LUND UNIVERSITY

SCHOOL OF ECONOMICS AND MANAGEMENT

Department of Business Administration

BUSN79

Spring 2023

Master Thesis

To ESG or Not to ESG? That is The Question for Cost of Debt

Examining the European primary bond market and the influence of the institutional environment between the years 2010-2021

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Abstract

Title: To ESG or Not to ESG? That is The Question for Cost of Debt

Seminar Date: June 1st 2023

Course: BUSN79, Degree Project in Accounting & Finance

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Key words: Cost of debt, ESG, corporate bond yield spreads, institutional environment, risk

Purpose and research question: The purpose of this study is to investigate whether an improved ESG performance leads to a lower cost of debt, proxied by the yield spread of newly issued corporate bonds and if this effect is more pronounced for firms operating in a stronger institutional environment. We therefore ask the following two research questions: Does a higher ESG score lead to a lower cost of debt, and is this effect moderated by the institutional environment?

Methodology: For our panel data we apply POLS-regression models, random effects models, introduce an interaction term to test for the partial effect of the institutional environment, and an ordered probit model to exchange our dependent variable. Finally, we test the sensitivity of our results with various robustness tests.

Theoretical perspectives: The theoretical perspectives used to develop our hypotheses and contextualize our findings are ESG, Cost of debt, Legitimacy theory, Institutional theory and Agency theory.

Empirical foundation: The study uses a final sample of 1086 firm-year observations of 176 ESG-rated firms with their headquarters located in Europe that have issued corporate bonds on the primary market over the time period 2010-2021.

Conclusions: We provide evidence that there is a significant negative relationship between ESG performance, the individual dimensions environmental and social, and the associated corporate bond spread. Furthermore, our findings suggest that the overall institutional environment partly determines a firm's inherent financial risk and that two institutional dimensions are capable of positively moderating the relationship between ESG performance and bond spreads namely the *Institutional score* and *Government Effectiveness*.

Acknowledgements

First and foremost, we would like to thank our advisor Reda Moursli for supporting our research process from start to finish. In addition, he continuously challenged our study which generated both crucial and nuanced insights for our final version.

Secondly, we would like to acknowledge our dear friends that have always been encouraging and reflective whenever we faced obstacles.

Finally, we would like to express our gratitude towards each other for making ordinary moments extraordinary, countless of laughter, and a never ending friendship.

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Abbreviations

CC - Control of Corruption

CEO - Chief executive officer

CSP - Corporate Social Performance

CSR - Corporate Social Responsibility

ESG - Environmental, Social and Governance

EU - European Union

FE - Fixed Effects

GE - Government Effectiveness

IFC - International Finance Corporation

IV - Instrumental variable

IS - Institutional score

POLS - Pooled Ordinary Least Squares

PS - Political Stability

RE - Random Effects

RL - Rule of Law

RQ - Regulatory Quality

S&P 500 - The Standard and Poor's 500 stock market index

U.S - United States

VA - Voice and Accountability

WGI - Worldwide Governance Indicators

2SLS - 2-Stage Least Square

1. Introduction

This section covers the background of this study, including a problem discussion regarding the current disagreements in previous research within the chosen field of study as well as the purpose and applied methodology. This is followed by the main findings, our contribution to the topic and finally the following outline of this paper.

1.1 General Background

In 1987, the United Nations Brundtland Commission defined sustainability as "meeting the needs of the present without compromising the ability of future generations to meet their own needs." (United Nations, n.d.). Since then, the importance of this topic has been gradually growing and today nearly 140 countries strive to fulfill their development needs in accordance with the Sustainable Development Goals. This induced firms to evaluate, reveal, and address sustainability risks and opportunities associated with their business. One preeminent response was firms' engagement in environmental, social and governance (ESG) activities that reflects a company's capacity to create value and implement successful strategies beyond sole financial performance (IFC, 2021).[1] Indeed, according to a survey of 766 chief executive officers (CEOs) worldwide, 93% of them believe that Corporate Social Responsibility (CSR) issues are crucial for their businesses' future success (Lacy et al. 2010).[2] Even during economic downturns, corporate dedication to CSR activities remains strong, with 74% of CEOs reporting closer alignment between CSR and core business. Their view seems to coincide with investors who claim firms with a strong ESG performance as less risky and are therefore willing to accept a haircut on their returns in exchange for the realization of ESG goals (PwC, 2021). This trend is further emphasized by the capital markets. Evidently, Bloomberg Intelligence's (BI) ESG 2021 Midyear Outlook report predicts that ESG assets estimated to $35 trillion in 2020 will surpass $50 trillion by 2025, accounting for over a third of the projected $140.5 trillion in total global assets under management. The report also highlights the potential for the ESG debt market to

[1] The terms: ESG activities and ESG practices will be used interchangeably
[2] ESG measures CSR performance

reach $11 trillion by 2025, driven by companies, development projects, and central banks focused on pandemic recovery, net-zero emissions, and low interest rates.

1.2 Problem Discussion

Alongside the rise of ESG practices, academic debate attempts to untangle the rationales behind this engagement. The majority of market-based research are in conjunction that effective implementation of ESG practices can enhance a company's financial performance (Hillman & Keim, 2001; Orlitzky 2003; Van Beurden & Gössling 2008) and firm value (Atkins, 2018; Fatemi et al. 2018; Pérez, 2022). This is because such practices can establish and maintain a competitive advantage for the company (Hart, 1995; Russo & Fouts, 1997; Shrivastava, 1995) by cultivating internal resources and intangibles, such as reputation, customer loyalty, or long-term relationships with various key-stakeholders (Donaldson & Preston, 1995; Freeman, 1984; Jones, 1995). However, one area within this research that persits ambiguous, is how ESG performance influences the cost of capital of a firm. In particular, scholars try to examine whether firms are able to significantly reduce their cost of debt by improving their ESG performance or if giving into public pressure remains unrewarded.[3] For instance, Bauer & Hann (2010) find that environmental performance is rewarded with a lower bond yield whilst in contrast, Sharfman and Fernando (2008) observes that companies with strong environmental performance associate with higher bond yields and leverage. Oikonomou et al. (2014) reveals that corporate social performance can materially reduce the risk premia associated with corporate bonds while Gonçalves et al. (2022) provide evidence of how socially responsible firms are being penalized with higher bond spreads as managers are perceived to overinvest in a social responsibility beyond the core business. This lack of consensus has left managers and investors without a clear direction whether ESG activities can benefit the firm in relation to their cost of debt, encouraging additional research on how responsible firms are perceived by the financial market.

The institutional environment of the firm is suggested to play a critical role in the aforementioned relationship between ESG performance and cost of debt. Indeed, there have been increasing pressures from the institutional environment that tries to pull firms away from

[3] Cost of debt can be proxied by the market measure (corporate bond yield or yield spread), accounting measure (Interest expense / average total long term debt), and credit ratings.

voluntary ESG integration by making ESG management and disclosure mandatory.[4] For instance, the EU taxonomy will be requiring all listed companies inside the EU by 2027 to disclose company specific ESG information (European Commission, 2022). This implies that the institutional environment of a country "aim[ing] to benefit all parties that are affected by the future success or failure of an organization", can play a critical role in the integration of ESG factors into a firm's management (HPO Center, 2013). Previous studies find evidence that support how country-level characteristics significantly affect firms' ESG disclosure practices (Baldini et al. 2018; Cai et al. 2016), the markets perception of these practices (Stellner et al. 2015; Eliwa et al. 2021), and firm's access to capital markets (la Porta et al. 1997). As a consequence, ESG considerations began emerging among different stakeholders in their risk assessment of a firm. Credit rating agencies include new factors such as ESG risks and the management of those into their credit assessments of firms, where a stronger ESG performance allows firms to decrease their perceived risk (Moody's, 2023; S&P, 2023).[5] In addition, a recent study finds that lending institutions are no longer relying solely on firms' profitability measures but also incorporate sustainable characteristics of the company, such as social, organizational and management issues, when assessing the financial risk of the firm (Birindelli et al. 2015). This suggests that ESG's relationship with the firm's cost of debt could be influenced by the institutional environment.

Against the backdrop of this, there seems to be a consensus regarding ESG's impact on the financial performance of a firm but the question regarding how ESG influences cost of debt remains unsolved. Besides, there is a scarcity of empirical studies with a comprehensive sample of EU firms that investigates the level effect of ESG performance on the cost of debt, proxied by yield spreads on newly issued corporate bonds in a cross-country setting.[6] Our paper therefore not only aims to see if ESG performance impacts the market measure of cost of debt but also if the institutional context of a country has a moderating effect on the relationship between ESG and cost of debt. Our study thus both complements and draws upon the current research within the field of ESG and cost of debt.

[4] The terms: Governance; Institutional environment; and; Institutional context all measure the degree of governmental/institutional influence in the society.
[5] The terms: ESG score and ESG performance will be used interchangeably since the former is a measurement of the latter
[6] Hereby, "Corporate bond yield spreads" will be shortened and referred to only as "bond spreads"

1.3 Purpose & Methodology

The presented findings identify a void that this study aims to fill by providing evidence that ESG scores both as standalone factors and by pillar are crucial in assessing financial risk as indicated by the yield spread of newly issued corporate bonds. Our findings aspire to clarify any ambiguity surrounding the impact of these variables (Bauer & Hann 2010; Gonçalves et al. 2022; Menz 2010) and to extend the analysis (Aman & Nguyen, 2013; Oikonomou et al. 2014; Sharfman & Fernando, 2008), by encompassing all ESG pillars and a combined ESG score for newly issued bonds. Specifically, we investigate whether having robust ESG practices leads to a reduction in cost of debt. This is relevant to untangle in many aspects but mainly since it potentially allows firms to access capital markets at reduced rates, lower its cost of capital, and thus increase the firm's overall value, ceteris paribus. We also aspire to complement the study by substituting the bond spreads with bond ratings, as another measure of cost of debt to check robustness, and to see whether bond investors and credit rating agencies differ in their risk assessment. In addition to our exploration of the direct link between ESG performance and bond spreads, we want to examine if the ESG effect on cost of debt is more pronounced for the average firm operating in a country with a stronger institutional environment. Based on previous findings of the most dominant institutional characteristics (Amor-Esteban et al. 2018; Doupnik & Salter, 1995; La Porta et al. 1997), we will use six individual dimensions and an aggregate measure approximating the overall institutional environment: *(1) Voice & Accountability (VA) (2) Political Stability & Absence of Violence and Terrorism (PS) (3) Government Effectiveness (GE) (4) Regulatory Quality (RQ) (5) Rule of Law (RL) (6) Control of Corruption (CC) (7) Institutional Score (IS)*, to estimate the level of institutional influence in a country, where three of the dimensions have earlier been applied (Salvi et al. 2021). In contrast to former studies scrutinizing the direct link between the institutional factors and CSR practices and disclosure (Baldini et al. 2018; Campbell, 2007; Jackson & Apostolakou, 2010), we want to study the moderating effect of the institutional environment on the relationship between ESG performance and cost of debt.

Moreover, the European market is interesting to investigate in two regards. First, this paper's findings may pave the way for firm’s ESG-related strategies until the mandatory disclosure year 2027 (European Commission, 2022). By already understanding how investors in the market

value ESG performance in regards to the bond spreads, firm's may adapt their asset management as one of the factors to obtain a lower cost of debt without changing the capital structure. Secondly, as the institutional environment among European companies is relatively strong compared to the world, our study provides new insight into the most institutional intense contexts and their moderating effect on the relationship between ESG performance and cost of debt.

The study uses an econometric approach with different multiple linear regression models. When estimating the relationship between ESG performance and the cost of debt of a firm, we look both at the overall ESG score as well as its individual pillars in relation to cost of debt, which is proxied by the yield spread of newly issued corporate bonds. We test our data in different functional forms such as: one-way (two-way) robust standard errors clustered by firm (firm & year) and random effect model with robust standard errors clustered by firm, to strengthen the reliability and validity of our findings. Cost of debt can also be measured through different ways and therefore we include an ordered probit model with the bond rating as a dependent variable, instead of the bond spreads. In addition, the paper includes lagged ESG scores and an instrumental variable approach as robustness.

1.4 Main Findings

Our results show a significant negative relationship between the combined ESG score of a firm as well as a significant negative relationship between the individual ESG pillars, environmental and social, and the associated cost of debt, but an insignificant relationship for the governance pillar. The findings imply that bond investors reward a ten unit increase in ESG scores, ceteris paribus, as a risk mitigation effect of -4% decrease in bond spreads (bps) for the average firm. These results remain robust with regard to various economic and financial control variables, in addition to two-way clustering and random effects. Interestingly, when we exchange our dependent variable with bond ratings, we find support that credit rating agencies reward ESG performance similarly as bond investors in the public debt market. Furthermore, we establish a distinguishable negative relationship between six of the institutional dimensions, including the aggregated measure, and the bond spreads. This suggests that as the institutional level of a country increases, firm's may access capital markets at a lower cost of debt. However, we

discover that only two institutional dimensions have a moderating effect on the relationship between ESG performance and bond spreads, namely the *Institutional score* and *Government Effectiveness*. More specifically, our findings indicate that the impact ESG practices has on the cost of debt is diminishing in countries with a higher degree of *Institutional score* and/or *Government Effectiveness.*

1.5 Contribution

This study makes a valuable contribution to the existing literature by examining the relationship between ESG as a standalone value, as well as its individual dimensions, and the bond spreads as a measure of a firm's cost of debt. Prior research has mostly focused on how ESG practices influence a firm's performance, but our study sheds light on a less researched area that focuses on both cost of debt but also on the moderating role of a country's institutional environment. This enhances our understanding of how cross-country characteristics may account for the variations in the benefits associated with ESG practices and builds upon legitimacy-, institutional-, and agency theory that emphasizes the crucial role of societies preferences. We believe that our findings can be valuable for firms, investors and regulators. From a firm perspective, ESG may facilitate as a framework for analyzing and mitigating related risks, in addition to improving the legitimacy among stakeholders, reducing agency cost of debt, all constituting to a lower bond spread and cost of debt. However, depending on the institutional environment, the firm should be aware that the effect might be moderated. For an investor, ESG can be utilized as a risk assessment tool, to guide investors to companies with low financial risk. By incorporating the ESG performance of a firm and the information of the institutional environment when constructing an investment portfolio, they may accomplish better value creation. Regulators can shape policies and regulations related to ESG and consider promoting ESG practices and standards, as it can lead to lower bond spreads for firms and a more sustainable society as a whole.

