



Investigating the role of sensitive industries and
ESG performance in enhancing Corporate
Financial Performance: Empirical analysis from
the United States

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Abstract

English

This study explores the correlation between ESG performance and financial performance in US corporations. It examines the relationship between overall ESG performance and specific components (environmental, social, and governance). Financial indicators like Tobin's Q, ROA, and ROE are analyzed. Additionally, the study investigates the connection between industry sensitivity and ESG scores. An analysis based on recent data extracted from Compustat and Thomson Reuters databases of a time period of 6 years from 2016 to 2021 has been carried out. Data from a total of 2759 companies, both in the sensitive and non-sensitive sectors, were analyzed using multivariate regressions. Tobin's Q results demonstrate a positive relationship between ESG score, Environmental Score, Social Score, Governance Score, and Corporate Financial Performance. However, the results using the ROA measure do not align with previous studies, and the low coefficient prevents any conclusive evidence on the relationship with Corporate Financial Performance. Regarding ROE, the results are mixed. No significant relationship was found between ESG score and Governance score with ROE. However, the Environmental Score shows a significant positive relationship with ROE, while the Social score suggests a potential positive relationship. Furthermore, statistically significant positive relationships were observed between being in a sensitive industry and the ESG score, Social score, and Governance score. However, no clear association was found between industry sensitivity and the Environmental score.

Keywords: Corporate Social Responsibility (CSR), Environmental Social and Governance performance (ESG), Corporate Financial Performance (CFP), Tobin's Q, Return on Assets (ROA), Return on Equity (ROE), Sensitive Industry, Non-sensitive Industry.

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Portuguese

Este estudo explora a correlação entre o desempenho ESG e o desempenho financeiro em corporações dos Estados Unidos. Ele examina a relação entre o desempenho ESG geral e seus componentes específicos (ambiental, social e governança). Indicadores financeiros como Tobin's Q, ROA e ROE são analisados. Além disso, o estudo investiga a conexão entre a sensibilidade da indústria e as pontuações ESG. Foi realizada uma análise com base em dados recentes de 2759 empresas, em um período de 6 anos, de 2016 a 2021. Os resultados do Tobin's Q mostram uma relação positiva entre a pontuação ESG, a pontuação Ambiental, a pontuação Social, a pontuação de Governança e o Desempenho Financeiro Corporativo. No entanto, os resultados utilizando ROA não são conclusivos sobre a relação com o Desempenho Financeiro Corporativo. Em relação ao ROE, os resultados são mistos. Não foi encontrada nenhuma relação significativa entre a pontuação ESG e a pontuação de Governança com o ROE. No entanto, a pontuação Ambiental apresenta uma relação positiva significativa com o ROE, enquanto a pontuação Social sugere uma possível relação positiva. Além disso, foram observadas relações positivas estatisticamente significativas entre estar em uma indústria sensível e as pontuações ESG, Social e Governança. Porém, não foi encontrada uma associação clara entre a sensibilidade da indústria e a pontuação Ambiental.

Palavras-chave : Responsabilidade Social Corporativa (RSC), desempenho Ambiental, Social e de Governança (ESG), Desempenho Financeiro Corporativo (DFC), Tobin's Q, Retorno sobre Ativos (ROA), Retorno sobre Patrimônio Líquido (ROE), Indústria Sensível, Indústria Não Sensível.

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1. Introduction

Over the past few decades, sustainability issues have become increasingly prominent in academic and public discourse. This heightened awareness has been driven by a confluence of factors, such as climate-related disasters, social and governance scandals (Armstrong (2020)), and the 2008 financial crisis (Beloskar & Rao (2023)). Corporate Social Responsibility (CSR), once perceived solely as a moral obligation, has undergone a significant transformation, now encompassing a comprehensive framework known as Environmental, Social, and Governance (ESG). This holistic approach has gained widespread adoption among businesses.

The concept of corporate responsibility has undergone significant changes throughout the years, giving rise to three primary theories. Initially, Milton Friedman's shareholder theory was predominant, asserting that a corporation's sole responsibility is to generate profits to reward and attract investors. However, a decade later, Edward Freeman's stakeholder theory gained traction, positing that corporate responsibility should extend to all stakeholders and surpass operational control. Freeman (1984) argued for an inclusive definition of stakeholders that encompasses groups who can affect or be affected by the fulfillment of an organization's objectives.

Over time, the role of corporate responsibility has become increasingly crucial. Porter and Kramer (2006) assert that CSR has shifted from being perceived as damage control or a public relations campaign to being considered a key driver of business and societal success. This transformation has led to a transition from shareholder capitalism to stakeholder capitalism, a perspective that aims to enhance the well-being of individuals and the planet. This approach encourages businesses to adopt a long-term outlook in order to create value for the company while considering ESG measures.

ESG, or Environmental, Social, and Governance criteria, are non-financial factors employed to assess a company's performance in conjunction with traditional financial metrics. The term "ESG" was officially introduced in 2004 with the publication of the United Nations Global Compact initiative's "Who Cares Wins" report (UN, 2004). CSR disclosures provided by companies serve as a primary source for evaluating these criteria. ESG factors enable the assessment of a firm's societal contributions to stakeholders, such as employees, partners, subcontractors, and consumers, as well as the environment. Additionally, ESG criteria provide a framework for analyzing Corporate Financial Performance, with many socially responsible investors utilizing them to guide investment decisions.

While debates persist regarding the impact of ESG policies and practices on corporations, including their connection to financial performance, long-term business strategy, the attraction and retention of diverse talent, and risk (Giese, Lee, Melas, Nagy, & Nishikawa (2019)), the emergence of environmental, social, and governance concerns is undeniably reshaping society at large. Environmental, Social, and Governance (ESG) factors have gained significant attention in the United States as companies and investors increasingly recognize the importance of sustainability and responsible business practices (Durand et al., 2019). In recent years, there has been a growing awareness of environmental challenges such as climate change, pollution, and resource depletion. The U.S. has witnessed a shift towards greater environmental consciousness, with many companies voluntarily committing to reduce their carbon emissions and adopt sustainable practices. Additionally, investors have recognized that companies that effectively manage their environmental risks are better positioned for long-term success. As a result, ESG has become a key consideration for investment decisions (Sharma, Gupta, & Gupta (2022)).

