



School of Economics

The ESG score impact on Financial Performance and Capital Structure of the Firm.

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Statement of Originality

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Abstract:

This research paper delves into the examination of the influence that environmental, social, and governance (ESG) scores of companies have on their financial performance and capital structure. With the increasing worldwide focus on adhering to environmental regulations, sustainable finance has emerged as a crucial area of contemporary economic studies. Therefore, this study aims to explore the relationship between a company's ESG score and its financial performance and capital structure. To achieve this objective, a quantitative methodology is employed, utilizing a dataset encompassing 807 private and public firms across diverse industries in four Scandinavian countries (Denmark, Sweden, Finland, and Norway) as well as Germany. The findings of this research paper will contribute to the understanding of the impact of ESG scores on companies' financial performance and capital structure, providing insights for investors, policymakers, and stakeholders interested in sustainable finance and responsible investment practices.

Keywords: ESG scores, financial performance, capital structure, sustainability.

1. Introduction:

Over the past few decades, there has been a substantial debate surrounding the impact of environmental, social, and governance (ESG) factors on a firm's financial performance. Numerous studies have been undertaken to explore the connection between a firm's adherence to ESG rules and conditions and its financial performance and capital structure. These studies demonstrated conflicting findings regarding the relationship between ESG performance and both financial performance and capital structure.

The conflicting results of these studies have contributed to an ongoing debate in the field. Some research suggests a positive association between ESG performance and financial performance, implying that firms that prioritize ESG practices tend to experience better financial outcomes. On the other hand, other studies have found no significant relationship or even a negative association between ESG performance and financial performance, similarly, when investigating the impact of ESG performance on a firm's capital structure, studies have produced varying results. While certain studies suggest that firms with higher ESG scores are associated with higher leverage and greater debt in their capital structure, contradicting findings have also emerged, indicating no significant relationship or even a negative association between ESG performance and capital structure.

The presence of contradictory findings in previous studies served as the primary motivation for conducting the current research. The aim of this paper was to address an important question: "Does the ESG score have an impact on the financial performance and capital structure of a firm?"

The incorporation of ESG (Environmental, Social, and Governance) factors into a firm's operations and decision-making process can have various direct and indirect effects on its financial performance ([Ben-Porath, Dekel, & Lipman, 2018](#)). Direct effects can include cost savings through the adoption of environmentally sustainable practices and enhanced reputation through positive social and environmental practices and companies that meet ESG criteria may also have better access to capital from investors who prioritize sustainable investments. On the other hand, indirect effects may include regulatory compliance, improved employee productivity and retention, and reduced legal and reputational risk ([Sharfman and Fernando, 2008](#)). Overall, prioritizing ESG factors can have a significant impact on a firm's financial success in long term,

making it better prepared to respond to emerging market trends and investor preferences ([Allen Goss Gordon S. Roberts,2010](#)).

According to the stakeholder's theory, the market value of an enterprise largely depends on the ability to meet stakeholders' requirements ([Mohammad Hassan Shakil, 2021](#)). While on the contrary, supporters of the neoclassical theory that focus on marginal abatement costs and suggests that attempting to reduce environmental costs incurs additional costs, leading to a decrease in marginal net benefits. A meta-analysis study from 2010 [Eva Horváthová](#) provides evidence that supports this perspective, reporting mixed results regarding the relationship between environmental performance (EP) and financial performance (FP).

The primary aim of this research was to investigate the tangible impact of complying with Environmental, Social, and Governance (ESG) conditions measured by the ESG score on capital structure and financial performance. To accomplish this objective, the companies under study were classified into two categories based on specific criteria. Specifically, firms with an ESG score less than 25 were categorized as having a low ESG score ([Mohammad Hassan Shakil, 2021](#)), while those with an ESG score higher than 25 were classified as having a moderated high ESG score. This categorization allowed for a comparative analysis to discern the effects of varying levels of ESG compliance on financial outcomes.

Given the ongoing debate and divergent findings in previous research on this topic, it was essential to further explore the relationship between the ESG score, capital structure, and financial performance. To enhance the robustness and generalizability of the findings, this study specifically focused on a new sample of firms from Scandinavian countries, including Denmark, Sweden, Finland, Norway, recognized as highly compliant nations in terms of ESG policies. Additionally, Germany, as the largest industrial country in Europe, was included in the sample to capture a diverse range of market characteristics and ESG practices.

The utilization of ESG score measurements in this study was deliberate, aiming to overcome the limitations of prior research that primarily focused on either ESG disclosure without considering the degree of compliance among firms or ESG score without classifications. By adopting a comprehensive approach that encompasses both stakeholder and shareholder theories, the research aligns with the belief that firms need to achieve a reasonable degree of compliance to the

environmental, social, and governance rules to maximize financial benefits and that is consistent with the findings of this study which indicated that an excessive emphasis on adhering strictly to ESG rules that leads to recording a high ESG score may result in additional costs, potentially leading to reduced profitability and a negative impact on a firm's financial performance. Conversely, reasonable compliance with ESG principles has the potential to contribute to improved financial performance. These conclusions underline the importance of striking a balance between ESG practices and financial success.

All variables' data were collected from Eikon except the GDP per capita was collected from the world bank data. By using panel data for 807 firms from the five European countries. In the analysis of panel data, the fixed effect model was employed to examine two main hypotheses. The first hypothesis aimed to assess the impact of a firm's ESG score on its financial performance. The second hypothesis aimed to explore the existence of a positive relationship between the capital structure and ESG score.

The findings of the study indicate significant evidence regarding the first hypothesis, which examines the relationship between a high ESG score and financial performance. The results revealed a negative effect of the high ESG score on financial performance. This finding aligns with the shareholders' theory, which suggests that implementing ESG rules can increase costs and reduce profitability. Thus, it implies that high ESG scores are associated with poorer financial performance. Additionally, the analysis provided evidence supporting the second hypothesis. The results demonstrated a significant positive effect of firms' high ESG scores on their capital structure, specifically their leverage. This implies that a higher ESG score is linked to a greater amount of debt in a firm's capital structure.

In summary, the study employed the fixed effect model to analyze panel data and investigate two hypotheses. The findings suggest that a high ESG score has a negative impact on financial performance, aligning with the shareholders' theory. Furthermore, the results indicate a positive relationship between a firm's high ESG score and its capital structure, signifying a higher level of debt. This research provides valuable insights into the impact of ESG score on capital structure and financial performance. By delving into the complexities of this relationship and considering the degree of compliance, this study adds to the existing body of knowledge in the field. The

inclusion of Scandinavian countries and Germany in the sample enhances the relevance and applicability of the findings. Further research in this area is warranted to continue advancing our understanding of the intricate interplay between ESG score and the firms' financial performance and capital structure.

2. Literatures' review:

2.1. The relationship between ESG and financial performance:

The shareholder and stakeholder theories are two opposing corporate theoretic frameworks. Shareholder theory states that corporations' only responsibility is maximizing shareholders' value (Friedman, 1970). If a corporation's engagement in social activities negatively affects the value creation for shareholders, it will violate their core responsibility. Friedman further argues that the managers who spend money on behalf of businesses should only act in the interests of the shareholders and that spending on social activities is a violation of their duty. On the other hand, both of stakeholder theory that states that corporations have a responsibility towards all of their stakeholders, and it describes stakeholders as employees, customers and suppliers, shareholders, government, environmentalists, and other groups or individuals who are affected by a corporation (Friedman, 2007). And Legitimacy theory, as suggests that organizations strive to align their actions with societal boundaries and norms as a means to maintain legitimacy (Deegan, 2002). This theory specifically emphasizes the interactions between companies and society.

