.4783	78.1304	74.8066	74.7391
Technology	47.3236	31.9517	78.7345	31.1657	70.1873	59.2266	73.0367	72.0470	76.9200	74.7600	76.4800	74.2800
Telecommunications	59.1785	47.7915	88.3410	41.2901	76.4788	72.4284	77.8542	77.2403	75.0625	79.4375	72.8750	70.2500
Utilities	66.7897	61.4135	87.4859	51.3869	77.8604	80.8857	71.2683	79.0961	81.1600	81.2000	78.9600	77.7600

**Table 6.8:** Average ESG Scores and Pillar Scores Across Industry (2022)

Industry	Bloomberg				Refinitiv Eikon				S&P Global			
	ESG Score	Environmental	Governance	Social	ESG Score	Environmental	Governance	Social	ESG Score	Environmental	Governance	Social
Basic Materials	58.7881	53.0467	81.7580	41.4677	76.2700	72.4570	75.2870	81.7040	74.0625	74.4063	72.3750	74.9688
Consumer Discretionary	53.5649	37.9599	85.7979	36.8145	74.7329	72.3618	71.4535	78.4865	73.3768	77.8696	69.6522	71.8551
Consumer Staples	57.2578	49.2579	84.0608	38.3486	77.3375	74.7667	72.9108	81.0775	75.7222	78.0833	73.6667	72.6111
Energy	62.9279	53.2317	77.3480	58.1520	76.9733	75.2000	78.6267	77.1400	78.1250	82.7500	70.6250	79.1875
Financials	51.7657	32.5439	85.8469	37.2036	74.4070	75.3878	74.5365	74.3339	77.6552	78.2414	77.3103	75.2069
Health Care	52.9631	39.0961	86.4575	33.2065	76.6429	67.9300	75.2100	81.5265	77.2500	79.4091	70.7045	78.0227
Industrials	55.0303	44.6551	84.3474	37.0048	76.4425	72.5521	76.6704	78.3954	74.3980	75.4184	73.1633	72.1939
Real Estate	51.6640	37.4786	83.1502	31.7740	69.6500	76.3725	62.7350	67.9900	77.4783	78.1304	74.7826	74.7391
Technology	46.6969	30.0276	78.2188	31.7261	74.2950	66.3410	78.4810	76.3910	77.0800	75.0400	76.4800	74.3600
Telecommunications	61.2212	47.7046	92.4029	43.4364	78.5738	75.0600	78.1825	80.0700	75.0625	79.5000	72.8125	70.1875
Utilities	65.7395	59.1866	87.2818	50.6651	78.9144	82.4656	68.7300	82.2022	80.7200	81.4800	78.3200	77.4400

The findings presented in Tables 6.9-6.12 offer significant insights into the ESG performance across multiple countries and providers. The tables includes data from the years 2019 to 2022, representing the most current observations available. For data from the years 2012 to 2018, refer to Appendix 3.

The results indicate several notable observations. First, Poland emerges as the country with the lowest ESG score across all pillars. This outcome suggests a relatively subpar ESG performance compared to the other countries under examination. However, this finding is expected as empirical evidence highlights that the focus on ESG tends to be less present in countries with weaker institutions, less press freedom, less commitment to an environmental agenda, and less democracy (Cahan et al., 2016).

Conversely, Spain and Portugal demonstrate the highest scores in both total ESG scores and pillar scores, indicating their superior ESG performance. The Nordic countries, including Norway, Sweden, and Denmark, demonstrate different and suprising results. Even though they are recognized for their strong emphasis on sustainability and responsible governance practices, the analysis unveils that their ESG scores are merely average to moderately good (Scholtens & Sievänen,2013). This unexpected result suggests a discrepancy between the Nordic countries' reputation for sustainability and their actual ESG performance. Consequently, there exists an opportunity for these countries to enhance their ESG practices and align them more closely with the exemplary performance demonstrated by countries such as Spain and Portugal.

Additionally, the analysis reveals a consistent pattern whereby Bloomberg consistently exhibits the lowest total ESG scores, with the exception of the governance pillar score.

**Table 6.9:** Average ESG Scores and Pillar Scores Across Country (2019)

Country	Bloomberg				Refinitiv Eikon				S&P Global			
	ESG Score	Env.	Gov.	Social	ESG Score	Env.	Gov.	Social	ESG Score	Env.	Gov.	Social
Austria	54.1176	52.6125	72.5065	37.1574	72.3844	76.4782	64.3750	74.7966	51.1667	53.0000	50.0000	50.1667
Belgium	43.0579	21.4925	81.8136	25.7232	57.2100	55.5902	56.1964	61.3152	34.6364	40.8182	31.9091	41.1818
Denmark	50.1293	37.2217	84.4123	28.6205	68.8477	63.4715	65.8573	72.9630	42.3750	39.8125	38.1250	43.8750
Finland	62.9988	54.2779	88.8191	45.7981	71.4977	74.3505	63.3955	74.9155	70.4615	67.4615	68.0000	70.6923
France	55.9211	40.8002	93.9079	32.9083	73.8151	77.8594	61.8156	79.7676	68.3077	71.7231	60.5692	70.9538
Germany	50.6358	41.2750	77.3218	33.3609	71.2608	67.5638	68.5380	75.2885	55.7222	57.9630	51.2037	58.1852
Ireland (Republic of)	51.6476	32.6746	86.3550	35.7834	63.9247	56.7845	62.9055	68.9569	44.7143	50.0000	51.5714	37.8571
Italy	57.0798	46.9194	82.4644	41.7574	70.8137	68.9867	63.5767	76.9172	64.0667	64.1667	60.4333	64.3000
Netherlands	51.1196	37.4304	83.8085	32.0726	68.0697	66.6312	63.5714	71.9706	74.0909	75.0455	74.0909	72.9545
Norway	50.4639	41.2889	71.9678	38.0523	66.4290	65.0329	64.1438	69.4159	44.8333	48.5000	38.7500	49.0000
Poland	41.5494	36.1350	56.4204	32.0349	60.0956	52.7229	57.8550	63.3769	22.5714	24.7143	18.5714	34.2857
Portugal	62.0888	58.0338	74.4506	53.7334	73.5405	80.8900	48.6749	83.1276	86.7500	88.5000	78.7500	84.0000
Spain	61.1139	52.7232	82.1077	48.4295	78.0263	78.7021	66.2116	85.6325	83.0952	84.3810	79.0000	82.1905
Sweden	47.0918	34.8535	77.9329	28.3696	60.2459	58.8421	56.5909	66.0460	47.7632	49.8158	46.1316	49.1579
Switzerland	52.5034	44.2177	81.3446	31.8622	67.8368	65.5968	66.4715	70.4628	54.7436	58.3333	50.4615	53.6154
United Kingdom	54.7690	37.8881	85.6787	40.6247	69.1694	64.6904	69.9658	70.3664	61.1789	64.8632	59.6211	57.2842

**Table 6.10:** Average ESG Scores and Pillar Scores Across Country (2020)

Country	Bloomberg				Refinitiv Eikon				S&P Global			
	ESG Score	Env.	Gov.	Social	ESG Score	Env.	Gov.	Social	ESG Score	Env.	Gov.	Social
Austria	55.2124	53.1763	75.1154	37.2632	74.6113	77.4655	70.3552	74.2745	57.6667	60.1667	56.0000	57.0000
Belgium	43.8928	22.7935	81.6399	27.1045	60.4643	61.9561	55.9827	65.1060	53.3846	54.6154	49.9231	55.7692
Denmark	51.9565	38.9699	87.0985	29.6643	70.6691	65.9945	68.5927	73.4848	54.6471	55.0588	49.8824	56.0588
Finland	64.9920	56.1268	90.1114	48.6397	74.5947	77.2113	70.1825	75.4699	75.3846	74.5385	74.1538	75.0769
France	56.7422	41.7735	94.5998	33.7066	76.2980	78.2559	66.9691	81.3792	76.8182	78.0909	69.3485	77.2727
Germany	52.9786	42.5687	80.7911	35.2291	75.5606	69.0231	77.6333	77.9752	65.3509	67.9649	60.2982	66.0877
Ireland (Republic of)	53.9483	38.1671	87.2495	36.3016	68.6067	65.1437	64.1074	73.5154	52.5714	52.0000	54.7143	47.0000
Italy	59.0555	48.0539	85.2052	43.8068	75.6956	71.2266	73.8398	79.7540	71.8710	71.4516	65.4194	72.8065
Netherlands	51.3668	37.4263	83.9153	32.6918	71.0616	68.4299	68.3772	74.1011	72.4615	72.1923	74.0000	71.4231
Norway	51.9024	44.5067	73.5285	37.5872	71.1526	69.5091	73.2997	72.6258	53.7500	56.9167	47.4167	57.7500
Poland	43.5484	40.2943	57.1214	33.1750	59.7488	57.7381	54.9852	63.3827	34.1429	35.4286	27.5714	43.1429
Portugal	62.5013	58.6077	73.8260	55.0257	76.8865	83.9391	49.9866	87.3247	87.2500	91.2500	80.0000	83.2500
Spain	62.4542	54.5455	82.6166	50.1224	79.9615	80.9397	69.3061	86.7844	88.0000	88.2857	86.0000	86.4762
Sweden	47.4010	35.0279	78.7135	28.3404	65.6422	62.8301	65.6489	68.6063	60.7692	60.3590	60.7692	59.9744
Switzerland	54.4920	46.9440	83.5913	33.3213	70.1231	66.8543	71.6965	71.4158	66.8500	70.4500	61.4250	65.6000
United Kingdom	56.2837	41.2707	85.9860	41.4824	72.0293	66.5503	74.5629	72.1576	71.3021	72.6146	70.7813	66.3750

**Table 6.11:** Average ESG Scores and Pillar Scores Across Country (2021)

Country	Bloomberg				Refinitiv Eikon				S&P Global			
	ESG Score	Env.	Gov.	Social	ESG Score	Env.	Gov.	Social	ESG Score	Env.	Gov.	Social
Austria	56.4983	53.5186	76.0335	39.8630	75.4715	79.0981	68.4656	77.4127	73.5000	71.0000	72.6667	71.0000
Belgium	46.5338	27.4818	83.8582	28.1206	63.7937	64.9746	60.2064	67.3781	64.1538	64.6923	64.2308	63.2308
Denmark	53.0323	42.1465	86.8258	29.9915	72.6218	70.7718	70.3521	74.1206	67.2941	68.7059	66.4118	63.1176
Finland	65.5273	57.4060	90.5092	48.5684	74.5360	76.3223	70.8851	75.3021	79.8571	80.5000	79.3571	77.2143
France	58.1479	44.3599	95.0012	34.9392	77.7425	78.9584	71.2598	81.2466	82.2424	84.9394	77.8636	82.1667
Germany	54.3280	44.0637	82.5095	36.3167	77.5860	70.3176	81.2567	78.8503	74.7586	75.5862	70.6724	73.8793
Ireland (Republic of)	55.2416	40.4539	88.3246	36.8198	73.8383	69.1598	70.2683	78.5291	63.7143	64.7143	67.1429	54.1429
Italy	61.0392	50.6513	87.3357	45.0287	77.4785	74.1157	75.9849	80.3155	83.6129	81.7742	81.0645	84.8710
Netherlands	54.0996	39.6277	87.4306	35.1785	74.4148	70.6327	76.0660	75.1977	76.8966	76.8276	78.6552	74.5862
Norway	53.9235	48.2796	75.5407	37.8639	72.4367	70.6010	74.0183	73.9136	67.5000	77.6667	62.6667	62.7500
Poland	43.7242	36.2353	58.8952	35.9847	62.8420	62.7941	56.3627	67.8704	55.0000	54.2500	45.5000	58.1250
Portugal	63.5198	61.9903	73.5024	55.0257	80.6128	86.6685	60.8787	87.4566	84.0000	85.2500	76.2500	85.0000
Spain	64.2251	57.5283	84.9488	50.2893	81.4712	83.0878	70.3029	88.5062	92.7619	92.5238	91.0952	91.1429
Sweden	49.7348	39.0798	79.4189	30.5898	67.5556	66.9241	65.0418	70.9895	69.4091	70.6136	67.8409	67.6591
Switzerland	55.8758	48.6074	85.2330	33.7511	73.0587	70.1108	73.5228	74.8268	72.6341	75.8537	68.4878	69.3415
United Kingdom	57.0295	42.6155	85.7762	42.5881	73.2074	68.9847	76.5608	72.2877	78.3918	79.7526	77.8351	74.8660

**Table 6.12:** Average ESG Scores and Pillar Scores Across Country (2022)

Country	Bloomberg				Refinitiv Eikon				S&P Global			
	ESG Score	Env.	Gov.	Social	ESG Score	Env.	Gov.	Social	ESG Score	Env.	Gov.	Social
Austria	52.3438	41.7019	78.9058	36.3210	72.8625	80.3975	59.3200	75.4025	73.0000	70.8333	72.6667	71.1667
Belgium	49.2385	31.1749	84.1782	32.2310	-	-	-	-	65.2308	66.6154	65.8462	63.6923
Denmark	50.9271	37.8033	85.6445	29.1986	74.8040	72.2873	72.4793	76.3613	67.2941	68.7059	66.4118	63.1176
Finland	58.3820	45.0468	88.4633	41.5206	82.8740	80.8080	79.5180	85.8520	79.5000	80.5714	79.2143	76.9286
France	57.6557	42.2960	94.2233	36.3069	76.8042	77.0467	72.9967	79.2658	82.0000	84.9545	77.5606	81.8485
Germany	49.4193	38.9585	78.6273	33.5349	82.9229	78.6700	84.9514	84.4700	73.8136	74.9153	69.3729	73.2542
Ireland (Republic of)	50.0989	26.0143	87.0259	37.1221	68.5175	55.7200	72.4175	73.4100	63.2857	65.1429	67.0000	54.1429
Italy	61.4876	51.7563	85.5744	47.0388	67.5633	55.6900	63.7200	74.9400	83.5806	81.2258	80.8387	84.8387
Netherlands	53.7402	35.8301	87.3570	36.3482	77.9127	71.7636	82.5064	79.3364	76.9310	77.0690	78.5517	74.5517
Norway	48.2467	42.1806	70.8910	31.5780	69.0200	64.8000	76.1000	64.1500	67.4615	78.6154	62.8462	61.9231
Poland	46.0215	32.6487	64.8455	40.5028	63.0100	88.9700	40.5600	71.5300	55.0000	54.2500	45.5000	58.1250
Portugal	60.9697	52.9447	74.5133	55.4010	80.1500	91.4800	69.6600	73.4100	84.0000	85.2500	75.2500	85.2500
Spain	61.6075	57.6201	84.4070	42.7025	83.8564	86.7936	72.4573	90.7618	92.0476	92.5238	89.9048	91.1429
Sweden	48.5175	36.6657	78.1734	30.5985	71.1040	68.4880	67.4610	77.1860	69.3636	70.6591	67.7045	67.7273
Switzerland	56.3966	46.2043	88.0866	36.4909	73.8200	70.7379	74.2164	76.6393	72.2683	76.2927	67.4390	69.3415
United Kingdom	56.6963	41.5063	85.6630	42.8106	73.8231	69.1103	75.0034	74.5460	77.6224	79.2143	77.1122	74.2653

### 6.2.3 Correlation Matrix

Tables 6.13-6.14 present the correlation matrix, which is based on data from the years 2016 and 2022. This time frame was chosen because it marks the initial year when Bloomberg, Refinitiv Eikon, and S&P Global simultaneously published their ESG scores. Comparing the ESG scores of this particular year to the most recent published scores offers valuable insights into the evolving correlations between the scores. Correlation Matrices for the years 2012-2018 and 2020-2021 are presented in Appendix 4.

The data reveals several noteworthy observations. First, it is observed that S&P Global exhibits the highest correlation for its own total ESG score and own pillar scores. This finding suggests a strong alignment between the ESG assessments provided by S&P Global and the overall ESG performance and individual pillar performance.

Furthermore, the analysis indicates a low or negative correlation between stock returns and all the remaining variables. This outcome implies that factors such as leverage ratio and beta are inversely related to stock returns, aligning with expectations. The negative correlation between these variables and stock returns can be attributed to the inherent risk associated with higher leverage and beta, which can negatively impact stock performance.

Regarding the inter-provider correlations, the highest correlation is observed between Bloomberg and Refinitiv Eikon for the total ESG score, with a coefficient of 0.72 in 2016. Conversely, the lowest correlation for this score is observed between S&P Global and Bloomberg, with a coefficient of 0.51 in 2016. These correlations denote the degree of similarity in ESG assessments between different providers, with Bloomberg and Refinitiv Eikon showing a relatively stronger concordance in their evaluations compared to S&P Global and Bloomberg.