The U.S. government has also recognized the significance of ESG in shaping a sustainable and inclusive economy. While there is no federal regulatory framework specifically dedicated to ESG, various agencies have been taking steps to address environmental and social issues. For example, the Securities and Exchange Commission (SEC) has increased its scrutiny of ESG disclosures and reporting by companies, aiming to improve transparency and standardization in the industry. Furthermore, several states have enacted legislation and regulations to promote sustainable practices and renewable energy adoption. Some cities and states have also introduced policies to address social issues, such as minimum wage increases and non-discrimination protections. Thus, this has led to the development of ESG investment. ESG investing has gained considerable traction in the United States, with a growing number of investors incorporating ESG factors into their decision-making processes (Hübel & Scholz (2020)). Asset managers are offering a wide range of ESG-focused investment products, such as sustainable mutual funds and exchange-traded funds (ETFs). Institutional investors, including pension funds and endowments, are increasingly demanding ESG integration in their investment strategies, driving the momentum further.

However, challenges remain in the ESG landscape. One key challenge is the lack of standardized ESG metrics and reporting frameworks, which makes it difficult for investors to compare companies' ESG performance accurately (Arvidsson, & Dumay (2022)). Efforts are underway to establish common standards and metrics, such as those developed by the

Sustainability Accounting Standards Board (SASB) and the Task Force on Climate-related Financial Disclosures (TCFD), to address this issue.

ESG has emerged as a critical consideration for companies and investors in the United States. Environmental sustainability, social responsibility, and good governance are seen as essential elements for long-term success and value creation (Schoenmaker & Schramade (2019)). As the U.S. continues to embrace ESG principles, it is expected that sustainability and responsible business practices will become increasingly ingrained in corporate strategies and investment decision-making processes, contributing to a more sustainable and inclusive economy. The United States has a relatively mature and well-developed ESG market compared to many other countries. It has a large number of companies that actively report on their ESG performance and engage with investors on these matters. This is especially true for large corporations with global operations and exposure to international markets. However, there is still variation in the extent to which companies prioritize and disclose (Khan (2022)). The United States has traditionally had a strong focus on technology, energy, and financial sectors, which may impact the ESG landscape. Companies in these sectors have varying levels of ESG performance and disclosure.

This suggests that United States companies, operating in a pro ESG market, are well advanced on the subject. It is therefore for all the reasons mentioned above that this thesis will address the link between ESG and Corporate Financial Performance.

This study addresses a research gap about the relationship between environmental, social, and governance (ESG) performance and industry sensitivity. In fact, this relationship has been the subject of very few studies, and very often in emerging countries like Garcia, Mendes-Da-Silva, and Orsato (2017). Their study finds that companies operating in sensitive industries have better ESG performance than companies operating in less sensitive industries.

To fill the gap in the literature, the research question of this thesis is: What is the effect of ESG factors on Corporate Financial Performance and the relationship to establish between being in a sensitive industry and firms' ESG score?

To the best of my knowledge, no paper has chosen to focus on the link between the three dimensions: ESG, CFP and sensitive industries. The goal of this research is to fill this gap. This research is contributory for three reasons. First of all, throughout the literature on the relationship between CFP and ESG, results have been mixed. More and more studies confirm that this relationship exists. This study provides further evidence and highlights the need for

further research. This study also provides empirical evidence based on more recent and therefore more accurate data. The subject of ESG has only begun to receive a lot of attention in the last few years, and company data on ESG is actually being measured in droves too. This study is based on data that is becoming increasingly reliable.

Secondly, this study provides a better understanding of this study provides a better understanding of what contributes to a company's ESG score. It provides understanding elements of why one company has a better ESG score than another, and in particular with the industry to which it belongs (sensitive industry or not).

Thirdly, this paper represents the first application of the role of sensitive industries in determining ESG scores in the United States. Thus, it contributes to providing new empirical pieces of evidence of it.

The structure of this paper is as follows: first of all, a literature review that exposes a theoretical background discussing the existing connections between corporate social responsibility (CSR) then environmental, social, and governance (ESG) considerations, and Corporate Financial Performance.

After the aforementioned discussion, the paper focuses on the research methodology, with particular emphasis on how the data collection and analysis were carried out. A quantitative approach was chosen, concentrating on three different indicators of Corporate Financial Performance. The empirical study will examine the relationship between ESG factors and the Corporate Financial Performance, using 12 regressions and then between a company being in a sensitive industry and its ESG score, using 4 regressions. Additionally, the discussion will cover extension elements related to the topic, as well as some limitations.

2. Literature Review

2.1. Embracing Corporate Social Responsibility (CSR) for Sustainable Success

The idea of social responsibility has roots dating back to the 1950s, as noted by management historians like Carroll (1979). Nonetheless, it wasn't until the early 21st century that the topic gained considerable attention (Mourthe Junior, 2001; Campbell, 2007). The World Business Council for Sustainable Development (2000) described Corporate Social Responsibility (CSR) as an ongoing commitment by businesses to act ethically and contribute to economic growth while enhancing the lives of employees, their families, and the broader community and society. The European Commission characterized CSR as the voluntary incorporation of social and environmental concerns into business operations and stakeholder relationships.

Corporate Social Responsibility encompasses all practices carried out by companies to adhere to sustainable development principles, including social, environmental, and economic aspects. As a broad concept, CSR manifests in various ways across different businesses and industries. Companies can contribute to societal betterment while simultaneously strengthening their brand image through philanthropy, CSR initiatives, or volunteer efforts.

Considering social responsibility can be a strategic move for companies. Porter & Kramer (2011) introduced the concept of Creating Shared Value (CSV), which posits that businesses can generate economic value while also creating value for society. This model is widely cited in literature and forms the basis for numerous studies. Companies that focus solely on profit maximization and commoditization may experience negative externalities, such as unemployment and poverty (John Mendy, 2019). These issues can be mitigated through the creation of Shared Value, allowing companies to incorporate societal value creation into their operations without additional burdens. Integrating CSR into a company's strategy necessitates a transformation of its organizational structure.