1.6 Outline

The remainder of this paper is structured as follows: Section 2 discusses the theoretical perspectives on ESG practices and reviews prior studies which ultimately develop two

hypotheses. Section 3 explains our methodology and research design. Section 4 focuses on the data selection and describes our variables. Section 5 presents and analyzes the main tests and results, in addition to the robustness tests we have conducted. Finally, Section 6 concludes our paper with our main findings, contributions, limitations and encouragements to further research.

2. Literature Review & Hypothesis Development

This chapter begins with a theoretical literature dissecting ESG and cost of debt separately. It is then followed up by three relevant theories that assist the understanding in both the relationship between ESG and cost of debt and the institutional environment's influence. The subsequent part consists of an empirical review of relevant literature with regard to the variables of interest. Finally, the theoretical literature presented as well as the empirical literature review form the basis of the hypothesis development.

2.1 Theoretical Literature

2.1.1 ESG

The acronym ESG was coined in 2004 by the United Nations Global Compact and has since been an acknowledged phenomenon related to firms' responsibilities beyond their core-business (IFC, 2021). ESG is a framework used by companies and investors to make investment decisions while taking into consideration the associated risks, impacts, and opportunities related to various factors, including but not limited to environmental, social, and governance issues. According to the International Finance Corporation (IFC), the Environmental aspect of ESG involves assessing the potential or actual changes that a company's activities may have on the physical or natural environment, such as pollution, climate change, or natural resource use. The Social aspect of ESG involves evaluating the potential or actual impacts on surrounding communities and workers, including issues related to health and safety, supply chain, diversity, and inclusion. Finally, the Governance aspect of ESG involves analyzing corporate governance structures and processes, such as board structure and diversity, ethical conduct, risk management, disclosure, and transparency.

2.1.2 Cost of Debt

Cost of debt measures the interest that debtholders and creditors require for lending them capital. This cost is mainly explained by the associated financial risk, specifically the default risk, that

lenders perceive in the firm (Longstaff, 2005). As the perceived default risk grows, lenders will charge higher default spreads (on top of the risk-free rate) to lend to the firm (Damodaran, 2006). Cost of debt can be proxied through various methods. One direct way is through the accounting measure (Interest expense / average long-term debt) and another one is indirectly by retrieving an implied cost of debt through the credit ratings. However, the most dominantly used measure for the cost of debt, especially by the market participants, is the corporate bond spread of newly issued bonds (Damodaran, 2006). In Merton's (1973) paper on option pricing, he extends upon the Black-Scholes model and identifies three distinct factors that determine interest rates on debt namely, the risk-free rate, bond characteristics and the default risk. Typically, the risk-free rate is estimated using the yield on government bonds with equivalent maturity, while the default risk is assessed by both firm's capacity to generate cash flows from its operations and their corresponding volatility which determines the likelihood that the borrower will be unable to meet its payment obligations (Damodaran, 2006).

2.1.3 Legitimacy Theory

There is a long history of looking at ESG through the lens of legitimacy theory, developed by Ashforth and Gibbs' (1990). The theory looks at the relationship between a firm and the broader public and posits that a firm's actions can be explained as a way of gaining legitimacy in the eyes of the public, which is needed to keep operating within the society (Deegan, 2014). Advocates of this idea often cite the "social contract" that exists between companies and the communities they operate in, which encompasses the implicit and explicit expectations of society regarding the company's operations. One way for firms to uphold the social contract could be by adopting ESG practices, including carbon footprint reductions, sustainable supply chains and, transparent governance - all mitigating their reputational risk by convincing key stakeholders of their legitimacy. It is believed that a company's legitimacy is impacted not only by changes in its operations but also by the information it chooses to disclose (Ashforth & Gibbs', 1990). However, as these expectations are dynamic, firm's must be responsive, or a legitimacy gap may arise (Fernando & Lawrence, 2014). This phenomenon refers to the difference between how society expects the firm to operate and how society observes its actions. If this emerges, a firm may be severely sanctioned by key stakeholders such as consumers and suppliers, leading to increased earnings volatility and imposed risk thus charged with a higher cost of debt. Bond

holders should therefore incorporate firms' ESG information in their investment decision to evaluate two types of risks imposed by firms, default risk and reputational risk.

2.1.4 Institutional Theory

The institutional theory originating from Meyer and Rowan (1977) proposes that organizations are being shaped by social, cultural, and political forces where they are operating. This approach states that firms shall adapt to the norms, values, and practices of their wider institutional environment in order to gain legitimacy among key stakeholders. The theory emphasizes the power of the institutional environment, consisting of normative and regulatory pressures exerted on organizations by the state or society (Meyer & Rowan, 1977). With this regard, firms tend to act in socially responsible ways the more they encounter strong state regulation, collective industrial self-regulation, monitoring, and a normative institutional environment that encourages socially responsible behavior (Campbell, 2007). This is because ESG risks, such as environmental disasters or social controversies, can have significant financial implications for companies' cash flows. As a result, companies that are perceived to be more socially responsible and sustainable may be viewed as lower risk borrowers, which could lead to a lower cost of debt. DiMaggio and Powell (1983) expand on the institutional theory and use the term isomorphism to explain how firms lose diversity and creativity within organizational fields.[7] They argue that bureaucratization and other forms of organizational change arise as a consequence of processes that make organizations more similar without necessarily making them more efficient (DiMaggio & Powell, 1983). One could posit that in societies where the institutional environment is strong, the expectations on firm's adoption of ESG standards may be higher since firms are expected to adhere to the homogenous behavior. Thus, improving your ESG performance may generate a weaker signaling effect compared to a firm improving its ESG performance in a less efficient institutional environment.

2.1.5 Agency Theory

The Agency theory, originating from Jensen & Meckling (1976) examines the relationship between the principal and the agent. Their theory builds upon the separation between ownership and control, that is when the principal delegates decision-making authority to the agent to

[7] Isomorphism refers to the tendency for firms within a similar field to adopt similar behaviors

perform a service on their account. Since both parties are assumed to be utility maximizers, the agent with decision making power might not always act in the interest of the principal. Hence, agency costs arise including monitoring expenditures by the principal, bonding expenditures by the agent, and the residual cost - all being accentuated in the presence of information asymmetry and uncertainty (Jensen & Meckling, 1976). One preeminent principal-agent relationship for this research is the one between the bond holder (principal) and the issuer (agent) converging into agency cost of debt. Accordingly, there is a risk that managers engage in ESG activities to increase media attention and publicity, thereby enhancing their personal reputation at the expense of the principals, which tends to be particularly true for less entrenched CEOs (Jiraporn & Chintrakarn, 2013). If managers with an information advantage are restrictive in providing information to lenders, they tend to be penalized for an opaque information environment with higher bond yields (Liu & Jiraporn, 2010). To mitigate this, managers can provide detailed ESG information (Mazumdar & Sengupta, 2005) that reduces costly information asymmetries, agency costs, and adverse selection (Dye, 1985; Diamond & Verrecchia, 1991; Verrecchia, 1983; Sengupta, 1998), and thus make bond holders more inclined to accept a lower bond yield (Aman & Nguyen, 2013; La Rosa et al. 2018). Ultimately, ESG expenditures either give rise to or mitigate agency costs of the firm depending on the rationales behind them.

2.2 Empirical Literature

2.2.1 The Relationship between ESG and Cost of Debt

Prior research employs various methodologies to investigate the association between ESG performance and the cost of debt. Apergis et al. (2022) conducted a study on 1540 bonds and 157 firms listed on the S&P 500 in the primary bond markets from 2010 to 2019. Their results demonstrate that the ESG score, and its individual pillars are highly statistically significant and have a negative impact on bond yields. They argue that ESG practices relate positively to a firm's solvency, allowing it to manage environmental, social, legal, reputational, operational, and regulatory risks, whereas those with poor ESG performance may face increased liabilities that can impact their default risk and the value of their fixed income securities. In the same field, Eliwa et al. (2021) conducted a study on a sample of 6018 observations in 15 EU countries from 2005 to 2016, finding that the ESG and its individual dimensions are negatively associated with

the cost of debt. They contend that integrating ESG practices may reduce the information asymmetry, the agency conflict and mitigate default- and reputational risks, consequently decreasing the cost of debt. In addition, according to the stakeholder theory and stewardship theory ESG practices can be utilized as a signaling effect, proving the efficiency and integrity of their management.

Other papers put a greater emphasis on the individual dimensions of ESG. Firm's environmental concerns seem to penalize firms with higher cost of debt (Bauer & Hann, 2010; Chava, 2014) whilst high environmental performance is rewarded with a lower bond yield (Bauer & Hann, 2010; Eichholtz et al. 2019). Specifically, Bauer & Hann (2010) studies bond spreads on newly issued corporate bonds. The research uses a sample of 582 U.S public companies between 1995 and 2006 and they conclude that proactive environmental practices are associated with a lower bond spread since they mitigate their exposure to potentially costly legal, reputational, and regulatory risks. Furthermore, the social dimension has been studied by various papers (La Rosa et al. 2018; Oikonomou et al. 2014). La Rosa et al. (2018) scrutinized how non-financial factors impact the cost and accessibility of debt capital. Analyzing data from eight years (2005-2012) of European non-financial firms, the study reveals that there is a negative correlation between corporate social performance and cost of debt and a positive one to credit ratings. They mean that fostering a corporate culture that prioritizes transparency and cooperation can mitigate suspicion of opportunism, establish trust among stakeholders, encourage stakeholder involvement, and ultimately diminish information asymmetries, agency costs, and financial constraints. Finally, many studies shed light on the governance aspect of a firm and find support for a negative relationship to cost of debt (Aman & Nguyen, 2013; Andrade et al. 2014; Boubakri & Ghouma, 2010; Erragragui, 2018). Erragragui (2018) studied a group of 214 U.S. companies from 2000 to 2011, and their findings confirms that environmental and governance strengths can lower a company's cost of debt. These studies suggest that with effective governance practices, such as strong board oversight, transparent reporting, and effective risk management, firms might be viewed as more trustworthy, better shareholder aligned and less risky, thus lowering the associated cost of debt.

Research has also developed opposing results. Gonçalves et al. (2022) conducted a study on the largest European firms listed on the STOXX Euro 600 between 2002 and 2018, examining the correlation between ESG performance and the cost of capital. Their findings contrast with the preceding results, indicating that ESG is assessed by both debt and equity markets, but in opposite directions. While a better ESG performance leads to a lower cost of equity, the relationship is positive for the cost of debt. Their results suggest that socially responsible firms are subjected to a penalty from lenders. Furthermore, it appears that lenders and investors punish firms that exceed industry-standard corporate sustainability performance, while rewarding those that underinvest. Their findings stem from the overinvestment theory that draws its support from agency theory, suggesting that managers may overinvest in philanthropy beyond an optimal level for their self-interests, leading to a higher cost of debt demanded by creditors (Sharfman & Fernando, 2008; Menz, 2010; Magnanelli & Izzo, 2017).

2.2.2 The Moderating Effect of The Institutional Environment

It's prevalent that ESG performance varies across firms and Cai et al. (2016) found that variations in country-level factors, such as economic development, culture, and institutions, accounts for a significant portion of the observed differences in corporate social performance (CSP) across firms. Specifically, their findings show that countries with higher income per capita, stronger civil liberties and political rights tend to have firms with higher CSP ratings. In addition, the institutional environment impacts a firm's availability to functional capital markets (La Porta et al. 1997). In particular, with better legal rules and quality of enforcement the access of external financing is at a lower risk. Other researchers argue that these country-level characteristics not only determine the level of ESG engagement by firms but also accentuates the relationship between ESG and cost of debt. For instance, Stellner et al. (2015) examined the effect of ESG on the cost of debt, as well as the moderating influence of the country's ESG performance. Interestingly, firms only benefit from CSR investments if they operate in a country with superior ESG performance in which ESG activities are recognized and finally transfer to financial risk-reducing advantages. Finally, Salvi, Giakoumelou and Bertinetti (2021) used a sample of 5 280 bond issues from 2003 to 2018, across 40 countries worldwide to, among other things, examine whether the institutional level of a country had a moderating effect on the relationship between corporate social performance and bond pricing. They used three measures

for a country's institutional context being freedom of speech, regulatory quality, and government commitment where only the former one had a significant partial effect on the aforementioned relationship. They argue that this could be explained by the institutional theory, in that organizations are embedded within broader social structures that influence both firm's decision making and the market's appraisal of ESG practices (Salvi et al. 2021).