While many countries and firms prioritize financial performance over environmental and social responsibilities, studies have shown that companies that prioritize ESG issues actually perform better financially, a study from 2021, Ahmad N, Asma Mobarek, Naheed Nawazesh found a positive relationship between the ESG performance and financial performance.

Legitimacy and stakeholder theories provide the theoretical foundation for the relationship between ESG performance and financial performance (Qureshi, Kirkerud, Theresa, & Ahsan, 2019). According to stakeholder theory, meeting stakeholders' needs is critical to a company's market value, with institutional investors prioritizing public needs and policy orientation, including product quality and humanitarian needs (Cao, Titman, Zhan, & Zhang, 2020). However, shareholder supremacy theory suggests that a company's sole objective is to maximize shareholder interests and managers who allocate funds for environmental and social causes risk damaging

shareholder value and violating their core responsibilities (Friedman, 2007). Regardless of the contrasting opinions, it is evident that giving priority to ESG factors can yield substantial financial advantages for companies, including enhanced performance and increased access to capital.

The natural resource-based view theory suggests that environmental issues hinder contingency cost, whereas mitigating environmental risk is good for economic performance. In contrast, neoclassical theory's proponents address marginal abatement costs. The premise of neoclassical theory is that reducing environmental costs generates an additional cost, decreasing the marginal net benefit.

Previous studies found significant inverse association among corporate social performance (CSP) and risk of firms (Oikonomou et al., 2012). Risk management theory posits that better ESG performance protects firms during unfavorable market situation (Sharfman and Fernando, 2008).

A study from 2021, Garel & Petit-Romec supports this idea by studying the financial performance of the companies during the COVID-19 pandemic which caused economic disruption globally, raising concerns about the future of climate actions. While the pandemic has led to immediate positive environmental impacts, economic recovery efforts may threaten climate action initiatives. However, evidence shows that firms with good environmental scores have higher returns during the COVID-19 crisis, indicating that investors are rewarding responsible climate strategies. This suggests that companies with responsible strategies on climate change are likely to perform better in the long run.

Another study from 2019, Muhammad Azeem Qureshi, Sina Kirkerud, Kim Theresa, Tanveer Ahsan supports the Stakeholder theory, which posits that corporations engaged in activities beyond profit maximization can be rewarded with value creation for both the firm and its stakeholders. The study reveals that adhering to environmental, social, and governance (ESG) rules can have a positive impact on a company's value. This is attributed to the fact that such practices promote good management, foster trust among stakeholders, and enhance overall performance. Additionally, the research highlights that companies operating in sensitive industries often exhibit better social and governance performance, further underscoring the importance of ESG considerations in achieving sustainable and responsible business practices. Furthermore, a recent study from 2023, Kalia, D, & Aggarwal, D indicated that the relationship between ESG score and financial performance cannot be universally applied. The results reveal that engagement in ESG activities has a positive influence on the performance of healthcare companies in developed

economies. However, this relationship may be negative or not significant when it comes to developing economies.

Another study from 2018, [Marina Brogi](#), [Valentina Lagasio](#) examined how a company's financial performance, measured by return on assets (ROA), is linked to its environmental, social, and governance (ESG) score. The researchers focused on the relationship between ROA and the three dimensions of the ESG score since both of social and governance scores have a significant positive effect on the financial performance while the social score has insignificant effect on the financial performance. The researchers found significant differences between industrial firms and financial intermediaries. They also found a positive and significant relationship between ESG score and profitability. These findings support my first hypothesis that the ESG score has an impact on the financial performance of the firm. Furthermore, a significant scientific study from 2015, [Gunnar Friede](#), [Timo Busch](#), [Alexander Bassen](#) analyzed 60 studies focusing on the correlation between environmental, social, and governance (ESG) factors and corporate financial performance (CFP). The study discovered compelling evidence supporting a positive association between ESG factors and CFP.

A study from China from 2018, [Changhong Zhao](#), [Yu Guo](#), [Jiahai Yuan](#), [Mengya Wu](#), [Daiyu Li](#), [Yiou Zhou](#) and [Jiangang Kang](#) investigated the potential for large listed power generation groups to enhance their financial performance through a focus on strong environmental, social, and governance (ESG) performance. The findings demonstrated a positive relationship between ESG performance and financial outcomes. These results hold practical implications for investors, company management, decision-makers, and industry regulators. Investors can make more informed investment decisions by evaluating a company's ESG report, while companies themselves can respond to investor demands by improving their ESG performance. In order to achieve long-term profitability and sustainable development, company management and decision-makers should shift their attention towards corporate social responsibility. Additionally, industry regulators stand to benefit from the ESG development of companies, as it contributes to the stability and growth of the capital market, fostering a more sustainable business landscape.

A recent research paper from 2021, [Muhammad Ramzan](#), [Muhammad Amin](#), [Muhammad Abbas](#) examined the relationship between corporate social responsibility (CSR) initiatives and the financial performance (FP), financial risk management (FS), and financial inclusion (FI) of banks in Pakistan over a ten-year period. The findings indicated a significant positive correlation between

CSR and FP, suggesting that CSR activities positively influence customers' perception of the bank, attracting them and subsequently leading to improved financial performance for the banks. Moreover, the study found that banks investing in CSR initiatives can establish strong client relationships, which in turn helps mitigate financial risk and enhance financial stability. Additionally, the research revealed a positive association between FI and CSR initiatives, indicating that banks that allocate greater resources to CSR activities tend to have larger networks of branches and ATMs, enabling them to reach and serve a larger customer base effectively. These findings have important implications for banks, highlighting the potential benefits of CSR in enhancing financial performance, risk management, and inclusive banking practices. A previous study by [Phuong-Anh Nguyena, Ambrus Kecskés, Sattar Mansi \(2020\)](#), investigated the impact of corporate social responsibility (CSR) on shareholder value. The authors argued that long-term investors act as natural monitors, ensuring that managers make decisions regarding CSR that maximize shareholder value. Examining firms with longer investor horizons and higher CSR investments, the study found that these firms had significantly higher stock valuations, approximately 5% higher, despite not having higher realized or expected profitability. Additionally, these firms exhibited lower volatility in profitability, sales, and costs by approximately 5%. They also experienced lower volatility in stock returns, both systematic and idiosyncratic, as well as future stock returns. The presence of long-term investors, indexers, and changes in stakeholder orientation laws established causality, emphasizing the role of effective monitoring in aligning CSR activities with shareholder interests and creating shareholder value. However, a Turkish study from 2022, [Ebru Saygili, Serafettin Arslan, Ayse Ozden Birkan](#) examined the impact of ESG (environmental, social, and governance) disclosure on corporate financial performance (CFP) in Turkish companies listed on the Borsa Istanbul Corporate Governance Index (XKURY) the author found that environmental disclosures have a negative impact on CFP, while social disclosures related to stakeholder participation in corporate management lead to operational efficiency, Another study from 2019, [Piers Weston, Matthias Nnadi](#) found there is no financial advantage of being sustainable. Nevertheless, it is crucial to note that there are various non-financial benefits to behaving sustainably, including a better reputation, a sense of satisfaction in being environmentally conscious, improved opportunities for obtaining debt and equity financing, and possibly better credit ratings, as well as a general contribution to a healthier environment.