CSR performance can act as a strategic tool with positive effects on a company, particularly following an innovation. Dev R. Mishra (2017) examined the relationship between post-innovation CSR performance and firm valuation, finding that more innovative companies exhibit strong CSR performance after successful innovations. Companies with high CSR achieve significantly higher post-innovation valuations, suggesting that strategic CSR investment can lead to "doing well by doing good" (Dev R. Mishra, 2017).

The relationship between CSR and Corporate Financial Performance (CFP) has been debated, with some studies showing a positive impact and others suggesting little to no additional gain or drawing inconclusive results. CSR was once considered a financial burden (Zhi Tang, Clyde Eiríkur Hull, and Sandra Rothenberg, 2012), and measuring it was regarded as complex (Gjølberg, 2009). However, neglecting to implement CSR measures can also threaten a company's reputation and brand value, negatively impacting firm value. Sometimes, these effects can be long-term, which is why companies may not always recognize their impact.

Gradually, the potential benefits of CSR began to emerge, including enhanced stakeholder relationships and improved company reputation among employees, regulators, customers, and suppliers. Zhi Tang, Clyde Eiríkur Hull, and Sandra Rothenberg (2012) argued that a well-defined and consistent CSR strategy with a long-term vision is required to achieve financial results. The pace of CSR adoption has also been investigated, with rapid adoption leading to high costs and low returns, while slower adoption may help mitigate these issues.

Golrida Karyawati P, Bambang Subroto, Sutrisno T, Erwin Saraswati (2018) studied the relationship between CSR and Financial Performance (FP), concluding that CSR improves financial performance, but proper analysis requires consideration of variables such as country characteristics and CSR forms and dimensions. Blasi, S., Caporin, M., & Fontini, F. (2018) analyzed the relationship between firms' CSR activities and economic performance while accounting for sector specificities. They called for further theoretical research focusing on each particular sector.

CSR can benefit all company stakeholders, including shareholders, employees, investors, management, and consumers. Numerous studies have demonstrated a positive relationship between CSR and performance, but it must be implemented carefully, as skepticism can negate its positive effects. Scandals, greenwashing, and inconsistent practices must be addressed with caution.

In conclusion, Corporate Social Responsibility (CSR) has evolved significantly, becoming a truly global concept. It can serve as a strategic tool for companies, benefiting all stakeholders, including shareholders, employees, investors, management, and consumers. However, it must be approached with care to ensure its positive effects are realized.

Initially met with skepticism, corporate social responsibility has now demonstrated its positive influence on business performance through numerous studies and articles. As a result, it has

become an essential component of corporate strategy and has paved the way for the rise and advancement of ESG (Environmental, Social, and Governance) considerations.

CSR to ESG: Evolving Considerations for Sustainable Business Practices

Corporate Social Responsibility (CSR) focuses on holding companies accountable, while Environmental, Social, and Governance (ESG) criteria aim to quantify and compare companies' efforts and impacts in these areas. It's important to note that CSR activities can differ significantly between companies or sectors and are not directly comparable. This is where ESG comes into play, offering quantifiable metrics that enable easy comparisons between companies. In recent years, rating agencies have incorporated ESG criteria into their assessments to meet the growing demand from investors for insights into companies' sustainability performance. Additionally, there has been a rise in specialized rating agencies, known as non-financial agencies, that focus on ESG considerations. These extra-financial rating agencies work to provide an objective method of measurement.

2.2. ESG's Influence on Corporate Financial Performance (CFP)

ESG main theories

There are four main theories that attempt to explain the relationship between Environmental, Social, and Governance (ESG) factors and Corporate Financial Performance (CFP). The Stakeholder Theory suggests that managing relationships with various stakeholders through ESG factors can improve a company's financial performance. The Resource-Based View (RBV) theory emphasizes how ESG performance can contribute to a firm's unique resources and capabilities, leading to better financial performance. The Shared Value Creation concept, proposed by Porter and Kramer (2006), proposes that focusing on ESG factors can create economic value while addressing social and environmental challenges. The Legitimacy Theory suggests that conforming to societal norms and expectations through ESG can improve a company's financial performance by reducing risks and potential conflicts with stakeholders.

These theories have been studied extensively to explain why companies voluntarily disclose information about their social and environmental performance. According to the Legitimacy Theory, companies need to comply with societal norms and expectations to maintain their legitimacy and survive in the long run. By addressing ESG issues, firms can meet these expectations, avoid conflicts with stakeholders, and reduce risks, which can potentially improve their financial performance. Mark Suchman, a sociologist, is a major contributor to this theory,

defining organizational legitimacy as the perception that a company's actions are desirable, proper, or appropriate within a socially constructed system of norms, values, beliefs, and definitions. The Legitimacy Theory has been used to explain why companies voluntarily disclose their social and environmental performance information. Gray, R., Kouhy, R., & Lavers, S. (1995) have made significant contributions to this area of research.

While these theories suggest a positive relationship between ESG and CFP, it is essential to acknowledge that empirical evidence on this relationship remains mixed. Some studies have found a positive link between ESG performance and financial performance, while others have reported weak, mixed, or even negative relationships. The inconsistencies in findings can be attributed to various factors, such as differences in research methodologies, measurement of ESG and CFP, and the time horizon considered in the studies. However, the growing interest in sustainable investing and increasing awareness of ESG issues suggest that companies may benefit from incorporating ESG considerations into their strategies and decision-making processes.

ESG and Corporate Financial Performance (CPF)

The association between companies possessing robust environmental, social, and governance (ESG) attributes and their financial performance has been the focus of numerous investigations. Identifying concrete connections between ESG factors and financial performance could spur the adoption of ESG criteria as a central component of corporate investment strategies and decision-making processes. As a result, examining the evidence that connects environmental, social, and governance factors to financial performance is an intriguing endeavor. Generally, the literature on the relationship between ESG criteria and financial performance reveals a positive correlation. However, challenges can emerge when attempting to demonstrate this positive correlation when it exists.