2.3 Hypothesis Development

2.3.1 The Relationship between ESG and Cost of Debt

The debt market is an essential platform for a firm's external financing. By adopting an ESG-focus into their operations, firms may impact their bond spreads in the primary market. First, companies that provide ESG-related information (Mazumdar & Sengupta, 2005) can reduce costly information asymmetries, agency costs, and adverse selection (Dye, 1985; Diamond & Verrecchia, 1991; Verrecchia, 1983; Sengupta, 1998) resulting in bond holders being more prone to accept a lower bond yield (Aman & Nguyen, 2013; La Rosa et al. 2018). Second, ESG activities also improve the company's financial performance and thus their repayment capacity (Hillman & Keim, 2001; Orlitzky 2003; Van Beurden & Gössling, 2008) as they can preserve competitive advantages for the firm in accordance with the resource-based view including reputation, customer loyalty, or long-term relationships with various key-stakeholder (Hart, 1995; Russo & Fouts, 1997; Shrivastava, 1995). Third, if the firm is associated with a strong ESG performance they reduce their financial distress costs, default risk and loss given default (Boubaker et al 2020; Sun & Cui, 2014; Rizwan, 2017) but are also perceived as less risky by investors who are willing to accept a haircut on their returns in exchange for the realization of ESG goals (PwC, 2021). Fourth, continuous engagement in socially and environmentally responsible activities signals to stakeholders that the enterprise has a responsibility beyond the shareholders (Donaldson & Preston, 1995; Freeman, 1984). When the market recognizes this signal, the enterprise can gradually form reputational capital, which serves both as a way to uphold the "social contract" (Deegan, 2014) and a form of insurance when the firm experiences setbacks (Godfrey 2005; Minor & Morgan 2011). The reputational capital of a firm can assist in coping with pre-event adverse shocks and mitigating post-event losses caused by adverse events. Finally, a considerable reason why firms experience financial

distress and possible failure is due to managerial inadequacy (Altman & Hotchkiss, 2010). Therefore, improvements in the governance spectrum of a firm should reduce a firm's associated risk and thus its cost of debt.

One can assume that rational investors assess the value of a bond primarily based on the borrower's capability to repay the principal at the maturity date. If the advantages based on preceding arguments outweigh the costs, the investor is likely to reward the borrower's improved risk profile via a lower spread (Apergis et al. 2022; Attig et al. 2013; Bauer & Hann, 2010; Oikonomou et al. 2014). However, as soon as the investor perceives the costs to outweigh the benefits, highlighting managers' excessive investment in ESG for their own interests, the investor justifiably will demand higher spreads for the increased agency costs (Sharfman & Fernando, 2008; Menz, 2010; Magnanelli & Izzo, 2017). In addition, since ESG concerns receive more attention, capital markets are becoming more aware of the reputational risks associated with borrowing firms, in addition to default risk. This awareness stems from the possibility that lenders may be seen as enablers of negative ESG practices by society, leading to negative reactions from various stakeholders. To mitigate these risks, lenders have incentives to incorporate ESG information into their evaluation process of a firm's financial risk.

Following the mixed empirical results on the relationship between ESG and cost of debt, we identify a need for further research. Based on the above-discussed theories, we hypothesize that a firm's ESG engagement should lead to a decrease in cost of debt. As the dimensions of ESG measures considerable different parts of an organization, we in addition test each pillar apart, environment, social, and governance's relationship to cost of debt:

H1*: The ESG score of a firm is associated with a negative impact on cost of debt*

H1a*: The Environmental score of a firm is associated with a negative impact on cost of debt*

H1b*: The Social score of a firm is associated with a negative impact on cost of debt*

H1c*: The Governance score of a firm is associated with a negative impact on cost of debt*

2.3.2 The Moderating Effect of The Institutional Environment

Previously, scholars have been exploring how country characteristics impact firm behavior. In particular, how CSR practices and disclosures are being shaped by the institutional environment of a country (Amor-Esteban et al. 2018; Campbell, 2007; Doupnik & Salter., 1995). Their studies suggest that the most significant institutional factors for CSR performance are freedom of speech and media, government stability and lack of terrorism, effective regulations and laws, and protection of property and the private sector. According to the institutional theory, organizations which incorporate institutionalized myths are more legitimate, successful, and likely to survive (DiMaggio & Powell, 1983). Hence, we argue that ESG practices are shaped on an institutional-level rather than only on an organizational-level. If this holds, we posit that country-level characteristics will determine the firm-level of ESG performance, as well as the market reward of these practices. Companies that perform well in ESG will align more closely with the institutional environment (DiMaggio & Powell, 1983), such as the government regulatory standards, reducing the company's hidden legal risks and uncertain future cash expenditures, giving investors an incentive to accept a lower bond yield. If firms neglect this, they risk being penalized for their opacity, sanctioned by key stakeholders imposing uncertainty to ongoing operations, increasing the risk of default which forces lenders to require a higher bond yield (Liu & Jiraporn, 2010). Lenders should therefore, following the logic of the institutional theory, take into account a firm's engagement in ESG practices when assessing their financial risk. Moreover, since legitimacy is gained through aligning the firm with the expectations of society, and different societies have different expectations, the extent to which involvement in ESG practices is rewarded should differ between countries (Baldini et al. 2018; Eliwa et al. 2021; Salvi et al. 2021; Stellner et al. 2015).

In particular, we posit that: (1) in a country with higher degrees of freedom of speech, investors can elect governments that value sustainability matters in their decision-making, but also freely discriminate against poor ESG-performance in media. (2) In a country where political instability is a concern, firms might face difficulties implementing and maintaining ESG practices caused by the uncertainty of the operating environment. (3) In countries with an effective government, there is a greater likelihood of developing and implementing policies that support sustainable practices and ESG considerations. Such policies can include both regulations and incentives for

ESG investments. When a firm demonstrates strong ESG performance in line with government priorities, it may positively influence the perception of the firm's financial risk. (4) In countries with high regulatory quality, firms are more likely to face legal and financial consequences for non-compliance with ESG standards. Thus, poor ESG performance can impose higher operational, legal, and reputational risks for the firm. (5) In a country with a higher degree of obedience by law, there should be a more robust legal framework that protects stakeholders' interests and ensures accountability which enhances the credibility of a firm's ESG commitments and the value of the information. (6) In countries where corruption is effectively managed, firms with strong ESG performance are more likely to be perceived as trustworthy, accountable, and committed to ethical business practices.

Consequently, following the institutional and legitimacy theory, it becomes evident that the impact ESG engagement has on a lender's assessment of a firm should differ across societies, if the value placed on ESG differs from country to country. To better contextualize and define the impact of institutional forces on the relationship between the cost of debt and ESG performance, we investigate whether the institutional environment has a moderating effect on the relationship between firms' ESG scores and their cost of debt, captured by the bond spreads:

H2*: The institutional governance in a country has a moderating effect on the relationship between ESG performance and cost of debt*

H3*: The freedom of expression in a country has a moderating effect on the relationship between ESG performance and cost of debt*

H4*: The political stability and absence of violence in a country has a moderating effect on the relationship between ESG performance and cost of debt*

H5*: The quality and effectiveness of governments in a country has a moderating effect on the relationship between ESG performance and cost of debt*

H6*: The regulatory power in a country has a moderating effect on the relationship between ESG performance and cost of debt*

***H7**: The confidence in the rules of society and abidance by the agents in a country has a moderating effect on the relationship between ESG performance and cost of debt*

***H8**: The risk of corruption in a country has a moderating effect on the relationship between ESG performance and cost of debt*

3. Methodology

The methodology chapter introduces the research design, followed by the econometric methodology where we in addition discuss the measures used in the study to increase the reliability and validity of our findings.

3.1 Introduction and Scientific Approach

This paper investigates how ESG performance of a firm impacts the cost of debt, proxied mainly by the bond spreads. Previous studies have commonly used pooled ordinary least squares regression (POLS), random effects (RE) or fixed (FE) effects to estimate the relationship (Lian et al. 2023; Menz, 2010; Eliwa et al. 2021). The main methodology this paper follows is from Salvi et al. (2021) which utilizes panel data with POLS but with multiple clusterings as a robustness. In addition, the possibility of endogenous variables in our model are accounted for by introducing lagged values of the main explanatory variable and using an instrumental variable approach.

To account for different proxies of cost of debt we also use bond ratings as a substitute in an ordered probit model. An ordered probit model is necessary to use since bond ratings are on a categorical scale (BBB > BB > B… etc.). In addition, the substitution allows us to investigate if the credit rating agencies and the bond investors differ in how and if ESG performance influences their risk assessment of the firm. The model utilizes the same controls as the main model (1) shown below in section 3.2.1, except for the bond rating control since it is now used as our dependent variable.

3.2 Econometric

3.2.1 Pooled Ordinary Least Square (POLS)

We start out with a multiple regression model estimated through a POLS in order to answer our hypotheses. However, the problem in only using pooled OLS is that the model does not consider

the panel data structure. All the observations are instead pooled across time, units, and groups (Wooldridge, 2016). To address a part of this problem, we can introduce industry and year dummy controls in our model.

To answer our first hypothesis, we examine what kind of impact the ESG score has on the cost of debt, both on the overall level and for each pillar separately. In estimating this relationship, we control not only for industry and year effects, but also for bond specific (Maturity, Issue size & Bond rating) and firm specific characteristics (Assets, Leverage, ROA, ICR & Board Size). We initially use a three-step process. First, we include only firm controls; secondly we add bond controls, except the bond rating dummy; and third we use the full model by adding bond rating-, industry-, and year dummy. This leads to our first main model (1), which is consequently followed by sub models for each individual pillar of ESG (2, 3, 4):

(1) $$Spread\ (log)_{i,t} = \alpha + \beta_1 ESG_{i,t} + \beta_2 Total\ Assets\ (log)_{i,t} + \beta_3 Leverage_{i,t} + \beta_4 ROA_{i,t} + \beta_5 ICR_{i,t} + \beta_6 Board\ Size_{i,t} + \beta_7 Maturity_{i,t} + \beta_8 Principal\ Amount\ (log)_{i,t} + \beta_9 Bond\ Rating_{i,t} + \beta_{10} Industry_i + \beta_{11} Year_t + \varepsilon_{i,t}$$

(2) $$Spread\ (log)_{i,t} = \alpha + \beta_1 Environmental_{i,t} + \beta_2 Total\ Assets\ (log)_{i,t} + \beta_3 Leverage_{i,t} + \beta_4 ROA_{i,t} + \beta_5 ICR_{i,t} + \beta_6 Board\ Size_{i,t} + \beta_7 Maturity_{i,t} + \beta_8 Principal\ Amount\ (log)_{i,t} + \beta_9 Bond\ Rating_{i,t} + \beta_{10} Industry_i + \beta_{11} Year_t + \varepsilon_{i,t}$$

(3) $$Spread\ (log)_{i,t} = \alpha + \beta_1 Social_{i,t} + \beta_2 Total\ Assets\ (log)_{i,t} + \beta_3 Leverage_{i,t} + \beta_4 ROA_{i,t} + \beta_5 ICR_{i,t} + \beta_6 Board\ Size_{i,t} + \beta_7 Maturity_{i,t} + \beta_8 Principal\ Amount\ (log)_{i,t} + \beta_9 Bond\ Rating_{i,t} + \beta_{10} Industry_i + \beta_{11} Year_t + \varepsilon_{i,t}$$

(4) $$Spread\ (log)_{i,t} = \alpha + \beta_1 Governance_{i,t} + \beta_2 Total\ Assets\ (log)_{i,t} + \beta_3 Leverage_{i,t} + \beta_4 ROA_{i,t} + \beta_5 ICR_{i,t} + \beta_6 Board\ Size_{i,t} + \beta_7 Maturity_{i,t} + \beta_8 Principal\ Amount\ (log)_{i,t} + \beta_9 Bond\ Rating_{i,t} + \beta_{10} Industry_i + \beta_{11} Year_t + \varepsilon_{i,t}$$

Our second hypothesis, namely whether institutional characteristics of a country has a moderating effect on the relationship between ESG performance and cost of debt, is estimated through seven models (5 - 11). Model 5 uses the average value of the six dimensions of the Governance indicators together and model 6 to 11 are the respective ones (See section 4.4 for

extended details).[8] The model adds both the estimate of a Governance indicator, named in our model as "*Institutional Dimension"*, which is between -2.5 and 2.5, and an interaction term (*ESG * Institutional Dimension)*, which is the ESG score of the firm multiplied by the estimate.

$$
\begin{aligned}
(5\text{-}11) \qquad & Spread\ (log)_{i,t} = \alpha + \beta_1 ESG_{i,t} + \beta_2 Institutional\ Dimension_{i,t} \\
& + \beta_3 (ESG\ * Institutional\ Dimension)_{i,t} + \beta_4 Total\ Assets\ (log)_{i,t} + \beta_5 Leverage_{i,t} \\
& + \beta_6 ROA_{i,t} + \beta_7 ICR_{i,t} + \beta_8 Board\ Size_{i,t} + \beta_9 Maturity_{i,t} + \beta_{10} Principal\ Amount\ (log)_{i,t} \\
& + \beta_{11} Bond\ Rating_{i,t} + \beta_{12} Industry_i + \beta_{13} Year_t + \varepsilon_{i,t}
\end{aligned}
$$

3.2.2 Fixed & Random Effects Model

A POLS is not perfect within a panel data setting, even with year and industry controls. A panel data consists of two dimensions, unit and time, which then create a unit and time dimension for our error term. For our POLS to be unbiased and consistent, the error term must be uncorrelated with our explanatory variable. The panel data structure change our error term so it can be divided into two parts; the component that does not change over time but varies over units (α_i), which is the unobserved heterogeneity, and the component that varies across time and units ($\mu_{i,t}$), called idiosyncratic errors. The composite error term is now ($\varepsilon_{i,t} = \alpha_i + \mu_{i,t}$). There is a possibility that the unobserved heterogeneity in the error term, such as industry, is correlated with our explanatory variable ESG, which will cause endogeneity and biased estimates. To deal with this issue there are two common methods used, fixed (FE) and random (RE) effects model. The FE model eliminates the unobserved component of the error term, meanwhile the RE model leaves the unobserved component in and only accounts for it when estimating the standard errors. RE is useful when the focus is on the average effect of the explanatory variables among all groups.

In relation to our data, the RE model might be a better fit than FE since issuers tend to repeat themselves over the years as well within the same year. For instance, some of the firms in our sample issue a fixed number of bonds each year with the same maturity, principal amount, and bond yield as the previous year. If we were to use a FE model, this time invariant firm specific components would be eliminated and integrated into the intercept instead of being part of the

[8] The Governance indicators from the World Bank is a measure of the institutional level in a country.

model. The study is also interested in examining the average effect of ESG on bond spreads for the average firm, therefore, this paper utilizes RE.