Interestingly, the analysis also reveals that the governance pillar, in general, exhibits the lowest correlation with all other scores across providers. This finding suggests a relatively weaker alignment between governance performance and other ESG dimensions, implying that governance practices may have less influence on overall ESG performance compared to other factors.

Furthermore, these findings are consistent for the year 2022, with the same patterns observed. However, it is noteworthy that the correlations have decreased for all the aforementioned factors compared to 2016. Specifically, the correlation between Bloomberg and Refinitiv Eikon in 2022 stands at 0.61, indicating a slight reduction in the strength of the relationship. The correlation between S&P Global and Bloomberg remains at 0.51.

**Table 6.13:** Correlation Matrix (2016)

	Stock Return	Bloomberg ESG	Bloomberg ENV	Bloomberg GOV	Bloomberg SOC	Refinitiv ESG	Refinitiv ENV	Refinitiv GOV	Refinitiv SOC	S&P ESG	S&P ENV	S&P GOV	S&P SOC	Leverage	Beta	Firm Size	Market-to-Book
Stock Return	1.0000																
Bloomberg ESG	0.0435	1.0000															
Bloomberg ENV	-0.0324	0.8790*	1.0000														
Bloomberg GOV	0.0951	0.6855*	0.3233*	1.0000													
Bloomberg SOC	0.0746	0.8672*	0.7287*	0.4227*	1.0000												
Refinitiv ESG	-0.0289	0.7169*	0.6384*	0.3781*	0.6446*	1.0000											
Refinitiv ENV	-0.0519	0.6437*	0.6357*	0.3208*	0.5290*	0.7802*	1.0000										
Refinitiv GOV	0.0379	0.4352*	0.3096*	0.3339*	0.4200*	0.6931*	0.3356*	1.0000									
Refinitiv SOC	-0.0666	0.6121*	0.5861*	0.2760*	0.5628*	0.5765*	0.6405*	0.3885*	1.0000								
S&P ESG	-0.0714	0.5070*	0.3945*	0.3790*	0.3807*	0.5949*	0.5183*	0.3157*	0.5408*	1.0000							
S&P ENV	-0.0675	0.4757*	0.3706*	0.3632*	0.3477*	0.5795*	0.5155*	0.2964*	0.5343*	0.9429*	1.0000						
S&P GOV	-0.0944	0.4793*	0.3619*	0.3599*	0.3733*	0.5494*	0.4613*	0.2960*	0.5066*	0.9309*	0.8530*	1.0000					
S&P SOC	-0.0917	0.4884*	0.3805*	0.3427*	0.3740*	0.5709*	0.4846*	0.2943*	0.5265*	0.9570*	0.8813*	0.8822*	1.0000				
Leverage	-0.0020	0.1299*	0.1241*	0.0860	0.1002	0.0796	0.0025	0.0295	0.0809	0.1250	0.1111	0.1044	0.1051	1.0000			
Beta	-0.0936	0.2145*	0.1332*	0.2244*	0.1823*	0.2255*	0.2294*	0.1600*	0.0632	0.0655	0.0579	0.0633	-0.0281	1.0000			
Firm Size	-0.0563	0.0565*	0.0107	0.0760	0.0394	0.1344*	0.2312*	0.1221	0.0910	0.0388	0.0456	0.0298	0.0439	0.0572	0.2303*	1.0000	
Market-to-Book	0.0249	-0.0327	-0.0529	0.0001	-0.0150	-0.0431	-0.0563	0.0101	-0.0784	-0.0449	-0.0332	-0.0417	-0.0586	-0.1582*	-0.0428	-0.0348	1.0000

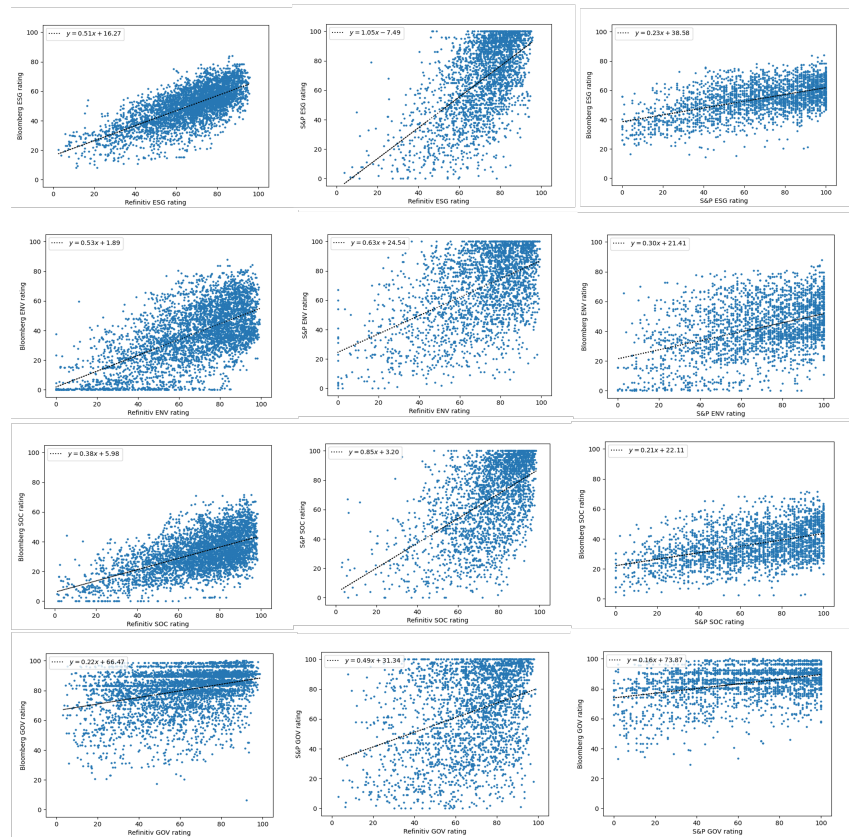
\*p<0.01.

**Table 6.14:** Correlation Matrix (2022)

	Stock Return	Bloomberg ESG	Bloomberg ENV	Bloomberg GOV	Bloomberg SOC	Refinitiv ESG	Refinitiv ENV	Refinitiv GOV	Refinitiv SOC	S&P ESG	S&P ENV	S&P GOV	S&P SOC	Leverage	Beta	Firm Size	Market-to-Book
Stock Return	1.0000																
Bloomberg ESG	-0.0695	1.0000															
Bloomberg ENV	-0.1146	0.8790*	1.0000														
Bloomberg GOV	-0.0752	0.5733*	0.2475*	1.0000													
Bloomberg SOC	0.0467	0.8246*	0.6412*	0.2346*	1.0000												
Refinitiv ESG	-0.1870	0.6956*	0.5322*	0.2858	0.4645*	1.0000											
Refinitiv ENV	-0.0880	0.5757*	0.6032*	0.0888	0.4528*	0.7304*	1.0000										
Refinitiv GOV	-0.0861	0.1828	0.0217	0.2812	0.1802	0.5911*	0.1284	1.0000									
Refinitiv SOC	-0.2009	0.5047*	0.4731*	0.2258	0.3506*	0.8147*	0.5198*	0.2987*	1.0000								
S&P ESG	-0.0076	0.5144*	0.3935*	0.3651*	0.4577*	0.5799*	0.4125*	0.1839	0.5478*	1.0000							
S&P ENV	0.0076	0.5190*	0.4279*	0.3591*	0.4068*	0.5497*	0.4787*	0.1617	0.5438*	0.9154*	1.0000						
S&P GOV	-0.0087	0.4410*	0.3014*	0.3462*	0.3743*	0.4965*	0.3110*	0.2207*	0.5029*	0.9211*	0.7708*	1.0000					
S&P SOC	-0.0430	0.4879*	0.3795*	0.3198*	0.4190*	0.4835*	0.3622*	0.1690	0.5925*	0.9552*	0.8565*	0.8472*	1.0000				
Leverage	0.0509	0.1449	0.0892	0.1536	0.0568	0.0719	0.0222	-0.0571	0.1634	0.1198*	0.1227*	0.0985	1.0000				
Beta	-0.0748	-0.0765	-0.1358	-0.0995	-0.0222	0.1907	0.1464	0.1857	0.0347	0.0447	0.0129	0.0422	-0.1165	1.0000			
Firm Size	-0.0365	0.0566	0.0003	0.0759	0.0559	0.1325	0.2562*	0.0737	0.0502	0.0624	0.1019	0.0762	0.0283	-0.0227	0.0987	1.0000	
Market-to-Book	0.0715	-0.0660	0.0014	-0.1011	-0.0519	-0.1383	-0.1413	-0.1800	-0.0436	-0.0938	-0.1093	-0.0874	-0.0903	-0.0221	-0.1091	-0.1296*	1.0000

\*p<0.01

To visually depict the correlation among rating agencies, the scatterplots in figure 6.6 have been incorporated showcasing the ESG scores. These visual representations highlight the observation that Bloomberg and Refinitiv exhibit the strongest correlation, particularly in relation to the environmental and social pillar score.



**Figure 6.6:** Scatterplots of ESG Scores and Pillar Scores

## 7 Empirical Findings and Analysis

### 7.1 Regression Results

In this section, the results from the regression analysis of the fixed-effects models will be presented and discussed. For all regressions, beta, leverage, market-to-book ratio, and size have been used as control variables, and industry and country as dummy variables. The detailed overviews of the regressions can be found in Appendix 6.

The first part focuses on the discussion of the regression results, the second part on the findings on the control variables, while the third part elaborates on the validity of the model. Finally, in the section concerning regression findings, the hypotheses will be linked to what the regression shows, allowing the thesis to discuss the research question.

### 7.1.1 Stock Return

The results retrieved from the regression analysis indicate that the relationship between ESG score and stock return varies and depends on the ESG rating provider. The regression analysis conducted on the dataset from Bloomberg revealed a negative relationship between ESG score and stock returns, as well as between individual pillar scores and stock return. These outcomes suggest that higher ESG scores and scores in specific pillars are linked to decreasing stock returns for the Bloomberg dataset. As illustrated in Table 7.1, the negative coefficient for total ESG score suggests that a one-unit increase in ESG score is associated with a decrease in stock returns of 1.86 USD. However, none of the results are significant at a 0.01 or 0.05 significance level.

**Table 7.1:** Regression Results on Data from Bloomberg

Variables	Model I	Model II	Model III	Model IV
Intercept	44.25 (58.29)	44.41 (58.18)	39.95 (58.22)	38.82 (58.16)
ESG Score	-1.86 (1.61)			
Environmental Score		-1.60 (0.94)		
Social Score			-0.41 (1.27)	
Governance Score				-0.03 (1.02)
Control Variables				
Beta	-12.29 (14.74)	-11.86 (14.73)	-11.66 (14.74)	-11.54 (14.75)
Leverage	0.66 (0.44)	0.66 (0.44)	0.65 (0.44)	0.65 (0.44)
Market to Book Ratio	0.09 (0.18)	0.09 (0.18)	0.09 (0.18)	0.09 (0.18)
Size	0.00 (1.88)	0.00 (1.87)	0.00 (1.87)	0.00 (1.87)
R-squared	0.0176	0.0180	0.0173	0.0172
Adjusted R-squared	0.0101	0.0105	0.0098	0.0097

(Standard errors in parentheses) \* $p < 0.05$ , \*\* $p < 0.01$

Intriguingly, in contrast to the findings for Bloomberg, the results from Refinitiv Eikon and S&P Global exhibit a positive relationship between ESG scores and stock returns. Findings from the regression analysis of data from Refinitiv Eikon show that one-unit increase in ESG score is associated with an increase in stock returns of 1.73 USD. Furthermore, the results for the environmental, social and governance pillar are all positive, and at a 0.05 significance level, the social pillar score is significant.

**Table 7.2:** Regression Results on Data from Refinitiv Eikon

Variables	Model V	Model VI	Model VII	Model VIII
Intercept	23.45 (60.91)	27.56 (60.84)	21.15 (60.92)	28.78 (60.84)
ESG Score	1.73 (1.10)			
Environmental Score		0.85 (0.82)		
Social Score			1.74 (0.87)*	
Governance Score				0.12 (0.56)
Control Variables				
Beta	-7.89 (16.12)	-8.94 (16.1)	-8.03 (16.10)	-9.37 (16.1)
Leverage	0.68 (0.47)	0.69 (0.48)	0.69 (0.47)	0.70 (0.46)
Market to Book Ratio	0.11 (0.19)	0.11 (0.19)	0.10 (0.19)	0.11 (0.19)
Firm Size	0.00 (1.95)	0.00 (1.95)	0.00 (1.95)	0.00 (1.95)
R-squared	0.0143	0.0139	0.0147	0.0137
Adjusted R-squared	0.0065	0.0061	0.0069	0.0059

(Standard errors in parentheses) \* $p < 0.05$ , \*\* $p < 0.01$

However, the results from the analysis conducted on data from S&P Global differ the most from Bloomberg. They reveal a positive relationship between ESG ratings and stock return for all pillar scores. The effect is strongest for the total ESG score (2.32), indicating that a one-unit increase in ESG score is associated with an increase in stock returns of 2.32 USD. In addition, total ESG score, social pillar score and governance pillar score are all significant at a 0.05 level. Additionally, total ESG score, and governance pillar score are both significant at a 0.01 level as well. These findings suggest a positive relationship between ESG score and stock return.

**Table 7.3:** Regression Results on Data from S&P Global

Variables	Model IX	Model X	Model XI	Model XII
Intercept	13.19 (87.56)	18.01 (87.64)	16.68 (87.59)	12.51 (87.52)
ESG Score	2.32 (0.80)**			
Environmental Score		1.51 (0.79)		
Social Score			1.87 (0.79)*	
Governance Score				2.14 (0.68)**
Control Variables				
Beta	-10.73 (23.42)	-11.02 (23.44)	-10.79 (23.43)	-10.00 (23.41)
Leverage	1.01 (0.69)	1.03 (0.69)	1.02 (0.69)	0.96 (0.69)
Market to Book Ratio	0.22 (0.36)	0.22 (0.36)	0.23 (0.36)	0.21 (0.36)
Size	0.00 (2.70)	0.00 (0.00)	0.00 (0.00)	0.00 (2.70)
R-squared	0.0141	0.0121	0.0129	0.0147
Adjusted R-squared	0.0015	-0.0005	0.0004	0.0022

(Standard errors in parentheses) \* $p < 0.05$ , \*\* $p < 0.01$

The results of R-squared and adjusted R-squared from the tables above indicate the goodness of fit of the regression models (Wooldridge, 2020). In all three tables, the values of R-squared and adjusted R-squared are relatively low. This implies that the independent variables included in the models explain only a small portion of the total variation in the dependent variable. The low values could be attributed to the inherent volatility and unpredictability of the stock market. Stock returns are influenced by numerous factors, including economic conditions, market sentiment, and investor behavior, among others. These factors introduce noise and randomness, making it challenging to achieve high levels of explained variance in stock return models.

### 7.1.2 Control Variables

The results from the regression analysis find that firm size has no significant influence on stock return regardless of ESG rating provider, which contradicts the expectation for the impact of firm size. On the one hand, small-firm effects find evidence that the average annual returns are consistently higher on small-firm portfolios, while Dremptetic et al. (2020) argue that larger firms have greater ESG scores because they are faced with additional public pressure and thus must report to a larger scale (Bodie, et al., 2018; Adams et al., 1998; Chauhan, 2014). Either way, previous research finds evidence that the

firm size has an effect on financial performance and therefore stock returns, contradicting the findings from our analysis. However, the coefficient is not statistically significant, thus does not provide an explanatory value to the regression model.

Furthermore, our findings show that leverage has a positive effect on stock return across all three rating agencies. This effect is rather similar for Bloomberg and Refinitiv, while it is slightly higher for S&P Global. Beta, on the other hand, exhibits a negative relationship with stock return for all rating agencies. Furthermore, the effect holds for all rating agencies, with slightly higher values for Bloomberg compared to the others. Lastly, the market-to-book ratio demonstrates a positive effect on stock return across all rating agencies and displays a larger effect for data retrieved from S&P Global.

### 7.1.3 Validity of the Model

In the methodology chapter, potential threats to the validity of the results were discussed. This section will present the actions taken to ensure the validity of the model.

Regarding omitted variable bias, there is no suspicion that the model suffers from it as the independent variables have been carefully selected based on recommendations from prior literature. Additionally, to address potential simultaneous causality, a one-year lag has been incorporated in the regression analysis. This lag helps to ensure that a change in ESG score does not primarily influence the subsequent year's stock return.

To assess multicollinearity in the data sample, a collinearity test has been conducted due to the potential high correlations observed in the correlation matrix. The variance inflation factor (VIF) has been calculated to estimate the extent to which the variance of a parameter estimate increases due to the correlation between explanatory variables (Brooks, 2019). A higher VIF suggests a more significant collinearity among the explanatory variables. Typically, a VIF below 10 is considered acceptable among researchers as a threshold (Brooks, 2019).