The strategic significance of environmental, social, and governance (ESG) factors, or the concept of sustainability, for businesses has been well-established. Over the last twenty years, ESG concerns have been shown to affect the profitability and financial stability of numerous companies. Additionally, a company's reputation is influenced by its ESG efforts. Furthermore, the risk profile and performance potential are tied to the sustainable aspects of a company's strategic initiatives, all of which have financial implications for the organization's performance. The connection between ESG performance and a company's financial performance has been extensively explored, with many studies demonstrating a positive relationship. First, Ortas et al. (2015) examined this relationship for companies in two European countries (Spain and

France) that adhered to the United Nations Global Compact (UNGC), finding that ESG performance significantly and positively impacted financial performance. Zhao et al. (2018) provided empirical evidence of this relationship for Chinese companies. Subsequently, Brogi and Lagasio (2019) also demonstrated the positive effect of ESG on corporate profitability by focusing on the U.S. banking sector and using Return on Assets (ROA) as a performance measure.

It is important to recognize that sustainability concerns vary across different sectors. As a result, it is essential to take this into account when evaluating the impact of ESG factors on a company's performance. Implementing an ESG strategy can offer substantial competitive benefits for a company. To fully assess these advantages, they often need to be examined over medium to long-term timeframes. Engaging all stakeholders, such as suppliers, employees, customers, communities, and shareholders, can be a potent driving force for achieving results in the execution of such a strategy. There are multiple methods for constructing a company's environmental, social, and governance (ESG) score or rating using a combination of financial and non-financial data. Understanding the effect of each factor on a company's performance can sometimes be overlooked in favor of simply engaging in ESG activities (Giese, Nagy & Lee, 2021).

The role of innovation should not be overlooked, as it is a key success factor for a company. Integrating ESG considerations with innovation can yield significant benefits. Financial advantages can be realized, particularly in the areas of product and process innovation, when combined with ESG concerns.

On the other hand, some studies examining the connection between ESG performance and company performance have yielded somewhat mixed outcomes. Huang, D.Z.X. (2021) explored alternative explanations for the relationship between ESG performance and Corporate Financial Performance. His findings indicated that while empirical evidence demonstrates a positive and statistically significant relationship between ESG performance and Corporate Financial Performance, the economic impact is relatively modest.

In Latin America's emerging markets for multinationals, the relationship between ESG scores and financial performance is significantly negative, both statistically and when evaluating environmental, social, and governance aspects separately (Duque-Grisales, E., & Aguilera-Caracuel, J. 2019).

Numerous studies have also investigated the connection between corporate sustainability and the cost of capital, which is a crucial factor for a company's performance. It appears that companies with high sustainability standards have lower capital costs, and those with strong environmental, social, and governance practices have easier access to capital. In this regard, incorporating ESG considerations is beneficial for companies. Cheng, B., Ioannou, I., & Serafeim, G. (2014) examined the relationship between firms' access to finance and their CSR behavior, concluding that it allows companies to benefit from reduced capital constraints.

Giese, Lee, Melas, Nagy, and Nishikawa (2019) connected ESG information to company valuation and performance, finding that ESG information impacts valuation and performance in two ways: first, through a company's systematic risk profile, resulting in lower capital costs and higher valuations; and second, through its idiosyncratic risk profile, leading to higher profitability and reduced tail risk exposure. They concluded that changes in a company's ESG characteristics might be useful financial indicators, and ESG ratings can be incorporated into policy benchmarks and financial evaluations (Giese, Lee, Melas, Nagy, & Nishikawa, 2019).

Environmental, Social, and Governance (ESG) factors have become increasingly important in the corporate world, with the potential to positively impact a company's financial performance. Taking into account the information presented above, the paper suggests the following hypotheses:

H1 : There is a positive and significant relationship between Corporate Financial Performance and ESG score.

Assuming the disaggregation of the ESG performance proxy, the following hypotheses are put forward:

H1a : There is a positive and significant relationship between Corporate Financial Performance and environmental score.

H1b : There is a positive and significant relationship between Corporate Financial Performance and social score.

H1c : There is a positive and significant relationship between Corporate Financial Performance and governance score.

2.3. ESG performance and sensitive industries

Nasruzzaman Naeem, Serkan Cankaya, and Recep Bildik (2022) studied the relationship between environmental, social, and governance (ESG) performance and financial performance in environmentally sensitive industries in both emerging and developed markets. The study finds that ESG performance has a positive effect on financial performance in both emerging and developed markets. However, the effect is stronger in emerging markets than in developed markets.

Garcia, Mendes-Da-Silva, and Orsato (2017) examined the relationship between environmental, social, and governance (ESG) performance and industry sensitivity to environmental issues in emerging markets. The study finds that companies operating in sensitive industries have better ESG performance than companies operating in less sensitive industries. The authors suggest that this may be due to a greater need for companies in sensitive industries to manage their environmental and social risks in order to maintain their social license to operate. The study provides evidence to support the idea that industry sensitivity to environmental issues is an important driver of ESG performance in emerging markets.

Thus, some studies are looking at the link to establish between ESG performance and CFP by taking into account the nature of the industry (sensitive or not). However, this has often been studied for emerging countries and not applied on a large scale. There is a gap and this subject deserves to be tested on more countries (on both in emerging and developed countries). Therefore, based on the information presented above, the following assumptions are proposed:

H2: There is a positive and significant relationship between a company being in a sensitive industry and its ESG score.

Assuming the disaggregation of the ESG performance proxy, the following hypotheses are put forward:

H2a: There is a positive and significant relationship between a company being in a sensitive industry and its Environmental score.

H2b: There is a positive and significant relationship between a company being in a sensitive industry and its social score.

H2c: There is a positive and significant relationship between a company being in a sensitive industry and its governance score.

3. Data and methodology

3.1. Sample selection

To perform multivariate regressions and address the various research questions, data was sourced from Computstat database for companies' financial information and from Thomson Reuters databases for ESG information.

Given that ESG concerns are a relatively recent topic, ESG scores may not always be readily available or usable. For this reason, the analysis is restricted to recent data and covers a period of six years, spanning from 2016 to 2021. The analysis draws on data from 2759 companies across various industries located in the United States.

The identification of the industry group is based on Refinitiv Eikon industry group classification represented as a four-digit numeric code assigned to the company. Each company is classified into a major industry group, represented by the first two digits of the code. Table 1 shows the percentage that each industry represents in the sample of companies studied. For the sake of simplification in representation, "Others" groups together sixteen industries that were analyzed separately.