In a separate research conducted by [Svetlana Borovkova and Ying Wu \(2020\)](#), different results were found regarding the relationship between the ESG score and financial performance. The study revealed that EU stocks with higher ESG scores demonstrated an enhancement in returns. This indicates that European Union companies prioritizing sustainable and responsible practices did not compromise their financial performance. However, when analyzing Australian firms, no significant relationship was found between ESG scores and returns. This suggests that in Australia, the ESG performance of companies did not have a notable impact on their stock returns. In the United States, the study showed that both volatility and the ESG score exhibited a significant negative relationship with excess returns. This suggests that the US market places less emphasis on sustainability, resulting in lower demand from investors for stocks of highly ESG scoring firms. The negative relationship between excess returns and the ESG score in the US indicates that companies with higher ESG scores tended to generate lower returns, potentially due to the relatively lower investor demand for sustainable investments in the country.

Similar to the findings in the US, highly ESG scoring firms in Asia, where sustainability issues have gained recent attention, tended to experience lower returns in the subsequent year. This suggests that investors in Asian markets are currently assigning less value to ESG considerations when making investment decisions.

It is important to note that these findings highlight the diverse outcomes observed in different regions, reflecting variations in market dynamics, investor preferences, and the level of integration of ESG factors into investment strategies.

2.1.1. First hypothesis:

Building upon prior research that has presented varying perspectives on the relationship between environmental, social, and governance (ESG) performance and financial performance, this study aims to investigate the impact of a firm's ESG score on its financial performance. Previous studies ([Marina Brogi and Valentina Lagasio, 2018](#); [Guangyou Zhou, Lian Liu, and Sumei Luo, 2022](#)), have provided evidence supporting the positive influence of ESG performance on financial performance. Conversely, studies by Piers Weston and Matthias Nnadi (2019) have concluded that there is no financial advantage associated with sustainability. Additionally, a study from 2020 [Svetlana Borovkova and Ying Wu](#) identified negative effects of ESG performance on financial performance in certain markets. Based on these divergent findings, the

first hypothesis of this study posits that a firm's ESG score has an impact on its financial performance. To examine this relationship, the ESG score is categorized as either "moderated high ESG" when the score is greater than 25, or "Low ESG" when the score is less than 25, allowing for an investigation of the effects of these two ESG categories on a firm's financial performance.

2.2. The relationship between ESG score and firm's capital structure:

The ESG score of a company can have a significant impact on its capital structure, influencing various factors such as investor perception, access to capital, risk management, and regulatory compliance. Companies that prioritize ESG issues and maintain strong ESG practices often attract investors and gain better access to capital. Additionally, these companies are better equipped to manage risks and adhere to regulatory requirements. Previous study from 2022, [Muhammad Arif Khan](#) supported this notion by demonstrating a bidirectional relationship between ESG performance and financial performance/risk. Such studies suggest that firms with higher profits have the ability to invest in CSR projects, generating long-term integrated value. Moreover, sensitive industries tend to exhibit better ESG performance, supporting the legitimacy theory. The presence of debt also positively influences ESG performance, as it provides incentives for companies to comply with established ESG standards and facilitates access to the debt market. [Samuel M. Hartzmark, Abigail B. Sussman \(2020\)](#) presented compelling causal evidence demonstrating that investors consider sustainability factors when making investment decisions. It revealed that funds with higher sustainability ratings, as assessed by Morningstar's globe ratings, experienced significantly greater inflows of funds compared to those with lower ratings. The study put forward various explanations for this response to sustainability ratings, including non-pecuniary motives such as altruism or the warm glow effect. This implies that firms with strong ESG performance have a higher likelihood of accessing the debt market under favorable conditions. In a previous study [Justin Hung Nguyen Hieu V. Phan, \(2020\)](#) investigated the impact of environmental responsibility and carbon risk on a company's capital structure. The findings indicated that an increase in carbon risk is associated with a higher risk of financial distress, prompting firms to reduce their financial leverage. This suggests that companies facing elevated carbon risks may adjust their financial strategies to mitigate potential financial difficulties.

Extensive research in this area has consistently highlighted the adverse effects of unfavorable environmental track records and increased vulnerability to environmental risks on a company's capital expenses, as well as its financial and investment outcomes. Consequently, it is suggested that implementing better environmental, social, and governance (ESG) practices to address and mitigate environmental risks can result in decreased capital expenses ([Sharfman and Fernando in 2008](#)).

According to [Titman \(1984\)](#), the incentives of stakeholders to make firm-specific investments can affect financing decisions. Several studies showed that firms with unique products or bilateral customer-supplier relations have low leverage. However, the role of the workforce in financing decisions is less well-understood, a study from 2011, [Kee-Hong Bae a, Jun-Koo Kang b, Jin Wang](#) discussed three potential arguments for why a firm's treatment of its workforce might be related to its capital structure decisions. One argument is based on the idea that firms that want to credibly commit themselves to providing better employee benefits need to have lower debt ratios. The second argument is based on the agency costs of debt and optimal capital structure, while the third argument is based on the free cash flow argument of ([Jensen 1986](#)). Another study from 2010, [Allen Goss Gordon S. Roberts](#) studied whether the Corporate social responsibility CSR value-enhancing or value-destroying. Previous researches have mainly focused on the link between CSR and the cost of equity, but this paper examines the relationship between CSR and private debt extended by banks, the authors explored whether lenders discriminate between firms with low levels of CSR and those with higher levels, and whether they view the CSR initiatives of low-quality borrowers differently than those of high-quality borrowers. Advocates for CSR argue that it is a valuable tool for risk management, while opponents see it as a diversion of resources. The success of CSR initiatives depends largely on management motivations, and the authors showed that banks are able to discriminate between sincere attempts to align the goals of the firm with broader societal goals and value-destroying agency costs. This suggests that management attempts to use CSR to manipulate stakeholders are unlikely to be successful. Another study from 2010, [Yannik Bofinger a, Kim J. Heyden b, Björn Rock](#) investigated the relationship between corporate sustainability and misevaluation in the US and showed that a firm's engagement in environmental, social, and governance (ESG) activities affects its misevaluation as it increases a firm's market valuation relative to its true value. The effect of ESG on misevaluation is robust and persists even when accounting for various methodological alterations, the study found that ESG engagement

expands misevaluation for already overvalued firms but moves undervalued firms towards their true value. The authors rule out information asymmetry as a moderating factor in the ESG-misevaluation relationship, suggesting that sustainable investors' investment behavior and a strong sustainability trend are driving the valuation effect. The study also found that the effect of ESG on misevaluation intensifies over time due to increasing relevance of corporate social responsibility (CSR) topics and sentiment towards sustainability and that leads to access the debt market with better conditions, another evidence from the real estate market from 2019, [Piet Eichholtz a, Rogier Holtermans b, Nils Kok a, Erkan Yönder](#) found that the good environmental performance leads to an efficient price in the real estate debt market.