3.2.3 Two-way Clustering of Residuals

The FE issue regarding the static nature of certain variables can also be dealt with by clustering on additional variables. Instead of integrating the time invariant component in the intercept we keep it in the model and provide robust and valid inference with a two-dimensional clustering in our POLS (Oikonomou et al. 2014). The bonds' inherent static characteristics, such as their principal amount issued and maturity time, gives the clustering analysis a stronger fit than FE for our type of data (Salvi et al. 2021). Consequently, this research will use a two-way clustering of residuals (by both time and firm id) method proposed by Thompson (2011) and Cameron, Gelbach and Miller (2006), which follows previous research within this field (Oikonomou et al. 2014; Salvi et al. 2021).

3.2.5 Endogeneity

A vital assumption in multiple linear regression models for the results to be unbiased is the exogeneity (opposite of endogeneity) assumption; that the explanatory variable is uncorrelated with the composite error term. Omitted variables, simultaneity bias and reverse causality are all common reasons that can cause endogeneity. To address the endogeneity issue and ensure that the exogeneity assumption holds, this paper includes lagged explanatory variables and an instrumental variable (model 18a & 18b), in addition to the RE model. Lagging our main explanatory variable alleviates the reverse causality problem, which could be the case if firms with lower bond spreads are more willing and able to strengthen their ESG performance than firms with higher bond spreads (Waddock & Graves, 1997; Oikonomou et al. 2014). ESG performance in previous years could be interpreted as not being influenced by current year bond spreads. Due to this, we will substitute the explanatory variables with 1-year lagged values of ESG and its individual pillars. Moreover, using RE addresses and removes the omitted variable bias by measuring changes within groups across time.

3.2.5.1 Instrumental Variable Approach

A common way of tackling endogeneity is through an instrumental variable approach. Introducing an instrumental variable in our model generates more trustworthy and unbiased results since it eliminates the potential correlation between the explanatory variable and the error term. If the ESG score is correlated with the error term, which is the black box, we assign all other factors that influence the level of bond spreads. Then the expected value for the error term, for all values of ESG, is not equal to zero, and we have an endogenous variable. To solve this problem, we can insert an instrumental variable. Using an instrument variable is done through a two-stage least square (2SLS) method, and the substituted variable must satisfy two conditions; exogenous in respect to the error term (Cov(instrument, error term) = 0), and have a high correlation and relevance to our main explanatory variable (Cov(instrument, ESG) ≠ 0). 2SLS first stage involves a reduced form equation in which the endogenous explanatory variable is regressed on our exogenous variables (instrument & other control variables). Second stage consists of taking the fitted values of our main explanatory variable from the first stage regression and inserting them back into our original model. 2SLS transform our endogenous variable to an exogenous variable since the fitted values are made up of only exogenous variables, which ultimately makes the exogeneity assumption hold and report unbiased inference. (Wooldridge, 2016)

This study adopts two instruments that meet the two conditions; Country-Year ESG and Industry-Year ESG averages. Average ESG values at a national level could be argued to have a high level of correlation to firm level ESG since national characteristics, such as the institutional environment, can enable or make it harder for firms to obtain higher ESG performance (Cai et al. 2016; Campbell, 2007). A stronger institutional environment can facilitate and make ESG improvements cheaper for firms relative to firms in a weaker environment due to higher costs. Average ESG values at the industry level could also have a high correlation since different industries allow for more or less flexibility in obtaining a certain ESG performance.[9] Empirically, Ioannou & Serafeim, (2012) find that national-level institutions and industry play a significant role in the variation of Corporate Social Performance between firms due to isomorphism and

[9] E.g. Companies in the Utilities industry distributing gas or electricity might have a harder time acquiring a high ESG score since their high emission levels generate a low environmental score, compared to companies in the Technology or Health Care industry having lower emissions, on average.

peer pressure. Accordingly, the ESG performance of a firm should be correlated with the proposed instruments. Regarding the other condition, the variables could be interpreted as being exogenous to the error term since it is an average of ESG performance in a country or industry in a specific year and should not directly impact the bond spread of a firm. Previous studies have also used these types of instruments when the main explanatory variable has been ESG or CSR performance (Bhandari & Javakhadze, 2017; Salvi et al. 2021). The 2SLS model is therefore the following:

First stage

$$(18a) \quad ESG_{i,t} = \alpha + \beta_1 Country\,Year\,ESG_{i,t} + \beta_2 IndustryYear\,ESG_{i,t} + \beta_3 Total\,Assets\,(log)_{i,t} + \beta_4 Leverage_{i,t} + \beta_5 ROA_{i,t} + \beta_6 ICR_{i,t} + \beta_7 Board\,Size_{i,t} + \beta_8 Maturity_{i,t} + \beta_9 Principal\,Amount\,(log)_{i,t} + \beta_{10} Bond\,Rating_{i,t} + \beta_{11} Industry_i + \beta_{12} Year_t + \varepsilon_{i,t}$$

Second stage

$$(18b) \quad Spread\,(log)_{i,t} = \alpha + \beta_1 \widehat{ESG\_Instrumental}_{i,t} + \beta_2 Total\,Assets\,(log)_{i,t} + \beta_3 Leverage_{i,t} + \beta_4 ROA_{i,t} + \beta_5 ICR_{i,t} + \beta_6 Board\,Size_{i,t} + \beta_7 Maturity_{i,t} + \beta_8 Principal\,Amount\,(log)_{i,t} + \beta_9 Bond\,Rating_{i,t} + \beta_{10} Industry_i + \beta_{11} Year_t + \varepsilon_{i,t}$$

3.2.6 Heteroskedasticity

Homoscedasticity, the opposite of heteroskedasticity, is another key assumption that needs to hold in multiple linear regression models in order to provide unbiased inference. It refers to the condition in which the variance of the residuals is constant in the sample. To test for homoscedastic residuals, the paper performs a White's test. The test regresses the squared residuals on the original predictor variables and checks if the variance of the residuals is constant across all values of the predictor variables. A rejection of the null is equal to saying that the residuals are heteroskedastic and that the variance is not constant. However, the test does not test for serial correlation (autocorrelation), which can still cause heteroskedastic error terms. Therefore, the Wooldridge test for autocorrelation will be used to identify if there is a first-order autocorrelation. To deal with the potential case of heteroskedasticity the study uses robust standard errors clustered by firm id, and firm id & year together. Using clustered robust standard errors is essential to use within a panel data setting due to the expected clustering of variances in

panel data. The method accounts for a possible serial correlation within clusters, which is particularly useful in unbalanced panel data since it controls for unobserved heterogeneity at a firm level, where number of observations per firm can vary over time. Ultimately, we can extract more reliable standard errors and thereby provide unbiased estimates that are closer to true inference. (Wooldridge, 2016)

4. Data & Sample Description

This section describes the data that has been collected in order to estimate the relationship of interest. It consists of explanations of the dependent-, main explanatory-, moderating-, and control variables. The chapter ends with summary statistics and a correlation table of the variables used in the analysis.

4.1 Sample Description

This study uses data for publicly traded firms in Europe over 12 years between 2010-01-01 and 2021-12-31, which is extracted from the database *Refinitiv Eikon.* First, we obtained inputs for the newly issued bonds by screening with the following criterias: (I) The corporate bonds were limited to being issued by a corporation with their headquarters located in the European region, with more than three observations to ensure variability within the country. (II) We choose to only include deals that had the transaction status as of being live with a (III) fixed rate coupon type. (IV) In our sample asset-backed; agency, supranational, sovereign; convertibles; federal credit agency; IPO; mortgage-backed; and direct public offering were all excluded. (V) In addition, similar to other studies (Lian et al. 2023; Bauer & Hann, 2010; Apergis et al. 2022), we excluded security types that consist of the word "secured", since they rather show the credit risk of the secured asset than the credit risk of the firm. (VI) Subordinated debt is also excluded, following previous research within this field (Bauer & Hann, 2010). (VII) To be able to analyze the yield spread we had to filter for firms that had a basis point spread to benchmark. The benchmark is defined as the closest related treasury bond with a similar maturity. (VIII) Moreover, we only included bonds with an available credit rating by Moody's having a (IX) principal amount larger than $1 million to have any significant impact on the firm and to account for illiquidity issues. (X) We also exclude all issuers without an ESG-rating. (XI) As a last correction we excluded financial firms from our sample since it tends to adversely impact the results due to its unusual bond pricing and the high number of yearly bond issues, which also follows similar research (Lian et al. 2023; Priem & Gabellone, 2022; Johnson, 2020).

Hence, after matching the issuer with the corresponding ESG rating over the selected time horizon we end up with 1086 firm-year observations of 176 European firms. Table 1 provides the distribution of the sample across industries and countries. In total, we observe 16 countries where the three largest economies in Europe, France (28.27%), Germany (16.21%) and the United Kingdom (14.73%), make up about 60% of the sample. Furthermore, 10 industries are evenly represented ranging from 2.85% (Technology) to 16.11% (Utilities) where most industries account for less than 10%. The bonds are almost equally distributed over the issue years with a slight increasing amount in the later years (table 2). From table 3, we observe that almost every corporate bond attains an investment grade rating i.e., all bonds with a rating of Baa1-Baa3 and above (87.94%). Finally, 82.96% of all firms in the sample issued ten or less bonds over the time period with a concentration around one to three bonds that represents 50.57% of the whole sample (table 4).

4.2 Dependent Variable

The dependent variable for this study is the *Cost of Debt* which is measured mainly by the yield spread of newly issued corporate bonds, but also the bond rating. The bond spread represents the marginal cost for a firm when issuing new bonds on the primary debt market. This is a suitable estimate for the cost of debt because it reflects the additional yield that bond investors demand for holding a riskier corporate bond instead of government bonds with similar maturities. Measuring the cost of debt with this method is in conjunction with many previous studies (Apergis et al. 2022; Bauer & Hann, 2010; Oikonomou et al. 2014; Cooper & Uzun, 2015; Eichholtz et al. 2019). In addition, we analyze the bond spreads in its logarithmic form due to the significant positive skewness in the yield spread distribution (Apergis et al. 2022; Oikonomou et al. 2014).

Furthermore, a firm's cost of debt can also be proxied by the bond rating. The bond rating could be viewed as a measure of the credit quality of the bond and indirectly the firm´s default risk, consequently translating it into an implied cost of debt. We therefore substitute the bond spreads with the bond ratings, using a numerical scale illustrated in table 3, in an ordered probit model. It provides the study with an alternative way of estimating the cost of debt to ensure robustness.

The accounting measure of cost of debt is however not used because our data consists of multiple observations per year, and it would only take the same value throughout the year and reduce the variation in cost of debt. We are also primarily interested in how the market price the firm´s bond spreads, and not both the banks and the market together, which are included in the accounting measure.

4.3 Main Explanatory Variable

Our main explanatory variable is the firm-level ESG score provided by Refinitiv Eikon which is an overall company score based on the self-reported information in the Environmental, Social, and Corporate Governance pillars as well as the ESG controversies score. Refinitiv´s ESG score measures performance, commitment, and effectiveness across 10 different themes such as resource use, human rights, or CSR strategy, but also the degree of transparency in the reporting material (Refinitiv, 2022). In addition, Refinitiv provides a score for the three separate dimensions of ESG, which are included individually in our regression models as the main explanatory variable to allow for a more differentiated interpretation of the results. Since ESG is a third-party assessment, significant differences have been identified between the measurements of ESG (Berg, 2022), however, many papers examining ESG's impact on cost of capital use Refinitiv Eikon's scoring, highlighting its reliability (Apergis et al. 2022; Eliwa et al. 2021; Salvi et al. 2021). A more detailed description of the methodology provided by Refinitiv can be found in table 16.

4.4 Moderating Variables

In order to study the institutional environment of a country we apply six different dimensions of institutional characteristics found in the Worlds Bank's Worldwide Governance Indicators (WGI) database (World Bank, 2022). In addition, the paper constructs a seventh dimension, called *Institutional Score (IS)*, which is the average value of the six dimensions together - aimed to determine the overall institutional level of the country. WGI constructs aggregate indicators of six dimensions of governance and institutional characteristics on a country-level.[10] The estimates of the indicators take values between -2.5 to 2.5, with higher values corresponding to better

[10] The WGI indicators are in turn based on 30 underlying data sources produced by survey institutes, think tanks, non-governmental organizations, international organizations, and private sector firms

governance. These values are in units of a standard normal distribution that takes the mean value of 0 and standard deviation of 1. The six dimensions used are *(1) Voice & Accountability (VA) (2) Political Stability & Absence of Violence and Terrorism (PS) (3) Government Effectiveness (GE) (4) Regulatory Quality (RQ) (5) Rule of Law (RL) (6) Control of Corruption (CC)*. A detailed explanation of these indicators can be found in table 16.

4.4.1 Data Description of The Moderating Variables

A necessary condition for our moderating variables to have an effect is that the data on the institutional dimensions has some variation between the countries. Table 5 illustrates the distribution of the institutional dimensions (mean values) by country. Finland has the highest overall Institutional value of 1.802 meanwhile Italy has the lowest with 0.536. Not surprisingly, we can see the Nordic countries having relatively high scores in most of the variables. However, we did not expect France and the United Kingdom to have relatively low scores within PS. Furthermore, figure 1 depicts a scatterplot of the ESG scores on X-axis and Institutional scores on Y-axis by country in mean values for our sample. The scatterplot displays a distribution of values between 0.5 - 2.0 where three groups of countries can be identified, based on Institutional scores; (0.5 - 1.0), (1.0 - 1.5), (1.5 - 2.0). Additionally, our sample does not consist of any countries with negative scores, hence it could be argued that our data does not contain any countries with "weak" governance if it were to be compared worldwide.

4.5 Control Variables

Our models incorporate two sets of control variables, which account for issuer and bond characteristics that previous studies have identified as determinants of the cost of debt, proxied by bond spreads (Aman & Nguyen, 2013; Andrade et al. 2014; Apergis et al. 2022; Attig et al. 2013; Oikonomou et al. 2014; Salvi et al. 2021).