Tables 7.4-7.6 display the VIF values, all of which are comfortably below 10,

signifying no significant issue with multicollinearity. Furthermore, the tolerance levels (measured as  $1/\text{VIF}$ ) for all variables surpass the critical threshold of 0.1, providing further evidence of the absence of concern. For a more comprehensive overview of all collinearity statistics, please refer to Appendix 5.

**Table 7.4:** Collinearity Statistics - Bloomberg

Variables	Model I	Model II	Model III	Model IV
ESG Score	1.28 (0.78)			
Environmental Score		1.12 (0.90)		
Social Score			1.16 (0.86)	
Governance Score				1.14 (0.88)
Beta	6.63 (0.15)	6.63 (0.15)	6.63 (0.15)	6.64 (0.15)
Leverage	4.73 (0.21)	4.73 (0.21)	4.73 (0.21)	4.73 (0.21)
Market to Book Ratio	1.03 (0.97)	1.03 (0.97)	1.03 (0.97)	1.03 (0.97)
Size	1.67 (0.60)	1.67 (0.60)	1.67 (0.60)	1.67 (0.60)

(Tolerance level in parantheses)

**Table 7.5:** Collinearity Statistics - Refinitiv Eikon

Variables	Model V	Model VI	Model VII	Model VIII
ESG Score	1.15 (0.87)			
Environmental Score		1.06 (0.95)		
Social Score			1.10 (0.91)	
Governance Score				1.05 (0.95)
Beta	7.08 (0.14)	7.07 (0.14)	7.07 (0.14)	7.07 (0.14)
Leverage	4.80 (0.21)	4.80 (0.21)	4.80 (0.21)	4.80 (0.21)
Market to Book Ratio	1.03 (0.97)	1.03 (0.97)	1.03 (0.97)	1.03 (0.97)
Size	1.70 (0.59)	1.70 (0.59)	1.70 (0.59)	1.70 (0.59)

(Tolerance level in parantheses)

**Table 7.6:** Collinearity Statistics - S&P Global

Variables	Model IX	Model X	Model XI	Model XII
ESG Score	1.12 (0.89)			
Environmental Score		1.11 (0.90)		
Social Score			1.09 (0.92)	
Governance Score				1.10 (0.91)
Beta	7.58 (0.13)	7.58 (0.13)	7.58 (0.13)	7.58 (0.13)
Leverage	5.32 (0.19)	5.32 (0.19)	5.32 (0.19)	5.33 (0.19)
Market to Book Ratio	1.02 (0.98)	1.02 (0.98)	1.02 (0.98)	1.02 (0.98)
Size	1.69 (0.59)	1.68 (0.59)	1.68 (0.59)	1.69 (0.59)

(Tolerance level in parantheses)

## 7.2 Regression Findings

The research question for the thesis focuses on how the relationship between ESG ratings and stock returns unfold in the European stock market. To investigate this, three hypotheses were developed.

The first hypothesis analyzes the divergence between the different ESG rating providers. By delving into the 6.2.3 Correlation Matrix, it is displayed that it exists a significant variation in correlation across rating agencies and pillar scores. To exemplify this, the correlation between the rating providers ranged from 0.28 to 0.72 in 2016. Thus, indicating a clear divergence among the providers in their assessment of environmental, social and governance factors. Furthermore, when examining the correlations for the year 2022, it becomes evident that there is an increasing divergence among the providers.

Further exploration of descriptive statistics provides detailed insights into this divergence. It becomes evident that the assigned scores for different pillars vary across providers, even for the same industry or country in the same year. The standard deviations calculated from 2019 to 2022 exemplify this divergence. Belgium consistently demonstrates the highest standard deviation, while Portugal exhibits the lowest. In terms of industries, consumer discretionary and industrials show higher variability, while the energy and telecommunications sectors display lower variability. Overall, S&P Global consistently reports the highest standard deviations across all years and pillars.

According to Christensen et al. (2022), increased disclosure requirements lead to greater divergence in ESG ratings, primarily driven by the environmental and social pillars. This suggests that future divergence may continue to increase as ESG disclosure becomes more mandatory for companies. However, the introduction of the Corporate Sustainability Reporting Directive (CSRD) strengthens rules on social and environmental reporting requirements. As a result, it is plausible to expect a decrease in divergence among ESG rating providers in the future. Although this effect is not evident in the data analyzed for this thesis, as it only spans until 2022, the CSRD's influence may become

visible in subsequent periods.

Despite the anticipation of reduced divergence in the future, the correlation matrix and descriptive statistics in this thesis highlight notable discrepancies among the three ESG rating providers in their assessments of environmental, social, and governance factors. Consequently, the null hypothesis  $H0_1$ , suggesting no divergence between ESG scores from different providers, is rejected.

The second hypothesis pertains to the validity of the Efficient Market Hypothesis and examines the significance of ESG ratings in relation to stock returns within the European market. The regression analysis reveals that there exists an impact of ESG rating on stock returns across all rating agencies. However, the magnitude of this impact varies among them. Specifically, the results derived from Bloomberg data differ due to their negative nature. This finding supports Krüger (2015), who found a link between a drop in market value and ESG. However, Bloomberg lack statistical significance across all scores. Conversely, both Refinitiv Eikon and S&P Global exhibit positive outcomes for both total ESG score and pillar scores. This is in line with evidence presented by Aouadi and Marsat (2018) stating that a higher CSP score impacts market value. Furthermore, findings from S&P Global exhibit the most substantial effect (2.32) and attain the highest level of statistical significance at both 0.05 and 0.01 thresholds. The social pillar score proves to be significant for both Refinitiv Eikon and S&P Global, representing the sole score that demonstrates significance across multiple rating agencies. Hence, the social pillar seems to be the ESG dimension that drives the relationship for ESG ratings and stock returns.

In conclusion, the regression outcomes furnish ample evidence supporting the notion that ESG ratings exert influence on stock returns, thereby negating their insignificance and challenging the validity of the EMH. Consequently, hypothesis  $H0_2$  is rejected.

The thesis seeks to explore what kind of relationship that exists between ESG ratings and stock returns in the European stock market. Hypothesis 2 demonstrated that there is a relationship present as ESG scores has an effect on

stock returns. This hypothesis examines the variations in the impact of the pillar scores. The regression findings indicate that all pillar scores associated with Bloomberg exhibit a negative influence on stock return, and the environmental pillar exhibits the lowest negative value.

On the other hand, the pillar scores from Refinitiv Eikon and S&P Global all demonstrate a positive effect. Moreover, the effect is most pronounced for S&P Global across all pillar scores, with statistically significant results for both the social and governance pillar scores. Governance displays the highest score for S&P Global, which supports previous theory highlighting the impact governance has on financial aspects (Velte 2017, Xie et al. 2019). In the case of Refinitiv, the social pillar score exhibits the greatest impact on stock return and is the sole score that demonstrates statistical significance. Based on the regression results, it is challenging to draw a final conclusion regarding a common trend for Europe as a whole, as none of the pillars stands out across rating agencies. In addition, only three out of nine pillars demonstrate a significant result. However, one might argue that the social pillar is prominent as it is significant for two agencies. This provides evidence to support the notion that the observed difference or relationship is not due to random variation or sampling error. Nevertheless, the regression outcomes illustrate the disparities in the effects of pillar scores on stock return, thereby leading to the rejection of hypothesis  $H0_3$ , stating that there is no difference in effect of pillar scores (ENV, SOC, GOV) on stock return.

The three hypotheses aim to answer the research question “How does the relationship between ESG ratings and stock returns unfold in the European stock market?”. Based on the research conducted in the thesis, the hypotheses highlights that it exists divergence in ESG scores from different rating providers, and that the ESG scores have an effect on stock returns. Finally, this effect differs between pillar scores and the regression results indicate that the driver of this relationship is the social pillar score. In conclusion, the research shows that the relationship between ESG ratings and stock returns in the European stock market is positive. As the regression results display, this can be confirmed with statistically significant results for ESG scores retrieved from Refinitiv Eikon and S&P Global. However, the low explanatory power of the models present

a weakness for these results. As the stock market is characterized by being volatile and unpredictable, the influence of various factors leads to difficulty in achieving high levels of explained variance in stock return models.

Nevertheless, the findings are in line with previous research in support of a positive relationship between ESG scores and financial performance (Waddock & Graves 1997, Fischer and Sawczyn 2013, Velte 2017). On the other hand, data from Bloomberg shows negative results and uphold previous research finding a negative relationship between ESG scores and financial performance (Langeland & Ugland 2019, Giannopoulos et al. 2022, Nollet et al. 2016). However, none of these scores turned out to be statistically significant. For that reason, it is difficult to draw a final conclusion as to how the relationship between Bloomberg's ESG ratings and stock return actually unfolds.

The findings from hypothesis 2 reveal that the regression results provide clear evidence against the validity of the Efficient Market Hypothesis, as they demonstrate a significant effect of ESG scores on stock returns. This observation prompts further consideration regarding the implications of these thesis findings in relation to other pertinent theories.

First, as the relationship unfolds as positive, it clearly aligns with the stakeholder theory by showcasing that prioritizing stakeholder interests and sustainable practices can enhance the financial performance and value of the company. It further signifies that meeting the needs and expectations of stakeholders through ESG, improving the ESG rating, can contribute to the long-term success and competitive advantage of the business, ultimately benefiting shareholders as well.

Second, the findings regarding the relationship between ESG ratings and stock return are interesting in light of the Adaptive Market Hypothesis. This suggests that financial markets adapt and evolve based on new information, changing market conditions, and the behavior of market participants. Furthermore, it recognizes that investor preferences and market dynamics can influence asset prices and returns. A positive relationship between ESG scores and the AMH suggests that market participants, such as investors, increasingly consider ESG factors when making investment decisions. This consideration reflects a shift in

investor preferences towards sustainable and socially responsible investments. Overall, a positive relationship between ESG ratings and stock returns aligns with AMH, as markets are adapting to incorporate sustainability considerations and investor preferences, thus influencing asset prices and returns.

Finally, the positive relationship between ESG scores and stock returns also aligns with the virtuous cycle theory. As companies prioritize and improve their ESG practices, they generate positive financial outcomes, which further reinforces their commitment to ESG principles. This cycle continues as investors reward these companies with higher stock prices, fostering a self-reinforcing cycle of sustainable business practices and financial success.

### **7.3 Limitations and Suggestions for Further Research**

The thesis presents a limitation regarding the absence of R&D expenditures as a control variable. This omission is significant as highlighted by Fischer and Sawczyn (2013), who emphasized the relevance of R&D as a proxy for innovation. The inclusion of R&D expenditures could have potentially enhanced the explanatory capacity of our findings. Moreover, the exclusion of R&D expenditures raises concerns about the possibility of omitted variable bias.

A secondary limitation pertains to the data sample and screening procedures employed. The initial pool of 600 companies listed on the STOXX Europe 600 Index had to be reduced to 471 due to the unavailability of ESG information for 129 companies within the Refinitiv Eikon and Bloomberg Terminal databases. This reduction introduces the potential for selection bias within our data sample. Additionally, our dataset only encompasses 11 countries, thereby excluding 33 other European countries. Consequently, the generalizability of the thesis findings to the entirety of Europe may be limited.

Furthermore, there is potential to further explore and analyze the variation across countries and industries. This would provide insights into whether specific geographic areas or industry types exhibit distinctive characteristics in terms of ESG and the transition towards a more sustainable economy.

Additionally, a suggestion for future research involves incorporating additional variables to enhance the explanatory capacity of the models and provide a more comprehensive understanding of the relationships between the independent and dependent variables. Furthermore, a limitation of this research pertains to the calculation of the independent and dependent variables. While all ESG scores from the three rating agencies are calculated and published on an annual basis, stock prices vary as they reflect the last trading price during regular trading sessions. This raises the question of whether averaging the stock prices would have been a more appropriate approach when calculating the stock returns. Moreover, the specific calculation methods employed by the STOXX Europe 600 Index remain undisclosed, further complicating the accuracy of our calculations.

Additionally, expanding the dataset to include more European countries would be intriguing to determine if the results hold across a broader geographic scope. Currently, the thesis fails to represent 33 European countries. Finally, comparing the results for the European market and the STOXX Europe 600 Index with other markets, such as the American market with companies listed on the S&P 500 Index or the Asian market with the Shanghai Stock Exchange, would provide valuable insights. Furthermore, considering the empirical evidence presented by Cahan et al.(2016), which highlights differences across European countries, it is reasonable to assume that these differences persist and potentially amplify beyond the continent.

## 8 Conclusion

The increasing concern of stakeholders and regulators regarding social responsibility has prompted corporations and investors to increasingly incorporate ESG considerations into their business models. Consequently, the growth of ESG rating agencies has surged. However, numerous challenges surround the current landscape of ESG ratings, and limited research exists regarding the actual impact of ESG scores. Additionally, the European market is undergoing significant transformations due to new ESG regulations. Existing literature has predominantly focused on ESG news and stock prices or the relationship between ESG scores and financial performance. This thesis explores how the relationship between ESG ratings and stock returns unfold within the European stock market. The findings of this study reveal disparities in ESG scores across different rating providers, namely Bloomberg, Refinitiv Eikon, and S&P Global. Furthermore, these differences have intensified from 2016 to 2022. Moreover, the Efficient Market Hypothesis does not hold, as the results demonstrate an evident effect of ESG scores on stock returns. Importantly, this impact varies across different pillar scores, with the social pillar emerging as the primary driver of this relationship.

In conclusion, the research conducted in this thesis indicates a positive and significant relationship between ESG ratings and stock returns in the European stock market. These findings align with relevant theories such as the stakeholder theory, the adaptive market hypothesis, and the virtuous cycle theory. They serve as evidence that the markets are adapting to incorporate sustainability factors and align with investor preferences, leading to noticeable impacts on asset prices and investment returns. However, stock return models are complex and comprehensive, raising the question whether or not the findings of the thesis actually hold in the real world.