A study by [Muhammad Arif Khan \(2022\)](#), found a bidirectional relationship between ESG performance and financial performance/risk, suggesting that firms with higher profits have the capacity to invest in CSR projects, generating long-term integrated value. Systematic risk implies that sensitive industries exhibit better ESG performance, supporting legitimacy theory. Debt positively impacts ESG performance, as it provides incentives for companies to comply with ESG rules. All previous researches provided an evidence that compliance with the environmental, social and governance (ESG) rules is associated with a higher leverage in the firm capital structure.

However, there is an oppose opinion regarding the relationship between the ESG performance and capital structure, research paper from the year 2011, [Kee-Hong Bae a, Jun-Koo Kang b, Jin Wang](#) explored the stakeholder theory of capital structure and specifically examined the impact of a firm's interactions with its employees on its decision-making process regarding capital structure. The research yielded positive results, shedding light on the relationship between the social aspect of environmental, social, and governance (ESG) factors, particularly how a firm treats its employees, and its capital structure choices, the study emphasized the significant role of a firm's reputation for fair treatment of its employees in shaping its decisions related to capital structure. The findings revealed that companies that prioritize employee-friendly policies, as assessed by an Employee Treatment Index, tend to maintain lower levels of debt in their capital structure. Another opposed opinion from the year 2022, [Koundouri, P., Pittis, N., & Plataniotis,A](#) revealed that ESG performance does not have a significant impact on a company's debt-to-equity (D/E) ratio or its ability to raise funds through debt, except for media firms with strong ESG leaders. The findings suggest that ESG performance may not be a critical factor in determining a company's capital structure efficiency. However, in certain sectors, firms with strong ESG performance tend to

demonstrate a greater profit margin, although this relationship is not consistent across all industries.

2.2.1. Second hypothesis:

The second hypothesis on this paper posits that there exists a positive relationship between a firm's capital structure and its Environmental, Social, and Governance (ESG) score. This paper argues that a higher ESG score enhances a firm's reliability and provides better opportunities for accessing the debt market, ultimately earning the trust of investors.

Supporting evidence for this hypothesis comes from 2019 a study conducted by [Piet Eichholtz](#), [Rogier Holtermans](#), [Nils Kok](#), and [Erkan Yönder](#) found a positive relationship between good environmental performance and price efficiency in the real estate debt market. This finding aligns with the research from 2022 [Muhammad Arif Khan](#) which revealed a positive correlation between ESG performance and debt. Another study from 2018 by [Ben-Porath](#), [Dekel](#), and [Lipman](#) concluded that companies can leverage non-financial information to demonstrate their commitment to social and ecological responsibility. This enhances their reputation among consumers and investors, facilitates access to capital at lower costs, and improves their competitive advantage. These studies provide substantial support for the second hypothesis.

However, it is important to acknowledge opposing viewpoints. In a study conducted in 2011 [Kee-Hong Bae](#), [Jun-Koo Kang](#), and [Jin Wang](#) the researchers concluded that a higher ESG score is associated with lower debt in a firm's capital structure. This contrasting finding suggests that there may be divergent perspectives regarding the relationship between ESG scores and capital structure decisions.

In summary, the literature offers mixed perspectives on the relationship between a firm's capital structure and its ESG score. While some studies support the positive association between ESG scores and capital structure, others present opposing findings. It is crucial to consider these divergent views to gain a comprehensive understanding of the topic.

3. Sample, data collection:

This study aims to comprehensively examine the effects of the Environmental, Social, and Governance (ESG) score on financial performance and capital structure, while also controlling for other relevant variables that may influence these outcomes. Additionally, the study considers the Covid-19 variable to analyze the specific impact of the pandemic on the relationship between ESG and financial performance.

To achieve these objectives, a sample of 807 private and public firms from five European countries—Denmark, Sweden, Norway, Finland, and Germany—was selected for analysis. The choice of these countries was driven by two key factors. Firstly, the four Scandinavian countries are widely recognized for their strong adherence to environmental, social, and governance regulations and practices. Germany was included as it represents the largest industrial country in the region. By including these countries, the study aims to capture diverse market characteristics and variations in ESG practices across the European context. Furthermore, while previous studies have examined ESG effects on financial performance and capital structure at either a European or single-country level, there has been limited research focusing specifically on these five countries. Data for the main variables and control variables were primarily collected from Refinitiv Eikon DataStream, a reliable and widely used financial data provider. However, the gross domestic product per capita (GDP) data was obtained from the World Bank, ensuring the inclusion of a comprehensive and internationally recognized economic indicator.

The original dataset initially contained more than 1,500 firms, but rigorous data cleaning procedures were applied to ensure data quality and reliability. Firms with missing data, particularly the ESG score, were excluded from the analysis, resulting in a final sample size of 807 firms. Moreover, to ensure data consistency and reliability, a specific rule was followed during the dataset cleaning process. Firms with less than six years of available data within the ten-year study period were removed from the analysis. This approach aimed to provide a robust and representative dataset for conducting rigorous regression analyses.

By following these rigorous data collection and cleaning procedures, this study ensures the utilization of a reliable dataset, enhancing the validity of the findings. The comprehensive analysis of the effects of the ESG score on financial performance and capital structure, considering the influence of other relevant variables and the impact of the Covid-19 pandemic, will contribute to

the existing literature and provide valuable insights for policymakers, investors, and firms operating in these European countries.

To address the research question and test the two hypotheses, a panel data approach was adopted in this study. Various diagnostic tests were conducted to ensure the reliability and accuracy of the results, including tests for heteroskedasticity, autocorrelation, time effects, and the Hausman test. Based on these tests, it was determined that the fixed effect model would yield the most suitable and reliable outcomes for the analysis.

For testing the first hypothesis, both the main dependent variables, the natural logarithm of the return on assets (LnROA), and the robustness dependent variable, the natural logarithm of the return on equity (LnROE), were analyzed using the fixed effect clustered model. This approach allows for accounting for firm-specific effects and controlling for potential biases arising from unobserved heterogeneity across the sample. The clustering methodology was applied to account for potential correlation within clusters, enhancing the robustness of the analysis.

However, when examining the second hypothesis, it was found that using the fixed effect model with clustering did not yield significant results. Consequently, the fixed effect model without clustering was employed to test the second hypothesis. This decision was based on the understanding that clustering did not contribute substantially to the findings and that the fixed effect model alone would provide sufficient insights into the relationship being investigated.

By employing appropriate panel data techniques and carefully selecting the most suitable model for each hypothesis, this study ensures robustness and accuracy in evaluating the research questions and drawing meaningful conclusions. The rigorous methodological approach undertaken increases the reliability of the results and enhances the validity of the findings

3.1. Measures:

Dependent variables:

LnROA: The return on assets as a proxy to measure the firm financial performance, this variable has been used in previous paper by [Brahmana, R. K., & Kontesa, M, \(2021\)](#).

LnROE: The return on equity as a proxy to measure the firm financial performance, this variable has been used in previous paper by [Brahmana, R. K., & Kontesa, M, \(2021\)](#). And it used in this paper to apply the robustness test.