Table 1. Share of companies in the sample by sector of activity

Industry	Companies by industry (%)
Miscellaneous	30,0%
Drugs, cosmetics & health care	22,7%
Financial	15,1%
Electrical, electronics	13,4%
Others*	3,9%
Recreation	2,9%
Retailers	2,3%
Machinery & equipment	1,6%

**includes 16 industries presented in Appendix A*

3.1.1. Dependent variables

The paper introduces three measures of Corporate Financial Performance (CFP) as dependent variables: Tobin's Q (TobinsQ), Return on Assets (ROA), and Return on Equity (ROE). Tobin's Q is a measure that captures both short-term and long-term financial performance by calculating the ratio of a firm's market value to its tangible assets' replacement cost, thus capturing the value of intangible assets (Dowell et al., 2000; Konar and Cohen, 2001). On the other hand, ROA and ROE are short-term measures that represent the return on investment in relation to a company's

total assets and equity, respectively. The first hypothesis (H1) is tested using Corporate Financial Performance as the dependent variable.

On the second part of the paper, four measures of ESG performance (ESG, Environmental, Social, and Governance) were used as dependent variables: ESG, E, S, and G.

ESG definition

The definition of the ESG score, according to Thomson Reuters, is “an overall company score based on the self-reported information in the environmental, social and corporate governance pillars.” ESG scores are constructed with different weights for each pillar. The weights attributed to each pillar are almost identical for each company selected for this study, approximately 30% for the environmental pillar, 45% for social, and 25% for governance.

Environmental pillar score

According to Thomson Reuters, the Environmental pillar score is defined as a measure of: “a company's impact on living and non-living natural systems, including the air, land and water, as well as complete ecosystems. It reflects how well a company uses best management practices to avoid environmental risks and capitalize on environmental opportunities in order to generate long term shareholder value.”

Social pillar score

Thomson Reuters provides a definition for the social pillar score, stating that it is: “a company's capacity to generate trust and loyalty with its workforce, customers and society, through its use of best management practices. It is a reflection of the company's reputation and the health of its license to operate, which are key factors in determining its ability to generate long term shareholder value.”

Governance pillar score

Thomson Reuters defines the governance pillar score as a measure of: “a company's systems and processes, which ensure that its board members and executives act in the best interests of its long-term shareholders. It reflects a company's capacity, through its use of best management practices, to direct and control its rights and responsibilities through the creation of incentives, as well as checks and balances in order to generate long term shareholder value.”

3.1.2. Independent variables

To examine the validity of H1 the independent variables used were ESG, Environmental, Social, and Governance score (ESG, E, S, and G variables). The definition of these variables is the same as described above (3.1.1. Dependent variables).

On the second part of the analysis, to verify the validity of H2, a dummy variable has been introduced taking the value of 1 if the company belongs to a sensitive industry. Based on the previous researches, were considered as sensitive industry: oil, gas, chemicals, mining, steel making and paper and pulp as Garcia, Mendes-Da-Silva, & Orsato, R. J. (2017) definition and Alcohol, Gambling, Firearms, Military, Nuclear Power, and Tobacco based on Baron et al. (2009) definition.

3.1.3. Control variables

The set of control variables was chosen following the approach taken by Benkraiem, Dubocage, Lelong, and Shuwaikh (2023). The measure of firm size (Firmsize) is derived by taking the natural logarithm of the total assets of the firms. The capital intensity (CapitalIntensity) quantifies the ratio of capital expenditures to total assets, serving as an indicator of capital intensity. R&D intensity (RDintensity) gauges innovation capacity by computing the ratio of R&D expenditures to revenue, providing a measure of R&D intensity. Market value (MarketValue) is calculated as the product of the closed price and the number of shares outstanding. Last but not least, the year of incorporation of the firm (Year) was also included as a control variable.

To examine the validity of H2, this paper considers 4 control variables (describe above): Tobin's Q (TobinsQ), Firm size (Firmsize), R&D intensity (RDintensity) and the year of incorporation of the firm (Year). The set of control variables for this second part was chosen following the approach taken by Garcia, Mendes-Da-Silva, & Orsato (2017) and Benkraiem, Dubocage, Lelong, and Shuwaikh (2023).

3.2. Empirical modeling

In order to investigate the impact of ESG Score, Environmental Score, Social Score, and Governance Score on Corporate Financial Performance (Tobin's Q, ROA, ROE) (H1, H1_a, H1_b, H1_c), Equations (1-12) are constructed as follow:

$$CFP_{i,t} = \beta_0 + \beta_1 ESG_{i,t} + \beta_2 FirmSize_{i,t} + \beta_3 R\&Dintensity_{i,t} + \beta_4 CapitalIntensity_{i,t} + \beta_5 MarketValue_{i,t} + \beta_6 \sum YEAR_i + \varepsilon_{i,t}$$

With β_0 the intercept, β_1 the ESG score variable coefficient, β_2 the FirmSize variable coefficient, β_3 the R&DIntensity variable coefficient, β_4 the Capital Intensity variable coefficient, β_5 the Market Value variable coefficient, and β_6 the Year Effect variable coefficient.

Conceptual framework

The first part of this study has three main research questions, each of which is further divided into three sub-questions. These research questions are based on the conceptual framework illustrated in Figure 1.