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# Appendices

## Appendix 1: List of companies

3I Group Plc	Ashford Group Plc	Bnp Paribas	Daimler Truck Holding Ag	Eqt Ab	Gruppe Bruxelles Lambert Nv
A2A Spa	Aern International Nv	Bolide Ab	Danone	Equinox Asa	Gak Plc
Abb Ltd-Reg	Aum Holding Nv	Bolloré Se	Danske Bank A/S	Ericsson Lm-B Shs	Haleon Plc*
Abn Amro Bank Nv-Cva	Aur Nederland Nv	Bouygues Sa	Dassault Aviation Sa*	Erste Group Bank Ag	Halma Plc
Abn Plc	Asa Abloy Ab-B	Bp Plc	Dassault Systemes Se	EssilorLuxottica	Hannover Rueck Se
Acciona Sa	Associazione Generali	Bp Banca*	David Bull Campari-Milano Nv	Essity Aktiebolag-B	Harbour Energy Plc*
Accor Sa	Associated British Foods Plc	Brenntag Se	Dcc Plc	Euroarea Se	Hargreaves Lansdown Plc
Ackermans & Van Haaren	AstraZeneca Plc	British American Tobacco Plc	Dechra Pharmaceuticals Plc	Eurofins Scientific	Hays Plc*
Acta Actividades Cons Y Serv	Atlas Copco Ab-A Shs	British Land Co Plc	Delivery Hero Se	Euronext Nv	Heidelbergcement Ag
Adeltech Ab-B Shares*	Aurubis Ag*	Britvic Plc*	Demat A/S	Evolution Ab	Heineken Holding Nv
Adelco Group Ag-Reg	Auto Trader Group Plc	Brunello Cucinelli Spa*	Derwent London Plc	Evonik Industries Ag	Heineken Nv
Adidas Ag	Avanza Bank Holding Ab*	BT Group Plc	Deutsche Bank Ag-Registered	Evotec Se	Hellorish Se
Admiral Group Plc	Aviva Plc	Bucher Industries Ag-Reg*	Deutsche Boerse Ag	Exor Nv	Helvetia Holding Ag-Reg
Adp	Axa Sa	Castellum Ab	Deutsche Lufthansa-Reg	Experian Plc	Henkel Ag & Co Kgaa Vor-Pref
Adyen Nv	Axfood Ab*	Burberry Group Plc	Deutsche Post Ag-Reg	Fabergé Ab*	Hermès & Mauritz Ab-B Shs
Aedifica*	Axiom Holding Spa*	Bureau Veritas Sa	Deutsche Telekom Ag-Reg	Fastighets Ab Balder-B Shs	Hera Spa
Argon Nv	B&M European Value Retail Sa	Caixabank Sa	Diageo Plc	Faurecia	Hermes International
Arma Suez Sa	Bachem Holding Ag*	Cagimmi Se	Diason SpA	Ferrari Nv	Hexagon Ab-B Shs
Agree	Bae Systems Plc	Carl Zeiss Meditec Ag - Br	Dino Polska Sa	Ferrovial Sa	Hexatonic Group Ab*
Aib Group Plc*	Bakkafrost P/J*	Carlsberg As-B	Diploma Plc*	Finmeccbank Spa	Hecpol Ab*
Air France-Klm*	Balfour Beatty Plc*	Carrefour Sa	Direct Line Insurance Group	Fischer (Georg)-Reg	Hikma Pharmaceuticals Plc
Air Liquide Sa	Balouze Holding Ag - Reg	Castellum Ab	Dish Holding Ag*	Flughafen Zurich Ag-Reg	Hiscox Ltd*
Airbus Se	Banco Bilbao Vizcaya Argentia	Cellnex Telecom Sa	Dnb Bank Aa	Flutter Entertainment Plc-Di	Holcim Ltd
Aixtron Se*	Banco Bpm Spa	Cembra Money Bank Ag*	Dr Ing Hc F Porsche Ag*	Fortnox Ab*	Holmen Ab-B Shares
Aker Bp Asa	Banco De Sabadell Sa	Centrica Plc	Drax Group Plc*	Fortum Oyj	Howden Joinery Group Plc
Akva Nobel N.V.	Banco Santander Sa	Choccolatoierden Lindt Plc*	Dr Smith Plc	Freemant Ag	H&M Holdings Plc
Alcon Inc	Bank Of Ireland Group Plc	Chr Hansen Holding A/S	Dva A/S	Freemium Medical Care Ag &	Hugo Boss Ag -Ord*
Alfa Laval Ab	Bank Pekao Sa	Christian Dior Se	Dufry Ag-Reg*	Freemium Se & Co Kgaa	Huhtamaki Oyj*
Alk-Abello A/S*	Bankinter Sa	Cie Financiere Richemo-A Reg	E.ON Se	Frontline Plc*	Huayana Ab-B Shs
Allegro.Eu Sa	Barque Cantonale Vaudois-Reg*	Clariant Ag-Reg	Edenred	Fuchs Petrolub Se-Pref	Isordrola Sa
Allianda Group Plc	Bavarian	Coloplast B	Edf	Future Plc*	Ig Group Holdings Plc*
Allianz Se-Reg	Barratt Developments Plc	Cnh Industrial Nv	Edp Renovaveis Sa	Galenica Ag*	Imcd Nv
Allreal Holding Ag-Reg*	Barry Callebaut Ag-Reg	Coca-Cola Hbc Ag-Di	Edp-Energias De Portugal Sa	Galp Energia Sgss Sa	Imperial Brands Plc
Alsom	BASF Se	Coltannio*	Enbridge	Games Workshop Group Plc*	Indochip Plc*
Altes Sa	Bayerian Nordic A/S*	Coloplast B	Electrolux Ab-B	Gastropart Et Technics Sa*	Indivior Plc*
Amadeus II Group Sa	Bawag Group Ag	Commerzbank Ag	Elekta Ab-B Shs*	Ges Ag-Reg	Industria De Diseño Textil
Ambu A/S-B*	Bayer Ag-Reg	Compagnie De Saint Gobain	Elia Group Sa/Nv	Geberit Ag-Reg	Ginebra A/S
Amplifon Spa	Bayerische Motoren Werke Ag	Compass Group Plc	Elis Sa*	Gesnia Sa	Genus Plc*
Amu-Chem Ag*	Be Semiconductor Industries	Computercenter Plc*	Elia Oyj	Gigamon Ab	Getinge Ab-B Shs
Amundi Sa	Beadley Plc*	Continental Ag	Embracer Group Ab*	Getlink Se	Infineon Technologies Ag
Andritz Ag	Bechtie Ag	Convatec Group Plc*	Ems-Chemie Holding Ag-Reg	Givaudan-Reg	Infraestructura Wireless Ital
Anglo American Plc	Beiersdorf Ag	Corp Acciona Energias Renov*	Enagas Sa	Gjensidige Forsikring Aaa	Intercontinental Hotels Group
Anheuser-Busch Inbev Sa/Nv	Belief Ref Ab	Covivio	Endesa Sa	Glenclare Plc*	Intermediate Capital Group
Antofagasta Plc	Belimo Holding Ag-Reg	Credit Agricole Sa	Enel SpA	Glenora Plc	Instanbul Diyarbakir
Ap Moller-Maersk A/S-B	Bellway Plc*	Credit Suisse Group Ag-Reg	Emergen Plc*	Grafton Group Plc-Uts-Cd*	Interpump Group Spa
Arcadis Nv*	Berkley Group Holdings/The	Cih Plc	Enigma	Griggs Plc*	Intertek Group Plc
ArcelorMittal	Big Yellow Group Plc*	Croda International Plc	Eni Spa	Grifols Sa	Intesa Sanpaolo
Argens Se	Billerud Ab*	Cts Eventim Ag & Co Kgaa	Entain Plc		
Arkema	Blomereux	D'tieren Group	Epiroc Ab-A		
Aroundtown Sa	Bkw Ag*				

## List of companies continued.

Int'l Consolidated Airline-Di	Lotus Bakeries*	Partners Group Holding Ag	Salmar Asa	St James'S Place Plc	Ubs Group Ag-Reg
Investec Plc*	Lpp Sa	Pearson Plc	Samhallshyggnadsbolaget I No	Standard Chartered Plc	Ucb Sa
Investment Ab Latour-B Shs	Lundberg Ab-B Shs	Pennon Group Plc*	Sampo Oyj-A Shs	Stellantis Nv	Unicore
Investor Ab-B Shs	Lvmh Moet Hennessy Louis Vui	Pernod Ricard Sa	Sandvik Ab	Stmicroelectronics Nv	Unibail-Rodamco-Westfield
Ipsen	Lui-Bel Plc*	Persimmon Plc	Sanoofi	Stora Enso Oyj-B Shs	Unilever Plc
Isa A/S*	M&G Plc	Phoenix Group Holdings Plc	Sap Se	Storebrand Asa	Unilever Plc
Italgas Spa	Man Group Plc/Jersey*	Pko Bank Polski Sa	Sartorius Ag-Vorzug	Straumann Holding Ag-Reg	United Group Plc/The
Itr Plc	Marks & Spencer Group Plc	Polski Koncern Naftowy Orlen	Sartorius Steilm Biotech	Subsea 7 Sa*	United Internet Ag-Reg Share
It Sport Fashion Plc	Medibanco Spa	Porsche Automobil Wldg-Pf	Schneider Holding Part Cert	Svenska Cellulosa Ab-Sca-B	United Utilities Group Plc
Jde Peet'S Nv	Melrose Industries Plc	Poste Italiane Spa	Schneider Electric Se	Svenska Handelsbanken-A Shs	Universal Music Group Nv
Jeronimo Martins	Mercedes-Benz Group Ag	Powzechny Zaklad Ubezpiecze	Schroders Plc	Swatch Group Ag/The-Br	Upm-Kymmene Oyj
Johnson Matthey Plc*	Merck Kgaa	Prouss Nv	Scor Se	Sweco Ab-B Shs	Valco
Julius Baer Group Ltd	Merlin Properties Sacimi Sa	Prudential Plc	Scout24 Se	Svebank Ab - A Shares	Valmet Oyj
Just Eat Takeaway	Metro Outotec Oyj	Prysmian Spa	Seb Sa	Swedish Orphan Biovitrum Ab	Vantage Towers Ag*
Jyske Bank-Reg*	Michelin (Cgde)	Pap Swiss Property Ag-Reg	Sectra Ab-B Shs*	Swiss Life Holding Ag-Reg	Vat Group Ag
K&S Ag-Reg*	Millicom Int'l Cellular-Sdr*	Publicis Groupe	Securitas Ab-B Shs*	Swiss Prime Site-Reg	Veolia Environment
Kbc Group Nv	Monsie Spa	Puma Se	Signa Plc	Swiss Re Ag	Veralia*
Kering	Mondi Plc	Qlagen N.V.	Serco Group Plc*	Swisscom Ag-Reg	Verbund Ag
Kerry Group Plc-A	Mowal Asa	Qinetiq Group Plc*	Seo*	Sydbank A/S*	Vestas Wind Systems A/S
Kesko Oyj-B Shs	Mtu Aero Engines Ag	Randstad Nv	Severn Trent Plc	Symrise Ag	Vidrala Sa*
Kghm Polska Mieda Sa	Muenchener Rueckver Ag-Reg	Rational Ag	Sgs Sa-Reg	Saaba Ab-B*	Vinci Sa
Kindred Group Plc*	National Grid Plc	Beckitt Benckiser Group Plc	Shell Plc	Talano Ag*	Virgin Money Uk Plc*
Kingfisher Plc	Naturex Energy Group Sa	Recordati Industria Chimica	Sigfried Holding Ag-Reg*	Tate & Lyle Plc*	Viscofan Sa*
Kingspan Group Plc	Natwest Group Plc	Red Electrica Corporacion Sa	Siemens Ag-Reg	Taylor Wimpey Plc*	Vistry Group Plc*
Kinnevik Ab - B	Nel Aua*	Rex Plc	Siemens Energy Ag	Tecan Group Ag-Reg	Vivendi Se
Kion Group Ag	Nemetschek Se	Remy Cointreau	Siemens Healthineers Ag	Technip Energies Nv*	Vodafone Group Plc
Klappier	Neste Oyj	Renault Sa	Sig Group Ag	Tel22 Ab-B Shs	Vonovia Se
Knoor-Bremer Ag	Nestle Sa-Reg	Rentokil Initial Plc	Signify Nv	Telecom Italia Sa	Volkswagen Ag-Pref
Kojamo Oyj	Nexans Sa*	Reply Spa	Sika Ag-Reg	Telefonica Deutschland Holdi*	Volvo Ab-B Shs
Kone Oyj-B	Nest Plc	Repsol Sa	Sincomp A/S*	Telefonica Sa	Volvo Car Ab-B
Koninklijke Ahold Delhaize N	Nibe Industrier Ab-B Shs	Rheinmetall Ag*	Sinch Ab	Telenor Asa	Vonovia Se
Koninklijke Dsm Nv	Nn Group Nv	Rightmove Plc	Skandinaviska Enskilda Ban-A	Teleperformance	Wacker Chemie Ag*
Koninklijke Kpn Nv	Nokia Oyj	Ringsjoberg Landobank A/S*	Skanska Ab-B Shs	Telia Co Ab	Wallenstam Ab-B Shs*
Koninklijke Philips Nv	Nordde Bank Abp	Rio Tinto Plc	Sofia Ab-B Shares	Temenos Ag - Reg	Warehouses De Pauw Sca
Kuehne + Nagel Int'l Ag-Reg	Nordic Semiconductor Asa	Roche Holding Ag-Genusschein	Smith & Nephew Plc	Tenaris Sa	Wartsila Oyj Abp
L'Oreal	Nordnet Ab Publ*	Rockwool A/S-B Shs	Smurfit Kappa Group Plc	Terna Rete Elettrica Nazionale	Watches Of Switzerland Group*
La Francaise Des Jeux Saem	Norsk Hydro Asa	Rolls-Royce Holdings Plc	Snam Spa	Tesco Plc	Weir Group Plc/The
Land Securities Group Plc	Novartis Ag-Reg	Rotork Plc*	Societe Generale Sa	Thales Sa	Wendel*
Lanxess Ag	Novo Nordisk A/S-B	Royal Unibrew	Sodexo Sa	Thule Group Ab/The*	Whitbread Plc
Leg Immobilien Se	Novozymes A/S-B Shares	Rs Group Plc	Sofina	Thyssenkrupp Ag	Wienerberger Ag*
Legend Sa	Ocado Group Plc	Rubi*	Softcat Plc*	Tietoevry Oyj*	Wihlborgs Fastigheter Ab*
Leonardo Spa*	Oci Nv*	Rwe Ag	Solvay Se	Toma Systems Asa	Wise Plc - A
Lifco Ab-B Shs	Oranix	S.O.I.T.E.C.	Sonova Holding Ag-Reg	Topdemark A/S*	Wolters Kluwer
Lloyds Banking Group Plc	Orion Oyj-Class B	Saleforce Holdings Plc*	Sopra Steria Group*	Travis Perkins Plc*	Worldline Sa
Logitech International Reg	Orkla Asa	Safar Sa	Spectris Plc	Trelleborg Ab-B Shs	Wpp Plc
London Stock Exchange Group	Orsted A/S	Sagax Ab-B	Spirax-Sarco Engineering Plc	Trintax Big Box Rent Plc	Yara International Asa
Londonmetric Property Plc*	Oslo Group Plc*	Sage Group Plc/The	Staab Ab - B Shares*	Tryg A/S	Zalando Se
Lonsa Group Ag-Reg	Pandora A/S	Sainsbury (J) Plc	See Plc	Tui Ag	Zurich Insurance Group Ag

\*Companies included in the data

## Appendix 2: Average ESG Scores and Pillar Scores Across Industry (2012)

Industry	Bloomberg				Refinitiv Eikon			
	ESG Score	Environmental	Governance	Social	ESG Score	Environmental	Governance	Social
Basic Materials	46.9314	39.1454	73.5317	28.0115	64.5609	69.0558	57.9400	63.9154
Consumer Discretionary	40.8860	27.8847	71.5327	23.1226	60.9967	63.4124	53.0038	65.0773
Consumer Staples	44.6698	34.5043	73.4855	25.9069	65.2023	67.8621	56.9000	68.4783
Energy	48.5826	39.4322	71.4730	34.7541	71.7597	77.5156	63.0459	72.2851
Financials	37.9932	20.5924	72.2641	20.9570	56.1979	66.0185	60.1580	53.9412
Health Care	38.0104	25.3677	68.9151	19.6292	59.9381	56.9862	58.7076	61.7198
Industrials	41.7062	29.6534	70.5787	23.7368	57.7580	61.8923	50.8193	59.5480
Real Estate	32.5837	15.5262	68.1732	13.9165	56.0867	64.7712	49.0463	52.0527
Technology	35.4657	18.3738	68.1324	19.7681	55.8934	49.3403	59.6698	58.1584
Telecommunications	44.9689	32.7048	73.5293	28.5628	72.4312	72.7408	72.0546	72.3050
Utilities	50.5545	44.2678	74.4130	32.8874	68.4313	73.3601	58.7489	69.2920

## Average ESG Scores and Pillar Scores Across Industry (2013)

Industry	Bloomberg				Refinitiv Eikon			
	ESG Score	Environmental	Governance	Social	ESG Score	Environmental	Governance	Social
Basic Materials	48.9034	41.1012	75.3493	30.1547	66.0286	70.0017	59.3224	65.9781
Consumer Discretionary	41.7659	29.7370	71.4997	23.9461	60.5063	62.5073	51.4475	65.2817
Consumer Staples	46.0706	35.8087	75.3038	26.9848	67.3284	70.3503	59.4074	70.1953
Energy	49.4404	40.0161	72.1654	36.0520	72.1234	77.9102	63.2131	72.7988
Financials	39.5375	21.9099	74.8225	21.7468	56.3939	67.0231	58.9713	55.4956
Health Care	39.3942	27.5531	68.5755	21.9414	60.9555	57.5616	58.1400	63.8675
Industrials	42.8012	30.4775	71.8569	25.9573	58.9153	62.3657	51.9000	61.5131
Real Estate	35.7563	17.9483	73.1768	16.0016	56.4270	66.2823	48.1850	52.4223
Technology	34.0321	17.3885	67.4533	17.1282	52.6125	49.5745	53.7638	55.5333
Telecommunications	45.6328	32.9357	74.0303	29.8238	72.0035	73.0577	65.4784	75.1540
Utilities	51.3702	45.0040	74.6062	34.4077	69.1310	75.1801	58.3137	69.3524

## Average ESG Scores and Pillar Scores Across Industry (2014)

Industry	Bloomberg				Refinitiv Eikon			
	ESG Score	Environmental	Governance	Social	ESG Score	Environmental	Governance	Social
Basic Materials	51.4245	44.6844	75.7644	33.7278	66.9182	69.7802	62.8618	66.5774
Consumer Discretionary	42.2722	29.2190	72.1084	25.3747	62.1493	64.3989	51.8575	67.5414
Consumer Staples	47.2488	37.2103	77.2329	27.1853	68.1779	70.7399	58.9676	72.0636
Energy	49.7113	38.9933	73.1587	36.8924	71.6474	75.5549	61.7727	74.3307
Financials	40.6833	22.5128	76.2113	23.1734	56.8120	66.3733	60.1924	56.1650
Health Care	40.3019	27.9062	70.1493	22.7351	60.9629	55.5438	58.5060	64.9080
Industrials	45.4484	33.2697	75.2849	27.6753	60.1793	62.5747	53.6958	63.1830
Real Estate	36.3570	18.8784	72.8458	17.2083	55.3411	60.2174	50.4841	54.0106
Technology	38.6541	22.0658	71.0917	22.6824	49.9737	45.0667	48.8700	56.5372
Telecommunications	47.7963	34.3789	78.3070	30.5860	72.5616	72.4126	66.8253	75.6215
Utilities	52.8464	45.8421	76.6606	35.9419	69.1610	75.6497	56.9190	69.8404