Lev: The firm leverage as dependent variable to measure the Capital structure, represents the total debt on total assets, it's used by ([Bennouri, Chtioui, Nagati, & Nekhili, 2018](#); [Jiang, Du, & Chen, 2022](#))

LD_Equity: The long-term debt to equity ratio as a measure of the firm capital structure ([Allen Goss Gordon S. Roberts,2010](#)). It used to apply the robustness test for the firm leverage.

Independent Variables:

ESG: Represent the environmental, Social and governance score for the firm.

H_ESG: The moderated high ESG score variable represents the firm with ESG score > 25

L_ESG: The low ESG score variable represents the firm with ESG score < 25 ([Mohammad Hassan Shakil, 2021](#))

Control variables:

InSize : The natural logarithms of total assets ([Bennouri, Chtioui, Nagati, & Nekhili, 2018](#); [Jiang, Chen, Rughoo, & Zhou, 2022](#))

InAge: The natural logarithms of the firm age ([Jiang, Chen, Rughoo, & Zhou, 2022](#))

Lev it: the total debt divided by the total assets ([Bennouri, Chtioui, Nagati, & Nekhili, 2018](#); [Jiang, Du, & Chen, 2022](#))

LnGDP: The natural logarithms of GDP, measured by total GDP output divided by total population (per capita gross domestic product) ([Guangyou Zhou, Lian Liu, Sumei LuoThis,2022](#))

Covid-19: Dummy variable = 1 during covid-19 (years 2020-2021) otherwise 0.

CR: The current ratio as a proxy for the firm liquidity.

Lev: Firm leverage as a control variable ([Brahmana, R. K., & Kontesa, M. 2021](#))

3.2. Descriptive statistics: Table (1)

In this dataset, the variable "ID" serves as the identification number or code for each observation. It encompasses a total of 9,046 observations, with a mean value of 454.2966, a standard deviation of 261.9698, and a range spanning from 1 to 909, the dependent variable, "LnROA," represents the natural logarithm of the return on assets. It comprises 6,357 observations, with a mean of -

3.139234, a standard deviation of 1.092465, and values ranging from -10.63377 to 0.6328205. While, the robustness dependent variable "LnROE" corresponds to the natural logarithm of the return on equity. It consists of 6,356 observations, with a mean value of -2.13366, a standard deviation of 0.9180809, and values ranging from -10.61794 to 3.241106.

The variable "LD_Equity" represents the long-term debt to equity ratio. It encompasses 8,251 observations, with a mean of 0.7776931, a standard deviation of 6.371667, and a range spanning from -109.4114 to 461.131.

Moving on to the second part, the variable "H_ESG" represents the moderated high ESG (Environmental, Social, and Governance) score. It comprises 6,932 observations, with a mean value of 0.8465089, a standard deviation of 0.3604862, and values ranging from 0 to 1 and in contrast, the variable "L_ESG" corresponds to the low ESG score, with 6,932 observations. It has a mean value of 0.1534911, a standard deviation of 0.3604862, and values ranging from 0 to 1.

The variable "Ln_Age" represents the natural logarithm of the firm's age. It encompasses 6,886 observations, with a mean value of 2.759575, a standard deviation of 0.9831597, and values ranging from 0 to 4.795791 and regarding the variable "LnGDP," it represents the natural logarithm of the Gross Domestic Product (GDP). It consists of 6,922 observations, with a mean of 10.84395, a standard deviation of 0.1859764, and values ranging from 10.57707 to 11.52384. While the variable "LnSize" corresponds to the natural logarithm of the firm size. It encompasses 6,371 observations, with a mean value of 20.741, a standard deviation of 2.218736.

Finally, the variable "Lev" represents the leverage ratio, with 7,705 observations. It has a mean of 0.8554815, a standard deviation of 2.34397, and values ranging from 0 to 117.3333.

Additionally, the variable "Covid_19" represents the presence or absence of the COVID-19 pandemic. It consists of 6,932 observations, with a mean value of 0.1885459, a standard deviation of 0.3911757, and a minimum value.

Table 1 Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
ID	9,046	454.2966	261.9698	1	909
LnROA	6,357	-3.139234	1.092465	-10.63377	0.6328205
LnROE	6,356	-2.13366	0.9180809	-10.61794	3.241106
LD_Equity	8,251	0.7776931	6.371667	-109.4114	461.131

H_ESG	6,932	0.8465089	0.3604862	0	1
L_ESG	6,932	0.1534911	0.3604862	0	1
Ln_Age	6,886	2.759575	0.9831597	0	4.795791
LnGDP	6,922	10.84395	0.1859764	10.57707	11.52384
LnSize	6,371	20.741	2.218736	9.904649	28.33525
Lev	7,705	0.8554815	2.34397	0	117.3333
Covid_19	6,932	0.1885459	0.3911757	0	1
ROE	8,066	0.1374957	0.4671751	-16.624	25.56198
CR	7,259	2.947045	18.64177	0.01121	729.4828

3.3. Correlation analysis:

To examine the relationships between ESG score, financial performance, and capital structure. And to determine the direction and strength of the relationships between the variables.

3.3.1. Correlation matrix for the financial performance: table (2)

The correlation matrix reveals several significant relationships among the variables at a 0.05 significance level. Firstly, there is a strong positive correlation (0.8126) between LnROA (returns on assets) and LnROE (returns on equity), indicating that companies with higher returns on assets tend to have correspondingly higher returns on equity. This suggests a positive connection between the profitability measures.

Secondly, the ESG (Environmental, Social, and Governance) variables show interesting associations. H_ESG (high ESG score) and L_ESG (low ESG score) exhibit a significant negative correlation (-0.0640), implying an inverse relationship between the two. This means that companies with higher ESG scores tend to have lower ESG scores and vice versa. Additionally, Ln_Age (natural logarithm of the age of the company) displays a weak positive correlation (0.0579) with H_ESG, suggesting that older companies may be associated with higher ESG scores. Conversely, Ln_Age has a weak negative correlation (-0.0579) with L_ESG, indicating that older companies may have lower L_ESG scores.

Furthermore, leveraging (Lev) shows a significant negative correlation (-0.2857) with LnROA, suggesting that higher leverage is linked to lower returns on assets. This implies that increased financial leverage might have an adverse impact on a company's profitability. On the other hand,

Covid_19 does not exhibit any significant correlations ($p > 0.05$) with the other variables in the matrix, indicating that it is not significantly related to LnROA, LnROE, H_ESG, L_ESG, Ln_Age, LnGDP, or Lev. These findings provide valuable insights into the relationships between the variables and their potential implications in understanding company performance, ESG factors, and leverage.

Table 2 Correlation matrix for the financial performance

Variable	LnROA	LnROE	H_ESG	L_ESG	Ln_Age	LnGDP	Lev
LnROA	1.00						
LnROE	0.8126*	1.00					
H_ESG	-0.0640*	-0.02	1.00				
L_ESG	0.0640*	0.02	-1.0000*	1.00			
Ln_Age	0.00	-0.02	0.0579*	-0.0579*	1.00		
LnGDP	0.02	0.0518*	0.02	-0.02	-0.0276*	1.00	
Lev	-0.2857*	0.0482*	0.0467*	-0.0467*	-0.0591*	0.02	1.00
Covid_19	-0.02	-0.0273*	0.02	-0.02	0.1593*	0.0289*	-0.01

3.3.2. Correlation matrix for the firm capital structure: table (3)

The correlation matrix, considering a significance level of 0.05, provides valuable insights into the relationships between the variables. Starting with Lev (Leverage), no significant correlations were found with the other variables in the matrix, indicating a lack of strong linear relationships. Similarly, LD_Equity (Long-term debt to equity ratio) does not exhibit any significant correlations, suggesting that it is not significantly associated with the other variables.