Figure 1. Research conceptual framework

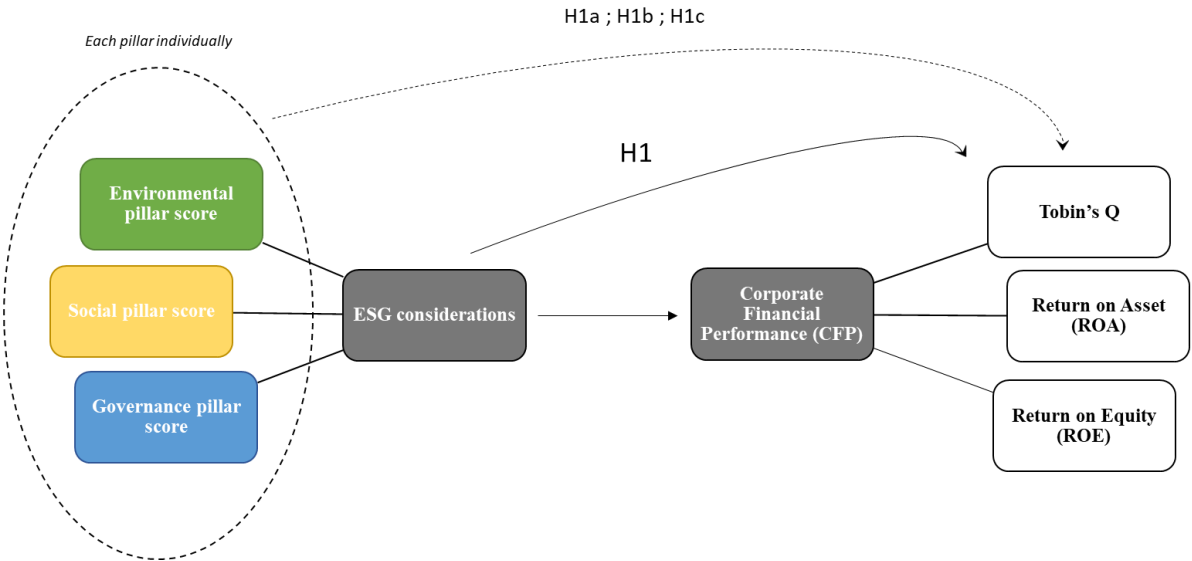


Figure 1 includes the dependent variables (corporate financial performance), independent variables (ESG score, Environmental score, Social Score, Governance Score. Hypothesis 1 (H1) suggests that ESG performance has a positive effect on Tobin’s Q, ROA, and ROE (Corporate Financial Performance). Hypothesis 1a (H1a) suggests that Environmental performance has a positive effect on Tobin’s Q, ROA, and ROE. Hypothesis 1b (H1b) suggests that Social performance has a positive effect on Tobin’s Q, ROA, and ROE. Finally, hypothesis 1c (H1c) suggests that Governance performance has a positive effect on Tobin’s Q, ROA, and ROE.

In order to estimate the empirical models and evaluate the hypotheses, the initial approach is to use ordinary least squares (OLS) regressions while controlling for firm and year effects. Given the nature of the variables used in the regression models, random effect models are applied. The decision to use fixed effect models instead of random effect models was further supported by a Hausman test (Hausman, 1978).

For H1, H1_a, H1_b, H1_c to be validated, coefficient β_1 needs to be significantly positive, as CFP with better ESG score, i.e. better ESG practices, are expected to generate higher financial performance.

The second part of this study is based around one research question, which is further divided into three sub-questions.

To test the existence of associations between the Corporate Financial Performance (Tobin's Q, ROA, ROE) and their ESG Score (ESG), Environmental Score (E), Social Score (S), and Governance Score (G) (H2, H2_a, H2_b, H2_c), Equations (13-16) are constructed as follow:

$$ESG_{i,t} = \beta_0 + \beta_1 Ind + \beta_2 TobinsQ_{i,t} + \beta_3 FirmSize_{i,t} + \beta_4 RDintensity_{i,t} + \beta_5 \sum YEAR_t + \varepsilon_{i,t}$$

With β_0 the intercept, β_1 the industry dummy variable coefficient, β_2 the TobinsQ variable coefficient, β_3 the FirmSize variable coefficient, β_4 the R&Dintensity variable coefficient, and β_5 the Year Effect variable coefficient. Equation 13 uses ESG score (ESG), Equation 14 uses environmental score (E); Equation 15 uses social score (S), and Equation 16 uses governance score (G).

Here as well, to estimate the empirical models and evaluate the hypotheses, the initial approach is to use ordinary least squares (OLS) regressions while controlling for firm and year effects. Given the nature of the variables used in the regression models, random effect models are applied. The decision to use fixed effect models instead of random effect models was further supported by a Hausman test (Hausman, 1978).

For H2, H2_a, H2_b, H2_c to be validated, coefficient β_1 needs to be significantly positive, as ESG score for companies in sensitive industry tend to have a positive effect on ESG score, i.e., firms operating in a sensitive industry, are expected to have higher ESG score.

4. Empirical results and discussion

4.1. Descriptive statistics and correlations

The statistics of the 2759 firms which composes the research sample underlying the study are synthesized on [Table 2](#).

The Corporate Financial Performance measures, Tobin's Q, ROA and ROE have an average (median) of 3.55 (1.71), -0.37 (0.00) and 0.02 (0.01) respectively. The average (median) of the ESG, Environmental, Social, and Governance performance measures are 23.20 (22.90), 8.93 (0.00), 25.40 (23.84) and 30.12 (28.23), respectively. Finally, the average (median) of the

Market Value, Firm Size R&D intensity and Capital Intensity are, respectively, 6126.82 (395.56), 2.59 (2.63), 0.16 (0.01), and 0.02 (0.01). A high likelihood of extreme results for Tobin's Q, ROA, ROE, R&D Intensity and Capital Intensity is indicated by the observed kurtosis of 635.04, 1018.15, 9115.92, 2706.02 and 49.78, respectively. Tobin's Q and ROE skewness indicate that the tail on the right side of the distribution is longer or fatter than the left side. Whereas, ROA skewness indicates that the tail on the left side of the distribution is longer or fatter than the left side. ESG, Environmental, Social, and Governance performance measures skewness are positive also indicating that the tail on the right side of the distribution is longer or fatter than the left side. As the variable Ind is a dummy variable, its statistics are less interpretable than the other variables. However, it shows that sensitive industry company represents around 21% of the firm observed.

Table 2. Summary Statistics.