## Average ESG Scores and Pillar Scores Across Industry (2015)

Industry	Bloomberg				Refinitiv Eikon			
	ESG Score	Environmental	Governance	Social	ESG Score	Environmental	Governance	Social
Basic Materials	55.1372	51.2953	76.4337	37.5961	70.4160	71.5840	64.3406	73.3124
Consumer Discretionary	45.8306	31.1410	77.5714	28.6583	62.3050	63.6463	53.1764	67.4175
Consumer Staples	51.0424	42.2767	79.4683	31.2698	69.1072	71.3562	58.4743	73.8787
Energy	52.1356	42.3457	74.4130	39.5627	74.1691	75.7355	61.9738	80.4028
Financials	42.9972	24.4133	78.4452	26.1362	57.9057	66.8050	58.9689	59.4382
Health Care	43.1328	29.7486	73.4082	26.1257	62.1301	55.7820	56.6494	69.1633
Industrials	47.6227	35.8270	77.7775	29.9496	61.7849	63.2622	55.0385	65.7031
Real Estate	41.5842	26.7504	75.8739	21.9966	56.8821	59.1913	53.5881	55.6310
Technology	37.6404	20.4990	69.5632	22.7395	54.2987	49.1436	51.0232	61.6176
Telecommunications	50.5241	38.4476	80.8449	32.1624	70.1679	68.8818	62.2230	74.7743
Utilities	57.0344	50.8394	79.0325	41.1439	69.9060	76.5830	55.8077	71.7543

## Average ESG Scores and Pillar Scores Across Industry (2016)

Industry	Bloomberg				Refinitiv Eikon				S&P Global			
	ESG Score	Environmental	Governance	Social	ESG Score	Environmental	Governance	Social	ESG Score	Environmental	Governance	Social
Basic Materials	58.0204	52.9589	79.6743	41.3411	68.9769	68.9657	62.8715	73.2233	67.1600	66.4400	67.8000	69.0400
Consumer Discretionary	48.0482	33.2254	79.8437	30.9543	65.0617	66.0513	56.1268	69.8405	70.1200	72.0400	70.3200	68.9800
Consumer Staples	51.7959	43.2662	80.4809	31.5269	69.9242	71.1764	60.1897	74.8364	76.1818	75.7273	74.3182	72.7727
Energy	56.1318	50.1842	76.4118	41.7191	76.7644	77.1734	68.7420	81.6935	75.8462	78.8462	69.9231	74.4615
Financials	43.5130	25.4180	78.5091	26.4871	59.3459	69.5177	59.9422	61.1201	70.5883	70.3571	69.2590	69.6429
Health Care	45.2980	32.1669	75.3519	28.2598	64.4802	57.8833	57.2140	72.9427	76.4091	75.7273	71.8182	78.3636
Industrials	48.7455	37.6587	77.7934	30.7340	63.4094	64.5753	54.3320	69.5063	66.0781	66.8594	65.1563	63.9688
Real Estate	40.5607	26.6198	72.3675	22.5730	58.8194	62.8786	55.3945	56.3220	72.3000	71.5000	69.0000	72.9000
Technology	39.3039	21.5313	72.6460	23.5384	57.1348	49.2182	48.9343	68.5066	69.0000	69.6000	68.7000	67.6000
Telecommunications	51.9936	40.7184	82.2509	32.8937	70.8115	70.1213	63.2289	75.1150	73.6154	74.7692	73.9231	70.9231
Utilities	59.9629	53.4984	82.6284	43.6719	68.7996	73.8369	55.2680	72.2841	78.7895	78.9474	78.6316	77.6842

### Average ESG Scores and Pillar Scores Across Industry (2017)

Industry	Bloomberg				Refinitiv Eikon				S&P Global			
	ESG Score	Environmental	Governance	Social	ESG Score	Environmental	Governance	Social	ESG Score	Environmental	Governance	Social
Basic Materials	60.2146	54.7135	84.2179	41.6160	71.1132	71.9695	63.1386	75.4279	61.2581	59.7742	61.2903	61.5806
Consumer Discretionary	49.9871	35.0994	82.2881	32.4507	65.8430	64.8054	57.0407	71.7615	66.9273	69.8909	63.8000	67.3091
Consumer Staples	53.4114	45.4494	81.4398	33.2337	68.0231	68.3616	58.9511	72.8664	64.3214	63.6429	62.4286	62.9286
Energy	59.4394	54.5334	80.4074	43.2930	76.5852	75.9662	71.9577	80.0263	70.2667	72.2667	66.2000	70.6000
Financials	46.4067	28.3776	81.0724	29.7893	63.3180	71.6603	61.8608	65.6101	57.2533	58.0267	54.5200	59.4533
Health Care	48.2990	35.5935	79.1943	29.9901	66.1460	56.8641	58.5363	76.4116	61.8857	61.9429	57.0857	64.1143
Industrials	50.4532	38.5787	80.4550	32.2083	64.1104	63.6363	55.2454	71.3529	62.0526	61.6053	58.2368	60.4474
Real Estate	45.7174	30.8009	81.0861	26.5362	59.9655	62.8441	53.6396	61.0835	68.9167	69.5833	63.5833	67.6667
Technology	41.1648	22.2361	75.8938	25.2346	56.1257	50.2947	48.4537	66.5295	61.3846	62.6923	55.6923	66.0769
Telecommunications	53.2548	41.7264	83.7466	34.1728	72.4667	70.2874	66.0152	76.7206	64.7333	69.7333	62.7333	62.0000
Utilities	61.3017	54.6336	83.6026	45.5804	68.9654	73.4563	55.9569	72.7736	72.2083	72.2083	69.5417	69.7083

### Average ESG Scores and Pillar Scores Across Industry (2018)

Industry	Bloomberg				Refinitiv Eikon				S&P Global			
	ESG Score	Environmental	Governance	Social	ESG Score	Environmental	Governance	Social	ESG Score	Environmental	Governance	Social
Basic Materials	61.4916	56.3406	84.5123	43.5289	73.1091	71.9392	65.8350	79.2694	61.5806	59.6129	60.6452	62.4516
Consumer Discretionary	51.0024	36.5682	83.1441	33.1721	67.1096	65.1287	60.2551	72.2510	65.4068	66.7458	60.8475	65.7966
Consumer Staples	54.2757	45.1266	82.2852	35.3049	67.7420	65.8202	63.2303	71.3075	60.0313	60.5938	59.0938	58.3438
Energy	62.1467	56.9918	81.5332	47.8376	77.1543	76.8419	72.8364	80.7318	69.4667	68.8667	63.2000	72.2000
Financials	47.9908	29.9478	82.4077	31.5095	65.6334	65.3806	65.2890	67.4982	55.4177	56.6203	52.4810	57.2278
Health Care	49.0773	37.0171	79.8075	30.2881	67.8748	58.2787	61.1731	77.3874	59.3684	64.0789	53.6579	60.9211
Industrials	51.4062	38.7111	81.9069	33.4830	66.1783	65.0683	60.0355	71.6442	57.5529	58.2824	54.0706	56.5765
Real Estate	47.1853	32.6711	81.1926	28.0493	62.3655	65.7339	57.7267	61.4647	66.1667	66.9167	60.7500	64.5000
Technology	42.3549	22.5927	77.6216	26.7190	57.1485	49.1528	52.8980	64.0941	53.8667	57.4000	49.6000	61.4667
Telecommunications	53.8490	40.7921	84.7889	35.8468	72.8030	70.2638	67.5790	76.3097	60.3333	65.6667	55.5333	58.4667
Utilities	63.4186	56.0048	86.3299	47.8307	70.9413	74.4184	60.8091	73.9558	67.4000	68.2800	65.1600	66.6400

### Appendix 3: Average ESG Scores and Pillar Scores Across Country (2012)

Country	Bloomberg				Refinitiv Eikon			
	ESG Score	Env.	Gov.	Social	ESG Score	Env.	Gov.	Social
Austria	35.83	25.57	63.53	18.27	55.23	68.40	52.69	49.29
Belgium	34.52	17.29	69.83	16.30	41.52	44.50	47.98	36.42
Denmark	38.39	29.63	65.69	19.74	56.32	57.19	51.03	57.15
Finland	49.42	42.51	77.13	28.49	61.96	72.85	51.59	61.32
France	45.70	30.95	83.74	22.27	61.99	71.23	51.24	63.83
Germany	34.20	29.89	48.14	23.19	67.56	69.38	64.42	69.43
Ireland (Republic of)	40.81	18.49	83.74	20.04	49.10	51.24	54.64	45.10
Italy	38.61	30.70	59.67	25.39	62.13	67.39	56.04	63.16
Netherlands	42.55	29.36	74.28	23.90	63.40	62.50	63.53	64.53
Norway	31.31	21.13	53.36	19.37	63.20	67.22	56.91	67.70
Poland	17.43	2.56	44.80	4.84	48.34	46.46	59.87	42.03
Portugal	43.85	33.69	67.86	29.90	66.71	75.45	51.12	70.78
Spain	50.30	43.58	72.89	34.34	72.95	80.79	60.78	77.65
Sweden	40.99	31.69	69.20	21.98	60.80	63.96	54.34	64.13
Switzerland	38.61	28.87	68.67	18.09	56.24	58.86	56.10	55.56
United Kingdom	46.04	25.70	83.33	28.96	60.34	62.35	58.94	60.86

Average ESG Scores and Pillar Scores Across Country (2013)

Country	Bloomberg				Refinitiv Eikon			
	ESG Score	Env.	Gov.	Social	ESG Score	Env.	Gov.	Social
Austria	35.81	25.16	63.53	18.63	55.41	70.32	46.87	52.36
Belgium	35.52	15.06	75.31	16.05	42.68	45.55	52.19	34.84
Denmark	39.35	29.89	66.68	21.38	56.16	56.72	46.32	60.55
Finland	51.01	42.56	81.50	28.84	63.51	76.55	51.89	63.32
France	47.55	33.64	84.46	24.42	62.80	71.42	52.22	64.84
Germany	34.83	32.16	48.74	23.54	67.68	70.66	63.49	69.59
Ireland (Republic of)	37.61	19.26	74.38	19.06	48.48	51.02	49.43	48.28
Italy	42.68	34.40	64.49	29.06	65.20	70.18	60.15	65.89
Netherlands	43.83	30.05	76.28	25.05	67.77	67.33	64.72	70.42
Norway	34.27	21.82	60.37	20.52	63.26	66.90	56.29	68.29
Poland	18.84	4.95	45.20	6.28	44.85	41.26	54.91	38.82
Portugal	46.19	35.68	67.38	35.41	67.20	77.14	47.47	72.74
Spain	51.02	44.55	73.40	35.03	72.95	79.71	61.09	78.72
Sweden	42.38	32.62	71.27	23.14	60.34	64.09	51.39	65.26
Switzerland	39.10	28.27	69.23	19.68	56.96	59.59	55.75	57.25
United Kingdom	46.51	26.24	83.24	29.90	60.24	62.75	57.87	61.66

Average ESG Scores and Pillar Scores Across Country (2014)

Country	Bloomberg				Refinitiv Eikon			
	ESG Score	Env.	Gov.	Social	ESG Score	Env.	Gov.	Social
Austria	40.58	34.49	67.21	19.94	59.28	68.48	57.47	54.72
Belgium	35.85	16.38	75.90	15.12	45.29	42.70	56.93	39.09
Denmark	40.23	29.87	68.23	22.46	59.43	58.43	50.79	63.86
Finland	54.43	46.56	83.89	32.74	65.67	76.28	57.49	65.11
France	49.31	34.90	86.44	26.44	63.24	71.45	50.74	67.06
Germany	35.47	31.93	49.59	24.83	66.41	68.91	60.83	69.50
Ireland (Republic of)	39.66	13.76	85.74	19.32	49.63	47.50	52.39	50.97
Italy	43.06	31.69	69.36	28.01	65.18	69.02	59.18	67.75
Netherlands	46.79	32.73	79.26	28.27	67.47	68.16	64.58	70.26
Norway	38.12	25.92	65.90	22.42	63.43	69.40	54.99	69.42
Poland	24.47	9.49	53.20	10.62	44.34	43.27	52.23	38.55
Portugal	47.93	40.21	65.28	38.24	70.15	75.91	54.03	76.89
Spain	50.51	41.02	76.42	33.99	70.87	76.51	59.87	76.49
Sweden	43.84	33.90	71.62	25.89	59.28	61.56	51.85	64.68
Switzerland	42.66	32.54	73.22	22.07	57.37	59.60	55.46	58.58
United Kingdom	47.13	27.22	82.95	31.08	61.60	62.93	60.64	62.71

## Average ESG Scores and Pillar Scores Across Country (2015)

Country	Bloomberg				Refinitiv Eikon			
	ESG Score	Env.	Gov.	Social	ESG Score	Env.	Gov.	Social
Austria	48.26	48.97	68.81	26.91	62.62	72.68	57.03	60.50
Belgium	36.02	16.14	76.21	15.57	44.95	43.67	49.10	43.43
Denmark	42.45	32.24	70.18	24.83	60.91	59.16	51.23	67.62
Finland	59.01	52.01	86.60	38.30	66.02	77.82	52.10	68.86
France	52.86	38.07	90.81	29.56	65.95	73.28	51.60	72.49
Germany	39.34	34.55	55.61	29.12	65.97	66.45	58.96	71.29
Ireland (Republic of)	45.68	23.18	86.15	27.54	52.92	49.91	55.09	54.72
Italy	45.04	30.98	73.77	30.28	61.10	63.48	55.27	64.14
Netherlands	48.04	34.39	79.80	29.81	68.03	68.22	61.77	73.67
Norway	42.50	30.67	69.48	27.26	65.47	67.41	60.25	72.99
Poland	28.15	13.80	53.82	16.72	47.84	47.02	53.93	45.30
Portugal	52.28	49.91	64.28	42.61	69.52	77.33	45.45	78.46
Spain	55.05	45.42	80.01	39.62	69.47	75.17	58.27	73.98
Sweden	43.96	33.35	74.07	24.34	60.12	60.63	53.71	66.24
Switzerland	45.50	37.10	73.83	25.74	58.59	61.10	54.17	61.21
United Kingdom	49.60	30.14	84.81	33.73	63.94	63.91	63.67	64.98

## Average ESG Scores and Pillar Scores Across Country (2016)

Country	Bloomberg				Refinitiv Eikon				S&P Global			
	ESG Score	Env.	Gov.	Social	ESG Score	Env.	Gov.	Social	ESG Score	Env.	Gov.	Social
Austria	49.6479	53.0404	67.5798	28.2447	63.9791	74.7536	56.5570	62.3386	47.0000	42.3333	37.6667	50.3333
Belgium	39.3336	18.8300	79.6369	19.3819	45.0658	44.8910	45.8202	46.3859	41.5000	42.3333	39.1667	47.1667
Denmark	43.3150	32.5084	71.5090	25.8180	62.7264	60.0014	52.0194	71.0958	56.3333	56.2500	55.3333	58.5833
Finland	56.9410	50.7356	82.2504	37.7354	67.1107	80.9559	52.4561	70.1542	75.6364	77.2727	76.1818	71.7273
France	54.1952	39.9270	91.2383	31.2765	67.1751	74.6661	52.6040	74.1051	79.4694	79.4286	76.8367	78.9184
Germany	42.3335	36.7775	59.8529	30.4061	66.8886	66.1860	58.8789	73.9052	65.8108	67.5405	64.2973	65.1081
Ireland (Republic of)	47.1568	24.2784	85.9981	31.0503	57.9517	55.0525	57.7806	61.5236	40.6000	42.6000	55.0000	34.0000
Italy	48.7904	36.5707	76.3815	33.3132	63.7626	67.8498	53.9253	69.2369	75.7500	76.0625	75.7500	75.2500
Netherlands	49.3502	34.4968	81.2276	32.1371	66.6818	67.5930	61.3186	71.7191	86.5333	82.7333	88.9333	85.4000
Norway	45.3367	34.6723	69.9602	31.2831	66.2769	69.1711	59.0283	72.1317	59.6667	66.0000	63.3333	60.3333
Poland	30.9593	21.1064	54.2294	17.4526	50.3222	52.9804	57.3556	46.0065				
Portugal	55.6383	55.2779	68.6258	42.9565	71.9374	76.3219	50.2644	82.4291	78.3333	80.0000	77.3333	78.6667
Spain	56.1896	47.2609	80.9165	40.2948	72.1835	77.5481	58.5484	79.0927	85.5263	81.5263	84.5263	85.0526
Sweden	41.9171	29.9034	73.6365	22.0879	61.7705	62.3995	53.0274	69.7467	59.7083	58.9583	59.8333	59.8750
Switzerland	46.6674	38.0821	75.1501	26.6719	61.2987	64.1801	55.1194	65.2095	68.1111	70.6296	65.0000	67.1481
United Kingdom	51.3629	32.4879	85.8592	35.6129	64.7463	63.2596	65.5938	65.3297	72.4930	73.9014	70.5634	69.6338