Moving on, H_ESG (High ESG score) and L_ESG (Low ESG score) show a significant negative correlation, indicating an inverse relationship between the two. This means that companies with higher H_ESG scores tend to have lower L_ESG scores and vice versa. Moreover, LnSize (Natural

logarithm of company size) exhibits a significant positive correlation with Lev, indicating that larger companies tend to have higher leverage. Additionally, LnSize shows a significant negative correlation with CR (Current ratio), implying that larger companies may have lower current ratios. Furthermore, CR displays interesting relationships with other variables. It has a significant negative correlation with H_ESG, suggesting that companies with higher current ratios tend to have lower H_ESG scores. On the other hand, CR has a significant positive correlation with L_ESG, indicating that companies with higher current ratios tend to have higher L_ESG scores. Examining ROE (Return on equity), it reveals a significant positive correlation with Lev, suggesting that higher leverage is associated with higher returns on equity. However, ROE has a significant negative correlation with LnSize, indicating that larger companies may experience lower returns on equity.

Lastly, Covid_19 does not exhibit any significant correlations with the other variables in the matrix. This implies that the pandemic variable is not significantly related to Lev, LD_Equity, H_ESG, L_ESG, LnSize, CR, or ROE.

It is important to note that while these correlations are statistically significant, they do not imply causation. Therefore, further analysis is required to understand the underlying factors and potential causal relationships between these variables.

Table 3 Correlation matrix for the firm capital structure

Variable	Lev	LD_Equ~y	H_ESG	L_ESG	LnSize	CR	ROE
Lev	1.00						
LD_Equity	0.01	1.00					
H_ESG	0.0467*	-0.02	1.00				
L_ESG	-0.0467*	0.02	-1.0000*	1.00			
LnSize	0.1748*	0.00	0.2619*	-0.2619*	1.00		
CR	-0.02	0.00	-0.0381*	0.0381*	-0.0505*	1.00	
ROE	0.2427*	-0.0641*	-0.01	0.01	-0.0615*	0.00	1.00
	0.00	0.00	0.31	0.31	0.00	0.74	

Covid_19	-0.01	-0.01	0.02	-0.02	0.0775*	0.00	0.01
	0.24	0.27	0.05	0.05	0.00	0.86	0.65

4. Methodology:

Model specification:

4.1. The relationship between ESG score and financial performance:

In order to uncover the relationship between the ESG score and financial performance, a series of models were employed to test the proposed hypotheses. To determine the most suitable approach, the Hausman test was applied to assess whether the fixed effect or random effect model should be utilized. Furthermore, a heteroskedasticity test was conducted to examine potential variations in the error terms.

By employing these methodological steps, this research aimed to robustly investigate and analyze the association between the ESG score and financial performance. The utilization of appropriate models and tests ensures the validity and reliability of the findings, enhancing the overall quality and credibility of the research outcomes. Additionally, this approach allows for a comprehensive exploration of the nuanced relationship between the ESG score and financial performance, leading to valuable insights and a deeper understanding of this important subject matter.

4.1.1. Model (1):

Hausman test: Table (4)

The probability associated with the chi-square test statistic ($\text{Prob} > \chi^2$) is reported as 0.0000, indicating that the difference in coefficients between the fixed effects and random effects models is statistically significant at any reasonable significance level. Thus, the null hypothesis of no systematic difference in coefficients is rejected, suggesting that the choice between the fixed effects and random effects models has an impact on the estimated coefficients.

Based on these results, it would be appropriate to use the fixed effect model.

Table 4 Hausman test for the financial performance model

Coefficient	(b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_b- V_B)) S.E.
H_ESG	-0.2075507	-0.213308	0.0057573	0.0318671
Ln_Age	0.1359062	0.0519361	0.0839701	0.0263561
LnGDP	-0.2561215	-0.0378563	-0.2182652	0.1074522
Lev	-0.0470655	-0.0561672	0.0091017	0.0014298
Covid_19	-0.1183394	-0.0919428	-0.0263966	0.0094656

b = consistent under Ho and Ha; obtained from xtre

B = inconsistent under Ha, efficient under Ho; obtained from xtre

Test: Ho: difference in coefficients not systematic

$$\chi^2(5) = (b-B)'[(V_b - V_B)^{-1}](b-B) = 50.14$$

$$\text{Prob} > \chi^2 = 0.0000$$

The effect of the moderated high ESG score (ESG >25) on the Financial performance measured by the return on assets (ROA).

The final model after applying Hausman test, Time fixed effects test, Heteroskedasticity test, and serial correlation Test is the following fixed effect clustered model **Table (5)**.

$$\begin{aligned} \text{LnROA}_{it} = & B_0 + B_1 \text{H_ESG}_{it} + B_2 \text{LnAge}_{it} + B_3 \text{LnGDP}_{it} + B_4 \text{Lev}_{it} + B_5 \text{Covid}_{19it} \\ & + E_{it}, \text{Fe cluster}(ID) \end{aligned}$$

The effect of the low ESG score (ESG ≤25) on the Financial performance measured by the return on assets (ROA).

Fixed effect clustered model **Table (5)**

$$\begin{aligned} \text{LnROA}_{it} = & B_0 + B_1 \text{L_ESG}_{it} + B_2 \text{LnAge}_{it} + B_3 \text{LnGDP}_{it} + B_4 \text{Lev}_{it} + B_5 \text{Covid}_{19it} \\ & + E_{it}, \text{Fe cluster}(ID) \end{aligned}$$

4.1.2. Financial performance robustness:

To ensure the robustness of the findings, a test of robustness was performed by employing an alternative proxy to measure the financial performance. Specifically, instead of using Return on Assets (ROA) as the primary measure, Return on Equity (ROE) was utilized as an alternative metric.

The purpose of conducting this robustness test was to verify the consistency and reliability of the relationship between the ESG score and financial performance. By employing an alternative measure, the research sought to examine whether the observed associations hold true across different indicators of financial performance. This helps to strengthen the validity and generalizability of the findings.

The decision to use ROE as an alternative proxy for financial performance is justified based on its relevance and widespread use in financial analysis. ROE is a commonly used measure that assesses a firm's profitability by evaluating its ability to generate earnings relative to shareholder equity. By incorporating ROE as an alternative metric, the study broadens the scope of analysis and provides a more comprehensive understanding of how the ESG score relates to different aspects of a firm's financial performance.