	Mean	Median	Std. Dev	Min	Max	Skewness	Kurtosis
Tobin's Q	3.55	1.71	12.71	0.00	524.82	22.03	635.04
ROA	-0.37	0.00	3.66	-153.00	14.23	-29.08	1 018.15
ROE	0.02	0.01	27.67	-654.73	2 733.08	90.55	9 115.92
ESG	23.20	22.90	20.57	0.00	93.71	0.59	2.78
E	8.93	0.00	18.59	0.00	98.14	2.41	8.19
S	25.40	23.84	23.23	0.00	98.94	0.63	2.65
G	30.12	28.23	26.83	0.00	96.85	0.34	1.85
Market Value	6 126.82	395.56	51 914.39	0.00	2 036 897.00	25.49	804.00
Firm Size	2.59	2.63	1.04	0.00	5.62	-0.24	3.35
R&D intensity	0.16	0.01	1.24	0.00	83.00	46.92	2 706.02
Capital Intensity	0.02	0.01	0.05	-0.19	0.90	5.27	49.78
Ind	0.21	0.00	0.41	0.00	1.00	1.40	2.97

This table shows the summary statistics for all dependent, independent, and control variables used in the different models.

Table 3 shows the correlations between variables. There is a strong negative correlation (correlation coefficient: -0.4983***) between Tobin's Q and ROA, indicating that higher Tobin's Q values are associated with lower ROA values. There is a very weak negative correlation (correlation coefficient: -0.0023) between Tobin's Q and ROE, which is not statistically significant. Tobin's Q has a statistically significant weak negative correlation (correlation coefficient: -0.0635***) with the ESG variable, suggesting that higher Tobin's Q values are slightly associated with lower ESG scores. The variables E, S, and G have statistically significant weak negative correlations (correlation coefficients: -0.0299***, -0.0491***, -0.0735*** respectively) with Tobin's Q. There is a very weak positive correlation

(correlation coefficient: 0.0095) between ROA and ROE, but the relationship is not statistically significant. ROA has a statistically significant weak positive correlation (correlation coefficient: 0.0998***) with the ESG variable, indicating that higher ROA values are associated with slightly higher ESG scores. The variables E, S, and G have statistically significant weak positive correlations (correlation coefficients: 0.0534***, 0.0891***, 0.0997***) with ROA. ROE has a statistically significant weak positive correlation (correlation coefficient: 0.0209**) with the ESG variable, suggesting that higher ROE values are associated with slightly higher ESG scores. There is no significant correlation between ROE and Market Value, R&D Intensity, or the industry variable. The ESG variable has a statistically significant moderate positive correlation (correlation coefficient: 0.2231***) with Market Value, indicating that higher ESG scores are associated with higher Market Values. There is a strong positive correlation (correlation coefficient: 0.6815***) between the ESG variable and Firm Size, suggesting that larger firms tend to have higher ESG scores. ESG has a statistically significant weak negative correlation (correlation coefficient: -0.0722***) with R&D Intensity, implying that higher R&D intensity is associated with slightly lower ESG scores. There is a statistically significant weak positive correlation (correlation coefficient: 0.0312***) between ESG and Capital Intensity. There is no significant correlation between ESG and the industry variable. The variables E, S, and G have positive correlations with Market Value and Firm Size. E has a negative correlation with R&D Intensity and a positive correlation with Capital Intensity.

Table 3. Correlation Matrix.

	Tobin's Q	ROA	ROE	ESG	E		
Tobin's Q	1.0000						
ROA	-0.4983***	1.0000					
ROE	-0.0023	0.0095	1.0000				
ESG	-0.0635***	0.0998***	0.0209**	1.0000			
E	-0.0299***	0.0534***	0.0312***	0.7213***	1.0000		
S	-0.0491***	0.0891***	0.0227***	0.9211***	0.6376***		
G	-0.0735***	0.0997***	0.0032	0.8829***	0.4758***		
Market Value	0.0109	0.0149	0.0000	0.2231***	0.2791***		
Firm Size	-0.2214***	0.2468***	0.0162*	0.6815***	0.4993***		
R&D intensity	0.3164***	-0.7453***	-0.0054	-0.0722***	-0.0457***		
Capital Intensity	0.0063	0.0289***	-0.0042***	0.0312***	0.0994***		
Ind	0.0262***	-0.0341***	0.0126	-0.0040	-0.0316***		
	S	G	Market Value	Firm Size	R&D intensity	Capital Intensity	Ind
S	1.0000						
G	0.6897***	1.0000					

Market Value	0.2040***	0.1469***	1.0000				
Firm Size	0.6111***	0.6002***	0.2240***	1.0000			
R&D intensity	-0.0540***	-0.0764***	-0.0096	-0.2070***	1.0000		
Capital Intensity	0.0169*	0.0397***	0.0473***	0.0198**	-0.0216**	1.0000	
Ind	0.0718***	-0.0128	-0.0326***	-0.1399***	0.0699***	0.0574***	1.0000

Figures in the table are pairwise correlations *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

4.2. ESG performance and Corporate Financial Performance

Table 4, Table 5, Table 6, and Table 7 presents the estimation results of equations (1) to (12). Various studies have explored this relationship and have found evidence of a positive correlation between strong ESG performance and improved financial performance, Eccles, Ioannou & Serafeim (2014). A significant majority of research conducted on the impact of corporate environmental performance on Corporate Financial Performance consistently reveals a positive correlation. For example, in order to illustrate this connection, Busch and Hoffmann (2011) employ financial indicators such as Return on Assets (ROA), Return on Equity (ROE), and Tobin's Q.

Table 4. ESG Performance and Corporate Financial Performance

	(1)	(2)	(3)
	Tobin's Q	ROA	ROE
ESG	0.0838*** (0.00990)	-0.0139*** (0.00224)	0.0310 (0.0190)
Firm size	-3.746*** (0.202)	0.794*** (0.0468)	0.146 (0.412)
RD intensity	2.711*** (0.0862)	-2.108*** (0.0182)	-0.247 (0.790)
Capital Intensity	2.348 (2.662)	1.054* (0.579)	-2.880 (5.949)
Market Value	1.03e-05*** (2.70e-06)	-8.65e-07 (6.00e-07)	-2.85e-06 (5.16e-06)
Constant	10.35*** (0.836)	-2.052*** (0.197)	-0.731 (2.238)
Year	YES	YES	YES
Observations	11,135	11,135	10,369
Number of firms	2,673	2,673	2,559

This table examines the effect of ESG performance on their financial performance. Standard errors are shown in parentheses, *, **, and ***, denote statistical significance at 10%, 5%, and 1% levels, respectively.