## Average ESG Scores and Pillar Scores Across Country (2017)

Country	Bloomberg				Refinitiv Eikon				S&P Global			
	ESG Score	Env.	Gov.	Social	ESG Score	Env.	Gov.	Social	ESG Score	Env.	Gov.	Social
Austria	51.2876	51.8222	70.1886	31.7715	63.4739	72.1138	56.9194	64.5789	49.8000	45.4000	48.4000	49.0000
Belgium	40.1291	18.6139	80.8225	20.7981	44.9545	44.3330	40.6177	50.5924	32.9000	34.1000	32.0000	38.6000
Denmark	45.8369	34.8926	75.9270	26.5737	62.4044	58.8255	54.0450	69.8030	48.4000	47.6667	46.6000	52.4667
Finland	60.1987	51.0592	88.5418	40.8836	68.6103	78.7474	57.8469	70.8043	70.0769	68.6154	69.6154	66.3846
France	55.1218	40.6439	92.4556	32.1210	68.9522	75.3073	54.0029	76.4149	72.9474	75.3509	66.7544	73.6316
Germany	47.1147	38.3471	71.4487	31.4510	66.6828	63.7495	58.7647	74.8240	62.5476	63.2143	59.3571	64.7143
Ireland (Republic of)	48.8540	25.9223	86.7120	33.7882	57.7001	55.0959	50.3860	66.2675	42.3333	42.5000	48.8333	35.8333
Italy	52.9434	43.1519	79.3633	36.2121	66.2836	65.2924	59.9213	71.6564	57.4000	58.8800	56.6400	58.0000
Netherlands	50.8729	37.4378	84.0903	31.6348	70.9932	73.1411	65.0429	75.1398	83.8889	80.2778	86.7222	83.1111
Norway	47.8098	38.3291	70.7567	34.2550	67.2488	68.0672	61.8641	71.7738	48.5833	48.3333	40.8333	48.2500
Poland	35.6805	27.9285	52.1072	26.9433	56.0246	53.1102	54.4521	61.7829	22.1667	25.5000	10.0000	32.3333
Portugal	55.9074	52.6654	71.7941	43.1983	72.9785	80.8815	46.4104	82.5947	77.2500	76.7500	76.7500	78.5000
Spain	57.3608	49.1292	80.8148	42.0467	73.8620	75.1513	62.7435	79.9137	83.4762	82.2381	80.6667	82.4762
Sweden	44.9599	33.2334	77.1083	24.4125	61.1553	60.3742	50.4837	71.2026	50.6563	50.8750	48.6875	52.5938
Switzerland	49.3986	40.3821	78.7809	29.2391	62.0629	62.9907	58.0156	66.2985	62.3871	63.9032	57.0000	62.8710
United Kingdom	52.7875	34.3851	85.8654	37.9887	66.3053	64.2542	65.7979	68.0673	65.9512	67.3293	62.8049	63.3537

Average ESG Scores and Pillar Scores Across Country (2018)

Country	Bloomberg				Refinitiv Eikon				S&P Global			
	ESG Score	Env.	Gov.	Social	ESG Score	Env.	Gov.	Social	ESG Score	Env.	Gov.	Social
Austria	52.7060	51.4849	72.5065	34.0437	67.5627	63.4992	64.5999	67.9092	45.1667	45.6667	41.8333	46.0000
Belgium	41.5691	19.9475	80.5817	24.0326	51.8101	47.6785	51.1438	56.4154	33.1818	36.7273	30.7273	37.3636
Denmark	47.9080	35.1307	80.8762	27.5891	64.2577	59.9871	59.0192	69.4090	43.6250	44.2500	40.5625	49.3750
Finland	61.5273	52.7959	88.5912	43.0882	70.8986	79.1459	60.2248	74.3640	70.0000	69.0000	70.9231	66.7692
France	55.7202	41.4310	93.3601	32.2230	71.5739	75.5474	59.1201	78.1894	67.8852	69.2787	60.2787	70.5246
Germany	48.6149	39.2604	75.0193	31.4617	69.1678	64.4365	64.8249	74.8066	58.8478	61.1304	53.2609	60.3043
Ireland (Republic of)	49.4374	28.3341	86.3550	33.4859	60.2875	52.3373	61.2656	64.5304	42.0000	44.5714	50.2857	37.7143
Italy	55.5089	45.0307	81.8701	39.5238	67.5226	63.5506	61.8674	73.0866	58.6538	58.1538	58.3846	61.0769
Netherlands	50.4279	36.5038	83.5497	31.5514	69.3853	66.5060	67.1049	72.8193	82.8333	80.1111	86.6111	80.3889
Norway	50.0104	39.9763	72.2503	37.7197	66.0474	63.5099	64.3896	69.6710	46.6667	48.3333	40.4167	48.9167
Poland	38.2255	29.2143	55.7065	29.6899	57.6520	42.5453	57.9606	61.7409	18.4286	21.5714	12.2857	26.8571
Portugal	59.9512	55.3458	74.4506	50.0000	72.8439	79.8739	49.9896	80.4069	77.5000	72.7500	74.2500	77.2500
Spain	59.1964	50.5199	82.1149	44.8653	76.2550	77.1548	65.5136	82.2725	81.6667	81.1429	77.6190	80.3810
Sweden	45.8963	33.6706	77.2785	26.6180	62.8644	60.2834	57.1114	69.9209	49.4286	50.6857	45.3143	51.0000
Switzerland	50.2150	40.9721	78.8234	30.7451	63.5296	62.7808	60.6552	66.2022	56.2222	59.6111	53.5556	56.1667
United Kingdom	53.9578	35.6649	86.1733	39.9155	66.8103	63.1379	65.5649	69.2687	64.1264	66.0115	60.8851	61.5287

Appendix 4: Correlation Matrix (2012)

	Stock Return	Bloomberg ESG	Bloomberg ENV	Bloomberg GOV	Bloomberg SOC	Refinitiv ESG	Refinitiv ENV	Refinitiv GOV	Refinitiv SOC	Leverage	Beta	Firm Size	Market-to-Book Ratio
Stock Return	1.0000												
Bloomberg ESG	-0.0473	1.0000											
Bloomberg ENV	0.0427	0.8404*	1.0000										
Bloomberg GOV	-0.1072	0.6910*	0.2644*	1.0000									
Bloomberg SOC	-0.0926	0.8411*	0.7253*	0.3678*	1.0000								
Refinitiv ESG	-0.0208	0.6561*	0.6625*	0.2420*	0.6321*	1.0000							
Refinitiv ENV	0.0034	0.5967*	0.6484*	0.2010*	0.5294*	0.8323*	1.0000						
Refinitiv GOV	-0.0581	0.3685*	0.3022*	0.1903*	0.3889*	0.7022*	0.3999*	1.0000					
Refinitiv SOC	-0.0113	0.5993*	0.6095*	0.2082*	0.5888*	0.8997*	0.6982*	0.4347*	1.0000				
Leverage	-0.0531	0.1254	0.1789	0.0079	0.1235	0.1562*	0.1340*	0.0711	0.1407*	1.0000			
Beta	-0.0357	0.0253	-0.0336	0.1024	-0.0056	0.0078	0.0614	0.0143	-0.0152	-0.1077	1.0000		
Firm Size	-0.0354	0.0650	0.0471	0.0721	0.0324	0.1711*	0.2233*	0.2072*	0.1093	0.0573	0.1637*	1.0000	
Market-to-Book Ratio	0.0038	-0.0640	-0.1152	0.0132	-0.0455	-0.1318	-0.1592*	-0.0577	-0.1417*	-0.0950	0.0090	-0.0493	1.0000

\*p-value < 0.01

Correlation Matrix (2013)

	Stock Return	Bloomberg ESG	Bloomberg ENV	Bloomberg GOV	Bloomberg SOC	Refinitiv ESG	Refinitiv ENV	Refinitiv GOV	Refinitiv SOC	Leverage	Beta	Firm Size	Market-to-Book
Stock Return	1.0000												
Bloomberg ESG	0.0800	1.0000											
Bloomberg ENV	0.0000	0.8334*	1.0000										
Bloomberg GOV	0.1300	0.6873*	0.2290*	1.0000									
Bloomberg SOC	0.0600	0.8457*	0.7230*	0.361 *	1.0000								
Refinitiv ESG	-0.0600	0.6771*	0.6837*	0.2480*	0.6436*	1.0000							
Refinitiv ENV	-0.0500	0.6046*	0.6496*	0.2028*	0.5307*	0.8224*	1.0000						
Refinitiv GOV	-0.0500	0.3839*	0.3396*	0.1907*	0.3692*	0.7070*	0.3928*	1.0000					
Refinitiv SOC	-0.0400	0.6249*	0.6217*	0.2226*	0.6174*	0.8924*	0.6947*	0.4212*	1.0000				
Leverage	-0.0200	0.1313*	0.1635*	0.0128	0.1372*	0.1590*	0.1281	0.0761	0.1348*	1.0000			
Beta	-0.0800	0.0922	0.0071	0.1653*	0.0409	0.0346	0.1033	0.0314	0.0152	-0.1325*	1.0000		
Firm Size	-0.0500	0.0777	0.0464	0.1014	0.0239	0.1597*	0.2212*	0.1981*	0.0962	0.0530	0.1764*	1.0000	
Market-to-Book	-0.0100	-0.0596	-0.1032	0.0168	-0.0497	-0.1219	-0.1379*	-0.0134	-0.1492*	-0.1226	0.0240	-0.0378	1.0000

\*p-value < 0.01

Correlation Matrix (2014)

	Stock Return	Bloomberg ESG	Bloomberg ENV	Bloomberg GOV	Bloomberg SOC	Refinitiv ESG	Refinitiv ENV	Refinitiv GOV	Refinitiv SOC	Leverage	Beta	Firm Size	Market-to-Book
Stock Return	1.0000												
Bloomberg ESG	0.0523	1.0000											
Bloomberg ENV	-0.0284	0.8376*	1.0000										
Bloomberg GOV	0.0992	0.6969*	0.2568*	1.0000									
Bloomberg SOC	0.0695	0.8444*	0.6945*	0.3918*	1.0000								
Refinitiv ESG	-0.0200	0.7025*	0.6853*	0.2925*	0.6538*	1.0000							
Refinitiv ENV	-0.0393	0.6188*	0.6632*	0.2248*	0.5267*	0.8222*	1.0000						
Refinitiv GOV	0.0115	0.4178*	0.3274*	0.2651*	0.3936*	0.6845*	0.3717*	1.0000					
Refinitiv SOC	-0.0250	0.6273*	0.6090*	0.2365*	0.6215*	0.8878*	0.6757*	0.3934*	1.0000				
Leverage	-0.0147	0.1302*	0.1506*	0.0495	0.1026	0.0396	0.0215	-0.0276	0.0484	1.0000			
Beta	-0.0558	0.1331*	0.0552	0.1702*	0.0927	0.1088	0.1485*	0.1206	0.0580	-0.0601	1.0000		
Firm Size	-0.0459	0.0680	0.0316	0.0824	0.0486	0.1266	0.2187*	0.1437*	0.0735	0.0467	0.2186*	1.0000	
Market-to-Book	0.0052	-0.0408	-0.0957	0.0146	0.0022	-0.1255	-0.1214	-0.0560	-0.1312	-0.0786	0.0047	-0.0321	1.0000

\*p-value < 0.01

Correlation Matrix (2015)

	Stock Return	Bloomberg ESG	Bloomberg ENV	Bloomberg GOV	Bloomberg SOC	Refinitiv ESG	Refinitiv ENV	Refinitiv GOV	Refinitiv SOC	Leverage	Beta	Firm Size	Market-to-Book
Stock Return	1.0000												
Bloomberg ESG	0.0574	1.0000											
Bloomberg ENV	-0.0008	0.8693*	1.0000										
Bloomberg GOV	0.0895	0.6829*	0.3040	1.0000									
Bloomberg SOC	0.0690	0.8433*	0.7188*	0.3861*	1.0000								
Refinitiv ESG	-0.0080	0.7306*	0.6701*	0.3776*	0.6673*	1.0000							
Refinitiv ENV	-0.0289	0.6712*	0.6528*	0.3370*	0.5666*	0.8366*	1.0000						
Refinitiv GOV	0.0351	0.4151*	0.2927*	0.3085*	0.4109*	0.6850*	0.3642*	1.0000					
Refinitiv SOC	-0.0246	0.6522*	0.6140*	0.3037*	0.6085*	0.8958*	0.7019*	0.4071*	1.0000				
Leverage	0.0361	0.1267*	0.1171	0.0638	0.1105	0.0511	0.0280	-0.0058	0.0447	1.0000			
Beta	-0.0256	0.1338*	0.0453	0.1896*	0.0967	0.1958*	0.1809*	0.1832*	0.1627*	-0.0258	1.0000		
Firm Size	-0.0450	0.0749	0.0532	0.0753	0.0513	0.1217	0.2213*	0.1267	0.0792	0.0619	0.1613*	1.0000	
Market-to-Book	0.0742	-0.0560	-0.0987	0.0096	-0.0236	-0.0726	-0.1168	0.0385	-0.1309*	-0.1261*	-0.0218	-0.0466	1.0000

\*p-value < 0.01

### Correlation Matrix (2017)

	Stock Return	Bloomberg ESG	Bloomberg ENV	Bloomberg GOV	Bloomberg SOC	Refinitiv ESG	Refinitiv ENV	Refinitiv GOV	Refinitiv SOC	S&P ESG	S&P ENV	S&P GOV	S&P SOC	Leverage	Beta	Firm Size	Market-to-Book
Stock Return	1.0000																
Bloomberg ESG	0.0526	1.0000															
Bloomberg ENV	-0.0188	0.8033	1.0000														
Bloomberg GOV	0.0636	0.6534	0.3293	1.0000													
Bloomberg SOC	0.1161	0.8619	0.7133	0.3847	1.0000												
Refinitiv ESG	0.0294	0.9092	0.6337	0.4084	0.6055	1.0000											
Refinitiv ENV	-0.0517	0.6517	0.3769	0.5434	0.3097	1.0000	1.0000										
Refinitiv GOV	0.0658	0.3245	0.2243	0.3852	0.3648	0.3648	0.3648	1.0000									
Refinitiv SOC	-0.0561	0.5093	0.5385	0.3027	0.5012	0.4589	0.6149	0.3677	1.0000								
S&P ESG	-0.0282	0.5257	0.4761	0.2299	0.4833	0.6216	0.3555	0.3463	0.5774	1.0000							
S&P ENV	-0.0552	0.2799	0.4644	0.1784	0.4397	0.5447	0.3673	0.3377	0.4922	1.0000							
S&P GOV	-0.0395	0.5614	0.4492	0.4109	0.4887	0.5851	0.4939	0.3411	0.5403	0.9487	0.8765	1.0000					
S&P SOC	-0.0543	0.5342	0.4302	0.3849	0.4542	0.5834	0.4930	0.3207	0.5585	0.9648	0.9061	0.9068	1.0000				
Beta	0.0294	0.1177	0.0284	0.1115	0.0887	0.1003	0.0225	0.1048	0.1153	0.0586	0.0845	1.0000					
Firm Size	-0.0459	-0.0484	-0.1706	-0.2758	-0.2070	-0.2044	-0.2339	-0.2434	-0.1401	-0.1351	-0.1426	-0.1437	-0.1377	-0.0987	1.0000		
Market-to-Book	0.0000	0.0052	0.0045	0.0151	0.1428	0.1072	0.1085	0.0713	0.1085	0.0598	0.0598	0.0447	0.0447	0.0447	1.0000		
Market-to-Book	-0.0181	-0.0887	-0.0879	-0.0793	-0.0594	-0.0419	-0.0509	-0.0091	-0.0793	-0.0299	-0.1002	-0.1034	-0.0845	-0.0619	-0.0131	1.0000	