High ESG score: to check the effect of the moderated high ESG score on the financial performance represented by the return on equity **Table (5)**.

$$\begin{aligned} \text{LnROE}_{it} = & B_0 + B_1\text{H_ESG}_{it} + B_2\text{LnAge}_{it} + B_3\text{LnGDP}_{it} + B_4\text{Lev}_{it} + B_5\text{Covid}_{(19it)} \\ & + E_{it}, \text{Fe cluster}(\text{ID}) \end{aligned}$$

Low ESG score: to check the effect of the low ESG score on the financial performance represented by the return on equity **Table (5)**.

$$\begin{aligned} \text{LnROE}_{it} = & B_0 + B_1\text{L_ESG}_{it} + B_2\text{LnAge}_{it} + B_3\text{LnGDP}_{it} + B_4\text{Lev}_{it} + B_5\text{Covid}_{19it} \\ & + E_{it}, \text{Fe cluste}(\text{ID}) \end{aligned}$$

4.1.3. Model 1 results:

Table 5 First model results (Financial performance)

Variable	High ESG score results (ESG>25)		low ESG score results (ESG<25)	
	LnROA	LnROE	LnROA	LnROE
	Coefficient	Coefficient	Coefficient	Coefficient
H_ESG	-0.2076*** (.0801)	-0.2195*** (.0770)	0.2076*** (.0801)	0.2195*** (.0770)
Ln_Age	0.1360** (.0730)	0.1130** (.0770)	0.1360** (.0730)	0.1130** (.0768)
LnGDP	-0.2561 (.2853)	-0.1441 (.3043)	-0.2561 (.2853)	-0.144 (.3042)
Lev	-0.0470* (.0241)	0.02078 (.0153)	-0.0471* (.0241)	0.0207 (.01534)
Covid_19	-0.1183*** (.0668)	-0.1013*** (.0676)	-0.1183*** (.0667)	-0.1013*** (.0676)

Standard Errors between parentheses

*** When P-Value < 0.01

** When P-Value < 0.05

*When P-Value < 0.10

4.2. The relationship between ESG score and firm's capital structure:

4.2.1. (Model 2):

Hausman test: Table (6)

The probability associated with the chi-square test statistic (Prob>chi2) is reported as 0.0196.

This probability indicates the likelihood of observing a test statistic as extreme as the one calculated under the null hypothesis that there is no systematic difference in coefficients. Since

the reported probability is less than the typical significance level of 0.05, we can conclude that there is evidence of a systematic difference in coefficients between the fixed effects and random effects models.

Based on these results, we reject the null hypothesis of no systematic difference in coefficients and conclude that the fixed effect model is more appropriate for my data.

Table 6 Hausman test for the capital structure model

Coefficient	(b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
H_ESG	0.3367666	0.0691882	0.2675784	0.1490702
LnSize	0.2216967	0.0862835	0.1354132	0.0606751
CR	-0.0002781	-0.001397	0.0011189	0.00131
ROE	1.338205	1.28314	0.0550649	0.0309815
Covid_19	-0.1960034	-0.0970549	-0.0989485	0.0347214

b = consistent under Ho and Ha; obtained from xtreg

B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

$\chi^2(5) = (b-B)[(V_b-V_B)^{-1}](b-B) = 13.44$

Prob>chi2 = 0.0196

High ESG score, to check the effect of the high ESG score on the capital structure of the firm represented by leverage =total debt/total assets. **Table (7)**

$$\text{Lev}_{it} = B_0 + B_1 \text{H_ESG}_{it} + B_2 \text{LnSize}_{it} + B_3 \text{CR}_{it} + B_4 \text{ROE}_{it} + B_5 \text{Covid}_{19it} + E_{it}, Fe$$

Low ESG score, to check the effect of the low ESG score on the capital structure of the firm represented by leverage =total debt/total assets. **Table (7)**

$$\text{Lev}_{it} = B_0 + B_1 \text{H_ESG}_{it} + B_2 \text{LnSize}_{it} + B_3 \text{CR}_{it} + B_4 \text{ROE}_{it} + B_5 \text{Covid}_{19it} + E_{it}, Fe$$

4.2.2. *capital structure robustness:*

To enhance the reliability and comprehensiveness of the analysis, an alternative proxy was employed to measure the firm's capital structure. Instead of utilizing the traditional measure of leverage, the ratio of long-term debt on equity was adopted.

The decision to use the long-term debt on equity ratio as an alternative proxy for capital structure is justified based on its relevance and specific focus on long-term debt obligations. By incorporating this ratio, the study aims to capture a more nuanced understanding of a firm's capital structure composition, particularly with regard to the proportion of long-term debt relative to equity.

By introducing this alternative measure, the research seeks to provide a more comprehensive view of how the ESG score relates to different aspects of a firm's capital structure. It allows for a deeper analysis of the long-term debt component, which can shed light on the financial risk and stability associated with a firm's financing decisions.

This utilization of the long-term debt on equity ratio as a proxy for capital structure enhances the robustness of the study's findings. It expands the scope of analysis and provides additional insights into the relationship between the ESG score and the financial composition of a firm. This approach strengthens the validity and applicability of the research, enabling stakeholders to have a more comprehensive understanding of the impact of ESG considerations on a firm's capital structure decisions.

High ESG score: to check the effect of the high ESG score on capital structure of the firm represented by long debt on equity. **Table (7)**

$$LD_Equity_it = B0 + B1 H_ESG_{it} + B2LnSize_it + B3CR_it + B4ROE_it + B5Covid_19it + E_it, Fe$$

Low ESG score: to check the effect of the low ESG score on the capital structure of the firm represented by long debt on equity. **Table (7)**

$$LD_Equity_it = B0 + B1 L_ESG_{it} + B2LnSize_it + B3CR_it + B4ROE_it + B5Covid_19it + E_it, Fe$$

4.2.3. Model (2) results:

Table 7 the second model results (capital structure)

Variable	High ESG score results (ESG>25)		Low ESG score results (ESG=<25)	
	Leverage	Long debt/equity	Leverage	Long debt/equity
	Coefficient	Coefficient	Coefficient	Coefficient
H_ESG	0.3368* (.1855)	-1.3939* (.7204)	-0.3368* (.1855)	1.3940* (.7204)
LnSize	0.2217*** (.0641)	0.0183 (.2510)	0.2217*** (.0641)	0.0183 (.2510)
CR	-0.0003 (.0022)	0.0013 (.0081)	-0.0003 (.0022)	0.0013 (.0081)
ROE	1.3382*** (.0825)	0.0143 (.3076)	1.3382*** (.0825)	0.0143 (.3076)
Covid_19	-0.196 (.0782)	-0.2097 (.2951)	-0.196** (.0782)	-0.2097 (.2951)

Table 8 Capital Structure Results

Standard Errors between parentheses

*** When P-Value < 0.01

** When P-Value < 0.05

* When P-Value < 0.10

5. Results and discussion:

The utilization of the Fixed Effect model for both primary hypotheses in this study significantly enhances our comprehension of the connection between a high ESG score and financial performance, as well as the correlation between a high ESG score and capital structure. By opting for this model, the research emphasizes the significance of accounting for firm-specific attributes and capturing the evolving dynamics over time when investigating the influence of ESG factors on firm outcomes.

5.1. Hypothesis (1): Table (5)

High ESG score:

The results at 0.05 significance level showed that there is a significant negative effect of the high ESG score on the financial performance represented by the natural logarithm of the return on assets, which means that high ESG score is associated with a lower financial performance and that's partially associated with both of [Ebru Saygili , Serafettin Arslan, Ayse Ozden Birkan, \(2022\)](#) finding that the environmental performance have a negative impact on the corporate financial performance CFP and [Svetlana Borovkova and Ying Wu, \(2020\)](#) who found negative relationship between ESG performance and financial performance. This result associated with the shareholders theory that consider the ESG practices as an extra cost and effect the profit negatively, and the Ln_Age which represents the firm age has a coefficient of 0.1359062, indicating that an increase in firm age is associated with an increase in LnROA (financial performance) and it is statistically significant at the 0.05 significant level, this result is consisted with the finding of ([Jiang, Chen, Rughoo, & Zhou, 2022](#)).