4.5.1 Firm Controls

This study includes five firm specific control variables that are commonly found to be related to the cost of debt. First, we control for *Firm Size* by taking the natural logarithm of total assets and expect Firm Size to be negatively related to the cost of debt since larger firms tend to have better

access to capital markets and a stronger financial position leading to lower cost of debt. Second, we control for *Leverage* which is calculated as the total debt divided by total assets and expect a positive relationship to the cost of debt due to higher leveraged firms being perceived as riskier and therefore being charged with higher cost of debt. Third, the paper controls for *Return on Assets* (ROA), which is calculated as the net income divided by total assets and expects a negative relationship to the cost of debt due to better profitability measures leading to lower perceived risk and interest rates. Fourth, we control for the *Interest Coverage Ratio* (ICR) which is calculated as the EBITDA divided by the total interest expense including both operating and non-operating interest expenses. We anticipate the ICR to be negatively related to the cost of debt as the higher likelihood of payments indicated by a higher ICR reduces default risk and the cost of debt for a firm. Finally, we control the governance aspect of a firm with the variable *Board size* which counts the total number of board members in each firm. We predict that as board size increases, firms experience greater coordination problems leading to poorer governance (Jensen, 1993), higher financial risk and thus a higher bond spread.

4.5.2 Bond Controls

In addition to our firm-specific variables, we also include bond specific variables that will account for the yield differences across different bonds. First, we use time to maturity estimated in years, where longer maturity should be associated with a higher yield spread due to the interest rate risk since it increases the probability of a change in interest rates, which affects the bond's price and return (Huang & Huang, 2012). Second, we include the natural logarithm of the principal amount (issue size) where the relationship to default risk is vague. Although larger debt issues tend to improve liquidity and reduce issue yield spread, they also increase the likelihood of default for the bond issuer and the potential absolute loss for the bondholder in case of insolvency (Apergis et al. 2022). Third, the paper differentiates between bonds with different ratings, issued by Moody's. Mainly due to its intrinsic nature of having a lower spread for higher rated bonds, but also since excluding them has shown to distort the results (Sufi, 2009). Previous papers have either transformed the ratings into a numerical scale (Apergis et al. 2022), or included a dummy variable for each rating (Oikonomou et al. 2014). This paper follows the structure of Oikonomou et al. (2014) which first transformed the bond ratings into a numerical scale (7: highest, 1: lowest) and afterwards created dummy variables for each of the scores from

the transformed scale (table 3). The reason to use a series of dummy variables instead of an ordinal scale is because the scale does not fit the linearity of our panel regression model. If we were to include the bond ratings ordinal scale 1-7, then we would implicitly assume that the variable has a linear relationship with the bond spreads since it is a multiple linear regression model, and therefore we include the dummy variable instead.[11]

4.6 Summary Statistics

Table 6 provides the summary statistics for our dependent, explanatory, and control variables of the final sample. All continuous variables have been winsorized at the 1st and 99st percentiles to prevent any extreme values tampering with the statistical efficiency of the regressions. The average bond spread for our sample firms is 137.694 basis points with a median of 105 indicating that our sample is slightly positively skewed. We also observe that the difference between the firm with the lowest bond spread (5 basis points) and the highest bond spread (591 basis points) is moderate considering the standard deviation of 100.503. The average firm in our sample has an ESG score of 72.341 with a highest score in Social of 75.404 followed by Environmental of 73.029 and lastly Governance score of 65.568. As expected, there is a large divergence in ESG Score, with the minimum being 9.18 and the maximum being 95.212. However, the median of ESG, Environmental, Social, and Governance Score each being above 70 indicates that the firms in our sample are performing generally well. For our firm-specific control variables we observe that the average firm has a leverage ratio of 30.7%, ROA of 3.2%, ICR of 14.453, assets of $70 099 290 million, and a board of 13 members. Regarding the bond specific variables, we observe that the shortest bond has a Maturity of 2.283 years whilst the longest expires in 99.99 years. However, the average (median) Maturity of 9.824 (8.117) years indicates that most firms issue bonds with a shorter tenure. The average bond has a Principal amount issued of $769.885 million with a numerical rating of 4.248, representing an above investment grade. Finally, from table 6 we see the six-dimensional institutional factors in addition to the combined Institutional score. Five of them, VA, GE, RQ, RL, and CC have a very similar average score ranging from 1.301 to 1.518, whereas Political Stability (PS) has an

[11] For example, going from a Caa1 - Caa2 rating (value of 1) to a B1 - B3 rating (value of 2) could have a stronger or weaker impact on the bond spreads than moving from Baa1 - Baa3 (value of 4) to A1 - A3 (value of 5).

abnormally low score of 0.626 compared to the others. This explains why the combined Institutional score has an average score (1.294) below the other dimension, excluding PS.

4.6.1 Correlation Table

Table 7 shows the pairwise correlation coefficients between our variables. Our dependent variable, *Bonds Spreads (bps)*, is significantly negatively correlated with all our variables, except for *Leverage, Maturity*, and *Political Stability*. All correlations show the expected signs, as for instance higher *Leverage* (0.078), and a longer *Time to Maturity* (0.052) impose a higher financial risk and thus are positively correlated to the firm's *Bond spread*. Surprisingly, a stronger *Political Stability (PS)* correlates positively with *Bond Spread (bps)*. Moreover, a higher *ROA* (-0.320), a better *ICR* (-0.288) and a larger firm in terms of *Total Assets (million $)* (-0.102) reduce the financial risk, and therefore are negatively correlated to the firm's *Bond Spread (bps)*. Finally, most variables show a highly statistically significant relationship with bps, however, we also observe that some are significant at five-percent, ten-percent or even insignificant.

5. Empirical Results & Analysis

This section discusses the regression results for our hypotheses, starting with diagnostic tests followed by a multivariate analysis. The chapter ends with a robustness tests analysis.

5.1 Diagnostic Tests

The study tested our main model (1) and interaction model (5) for heteroskedasticity and serial correlation. Using a White's test for unrestricted heteroskedasticity, extracted from table 14, we cannot statistically reject the null that our residuals are homoscedastic with a p-value of 0.966 for model 1 and 0.963 for model 5. However, White's test does not account for autocorrelation. Table 15 depicts a Wooldridge test for autocorrelation indicating we have a first-order autocorrelation in our sample with p-values of 0.0015 (model 1) and 0.0013 (model 5), which justifies the paper's methodology of clustering the standard errors.

5.2 Multivariate Analysis

5.2.1 ESG and Cost of Debt

5.2.1.1 ESG

From table 8 we observe in model 1 and 1.1 that the main explanatory variable ESG is highly statistically significant at one-percent level when applying both firm and bond-specific control variables. The result drops to five-percent significance when we also include the dummy variables *Bond rating, Industry* and *Year* (model 1.2) but the R-square increases (0.271 to 0.555) indicating that the model better fits our data. Given that our dependent variable is in logarithmic form we can only express percentage changes in the bond spreads and not absolute percentage point changes. For our case, a ten unit increase in ESG score corresponds to a ≈ -4% (100 * (-0.004) *10 ESG units) decrease in bond spreads (bps) for the average firm.[12] A four percent decrease in the average corporate bond spread (table 6) given a 10 unit increase in ESG would

[12] The following part of the analysis will use the transformed value (100 * coefficient) when including the % sign after the coefficient to understand the economic significance of the variables on the logarithmic form of cost of debt

then change 137.694 to 132.186 (137.694 * 0.96) bps. With these results, we can reject our first null hypothesis at five-percent significance and conclude that ESG practices are on average associated with a negative relationship to cost of debt. The finding suggests that as the ESG performance of a firm improves, lenders become more inclined to accept bonds at a lower yield, which is in accordance with previous studies (Apergis et al. 2022; Eliwa et al. 2021; Stellner et al. 2015). This indicates that lenders factor in the ESG performance of borrowing firms while assessing the firm's risk profile, plausibly since the information asymmetry between the firm and the lenders reduces with transparent ESG reporting, consequently lowering agency cost of debt and adverse selection (Dye, 1985; Diamond & Verrecchia, 1991; Verrecchia, 1983). ESG performance also tends to accentuate the financial performance of the firm (Hillman & Keim, 2001; Orlitzky 2003; Van Beurden & Gössling 2008) leading to a greater capacity to repay the debt which undoubtedly should be considered. We further posit that this effect is derived from the reduced risk of the firm, such as the reduced financial distress costs, default risk and loss given default (Boubaker et al 2020; Sun & Cui, 2014; Rizwan, 2017) associated with a firm's ESG activities. In addition, firm's also mitigate the risk of tampering with their reputation, losing their legitimacy in the eyes of the public (Deegan, 2014). If they fail, the ability of the company to operate effectively may be significantly curtailed, and the risk of defaulting on debts as well as bond spreads may increase.

From table 9, we see that the significance level remains at five percent for two-way clustering (model 1.3) but drops to ten-percent with random effects (model 1.4) for our main explanatory variable ESG. However, as we have earlier discussed in section 3.2.3, the two-way clustering has a better fit than FE or RE for our type of data, and thus strengthening the robustness of our results at five-percent significance level.

5.2.1.2 Individual Pillars

In table 8, when ESG is decomposed into its three individual pillars, Environmental (model 2.2), Social (model 3.2), and Governance (model 4.2); the former two show a statistically significant impact on cost of debt at five-percent, while the latter is insignificant. Therefore, we can accept the hypotheses *1a* and *1b*, confirming that the environmental- and the social performance of a firm is associated with a reduced cost of debt, proxied by bond spreads. These results are in

conjunction with preceding empirical findings presented in section 2.3.1 (Bauer & Hann 2010; Eichholtz et al. 2019; La Rosa et al. 2018; Oikonomou et al. 2014). However, we cannot accept hypothesis *1c,* that the governance pillar score is negatively related to the firm's cost of debt. The lack of significance between corporate governance and the cost of debt is inconsistent with prior research that demonstrates how adequate governance leads to lower borrowing costs (Aman & Nguyen, 2013; Andrade et al. 2014; Boubakri & Ghouma, 2010; Erragragui, 2017). It is our belief that market participants consider the collective and integrated impact of individual ESG performance dimensions to assess the reliability and trustworthiness of a company's management team when making lending decisions, and therefore this emphasizes a need for future research. For our paper, subsequent analysis will no longer include the governance pillar as it remains insignificant.

Moving over to the magnitude of the pillars, we observe that a ten unit increase in the environmental pillar is on average, ceteris paribus, associated with a -4% decrease in bps. The environmental dimension seems to be the most pivotal to reduce the cost of debt followed by the social one where on average a ten unit increase in the social dimension, ceteris paribus, is associated with a -3% decrease in bps. If a firm has strong environmental performance, they signal to the market and attract bond investors who are increasingly concerned about the long-term sustainability of their investments. In addition, they may be less likely to face legal or regulatory sanctions, which could reduce the risk of default and thus lower the cost of debt. The firm's commitment to social responsibility includes the well-being of its stakeholders, such as employees, customers, communities, and suppliers. A company that prioritizes its relationships with its stakeholders can result in employee engagement, retention, and productivity, which can lead to both higher profitability and cash flows (Donaldson & Preston, 1995; Freeman, 1984; Jones, 1995). This, in turn, can improve their legitimacy by upholding the "social contract" with the society (Deegan, 2014), and sustain competitive advantages for the firm by creating internal resources and intangibles such as reputation and customer loyalty (Hart, 1995; Russo & Fouts, 1997; Shrivastava, 1995).

In table 9, we observe that the significance level remains at five-percent in model 2.3 for the environmental dimension but drops to ten-percent in model 2.4 consistent with the aggregated

ESG score. However, we see a different pattern for the social dimension that shows significance at ten-percent for two-way clustering (model 3.3) and an insignificant relationship with random effects (model 3.4).

5.2.1.3 Control Variables

In regard to the control variables, we observe in table 8 that *Total Assets* goes from being highly statistically significant at one-percent to insignificant when we introduce the dummy variables except for the governance models where it reduces to five-percent level. *Board size* and *Leverage* are insignificant throughout all models and these three findings are quite surprising since larger firms are perceived as less risky (Moody's, 2023; S&P, 2023), board size impacts governance quality (Jensen, 1993), and leverage is an acknowledged measure for default risk. However, Lian et al. (2023) and Priem & Gabellone, (2022) could not, akin our paper, establish a significant relationship to the size of the firm and Salvi et al. (2021) finds none for the level of leverage. The other two firm-specific variables, *ROA* and *ICR* remain highly statistically significant throughout table 8 and the bond-specific variables are significant one-percent *Maturity* and at five-percent *Principal Amount*. From model 1.2, we observe that one percentage point increase in *ROA* and one unit increase in *ICR* is on average, ceteris paribus, associated with a -3.017% ((-3.017*0.01)*100) and -0.6% decrease in bond spreads, respectively. Furthermore, one more *Maturity Year*, and one percent increase in the *Principal Amount* (0.133*0.01) is on average, ceteris paribus, associated with a 2.20%, and 0.133% increase in bond spreads, respectively. These findings and coefficient signs are consistent with what we anticipated in section 4.5 and with previous studies.

In table 9, the control variables are overall similar to table 8, but with one noticeable difference. When we use RE in table 8, *Total assets* are negatively significant at five-percent across all models (1.4, 2.4, 3.4).

5.2.2 The Moderating Effect of The Institutional Environment

5.2.2.1 Institutional Dimensions

From table 10 we observe that our main explanatory variable ESG is negatively statistically significant for all models at five-percent except for model 8 and 11 that are highly significant at one-percent. Interestingly, when comparing the coefficient ESG in model 1.2 table 8 (-0.004), with its corresponding coefficient in table 10 model 5 (-0.014), we see a distinctive difference in magnitude presumably being accounted for in the interaction terms. Moving over to the institutional dimensions, we see that the *Institutional Score (IS)* (-0.617)*, Voice and Accountability (VA)* (-0.985)*, Government Effectiveness (GE)* (-0.618)*, Regulatory Quality (RQ)* (-0.488) and *Control of Corruption* (-0.305) all have a significant negative relationship at five-percent and *Rule of Law (RL)* (-0.415) at ten-percent with the bond spreads. Our results imply that the institutional environment impacts a firm's borrowing conditions, in particular, firms who operate in more stable institutional environments yield a lower cost of debt in six of our institutional dimensions, including the overall measure *Institutional score (IS)*. This corresponds to earlier findings on how the institutional factors determine which level of risk firms can access external financing (La Porta et al. 1997). We argue that this can be explained by how the institutional environment determines parts of the inherent risk of a business e.g., risk of corruption, biased governments, and deprived competition, that all risk disrupting operations. This is further supported by how credit rating agencies incorporate institutional factors in their credit assessment such as the country risk (Moody's 2023; S&P 2023).