\*p-value < 0.01

## Correlation Matrix (2018)

	Stock Return	Bloomberg ESG	Bloomberg ENV	Bloomberg G&P	Bloomberg SOC	Refinitiv ESG	Refinitiv ENV	Refinitiv G&P	Refinitiv SOC	S&P ESG	S&P ENV	S&P G&P	S&P SOC	Leverage	Beta	Firm Size	Market-to-Book
Stock Return	1.0000																
Bloomberg ESG	0.0561	1.0000															
Bloomberg ENV	-0.0068	0.8957*	1.0000														
Bloomberg G&P	0.0584	0.6368*	0.3282*	1.0000													
Bloomberg SOC	0.1178	0.8214*	0.7180*	0.3541*	1.0000												
Refinitiv ESG	0.0130	0.6282*	0.4144*	0.2824*	0.3834*	1.0000											
Refinitiv ENV	-0.0283	0.6674*	0.6439*	0.3765*	0.5507*	0.8231*	1.0000										
Refinitiv G&P	0.0012	0.3986*	0.3189*	0.2585*	0.3343*	0.6567*	0.3398*	1.0000									
Refinitiv SOC	0.0429	0.5148*	0.3366*	0.3863*	0.5885*	0.4954*	0.3880*	0.3701*	1.0000								
S&P ESG	-0.0098	0.0275	0.4664*	0.4213*	0.6437*	0.6473*	0.5771*	0.3801*	0.5862*	1.0000							
S&P ENV	0.0438	0.5407*	0.5296*	0.4396*	0.6138*	0.5674*	0.3475*	0.3472*	0.3472*	0.3472*	1.0000						
S&P G&P	-0.0182	0.5595*	0.4390*	0.4020*	0.4945*	0.6031*	0.5191*	0.3847*	0.5307*	0.9378*	0.8559*	1.0000					
S&P SOC	-0.0605	0.5250*	0.4431*	0.4031*	0.6123*	0.5430*	0.3394*	0.3394*	0.5930*	0.9030*	0.8850*	0.8850*	1.0000				
Leverage	0.1112	0.1173	0.1358*	0.1368*	0.0550	0.1301*	0.0739	0.0861	0.0994	0.1117	0.0938	0.0938	0.0938	1.0000			
Beta	-0.0124	0.2439*	0.1947*	0.1863*	0.2166*	0.2552*	0.2534*	0.1766*	0.2083*	0.0701	0.0819	0.0576	0.0858	-0.0403	1.0000		
Firm Size	-0.0349	0.0338	0.0185	0.0157	0.0252	0.1475*	0.181*	0.1133	0.0996	0.0549	0.0625	0.0357	0.0608	0.0726	0.1147	1.0000	
Market-to-Book	0.0018	0.1241*	0.0961	0.0881	0.0546*	0.0961*	0.1431*	0.1431*	0.1331*	0.1361*	0.0691	0.0691	0.0691	-0.0505	0.0000	1.0000	

\*p-value < 0.01

## Correlation Matrix (2019)

	Stock Return	Bloomberg ESG	Bloomberg ENV	Bloomberg GOV	Bloomberg SOC	Refinitiv ESG	Refinitiv ENV	Refinitiv GOV	Refinitiv SOC	S&P ESG	S&P ENV	S&P GOV	S&P SOC	Leverage	Beta	Firm Size	Market-to-Book
Stock Return	1.0000																
Bloomberg ESG	0.9450	1.0000															
Bloomberg ENV	0.9046	0.8550*	1.0000														
Bloomberg GOV	0.9348	0.6016*	0.2857*	1.0000													
Bloomberg SOC	0.9953	0.8421*	0.6892*	0.2964*	1.0000												
Refinitiv ESG	-0.0280	0.6337*	0.4219*	0.5722*	0.7527*	1.0000											
Refinitiv ENV	-0.0740	0.6440*	0.6195*	0.3416**	0.5204*	0.8133*	1.0000										
Refinitiv GOV	0.0616	0.1424*	0.2257*	0.3470*	0.3196*	0.6038*	0.3168*	1.0000									
Refinitiv SOC	0.0099	0.0095	0.3463*	0.5570*	0.3184*	0.8509*	0.3744*	0.6633*	1.0000								
S&P ESG	-0.0412	0.5727**	0.4445*	0.4155*	0.5603*	0.6040*	0.5361*	0.3247*	0.5671*	1.0000							
S&P ENV	-0.0813	0.6401*	0.4489*	0.3424*	0.5753*	0.7470*	0.5310*	0.3671*	0.5804*	0.3671*	1.0000						
S&P GOV	-0.0172	0.5203*	0.3922*	0.3869*	0.4635*	0.5680*	0.4917*	0.3252*	0.5223*	0.9437*	0.8384*	1.0000					
S&P SOC	-0.0589	0.5233*	0.3314*	0.4701*	0.5749*	0.4987*	0.2884*	0.2590*	0.4745*	0.8707*	0.8707*	1.0000					
Leverage	0.0121	0.1037	0.0069	0.0093	0.0073	0.0943	0.0323	0.1065	0.1523*	0.1306*	0.1529*	0.1267	1.0000				
Beta	-0.0040	-0.0933	-0.0563	0.0925	-0.0851	0.1228*	-0.1145	0.1356*	0.0748	0.0325	0.0835	0.0334	-0.0373	-0.1693*	1.0000		
Firm Size	-0.0549	-0.0549	0.0103	0.0437	0.0286	0.0375	0.0286	0.0375	0.0286	0.0375	0.0286	0.0375	0.0286	0.0375	0.0286	1.0000	
Market-to-Book	0.0768	-0.0030	-0.1622*	-0.0534	-0.1252*	-0.1309*	-0.1985*	-0.0400	-0.1544*	-0.0160	-0.0229	-0.0688	-0.0310	-0.0770	-0.0352	-0.1167	1.0000

\*p-value < 0.01

## Correlation Matrix (2020)

	Stock Return	Bloomberg ESG	Bloomberg ENV	Bloomberg GOV	Bloomberg SOC	Refinitiv ESG	Refinitiv ENV	Refinitiv GOV	Refinitiv SOC	S&P ESG	S&P ENV	S&P GOV	S&P SOC	Leverage	Beta	Firm Size	Market-to-Book
Stock Return	1.0000																
Bloomberg ESG	0.9605	1.0000															
Bloomberg ENV	0.8007	0.8969*	1.0000														
Bloomberg GOV	0.0288	0.6130*	0.3107*	1.0000													
Bloomberg SOC	0.0978	0.8425*	0.6833*	0.2187*	1.0000												
Refinitiv ESG	-0.0203	0.6429*	0.5604*	0.4584*	0.3399*	1.0000											
Refinitiv ENV	-0.0387	0.6050*	0.5649*	0.3297*	0.4947*	0.7963*	1.0000										
Refinitiv GOV	0.0233	0.8071*	0.7278*	0.2887*	0.2887*	0.6967*	0.3013*	1.0000									
Refinitiv SOC	0.0120	0.8719*	0.7717*	0.3750*	0.4881*	0.8678*	0.6534*	0.4100*	1.0000								
S&P ESG	-0.0200	0.4964*	0.3545*	0.4226*	0.5054*	0.5656*	0.2861*	0.5303*	1.0000								
S&P ENV	-0.0084	0.4701*	0.3556*	0.3556*	0.5422*	0.5959*	0.2950*	0.5699*	0.9217*	1.0000							
S&P GOV	0.0115	0.4421*	0.3900*	0.3871*	0.4693*	0.4975*	0.4466*	0.2756*	0.4468*	0.9342*	0.8317*	1.0000					
S&P SOC	-0.0092	0.5655*	0.3274*	0.3704*	0.4186*	0.5002*	0.4699*	0.2697*	0.5621*	0.9405*	0.8414*	0.8463*	1.0000				
Market-to-Book	0.0654	0.1270*	0.0809*	0.1343*	0.1390*	0.1411*	0.0145*	0.0877*	0.1862*	0.1794*	0.1641*	0.1000					
Firm Size	-0.1094	-0.0748	0.0294	0.0552	-0.0574	-0.0913*	-0.0783	0.0027	0.0137	-0.0003	0.0333	0.0169	-0.1129	1.0000			
Beta	0.0119	-0.0022	-0.0046	-0.1356	-0.0446	-0.0629	-0.0742	0.0072	0.0142	0.0072	0.0141	0.0072	0.0141				
Market-to-Book	-0.1391	-0.1603*	-0.1370*	-0.0915	-0.1435*	-0.1970*	-0.0687	-0.0806	-0.1165	-0.1050	-0.1058	-0.0566	-0.0319	-0.2567*	-0.1831*	1.0000	

\*p-value < 0.01

## Correlation Matrix (2021)

Stock Return	Bloomberg ESG	Bloomberg ENV	Bloomberg GOV	Bloomberg SOC	Refinitiv ESG	Refinitiv ENV	Refinitiv GOV	Refinitiv SOC	S&P ESG	S&P ENV	S&P GOV	S&P SOC	Leverage	Beta	Firm Size	Market-to-Book
Stock Return	1.0000															
Bloomberg ESG	0.0032	1.0000														
Bloomberg ENV	-0.0570	0.8553*	1.0000													
Bloomberg GOV	-0.0070	0.0007	0.2841*	1.0000												
Bloomberg SOC	0.0076	0.8240*	0.6370*	0.2336*	1.0000											
Refinitiv ESG	0.0248	0.6284*	0.4292*	0.1119*	0.2036*	1.0000										
Refinitiv ENV	-0.0714	0.5578*	0.3388*	0.4372*	0.7781*	1.0000										
Refinitiv GOV	-0.0100	0.3419*	0.2270*	0.3406*	0.2690*	0.6706*	0.2557*	1.0000								
Refinitiv SOC	0.0052	0.5738*	0.3602*	0.4570*	0.8703*	0.3838*	0.4601*	0.2841*	1.0000							
S&P ESG	-0.0557	0.8223*	0.3290*	0.3909*	0.2933*	0.5851*	0.4701*	0.3258*	0.5414*	1.0000						
S&P ENV	-0.0540	0.3738*	0.1300*	0.3561*	0.5811*	0.2984*	0.5402*	0.3912*	0.4601*	0.3314*	1.0000					
S&P GOV	-0.0102	0.3909*	0.2252*	0.3510*	0.3411*	0.5059*	0.3962*	0.3164*	0.4601*	0.9211*	0.7695*	1.0000				
S&P SOC	-0.0570	0.6761*	0.3316*	0.3607*	0.4011*	0.5773*	0.4812*	0.3105*	0.5561*	0.9539*	0.8402*	0.8475*	1.0000			
Leverage	0.0117	0.1763*	0.1320*	0.1310*	0.1282*	0.1242*	0.0670*	0.1301*	0.1330*	0.1460*	0.1341*	0.1149	1.0000			
Beta	-0.0527	0.0029	-0.0297	0.0412	0.0410	0.0109	0.0515	-0.0232	-0.0240	0.0363	0.0378	0.0231	0.0420	-0.0057	1.0000	
Firm Size	-0.0649	-0.0017	-0.0401	0.0198	0.1033	0.2054	0.0630	0.0471	0.0779	0.1049	0.0912	0.0482	-0.0188	0.1648*	1.0000	
Market-to-Book	-0.0121	-0.0088	-0.1231	0.1536	0.0684	-0.1242	0.1439*	0.1155	0.1154	-0.1104*	0.1222*	-0.1222*	-0.1599*		1.0000	

\*p-value &lt; 0.01

## Appendix 5: Collinearity Statistics (Bloomberg)

<b>Variables</b>	<b>Model I</b>	<b>Model II</b>	<b>Model III</b>	<b>Model IV</b>
ESG Score	1.28 (0.78)			
Environmental Score		1.12 (0.90)		
Social Score			1.16 (0.86)	
Governance Score				1.14 (0.88)
Beta	6.63 (0.15)	6.63 (0.15)	6.63 (0.15)	6.64 (0.15)
Leverage	4.73 (0.21)	4.73 (0.21)	4.73 (0.21)	4.73 (0.21)
Market to Book Ratio	1.03 (0.97)	1.03 (0.97)	1.03 (0.97)	1.03 (0.97)
Size	1.67 (0.60)	1.67 (0.60)	1.67 (0.60)	1.67 (0.60)
Belgium	1.55 (0.64)	1.55 (0.65)	1.55 (0.65)	1.55 (0.65)
Denmark	1.93 (0.52)	1.93 (0.52)	1.93 (0.52)	1.93 (0.52)
Finland	1.55 (0.65)	1.54 (0.65)	1.55 (0.65)	1.54 (0.65)
France	4.19 (0.24)	4.17 (0.24)	4.18 (0.24)	4.18 (0.24)
Germany	3.11 (0.32)	3.07 (0.33)	3.08 (0.32)	3.13 (0.32)
Ireland; Republic of	1.38 (0.73)	1.38 (0.73)	1.38 (0.73)	1.38 (0.73)
Italy	2.34 (0.43)	2.32 (0.43)	2.33 (0.43)	2.33 (0.43)
Netherlands	1.96 (0.51)	1.95 (0.51)	1.96 (0.51)	1.96 (0.51)
Norway	1.54 (0.63)	1.53 (0.65)	1.53 (0.65)	1.53 (0.65)
Poland	1.28 (0.78)	1.28 (0.78)	1.28 (0.78)	1.27 (0.78)
Portugal	1.26 (0.79)	1.26 (0.79)	1.26 (0.79)	1.26 (0.79)
Spain	2.09 (0.48)	2.09 (0.48)	2.09 (0.48)	2.09 (0.48)
Sweden	2.64 (0.38)	2.63 (0.38)	2.63 (0.38)	2.63 (0.38)
Switzerland	2.79 (0.36)	2.78 (0.36)	2.78 (0.36)	2.78 (0.36)
United Kingdom	5.66 (0.18)	5.65 (0.18)	5.66 (0.18)	5.64 (0.18)
Consumer Discretionary	3.06 (0.33)	3.05 (0.33)	3.05 (0.33)	3.06 (0.33)
Consumer Staples	2.13 (0.47)	2.13 (0.47)	2.13 (0.47)	2.13 (0.47)
Energy	1.49 (0.67)	1.49 (0.67)	1.49 (0.67)	1.49 (0.67)
Financials	3.65 (0.27)	3.64 (0.27)	3.65 (0.27)	3.65 (0.27)
Health Care	2.44 (0.41)	2.43 (0.41)	2.43 (0.41)	2.43 (0.41)
Industrials	3.77 (0.27)	3.76 (0.27)	3.76 (0.27)	3.77 (0.27)
Real Estate	1.72 (0.58)	1.71 (0.58)	1.72 (0.58)	1.71 (0.58)
Technology	1.63 (0.61)	1.63 (0.61)	1.63 (0.61)	1.63 (0.61)
Telecommunications	1.61 (0.62)	1.61 (0.62)	1.61 (0.62)	1.61 (0.62)
Utilities	1.91 (0.52)	1.91 (0.52)	1.91 (0.52)	1.91 (0.52)

(Tolerance level in parantheses)

## Collinearity Statistics (Refinitiv Eikon)

<b>Variables</b>	<b>Model V</b>	<b>Model VI</b>	<b>Model VII</b>	<b>Model VIII</b>
ESG Score	1.15 (0.87)			
Environmental Score		1.06 (0.95)		
Social Score			1.10 (0.91)	
Governance Score				1.05 (0.95)
Beta	7.08 (0.14)	7.07 (0.14)	7.07 (0.14)	7.07 (0.14)
Leverage	4.80 (0.21)	4.80 (0.21)	4.80 (0.21)	4.80 (0.21)
Market to Book Ratio	1.03 (0.97)	1.03 (0.97)	1.03 (0.97)	1.03 (0.97)
Size	1.70 (0.59)	1.70 (0.59)	1.70 (0.59)	1.70 (0.59)
Belgium	1.51 (0.66)	1.51 (0.66)	1.51 (0.66)	1.50 (0.66)
Denmark	1.96 (0.51)	1.95 (0.51)	1.96 (0.51)	1.96 (0.51)
Finland	1.55 (0.65)	1.55 (0.65)	1.55 (0.65)	1.55 (0.65)
France	4.11 (0.24)	4.11 (0.24)	4.11 (0.24)	4.11 (0.24)
Germany	3.00 (0.33)	2.99 (0.33)	2.99 (0.33)	3.00 (0.33)
Ireland; Republic of	1.41 (0.71)	1.40 (0.71)	1.41 (0.71)	1.41 (0.71)
Italy	2.21 (0.45)	2.20 (0.45)	2.21 (0.45)	2.20 (0.45)
Netherlands	2.02 (0.50)	2.01 (0.50)	2.01 (0.50)	2.01 (0.50)
Norway	1.44 (0.70)	1.44 (0.70)	1.44 (0.70)	1.44 (0.70)
Poland	1.26 (0.80)	1.26 (0.80)	1.26 (0.80)	1.26 (0.80)
Portugal	1.26 (0.80)	1.26 (0.80)	1.26 (0.80)	1.26 (0.80)
Spain	2.14 (0.47)	2.14 (0.47)	2.14 (0.47)	2.14 (0.47)
Sweden	2.49 (0.40)	2.48 (0.40)	2.48 (0.40)	2.48 (0.40)
Switzerland	2.83 (0.35)	2.82 (0.35)	2.83 (0.35)	2.82 (0.35)
United Kingdom	5.69 (0.18)	5.69 (0.18)	5.69 (0.18)	5.69 (0.18)
Consumer Discretionary	2.94 (0.34)	2.94 (0.34)	2.94 (0.34)	2.94 (0.34)
Consumer Staples	2.05 (0.49)	2.06 (0.49)	2.05 (0.49)	2.05 (0.49)
Energy	1.45 (0.69)	1.45 (0.69)	1.45 (0.69)	1.45 (0.69)
Financials	3.65 (0.27)	3.64 (0.27)	3.64 (0.27)	3.64 (0.27)
Health Care	2.31 (0.43)	2.31 (0.43)	2.31 (0.43)	2.31 (0.43)
Industrials	3.63 (0.28)	3.63 (0.28)	3.63 (0.28)	3.63 (0.28)
Real Estate	1.64 (0.61)	1.64 (0.61)	1.64 (0.61)	1.64 (0.61)
Technology	1.58 (0.63)	1.58 (0.63)	1.58 (0.63)	1.58 (0.63)
Telecommunications	1.60 (0.63)	1.60 (0.63)	1.60 (0.63)	1.60 (0.63)
Utilities	1.89 (0.53)	1.89 (0.53)	1.89 (0.53)	1.89 (0.53)