Firm's leverage has a negative coefficient of -0.0470655, indicating that an increase in Leverage is associated with a decrease in financial performance. However, the p-value of 0.052 is greater than the significance levels of 0.01 and 0.05, suggesting that the relationship between Lev and LnROA is not statistically significant at those levels. However, it is statistically significant at the 0.10 level.

The variable Covid_19 has a negative coefficient of -0.1183394, indicating that the presence of Covid_19 is associated with a decrease in LnROA. The p-value of 0.000 is less than the significance level of 0.05, indicating that the relationship between Covid_19 and LnROA is statistically significant and this result is reasonable since that almost all sectors got a negative effect during Covid-19 pandemic period as a result of the lockdown and the disruption of the supply chain over all the world. However, that some previous studies like ([Garel & Petit-Romec, 2021](#)) shows that firms with good environmental scores have higher returns during the COVID-19 crisis.

Low ESG score:

The results at 0.05 significance level shows that there is a significant positive effect of the low ESG score on the financial performance represented by the natural logarithm of the return on assets, which means that low ESG score is associated with a higher financial performance and this is associated with the stakeholder theory that expect better financial performance at the long term as a result of the ESG practices, and at 0.10 significance level the firm leverage has significant negative effect on the financial performance represented by the natural logarithm of ROA, this finding is associated with the shareholders theory which considered the environmental, Social, and governance cost are unjustified costs and it will add extra costs for the firm and that leads to lower financial performance.

Similar results revealed when the return on equity used as a proxy to measure the financial performance of the firm instead of the return on assets, since the H_ESG has a significant negative effect on the return on equity at the 0.05 significance level, while the L_ESG has a significant positive effect on the return on Equity, and that's mean the at high ESG score is associated with a lower ROE (financial performance) while the low ESG score is associated with a higher ROE (financial performance).

In summary, the previous findings indicate that an excessive emphasis on ESG performance, defined as a score exceeding 25, may result in additional costs for the firm, which, in turn, can have a negative impact on its financial performance. Conversely, opting for a more moderate and reasonable level of ESG practices, characterized by a score below 25, has the potential to contribute to improved financial performance.

These results highlight the importance of striking a balance in ESG practices. While it is crucial for firms to prioritize environmental, social, and governance factors, excessively strict adherence to ESG rules without considering the associated costs can potentially hinder financial performance. Therefore, adopting a reasonable approach that considers both ESG practices and financial outcomes is essential.

5.2. Hypothesis (2): Table (7)

High ESG score:

The high ESG score has no significant effect on the firm leverage at a significance level of 0.05 while it has a significant positive effect on the leverage at 0.10 significance level which means that a high ESG score leads to higher leverage of the firm and that's associated with previous study from 2018, [Ben-Porath, Dekel, & Lipman](#) who found a significant positive effect between the ESG performance and capital structure and another study from 2022, [Muhammad Arif Khan](#) revealed a positive relationship between ESG performance and debt.

Both of the natural logarithm of the firm size and the return on equity have a positive significant effect on the firm leverage which means that bigger firm and higher ROE of the firm leads to increase the firm leverage, while Covid_19 has negative significant effect which means that during the pandemic the firms' leverage decreased, and lastly the current ratio has no significant effect on the firm leverage at all significance levels (0.01, 0.05, 0.10).

Low ESG score:

At 0.10 significant level the low ESG score has significant effect on the firm capital structure, which means that lower ESG score is associated with less debt on the firm capital.

By using the long-term debt to equity ratio as a proxy for the firm's capital structure, a statistically significant positive effect of the High ESG score on the long debt/equity ratio was observed at a significance level of 0.10. This indicates that firms with higher ESG scores tend to have a larger proportion of long-term debt in their capital structure, resulting in higher leverage. Conversely, the results for firms with low ESG scores showed the opposite trend, providing additional support to the credibility of the main proxy (Lev) and affirming the positive relationship between a high ESG score and the debt component in the firm's capital structure.

The results indicate that a high ESG score is significantly associated with an increase in the proportion of debts within a firm's capital structure. This suggests that firms with a stronger commitment to ESG principles tend to have higher leverage, as reflected by a larger debt component in their capital structure. On the other hand, the findings show that firms with low ESG

scores have a contrasting effect, implying a lower level of leverage in their capital structure. These results highlight the influence of ESG scores on shaping the debt portion of a firm's capital structure and emphasize the importance of considering ESG factors when analyzing financing decisions.

6. Conclusion:

To summarize, the main objective of this research paper was to investigate how the ESG score affects a firm's financial performance and capital structure. The study formulated two hypotheses: one suggesting an influence of the ESG score on financial performance, and the other proposing a positive relationship between the ESG score and capital structure. Unlike previous studies that took a general approach to examining the ESG score or focused solely on the impact of ESG disclosure, this paper introduced the idea of categorizing the ESG score into moderated high (ESG score > 25) and low (ESG score < 25) groups.

Given the conflicting findings in prior research on the relationship between the ESG score and financial performance as well as capital structure, this study sought to address this gap by analyzing a new dataset and using the defined ESG categories. The study drew inspiration from both the shareholders theory, which considers ESG practices as an additional cost potentially leading to negative financial performance, and the stakeholder theory, which anticipates long-term financial benefits through improved firm reputation and increased investor interest resulting from ESG practices.

The analysis results shed light on the complex connection between ESG scores, financial performance, and capital structure. The findings revealed a significant negative impact of high ESG scores on financial performance, indicating that firms with ESG scores higher than 25 tended to experience a decline in financial performance. Conversely, firms with low ESG scores, less than 25, tended to exhibit higher financial performance.

Furthermore, the analysis indicated a significant positive effect of high ESG scores on leverage, although at a slightly lower level of significance. This suggests that firms with higher ESG scores may have increased leverage, potentially due to the perceived trustworthiness and reliability associated with strong ESG practices. On the other hand, firms with low ESG scores showed a

significant impact on their capital structure, with lower scores being associated with lower levels of debt.

To strengthen the validity of the findings, robustness tests were conducted using various proxies for financial performance and capital structure, which consistently supported the initial results. These findings emphasize that adhering to ESG standards serves as a positive indicator of efficient and reliable management. As a result, it enhances a firm's reputation and increases trust from investors and financial institutions. Consequently, firms with higher ESG scores are likely to access the debt market with less conservative conditions and at lower costs, enabling them to increase their leverage capacity.

Overall, these research findings provide valuable insights into the relationship between ESG scores, financial performance, and capital structure. They highlight the nuanced effects of ESG scores on different dimensions of firm performance and underscore the importance of considering contextual factors, including the impact of events such as the COVID-19 pandemic. The findings offer guidance to firms seeking to optimize their ESG practices, improve financial performance, and shape their capital structure in a rapidly evolving business environment. Moreover, the findings also serve as a benchmark for policymakers when setting ESG policies.

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