In table 11, we observe that ESG overall remains significant at five-percent but drops to ten-percent in model 8 and 10. Furthermore, the institutional dimensions in model 5 and 6 persist robust at five-percent significant but model 8, 9 and 11 drops to ten-percent significance while model 10 becomes insignificant and interestingly, model 7 becomes significant at ten-percent.

5.2.2.2 Interaction Terms

Furthermore, our interaction terms *ESG*IS* and *ESG*GE* are significant at five-percent whilst *ESG*VA* and *ESG*RQ* are significant at ten-percent (table 10). With these results, we can at this stage accept hypotheses *H2* and *H5* that an overall greater institutional score, higher quality, and

more effective governments in a country has a positive moderating effect on the relationship between ESG performance and cost of debt. As *ESG*VA* and *ESG*RQ* only show weak significance, the results should be interpreted with caution and thus we cannot infer that greater freedom of expression and stronger regulatory power in a country has a moderating effect on the relationship between ESG performance and cost of debt. Since most of the institutional dimensions show a direct significant inverse relationship to bond spreads, they seem to shape the debt market and ESG-practices overall but fail to facilitate as an ESG enhancer for firms issuing new bonds. A reason for this could stem from the sample of countries; most of them have relatively high and similar institutional values compared to countries worldwide, which could reduce the variation of the values in our sample and thus make it harder to obtain a significant impact. However, we may still argue that our findings are partly in conjunction with previous studies who also find support for how cross country-characteristics such as the ESG performance (Stellner et al. 2015) and the stakeholder-orientation (Eliwa et al. 2021) of a country moderates the relationship between ESG and cost of debt. Our findings shed light on the dimensions, *Institutional score* and *Government effectiveness,* as in contrast to Salvi et al. (2021) who only finds that free public criticism and media scrutiny (VA*ESG) significantly affects ESG relationship with cost of debt.

Looking more closely at the magnitude of the interaction terms, we scrutinize both the moderating impact and the percentage impact when increasing the ESG score by ten units on cost of debt using the average score of the governance indicator. The aforementioned is *IS*ESG* (0.007) and *GE*ESG* (0.007). Examining, with a partial derivative, the percentage change in bond spreads given a change in ESG score, we see that on average, holding other variables constant, ten units increase in ESG corresponds to ((-0.014 + 0.007*Institutional score)*10) impact on bond spreads. Taking the average value of Institutional score of 1.294 gives us a change of -4.942% in bond spreads when increasing ESG score with ten units.[13] Taking the average score *Government Effectiveness* of 1.422 gives us -4.046% decrease in bond spreads when increasing ESG score with ten units.[14] Interestingly, we find a moderating effect for a sample of countries that could be viewed to have somewhat similar strong institutional

[13] -4.942% = ((-0.014 + 0.007*1.294)*10*100)
[14] -4.046% = ((-0.014 + 0.007*1.422)*10*100)

characteristics as we can see in figure 1, being around 1.5 in institutional score. The positive coefficient also indicates that firms located in countries with stronger institutional characteristics earn less in the reduction of their bond spreads by increasing their ESG score. A reason for this could be that firms located in countries with stronger institutional environments could be shaped by isomorphisms (DiMaggio & Powell, 1983) leading to higher expectations by the market. Therefore, as a firm improves their ESG performance, the signaling effect will be smaller compared to firms in a less efficient institutional environment who may surprise the market to a greater extent and reduce larger information asymmetries generating a stronger reduction in their cost of debt.

From table 11, we see that our interaction terms *ESG*IS* and *ESG*GE* drop to a ten-percent significance level when we apply two-way clustering, which points out that the most rigid model reduces the validity of our results slightly.

5.2.2.3 Control Variables

Moreover, the firm- and bond-specific variables are consistently significant at one-percent or five-percent for all models 5-11, excluding *Total Assets, Leverage* and *Board size* that yet again persists insignificant (table 10). In table 11, we observe how *ROA* and *Maturity (years)* remain significant at one-percent, *ICR* drop to five-percent and *Principal Amount* drop to ten-percent.

5.3 Robustness Tests Analysis

We have conducted several sensitivity tests to examine whether our primary evidence on the relationship between ESG practices and cost of debt remains robust when applying; (1) additional controls; (2) random effects to our model; (3) two-way clustering by firm id and year; (4) lag the main explanatory variable and its individual pillars (E, S) with one year; (5) substituting bond spreads with bond ratings; (6) and exchange ESG with an instrumental variable. The first three have during previous sections already been discussed so the latter three will be in focus below.

From table 12 we observe both the ordered probit econometric model with bond ratings as dependent variable and the POLS econometric model with lagged explanatory variables. Model

12 illustrates a weak significance at the ten-percentage level for ESG Score impact on bond rating, meanwhile Environmental Score (model 13) and Social Score (model 14) are significant on the one-percentage and five-percentage level respectively. The positive coefficients indicate that higher ESG scores are associated with a higher bond rating, which we especially see for Environmental Scores having the strongest impact compared to ESG Score and Social Score. These results are consistent with our main models in table 8 using bond spreads and suggest that bond investors and credit rating agencies have a similar risk assessment of the bond in relation to the sign of the coefficient and which pillar that has the strongest impact on cost of debt.

Moving on, table 12 also includes lagged explanatory variables of ESG and its pillars (model 15-17). The model attempts to alleviate the endogeneity issue of reverse causality that may be present in our main model. Evidently, the coefficients and significance levels remain robust in relation to the main models in table 8 as only a small difference in ESG and Environmental is distinguishable. Given the assumption that the lagged models contain less endogeneity, our main models have overestimated the effect by -0.001 for ESG and Environmental Scores. Mentionable is also that the lagged models include a loss of 30 observations due to data limitations which may have altered some comparability of the results.

From table 13, model 18a, we can see that the first stage of the 2SLS in which ESG is regressed on our two instrumental variables *Country-Year ESG* and *Industry-Year ESG,* in addition to the rest of the controls. The instrumental variables are statistically significant at the one-percent level with positive coefficients and t-values of 4.61 for *Country-Year ESG* and 6.94 *Industry-Year ESG*. In addition to its statistical significance, we tested the instrumental strength of these two variables with an F-test revealing a F-statistic of 34.17. This result implies that the instrumental variable is strong, which is supported by its exceeding of the F-value of 10 (Wooldridge, 2016) and the F-value of 13.91 (Stock and Yogo, 2005). The second stage of the 2SLS, model 18b, is assumed to show unbiased inference for our variable (Wooldridge, 2016). Again, our results are robust as the variable *ESG Score* is statistically significant at five-percent, indicating that ten unit increase on average, ceteris paribus, is associated with -6% decrease in firm's bond spreads. When comparing the coefficients for our main explanatory variable in model 1.2 (table 8) and the instrumental variable in model 18b (table 13) one observes a slight underestimate of ESG's

effect with 0.002, conditionally on that the exogeneity assumption has been violated in our POLS model and consequently make the 2SLS model a better fit with more consistent and unbiased estimates.

6. Conclusion

In conclusion, with an increasing awareness of sustainability among investors, the ESG activities of a firm receive noticeable attention as it has been associated with business improvements, including risk reductions. Against this backdrop, the primary aim of this paper is to gain a deeper understanding of how the ESG performance of a firm impacts the cost of debt, proxied by yield spreads on their newly issued corporate bonds and whether this effect is moderated by the institutional environments. The posited relationship and moderating effect stem from three theoretical perspectives, namely the legitimacy-, institutional- and agency theory. Based on our sample of 1086 firm-year observations of EU firms during 2010-2021, we find a negative relationship between ESG performance and the cost of debt. These findings proved to be robust at five-percent significance level throughout all sensitivity tests including adding new control variables, two-way clustering, lagging ESG with one year, utilization of instrumental variables and at ten-percent significant while using random effects. Substituting the bond spreads with bond ratings results in similar findings that higher ESG scores are associated with higher bond ratings, consequently lowering the perceived default risk and thus the implied cost of debt. Therefore, it could be argued that bond investors and credit rating agencies have similar risk assessments of newly issued bonds in relation to a firm's ESG performance.

Our study suggests that ESG performance can reduce bond spreads by mitigating corporate financial risks, increasing corporate information transparency, and decreasing corporate debt agency costs. In addition, ESG practices can orchestrate insurance effects for firm's seeking legitimacy in the society of stakeholders. Hence, ESG may serve as a tool that expands investors' risk horizons and enhances the quality of their investment choices. Including ESG as a key factor in their portfolio decisions can therefore generate additional value creation. For companies, it encompasses a conceptual framework for analyzing and mitigating financial and reputational risks in pursuit of reducing their cost of debt, consequently increasing the overall firm value through a lower cost of capital, ceteris paribus. Thus, ESG plays a vital role in facilitating improved investment decisions and effective management practices to become a more reliable firm. In a more detailed examination, we find that out of the three individual pillars making up ESG, the environmental and social factors are inversely related to the cost of debt. In contrast to

previous findings, the governance pillar consistently remained insignificantly related to the cost of debt for our sample.

Furthermore, our paper establishes a direct negative relationship between four of our institutional dimensions, as well as the aggregated measure, and firm's bond spreads. This indicates that as the institutional level of a country increases, firms may borrow capital at a lower cost - suggesting that the institutional level of a country partially determines the overall financial risk of the average firm. However, we find that only the *Institutional Score* and *Government Effectiveness* are capable of positively moderating the relationship between ESG performance and bond spreads. We argue that this could be because firms located in countries with stronger *Institutional score* and/or *Government Effectiveness* could be subjected to higher market expectations to improve their ESG score and are hence not compensated as much in the reduction of their cost of debt, compared to a similar firm in a country with a lower score. This proposes that organizations experience isomorphisms; as they are being shaped to become more homogenous by social, cultural, and political forces where they are operating. These results imply that firms could be disincentivized to increase their ESG if they are already located in a country with a solid institutional environment. For example, a firm in Italy might be more motivated to increase their ESG since the return of reducing their cost of debt is higher than for a firm in Finland, ceteris paribus. However, it is again worth noting that the results are significant at five-percent for one-way clustering and at ten-percent for two-way clustering, indicating that these results need to be interpreted with caution. With that said, our study contributes to the existing literature by providing robust results for ESG impact on cost of debt as well as the individual dimensions. In addition, this paper highlights a less researched area, how the institutional environment influences the relationship between ESG scores and the cost of debt for European firms.

Even though our paper sheds light on the relationship between ESG and cost of debt, and how the institutional environment shapes this relationship, we acknowledge some limitations that can be considered in future research. First, we believe that our sample tampers with the representability of Europe by only including about half of the countries. While the availability of data for all countries in Europe concerning the ESG scores is limited, the proposed EU taxonomy

will make ESG reporting mandatory for many firms in the EU by 2027, hopefully leading to improvements in ESG data collections and allows future research to study a more diversified sample. Secondly, as we include multiple bonds per firm there is a possibility that this skews our results and gives larger weight to those firms that have issued many bonds. Therefore, some scholars apply the accounting measure of cost of debt, however, we believe that the accounting measure doesn't fit our data and could be noisy if a firm changes its level of debt near year-end. The accounting measure also includes both public (bonds) and private (bank) debt which would most likely change and distort our results since the aim of our paper is to better understand the bond investors' perceived financial risk of the firm. Thirdly, considering that ESG is an external assessment of a firm and not exclusive to one agency, there could be a risk of mixed findings depending on what agency other researchers collect the data from.

We believe that this emphasizes a potential for future research of ESG's impact on cost of debt and the moderating effect of country-specific factors. This includes using different measures for the dependent variable and the main explanatory variable, for example using both credit default swap spreads and the bond spreads, and ESG from different third-party providers interchangeably to see if the results persist. Furthermore, research within this subject represents merely the initial stage as a limited number of firms publish ESG-related information, therefore future scholars could investigate the differences in the strength of ESG relevance among industries, the evolution over time, and the impact of changing regulation.