(Tolerance level in parantheses)

## Collinearity Statistics (S&amp;P Global)

Variables	Model IX	Model X	Model XI	Model XII
ESG Score	1.12 (0.89)			
Environmental Score		1.11 (0.90)		
Social Score			1.09 (0.92)	
Governance Score				1.10 (0.91)
Beta	7.58 (0.13)	7.58 (0.13)	7.58 (0.13)	7.58 (0.13)
Leverage	5.32 (0.19)	5.32 (0.19)	5.32 (0.19)	5.33 (0.19)
Market to Book Ratio	1.02 (0.98)	1.02 (0.98)	1.02 (0.98)	1.02 (0.98)
Size	1.69 (0.59)	1.68 (0.59)	1.68 (0.59)	1.69 (0.59)
Belgium	1.46 (0.69)	1.46 (0.69)	1.46 (0.69)	1.46 (0.69)
Denmark	1.90 (0.53)	1.90 (0.53)	1.90 (0.53)	1.90 (0.53)
Finland	1.56 (0.64)	1.56 (0.64)	1.56 (0.64)	1.56 (0.64)
France	4.21 (0.24)	4.21 (0.24)	4.21 (0.24)	4.21 (0.24)
Germany	3.16 (0.32)	3.16 (0.32)	3.16 (0.32)	3.16 (0.32)
Ireland; Republic of	1.36 (0.74)	1.36 (0.74)	1.36 (0.74)	1.36 (0.74)
Italy	2.32 (0.43)	2.31 (0.43)	2.32 (0.43)	2.31 (0.43)
Netherlands	2.06 (0.48)	2.06 (0.48)	2.06 (0.48)	2.06 (0.48)
Norway	1.46 (0.68)	1.46 (0.68)	1.46 (0.68)	1.46 (0.68)
Poland	1.25 (0.80)	1.25 (0.80)	1.25 (0.80)	1.25 (0.80)
Portugal	1.25 (0.80)	1.25 (0.80)	1.25 (0.80)	1.25 (0.80)
Spain	2.18 (0.46)	2.18 (0.46)	2.18 (0.46)	2.18 (0.46)
Sweden	2.66 (0.38)	2.66 (0.38)	2.66 (0.38)	2.66 (0.38)
Switzerland	2.75 (0.36)	2.75 (0.36)	2.75 (0.36)	2.75 (0.36)
United Kingdom	5.65 (0.18)	5.65 (0.18)	5.65 (0.18)	5.65 (0.18)
Consumer Discretionary	2.98 (0.34)	2.98 (0.34)	2.98 (0.34)	2.98 (0.34)
Consumer Staples	2.06 (0.49)	2.06 (0.49)	2.06 (0.49)	2.06 (0.49)
Energy	1.48 (0.67)	1.48 (0.67)	1.48 (0.67)	1.48 (0.67)
Financials	3.61 (0.28)	3.61 (0.28)	3.61 (0.28)	3.62 (0.28)
Health Care	2.30 (0.44)	2.30 (0.44)	2.30 (0.44)	2.30 (0.44)
Industrials	3.69 (0.27)	3.69 (0.27)	3.69 (0.27)	3.69 (0.27)
Real Estate	1.58 (0.63)	1.58 (0.63)	1.58 (0.63)	1.58 (0.63)
Technology	1.56 (0.64)	1.56 (0.64)	1.56 (0.64)	1.56 (0.64)
Telecommunications	1.64 (0.61)	1.64 (0.61)	1.64 (0.61)	1.64 (0.61)
Utilities	1.89 (0.53)	1.89 (0.53)	1.89 (0.53)	1.89 (0.53)

(Tolerance level in parantheses)

## Appendix 6: Regression results (Bloomberg)

Variables	Model I	Model II	Model III	Model IV
Intercept	44.25 (58.29)	44.41 (58.18)	39.95 (58.22)	38.82 (58.16)
ESG Score	-1.86 (1.61)			
Environmental Score		-1.60 (0.94)		
Social Score			-0.41 (1.27)	
Governance Score				-0.03 (1.02)
Control Variables				
Beta	-12.29 (14.74)	-11.86 (14.73)	-11.66 (14.74)	-11.54 (14.75)
Leverage	0.66 (0.44)	0.66 (0.44)	0.65 (0.44)	0.65 (0.44)
Market to Book Ratio	0.09 (0.18)	0.09 (0.18)	0.09 (0.18)	0.09 (0.18)
Size	0.00 (1.88)	0.00 (1.87)	0.00 (1.87)	0.00 (1.87)
Country Variables				
Belgium	0.51 (61.12)	-0.51 (61.11)	1.88 (61.12)	2.17 (61.11)
Denmark	116.45 (59.38)*	115.43 (59.37)	117.47 (59.40)*	118.06 (59.38)*
Finland	-2.90 (60.59)	-3.91 (60.58)	-1.69 (60.59)	-1.72 (60.59)
France	-7.01 (53.28)	-7.74 (53.26)	-5.51 (53.27)	-5.17 (53.26)
Germany	-10.97 (53.86)	-13.18 (53.86)	-11.22 (53.88)	-10.82 (53.91)
Ireland	149.61 (68.72)*	150.66 (68.68)*	151.94 (68.70)*	152.09 (68.75)*
Italy	-0.89 (55.93)	-1.91 (55.91)	-1.82 (55.93)	-1.88 (55.95)
Netherlands	5.75 (57.69)	4.63 (57.69)	6.70 (57.70)	6.99 (57.69)
Norway	20.14 (61.04)	19.75 (61.03)	19.82 (61.05)	19.94 (61.05)
Poland	115.80 (68.67)	115.43 (68.65)	115.09 (68.70)	114.51 (68.67)
Portugal	14.44 (78.01)	14.19 (77.99)	15.30 (78.02)	15.23 (78.02)
Spain	-5.56 (57.47)	-6.64 (57.47)	-4.60 (57.48)	-4.46 (57.48)
Sweden	4.60 (55.12)	4.20 (55.10)	5.97 (55.12)	6.38 (55.11)
Switzerland	15.49 (54.51)	14.90 (54.50)	16.27 (54.52)	16.56 (54.51)
United Kingdom	77.42 (52.48)	77.52 (52.45)	79.25 (52.46)	79.54 (52.47)
Industry Variables				
Consumer Discretionary	-14.54 (27.26)	-15.04 (27.25)	-14.61 (27.26)	-14.57 (27.27)
Consumer Staples	-66.99 (31.40)*	-66.84 (31.39)*	-66.49 (31.41)*	-66.31 (31.40)*
Energy	-63.67 (40.14)	-63.83 (40.13)	-63.17 (40.14)	-63.20 (40.14)
Financials	-51.12 (28.28)	-51.54 (28.28)	-51.06 (28.29)	-51.02 (28.29)
Health Care	-24.71 (30.24)	-24.92 (30.24)	-24.60 (30.25)	-24.62 (30.25)
Industrials	-17.25 (25.87)	-17.26 (25.87)	-17.35 (25.88)	-17.28 (25.88)
Real Estate	-62.69 (36.24)	-62.83 (36.21)	-64.14 (36.24)	-64.65 (36.21)
Technology	-36.53 (35.05)	-36.18 (35.04)	-37.01 (35.05)	-37.11 (35.05)
Telecommunications	-69.36 (39.24)	-69.63 (39.23)	-68.78 (39.25)	-68.62 (39.24)
Utilities	-62.20 (35.11)	-62.31 (35.10)	-61.59 (35.11)	-61.54 (35.11)
R-squared	0.0176	0.0180	0.0173	0.0172
Adjusted R-squared	0.0101	0.0105	0.0098	

(Standard errors in parentheses) \*p&lt;0.05, \*\*p&lt;0.01

## Regression results (Refinitiv Eikon)

Variables	Model V	Model VI	Model VII	Model VIII
Intercept	23.45 (60.91)	27.56 (60.84)	21.15 (60.92)	28.78 (60.84)
Independent Variables				
ESG Score	1.73 (1.10)			
Environmental Score		0.85 (0.82)		
Social Score			1.74 (0.87)*	
Governance Score				0.12 (0.56)
Control Variables				
Beta	-7.89 (16.12)	-8.94 (16.1)	-8.03 (16.10)	-9.37 (16.1)
Leverage	0.68 (0.47)	0.69 (0.48)	0.69 (0.47)	0.70 (0.46)
Market to Book Ratio	0.11 (0.19)	0.11 (0.19)	0.10 (0.19)	0.11 (0.19)
Firm Size	0.00 (1.95)	0.00 (1.95)	0.00 (1.95)	0.00 (1.95)
Country Variables				
Belgium	3.88 (64.55)	2.43 (64.56)	4.02 (64.53)	3.15 (64.56)
Denmark	84.51 (61.93)	83.64 (61.94)	85.73 (61.93)	82.71 (61.95)
Finland	2.13 (63.38)	1.24 (63.38)	3.30 (63.37)	0.36 (63.39)
France	-2.25 (55.59)	-3.02 (55.59)	-1.16 (55.58)	-4.21 (55.59)
Germany	-9.43 (56.23)	-10.35 (56.24)	-7.33 (56.24)	-11.33 (56.24)
Ireland; Republic of	153.11 (70.83)*	152.87 (70.84)*	153.17 (70.81)*	152.47 (70.85)*
Italy	-1.70 (58.95)	-1.93 (58.96)	-1.03 (58.94)	-1.94 (58.97)
Netherlands	9.62 (60.02)	8.97 (60.03)	11.32 (60.02)	8.57 (60.04)
Norway	25.93 (65.42)	25.06 (65.43)	28.22 (65.43)	24.31 (65.44)
Poland	94.37 (72.92)	92.35 (72.94)	93.74 (72.90)	93.54 (72.95)
Portugal	14.68 (82.41)	14.05 (82.42)	15.39 (82.39)	13.65 (82.43)
Spain	-2.56 (59.69)	-3.68 (59.69)	-2.11 (59.68)	-4.45 (59.70)
Sweden	10.68 (57.89)	9.56 (57.89)	12.38 (57.89)	9.40 (57.90)
Switzerland	16.87 (56.81)	15.65 (56.81)	17.51 (56.80)	14.90 (56.82)
United Kingdom	78.25 (54.67)	76.89 (54.66)	79.64 (54.66)	75.77 (54.66)
Industry Variables				
Consumer Discretionary	-10.63 (28.4)	-10.81 (28.41)	-9.36 (28.39)	-9.89 (28.40)
Consumer Staples	-59.12 (33.03)	-59.95 (33.04)	-58.04 (33.03)	-59.04 (33.04)
Energy	-51.87 (42.52)	-52.71 (42.53)	-50.64 (42.53)	-53.20 (42.53)
Financials	-42.87 (29.43)	-41.23 (29.41)	-41.49 (29.40)	-40.97 (29.42)
Health Care	-10.13 (31.97)	-10.32 (32.00)	-9.35 (31.95)	-8.79 (31.97)
Industrials	-16.65 (26.88)	-16.25 (26.80)	-15.72 (26.87)	-15.68 (26.88)
Real Estate	-59.97 (38.54)	-59.54 (38.57)	-58.80 (38.51)	-57.69 (38.53)
Technology	-31.67 (37.39)	-30.85 (37.40)	-30.30 (37.35)	-29.20 (37.37)
Telecommunications	-61.14 (40.90)	-62.87 (40.88)	-60.24 (40.90)	-63.32 (40.89)
Utilities	-51.78 (36.52)	-53.43 (36.51)	-50.61 (36.53)	-53.50 (36.52)
R-squared	0.0143	0.0139	0.0147	0.0137
Adjusted R-squared	0.0065	0.0061	0.0069	0.0059

(Standard errors in parentheses) \*p&lt;0.05, \*\*p&lt;0.01

## Regression results (S&amp;P Global)

Variables	Model V	Model VI	Model VII	Model VIII
Intercept	13.19 (87.56)	18.01 (87.64)	16.68 (87.59)	12.51 (87.52)
Independent Variables				
ESG Score	2.32 (0.80)**			
Environmental Score		1.51 (0.79)		
Social Score			1.87 (0.79)*	
Governance Score				2.14 (0.68)**
Control Variables				
Beta	-10.73 (23.42)	-11.02 (23.44)	-10.79 (23.43)	-10.00 (23.41)
Leverage	1.01 (0.69)	1.03 (0.69)	1.02 (0.69)	0.96 (0.69)
Market to Book Ratio	0.22 (0.36)	0.22 (0.36)	0.23 (0.36)	0.21 (0.36)
Size	0.00 (2.70)	0.00 (0.00)	0.00 (0.00)	0.00 (2.70)
Country Variables				
Belgium	1.57 (93.17)	0.91 (93.27)	2.13 (93.23)	2.22 (93.14)
Denmark	71.60 (89.70)	68.62 (89.79)	70.83 (89.77)	72.61 (89.68)
Finland	15.57 (90.76)	12.00 (90.85)	11.91 (90.79)	17.64 (90.75)
France	10.10 (80.16)	6.16 (80.23)	7.21 (80.19)	11.71 (80.15)
Germany	-8.68 (80.85)	-10.28 (80.94)	-10.48 (80.90)	-5.65 (80.85)
Ireland; Republic of	195.93 (103.18)	194.42 (103.29)	194.99 (103.24)	200.27 (103.17)
Italy	-4.27 (83.94)	-4.18 (84.03)	-5.76 (83.99)	-0.80 (83.92)
Netherlands	27.92 (86.17)	22.46 (86.23)	24.69 (86.20)	30.50 (86.17)
Norway	28.61 (93.01)	25.22 (93.09)	28.55 (93.07)	31.24 (93.00)
Poland	130.41 (106.23)	131.84 (106.34)	131.33 (106.30)	132.21 (106.20)
Portugal	26.08 (118.04)	22.16 (118.16)	22.89 (118.10)	31.13 (118.05)
Spain	3.03 (85.72)	-2.21 (85.78)	-0.99 (85.74)	5.40 (85.72)
Sweden	11.01 (82.96)	9.36 (83.04)	9.62 (83.00)	13.43 (83.00)
Switzerland	20.46 (82.19)	16.52 (82.19)	17.83 (82.15)	22.71 (82.11)
United Kingdom	49.44 (78.93)	46.95 (79.01)	46.43 (78.96)	50.70 (78.92)
Industry Variables				
Consumer Discretionary	-13.02 (40.07)	-13.82 (40.11)	-12.72 (40.10)	-12.91 (40.05)
Consumer Staples	-96.80 (46.76)*	-97.30 (46.81)*	-96.14 (46.79)*	-96.54 (46.75)*
Energy	-51.38 (58.99)	-52.30 (59.05)	-52.63 (59.02)	-51.90 (58.97)
Financials	-49.45 (41.60)	-46.41 (41.62)	-47.04 (41.60)	-51.04 (41.60)
Health Care	-4.23 (44.79)	-3.29 (44.83)	-3.50 (44.81)	-4.10 (44.77)
Industrials	-31.03 (37.91)	-29.70 (37.94)	-29.94 (37.92)	-31.29 (37.90)
Real Estate	-84.12 (55.52)	-82.75 (55.59)	-82.42 (55.55)	-82.68 (55.49)
Technology	-40.16 (53.00)	-35.03 (53.00)	-35.16 (52.97)	-42.75 (53.02)
Telecommunications	-69.27 (58.19)	-70.77 (58.24)	-69.11 (58.23)	-67.93 (58.18)
Utilities	-53.99 (51.47)	-55.03 (51.52)	-53.75 (51.50)	-53.55 (51.45)
R Squared	0.0141	0.0121	0.0129	0.0147
Adjusted R Squared	0.0015	-0.0005	0.0004	0.0022

(Standard errors in parentheses) \*p&lt;0.05, \*\*p&lt;0.01