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Tables & Figures

Table 1. Sample Distribution by Country and Industry (ICB)

				ESG distribution			
Country	**Freq.**	**Percent**	**Cum.**	**Mean**	**SD**	**Min**	**Max**
Austria	21	1.93	1.93	72.543	9.522	51.879	81.339
Belgium	8	0.74	2.67	68.207	10.856	49.826	78.965
Czech Republic	10	0.92	3.59	43.35	10.227	34.784	62.374
Denmark	4	0.37	3.96	75.369	0.828	74.127	75.783
Finland	27	2.49	6.45	74.859	16.96	43.525	91.984
France	307	28.27	34.71	73.069	12.005	29.515	90.854
Germany	176	16.21	50.92	75.788	12.865	16.970	93.400
Ireland	11	1.01	51.93	64.436	19.249	28.569	85.365
Italy	124	11.42	63.35	75.483	10.477	42.219	91.474
Luxembourg	42	3.87	67.22	65.202	21.816	19.627	84.728
Netherlands	92	8.47	75.69	69.247	13.245	40.612	92.918
Norway	35	3.22	78.91	70.429	9.779	57.936	91.833
Spain	12	1.10	80.02	64.486	19.132	37.053	84.862
Sweden	20	1.84	81.86	73.369	17.067	25.766	85.524
Switzerland	37	3.41	85.27	70.626	13.474	22.494	93.416
United Kingdom	160	14.73	100.00	71.679	17.215	9.180	95.212
Total	1086	100.00					
Industry (ICB)	**Freq.**	**Percent**	**Cum.**	**Mean**	**SD**	**Min**	**Max**
Basic Materials	114	10.50	10.50	76.036	11.915	23.620	92.251
Consumer Discretionary	104	9.58	20.07	69.613	13.522	22.494	90.769
Consumer Staples	104	9.58	29.65	70.941	14.172	40.612	93.246
Energy	88	8.10	37.75	77.953	10.114	32.686	91.474
Health Care	87	8.01	45.76	83.092	9.712	42.759	95.212
Industrials	150	13.81	59.58	69.247	16.005	16.970	93.416
Real Estate	67	6.17	65.75	69.133	21.449	9.180	90.854
Technology	31	2.85	68.60	76.418	14.371	55.841	93.400
Telecommunications	166	15.29	83.89	72.806	14.07	19.627	91.984
Utilities	175	16.11	100.00	66.935	9.932	34.784	89.738
Total	1086	100.00					

Table 2. Bond Distribution by Years

Issue Year	Freq.	Percent	Cum.
2010	58	5.34	5.34
2011	48	4.42	9.76
2012	102	9.39	19.15
2013	75	6.91	26.06
2014	50	4.60	30.66
2015	62	5.71	36.37
2016	93	8.56	44.94
2017	99	9.12	54.05
2018	88	8.10	62.15
2019	127	11.69	73.85
2020	174	16.02	89.87
2021	110	10.13	100.00
Total	1086	100.00	

Table 3. Transformation of Categorical Bond Ratings to Numerical

Moody's Bond Rating	Assigned Ratings (Numerical)	Freq.	Percent	Cum.
Caa1 – Caa2	1	1	0.09	0.09
B1 – B3	2	17	1.57	1.66
Ba1 – Ba3	3	113	10.41	12.06
Baa1 – Baa3	4	577	53.13	65.19
A1 – A3	5	338	31.12	96.32
Aa1 – Aa3	6	39	3.59	99.91
Aaa	7	1	0.09	100.00
		1086	100.00	

Table 4. Sample Distribution by Frequency of Issuance

N. of Bonds	N. of Firms	Percent	Cum.
1 – 3	89	50.57	50.57
4 – 10	57	32.39	82.96
11 – 20	19	10.80	93.76
21 – 45	11	6.25	100.00
Total	176	100.00	

Table 5. Institutional Dimensions by Country (mean values)

	Institutional	VA	PS	GE	RQ	RL	CC
Austria	1.481	1.406	1.071	1.589	1.459	1.844	1.516
Belgium	1.244	1.343	0.574	1.356	1.277	1.421	1.492
Czech Republic	0.924	0.952	1.025	0.942	1.202	1.009	0.416
Denmark	1.665	1.538	0.964	1.872	1.577	1.860	2.177
Finland	1.802	1.580	1.117	2.045	1.839	2.025	2.205
France	1.126	1.157	0.302	1.378	1.194	1.399	1.324
Germany	1.454	1.393	0.705	1.495	1.666	1.624	1.843
Ireland	1.386	1.349	0.962	1.399	1.569	1.472	1.566
Italy	0.536	0.986	0.442	0.472	0.720	0.358	0.236
Luxembourg	1.709	1.556	1.351	1.714	1.745	1.812	2.074
Netherlands	1.651	1.530	0.944	1.827	1.818	1.794	1.993
Norway	1.776	1.706	1.230	1.906	1.710	1.972	2.131
Spain	0.816	1.018	0.365	1.011	0.883	0.972	0.646
Sweden	1.713	1.590	1.064	1.758	1.832	1.861	2.171
Switzerland	1.738	1.573	1.301	1.961	1.695	1.843	2.057
United Kingdom	1.389	1.309	0.411	1.507	1.687	1.656	1.764

Table 6. Summary Statistics

Variables	Mean	Median	SD	Min	Max	N
Bond Spreads (Bps)	137.694	105	100.503	5	591	1086
ESG Score	72.341	74.617	14.249	9.18	95.212	1086
Environmental Score	73.029	76.411	17.037	0	99.017	1086
Social Score	75.404	80.302	16.991	2.056	97.33	1086
Governance Score	65.568	70.481	20.250	8.71	98.251	1086
Leverage	0.307	0.295	0.121	0.068	0.623	1086
Return on Assets (ROA)	0.032	0.034	0.039	-0.079	0.127	1086
Interest Coverage Ratio (ICR)	14.453	11.121	12.557	-1.545	72.274	1086
Total Assets (Million $)	70 099 290	40 267 008	74 676 725	2 924 600	414 800 000	1086
Board Size	13.229	13	4.123	3	26	1086
Maturity (Years)	9.824	8.117	7.168	2.283	99.99	1086
Principal Amount (Million $)	769.885	696.99	399.416	55.41	2500	1086
Bond Rating (Numerical)	4.248	4	0.760	1	7	1086
Voice & Accountability (VA)	1.301	1.298	0.204	0.813	1.752	1086
Political Stability (PS)	0.626	0.555	0.371	-0.095	1.461	1086
Government Effectiveness (GE)	1.422	1.462	0.407	0.361	2.235	1086
Regulatory Quality (RQ)	1.432	1.571	0.368	0.503	2.045	1086
Rule of Law (RL)	1.464	1.599	0.449	0.236	2.069	1086
Control of Corruption (CC)	1.518	1.690	0.573	0.006	2.287	1086
Institutional Score (IS)	1.294	1.394	0.358	0.494	1.867	1086

Table 7. Pairwise Correlation Table

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
(1) Bond Spreads (Bps)	1.000																			
(2) ESG score	-0.222***	1.000																		
(3) Environmental Score	-0.262***	0.764***	1.000																	
(4) Social Score	-0.236***	0.884***	0.608***	1.000																
(5) Governance Score	-0.059*	0.702***	0.267***	0.431***	1.000															
(6) Leverage	0.078***	-0.062**	-0.051*	-0.055*	-0.025	1.000														
(7) Return on Assets (ROA)	-0.320***	-0.136***	-0.154***	-0.133***	-0.043	-0.017	1.000													
(8) Interest Coverage Ratio (ICR)	-0.288***	0.090***	0.039	0.131***	0.055*	-0.288***	0.329***	1.000												
(9) Total Assets (Million $)	-0.102***	0.231***	0.214***	0.269***	0.022	-0.164***	-0.304***	-0.069**	1.000											
(10) Board Size	-0.059*	0.013	0.150***	0.071**	-0.232***	-0.180***	-0.200***	-0.040	0.407***	1.000										
(11) Maturity (Years)	0.052*	0.000	0.028	0.019	-0.067**	-0.032	0.010	-0.053*	0.330***	0.097***	1.000									
(12) Principal Amount (Million $)	0.005	0.220***	0.175***	0.238***	0.085***	-0.029	-0.180***	-0.063**	0.390***	0.251***	0.105***	1.000								
(13) Bond Rating (Numerical)	-0.520***	0.216***	0.241***	0.230***	0.073**	-0.211***	0.179***	0.296***	0.393***	0.142***	0.235***	0.158***	1.000							
(14) Voice & Accountability (VA)	-0.007	-0.056*	-0.104***	-0.066**	0.055*	-0.226***	0.122***	0.048	-0.152***	-0.185***	-0.022	-0.182***	-0.030	1.000						
(15) Political Stability (PS)	0.118***	-0.117***	-0.127***	-0.154***	0.034	-0.044	0.081***	-0.013	-0.236***	-0.263***	-0.063**	-0.218***	-0.088***	0.745***	1.000					
(16) Government Effectiveness (GE)	-0.075**	-0.084***	-0.057*	-0.096***	-0.032	-0.358***	0.176***	0.077**	-0.072**	-0.094***	0.012	-0.171***	0.063**	0.839***	0.495***	1.000				
(17) Regulatory Quality (RQ)	-0.050*	-0.056*	-0.123***	-0.057*	0.054*	-0.279***	0.178***	0.078**	-0.101***	-0.145***	-0.005	-0.150***	-0.013	0.831***	0.528***	0.852***	1.000			
(18) Rule of Law (RL)	-0.051*	-0.071**	-0.075**	-0.080***	-0.001	-0.373***	0.137***	0.059*	-0.043	-0.047	0.016	-0.145***	0.055*	0.831***	0.468***	0.966***	0.885***	1.000		
(19) Control of Corruption (CC)	-0.041	-0.034	-0.078***	-0.039	0.046	-0.313***	0.115***	0.067**	-0.065**	-0.078**	-0.009	-0.145***	-0.007	0.892***	0.517***	0.924***	0.901***	0.948***	1.000	
(20) Institutional Score (IS)	-0.025	-0.075**	-0.100***	-0.088***	0.026	-0.306***	0.149***	0.061**	-0.112***	-0.136***	-0.011	-0.182***	0.001	0.936***	0.663***	0.949***	0.928***	0.956***	0.968***	1.000

*p*** p<0.01, ** p<0.05, * p<0.1*

Table 8: Pooled Ordinary Least Square (POLS)

Variable	(1) Spread	(1.1) Spread	(1.2) Spread	(2) Spread	(2.1) Spread	(2.2) Spread	(3) Spread	(3.1) Spread	(3.2) Spread	(4) Spread	(4.1) Spread	(4.2) Spread
ESG Score	-0.006***	-0.006***	-0.004**									
	(0.002)	(0.002)	(0.002)									
Environmental Score				-0.008***	-0.007***	-0.004**						
				(0.002)	(0.002)	(0.001)						
Social Score							-0.005***	-0.005***	-0.003**			
							(0.002)	(0.002)	(0.001)			
Governance Score										-0.001	-0.001	-0.001
										(0.002)	(0.002)	(0.001)
Total Assets (log)	-0.137***	-0.204***	-0.046	-0.130***	-0.195***	-0.050	-0.142***	-0.207***	-0.048	-0.177***	-0.242***	-0.067**
	(0.038)	(0.041)	(0.034)	(0.035)	(0.038)	(0.033)	(0.042)	(0.045)	(0.034)	(0.039)	(0.041)	(0.032)
Leverage	-0.337	-0.380	-0.084	-0.312	-0.355	-0.070	-0.317	-0.360	-0.070	-0.372	-0.410	-0.142
	(0.365)	(0.371)	(0.208)	(0.346)	(0.357)	(0.209)	(0.361)	(0.369)	(0.211)	(0.365)	(0.369)	(0.213)
ROA	-5.578***	-5.875***	-3.017***	-5.641***	-5.939***	-3.096***	-5.586***	-5.893***	-2.998***	-5.494***	-5.822***	-2.973***
	(0.924)	(0.904)	(0.665)	(0.854)	(0.852)	(0.681)	(0.923)	(0.903)	(0.660)	(0.935)	(0.911)	(0.662)
ICR	-0.014***	-0.014***	-0.007***	-0.014***	-0.014***	-0.007***	-0.014***	-0.013***	-0.007***	-0.015***	-0.015***	-0.007***
	(0.004)	(0.003)	(0.002)	(0.003)	(0.003)	(0.002)	(0.004)	(0.003)	(0.002)	(0.003)	(0.003)	(0.002)
Board size	-0.008	-0.010	-0.003	-0.005	-0.007	-0.001	-0.007	-0.009	-0.002	-0.006	-0.007	-0.003
	(0.011)	(0.010)	(0.005)	(0.010)	(0.010)	(0.005)	(0.011)	(0.010)	(0.005)	(0.011)	(0.011)	(0.006)
Maturity (Years)		0.016***	0.022***		0.016***	0.022***		0.016***	0.022***		0.017***	0.022***
		(0.003)	(0.002)		(0.003)	(0.002)		(0.003)	(0.002)		(0.003)	(0.002)
Principal Amount (log)		0.167**	0.133**		0.158**	0.132**		0.168**	0.134**		0.160**	0.131**
		(0.071)	(0.053)		(0.068)	(0.052)		(0.072)	(0.053)		(0.071)	(0.053)
Constant	8.149***	8.073***	6.343***	8.084***	8.028***	6.361***	8.115***	8.029***	6.326***	8.429***	8.374***	6.558***
	(0.635)	(0.664)	(0.569)	(0.598)	(0.642)	(0.572)	(0.680)	(0.693)	(0.569)	(0.663)	(0.683)	(0.551)
Observations	1086	1086	1086	1086	1086	1086	1086	1086	1086	1086	1086	1086
Bond rating	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Industry & Year	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Number of clustering	176	176	176	176	176	176	176	176	176	176	176	176
Adjusted R-squared	0.231	0.271	0.555	0.249	0.286	0.556	0.230	0.271	0.555	0.220	0.262	0.552

Extended definitions of the variables can be found in Table 16
*Clustered robust standard errors by Firm ID in parentheses. *** p<0.01, ** p<0.05, * p<0.1*

Table 9: Random effects & Two-way clustering

	(1.3)	(1.4)	(2.3)	(2.4)	(3.3)	(3.4)
Econometric Model	POLS	RE	POLS	RE	POLS	RE
Variables	Spread	Spread	Spread	Spread	Spread	Spread
ESG Score	-0.004**	-0.003*				
	(0.002)	(0.002)				
Environmental Score			-0.004**	-0.002*		
			(0.001)	(0.001)		
Social Score					-0.003*	-0.002
					(0.002)	(0.001)
Total Assets (log)	-0.046	-0.069**	-0.050	-0.072**	-0.048	-0.072**
	(0.032)	(0.033)	(0.034)	(0.031)	(0.034)	(0.032)
Leverage	-0.084	0.123	-0.070	0.122	-0.070	0.129
	(0.254)	(0.211)	(0.253)	(0.209)	(0.256)	(0.211)
ROA	-3.017***	-2.341***	-3.096***	-2.390***	-2.998***	-2.336***
	(0.800)	(0.653)	(0.817)	(0.665)	(0.798)	(0.649)
ICR	-0.007**	-0.007***	-0.007*	-0.006***	-0.007*	-0.006***
	(0.003)	(0.002)	(0.003)	(0.002)	(0.003)	(0.002)
Board size	-0.003	0.000	-0.001	0.002	-0.002	0.001
	(0.007)	(0.005)	(0.007)	(0.005)	(0.007)	(0.005)
Maturity (Years)	0.022***	0.021***	0.022***	0.021***	0.022***	0.021***
	(0.004)	(0.002)	(0.004)	(0.002)	(0.004)	(0.002)
Principal Amount (log)	0.133*	0.104**	0.132*	0.105**	0.134*	0.105**
	(0.061)	(0.043)	(0.060)	(0.043)	(0.061)	(0.043)
Constant	4.008***	4.402***	4.043***	4.396***	3.949***	4.373***
	(0.544)	(0.503)	(0.554)	(0.503)	(0.565)	(0.508)
Observations	1086	1086	1086	1086	1086	1086
Standard errors	Clustered (firm & year)	Clustered (firm)	Clustered (firm & year)	Clustered (firm)	Clustered (firm & year)	Clustered (firm)
Bond rating	Yes	Yes	Yes	Yes	Yes	Yes
Industry & Year	Yes	Yes	Yes	Yes	Yes	Yes
Number of clustering	570	176	570	176	570	176
Adjusted R-squared	0.555	-	0.556	-	0.555	-
Overall R-squared	-	0.559	-	0.560	-	0.558

Extended definitions of the variables can be found in Table 16.
*Clustered robust standard errors by Firm ID or Firm ID & Year in parentheses. *** p<0.01, ** p<0.05, * p<0.1*

Table 10: Interaction variables (One-way clustering)

	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Institutional Dimension	IS	VA	PS	GE	RQ	RL	CC
Econometric Model	POLS	POLS	POLS	POLS	POLS	POLS	POLS
Variables	Spread	Spread	Spread	Spread	Spread	Spread	Spread
ESG Score	-0.014**	-0.019**	-0.007**	-0.014***	-0.013**	-0.011**	-0.009***
	(0.005)	(0.008)	(0.003)	(0.005)	(0.005)	(0.005)	(0.004)
Institutional Dimension	-0.617**	-0.985**	-0.379	-0.618**	-0.488**	-0.415*	-0.305**
	(0.276)	(0.440)	(0.267)	(0.261)	(0.248)	(0.238)	(0.141)
ESG*Institutional Dimension	0.007**	0.011*	0.004	0.007**	0.006*	0.005	0.003
	(0.004)	(0.006)	(0.004)	(0.004)	(0.003)	(0.003)	(0.002)
Total Assets (log)	-0.043	-0.046	-0.048	-0.042	-0.044	-0.043	-0.043
	(0.034)	(0.034)	(0.034)	(0.034)	(0.034)	(0.034)	(0.034)
Leverage	-0.182	-0.159	-0.080	-0.242	-0.117	-0.206	-0.194
	(0.182)	(0.189)	(0.209)	(0.182)	(0.181)	(0.175)	(0.179)
ROA	-2.790***	-2.817***	-2.945***	-2.752***	-2.880***	-2.826***	-2.810***
	(0.648)	(0.656)	(0.661)	(0.643)	(0.650)	(0.640)	(0.638)
ICR	-0.008***	-0.008***	-0.007***	-0.008***	-0.007***	-0.008***	-0.008***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Board size	-0.004	-0.004	-0.004	-0.004	-0.003	-0.003	-0.003
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Maturity (Years)	0.022***	0.022***	0.022***	0.022***	0.022***	0.022***	0.022***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Principal Amount (log)	0.124**	0.124**	0.128**	0.119**	0.131**	0.124**	0.125**
	(0.051)	(0.051)	(0.051)	(0.050)	(0.052)	(0.051)	(0.051)
Constant	7.320***	7.826***	6.711***	5.650***	7.148***	7.097***	6.908***
	(0.653)	(0.803)	(0.532)	(0.695)	(0.656)	(0.687)	(0.595)
Observations	1086	1086	1086	1086	1086	1086	1086
Bond rating	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry & Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of clustering	176	176	176	176	176	176	176
Adjusted R-squared	0.557	0.558	0.556	0.559	0.556	0.556	0.557

***IS** = Institutional Score, **VA** = Voice & Accountability, **PS** = Political Stability, **GE** = Government Effectiveness, **RQ** = Regulatory Quality, **RL** = Rule of Law. **CC** = Control of Corruption. Extended definitions of the variables can be found in Table 16.*
Clustered robust standard errors by Firm ID in parentheses.
*** p<0.01, ** p<0.05, * p<0.1*

Table 11: Interaction variables (Two-way clustering)

	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Institutional Dimension	IS	VA	PS	GE	RQ	RL	CC
Econometric Model	POLS	POLS	POLS	POLS	POLS	POLS	POLS
Variables	Spread	Spread	Spread	Spread	Spread	Spread	Spread
ESG Score	-0.014**	-0.019**	-0.007**	-0.014*	-0.013**	-0.011*	-0.009**
	(0.006)	(0.008)	(0.003)	(0.007)	(0.006)	(0.006)	(0.004)
Institutional Dimension	-0.617**	-0.985**	-0.379*	-0.618*	-0.488*	-0.415	-0.305*
	(0.290)	(0.396)	(0.208)	(0.328)	(0.271)	(0.283)	(0.148)
ESG*Institutional Dimension	0.007*	0.011*	0.004	0.007	0.006*	0.005	0.003
	(0.004)	(0.005)	(0.003)	(0.005)	(0.003)	(0.004)	(0.002)
Total Assets (log)	-0.043	-0.046	-0.048	-0.042	-0.044	-0.043	-0.043
	(0.033)	(0.033)	(0.031)	(0.032)	(0.033)	(0.032)	(0.032)
Leverage	-0.182	-0.159	-0.080	-0.242**	-0.117	-0.206*	-0.194
	(0.138)	(0.169)	(0.238)	(0.106)	(0.167)	(0.105)	(0.147)
ROA	-2.790***	-2.817***	-2.945***	-2.752***	-2.880***	-2.826***	-2.810***
	(0.703)	(0.723)	(0.784)	(0.687)	(0.711)	(0.703)	(0.698)
ICR	-0.008**	-0.008**	-0.007**	-0.008**	-0.007**	-0.008**	-0.008**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Board size	-0.004	-0.004	-0.004	-0.004	-0.003	-0.003	-0.003
	(0.006)	(0.007)	(0.007)	(0.006)	(0.006)	(0.007)	(0.007)
Maturity (Years)	0.022***	0.022***	0.022***	0.022***	0.022***	0.022***	0.022***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Principal Amount (log)	0.124*	0.124*	0.128*	0.119*	0.131*	0.124*	0.125*
	(0.062)	(0.061)	(0.061)	(0.061)	(0.062)	(0.062)	(0.061)
Constant	4.935***	5.468***	4.393***	5.036***	4.748***	4.692***	4.543***
	(0.737)	(0.816)	(0.507)	(0.807)	(0.760)	(0.775)	(0.641)
Observations	1086	1086	1086	1086	1086	1086	1086
Bond rating	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry & Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of clustering	570	570	570	570	570	570	570
Overall R-squared	0.557	0.558	0.556	0.559	0.556	0.556	0.557

***IS** = Institutional Score, **VA** = Voice & Accountability, **PS** = Political Stability, **GE** = Government Effectiveness, **RQ** = Regulatory Quality, **RL** = Rule of Law. **CC** = Control of Corruption. Extended definitions of the variables can be found in Table 16.*
Clustered robust standard errors by Firm ID & Year in parentheses.
**** p<0.01, ** p<0.05, * p<0.1*

Table 12: Robustness Tests

	(12)	(13)	(14)	(15)	(16)	(17)
Econometric Model	Ordered Probit	Ordered Probit	Ordered Probit	POLS	POLS	POLS
Variables	Bond Rating	Bond Rating	Bond Rating	Spread	Spread	Spread
ESG Score	0.009*					
	(0.005)					
Environmental Score		0.012***				
		(0.005)				
Social Score			0.009**			
			(0.004)			
ESG Lag 1 Year				-0.003**		
				(0.002)		
Environmental Lag 1 Year					-0.003**	
					(0.001)	
Social Lag 1 Year						-0.003**
						(0.001)
Total Assets (log)	0.666***	0.648***	0.656***	-0.048	-0.050	-0.046
	(0.105)	(0.103)	(0.110)	(0.036)	(0.035)	(0.034)
Leverage	-0.436	-0.535	-0.505	-0.076	-0.052	-0.057
	(0.567)	(0.571)	(0.578)	(0.229)	(0.228)	(0.231)
ROA	9.324***	9.545***	9.311***	-3.094***	-3.145***	-3.078***
	(2.190)	(2.174)	(2.206)	(0.707)	(0.712)	(0.699)
ICR	0.042***	0.041***	0.041***	-0.007***	-0.007***	-0.007***
	(0.006)	(0.006)	(0.006)	(0.002)	(0.002)	(0.002)
Board size	0.001	-0.004	-0.000	-0.004	-0.002	-0.003
	(0.019)	(0.019)	(0.019)	(0.005)	(0.005)	(0.005)
Maturity (Years)	0.017***	0.017***	0.017***	0.022***	0.022***	0.022***
	(0.006)	(0.006)	(0.006)	(0.002)	(0.002)	(0.002)
Principal Amount (log)	-0.105	-0.104	-0.109	0.134**	0.131**	0.134**
	(0.090)	(0.086)	(0.091)	(0.054)	(0.053)	(0.055)
Constant				4.422***	6.257***	4.326***
				(0.564)	(0.551)	(0.573)
Observations	1086	1086	1086	1064	1064	1064
Bond rating	No	No	No	Yes	Yes	Yes
Industry & Year	Yes	Yes	Yes	Yes	Yes	Yes
Number of clustering	176	176	176	176	176	176
Adjusted R-squared	-	-	-	0.553	0.463	0.549
Pseudo R-squared	0.178	0.182	0.178	-	-	-

Extended definitions of the variables can be found in Table 16.
Clustered robust standard errors by Firm ID in parentheses.
**** p<0.01, ** p<0.05, * p<0.1*

Table 13: Two Stage Least Square (2SLS)

	(18a)	(18b)
Econometric Model	First Stage	Second Stage
Variables	ESG	Spread
ESG Score		-0.006**
		(0.003)
Country-Year ESG	0.470***	
	(0.102)	
Industry-Year ESG	0.646***	
	(0.093)	
Total Assets (log)	5.576***	-0.028
	(0.942)	(0.041)
Leverage	8.321	-0.046
	(7.742)	(0.212)
ROA	-1.047	-3.048***
	(0.068)	(0.659)
ICR	-0.019	-0.007***
	(0.068)	(0.002)
Board size	-0.085**	0.021***
	(0.039)	(0.002)
Maturity (Years)	-0.475**	-0.004
	(0.201)	(0.005)
Principal Amount (log)	0.464	0.134***
	(0.659)	(0.052)
Constant	-102.578***	3.888***
	(15.594)	(0.599)
Observations	1086	1086
Bond rating	Yes	Yes
Industry & Year	Yes	Yes
Number of clustering	176	176
Adjusted R-squared	0.520	0.553

Extended definitions of the variables can be found in Table 16.
Clustered robust standard errors by Firm ID in parentheses.
**** p<0.01, ** p<0.05, * p<0.1*

Table 14: White´s test

H0: Homoscedasticity
Ha: Unrestricted heteroskedasticity

	Test value	P-value	Decision
Model 1 (main)	352.79	0.966	Accept H0
Model 5 (interaction)	412.17	0.963	Accept H0

Table 15: Wooldridge test for autocorrelation (serial correlation)

H0: No first-order autocorrelation
Ha: Evidence of first-order autocorrelation

	Test value	P-value	Decision
Model 1 (main)	10.611	0.0015	Reject H0
Model 5 (interaction)	10.954	0.0013	Reject H0

Table 16: Description of variables

Variables	Description	Source
Dependent variables		
Bond Spread in Basis points (log)	Natural log of the marginal cost for a firm when issuing new debt. It is calculated as the difference between the yield on a corporate bond and the benchmark rate. The yield on a government bond with similar maturity is considered to be a benchmark rate. The credit spread thus gives an indication of the additional risk that lenders take when they buy corporate debt versus government debt of the same maturity.	Refinitiv
ESG variables		
ESG score	Company-level ESG measures of which the most comparable and material per industry power the overall company assessment and scoring process. The company-level ESG measures are grouped into the three pillars Environmental, Social, and Governance and scored based on category weights. The overall ESG score is then composed of the three pillar scores, each with equal weight.	Refinitiv
Environmental score	The Environmental score is based on category specific ESG measures falling under Emissions, Innovation, or Resource use.	Refinitiv
Social score	The Social score is based on category specific ESG measures falling under Community, Human rights, Product responsibility, and Workforce.	Refinitiv
Governance score	The Governance score is based on category specific ESG measures falling under CSR strategy, Management, or Shareholders.	Refinitiv
Institutional dimensions		
Voice & Accountability	Reflects perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.	World Bank
Political Stability & Absence of Violence/Terrorism	Political Stability and Absence of Violence/Terrorism measures perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism.	World Bank
Government Effectiveness	Reflects perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.	World Bank
Regulatory Quality	Reflects perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.	World Bank
Rule of Law	Reflects perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.	World Bank

Control of Corruption	Reflects perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests.	World Bank
Institutional Score	Is a combined score of the six institutional dimensions with equal weights	
Control variables		
Total Assets (log)	Natural log of Total Assets (million $)	Refinitiv
Leverage	Total debt / Total Assets	Refinitiv
ROA	Net income / Total Assets	Refinitiv
ICR	(EBITDA) / total interest expense	Refinitiv
Board size	Total number of board members	Refinitiv
Maturity (Years)	Time to Maturity of a newly issued corporate bond	Refinitiv
Principal Amount (log)	Natural log of the bond issue amount	Refinitiv

Figure 1: Distribution of Countries across Institutional and ESG scores (mean values)