Table 5. Environmental Performance and Corporate Financial Performance

	(4)	(5)	(6)
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	Tobin's Q	ROA	ROE
Environmental	0.0535*** (0.00912)	-0.00950*** (0.00204)	0.0523*** (0.0170)
Firmsize	-3.164*** (0.180)	0.705*** (0.0421)	0.0943 (0.349)
RDintensity	2.753*** (0.0860)	-2.114*** (0.0181)	-0.251 (0.783)
CapitalIntensity	1.644 (2.668)	1.155** (0.579)	-4.476 (5.977)
MarketValue	1.01e-05*** (2.73e-06)	-8.19e-07 (6.03e-07)	-5.10e-06 (5.23e-06)
Constant	9.462*** (0.825)	-1.918*** (0.195)	-0.459 (2.204)
Year	YES	YES	YES
Observations	11,135	11,135	10,369
Number of firms	2,673	2,673	2,559

This table examines the effect of environmental performance on their financial performance. Standard errors are shown in parentheses, *, **, and ***, denote statistical significance at 10%, 5%, and 1% levels, respectively.

Table 6. Social Performance and Corporate Financial Performance

	(7)	(8)	(9)
	Tobin's Q	ROA	ROE
Social	0.0607*** (0.00815)	-0.00873*** (0.00186)	0.0262* (0.0154)
Firmsize	-3.520*** (0.194)	0.742*** (0.0453)	0.191 (0.387)
RDintensity	2.726*** (0.0861)	-2.111*** (0.0182)	-0.294 (0.793)
CapitalIntensity	2.405 (2.665)	1.066* (0.579)	-2.716 (5.946)
MarketValue	1.09e-05*** (2.70e-06)	-9.82e-07 (6.00e-07)	-2.76e-06 (5.16e-06)
Constant	9.928*** (0.831)	-1.960*** (0.196)	-0.852 (2.218)
Year	YES	YES	YES
Observations	11,135	11,135	10,369
Number of firms	2,673	2,673	2,559

This table examines the effect of social performance on their financial performance. Standard errors are shown in parentheses, *, **, and ***, denote statistical significance at 10%, 5%, and 1% levels, respectively.

Table 7. Governance Performance and Corporate Financial Performance

	(10)	(11)	(12)
	Tobin's Q	ROA	ROE
Governance	0.0393*** (0.00687)	-0.00722*** (0.00155)	-0.00681 (0.0131)

FirmSize	-3.297*** (0.190)	0.731*** (0.0442)	0.693* (0.372)
RDintensity	2.749*** (0.0861)	-2.113*** (0.0181)	-0.0189 (0.784)
CapitalIntensity	2.113 (2.668)	1.097* (0.579)	-2.386 (5.953)
MarketValue	1.20e-05*** (2.70e-06)	-1.11e-06* (5.98e-07)	-2.16e-06 (5.14e-06)
Constant	9.577*** (0.830)	-1.943*** (0.196)	-1.816 (2.208)
Year	YES	YES	YES
Observations	11,135	11,135	10,369
Number of firms	2,673	2,673	2,559

This table examines the effect of governance performance on their financial performance. Standard errors are shown in parentheses, *, **, and ***, denote statistical significance at 10%, 5%, and 1% levels, respectively.

The results obtained with Tobin's Q measure are in line with the expected results (H1, H1_a, H1_b, H1_c) and previous literature. In fact, the relationship is positive between ESG score, Environmental Score, Social Score and Governance Score, and Corporate Financial Performance. ESG coefficient (0.0838***) indicates that a one-unit increase in the ESG score is associated with an increase of 8.38% in Tobin's Q, representing Corporate Financial Performance. Similarly, Environmental, Social, and Governance coefficients, respectively, (0.0535***; 0.0607***; 0.0393***) indicates that a one-unit increase in their scores is associated with an increase of 5.35%; 6.07% and 3.93% in Tobin's Q. The significance level suggests a strong positive relationship between ESG score and Corporate Financial Performance. The significance level suggests also a strong relationship between Environmental, Social, and Governance score separately and Corporate Financial Performance. However, the relationship is not as strong as it is for ESG for Environmental, Social, and Governance studied separately; by order, the stronger after ESG is Social, then Environmental and lastly Governance (again in line with previous work).

The results obtained with ROA measure are not in line with the expected results (H1, H1_a, H1_b, H1_c) and are not really conclusive. In fact, the results show a significant negative association between ROA and Corporate Financial Performance. The coefficient for the ESG score variable (-0.0139***) indicates that an increase in the ESG score is associated with a decrease in ROA. Similarly, the coefficient for the Environmental, Social, and Governance variables studied separately (-0.00950***; -0.00873***; and -0.00722***) indicates that an increase in the Environmental, Social, and Governance score is associated with a decrease in ROA. This finding suggests that companies with higher ESG scores tend to have lower ROA, indicating a

potential trade-off between environmental, social, and governance considerations and financial performance. It implies that focusing on ESG factors may lead to reduced profitability as measured by ROA. These results are not in line with previous studies and, as the coefficient is really low, one cannot really rely on them to conclude about the relationship between ROA and ESG, Environmental, Social, and Governance Performance.

The results obtained with ROE measure are mitigated. In fact, the coefficient for the ESG score variable in the regression of ROE (Return on Equity) as the independent variable is 0.0310, This result suggests a positive association between ROE and Corporate Financial Performance which is in line with H1. However, as the p-value is greater than 0.1, it indicates that the coefficient is not statistically significant at conventional levels of significance. It suggests that there is no significant relationship between the ESG score and ROE. In other words, this regression did not show evidence to support a direct impact of ESG considerations on a company's Return on Equity.

The coefficient for the Environmental Score variable in the regression of ROE (Return on Equity) as the independent variable is 0.0523, with a p-value lower than 0.01, indicating statistical significance at conventional levels. It suggests that there is a significant positive relationship between the Environmental score (ESG factor related to environmental considerations) and ROE. In other words, companies with higher environmental scores tend to have higher Return on Equity. This finding implies that incorporating and prioritizing environmental factors in corporate practices and strategies can have a positive impact on financial performance, specifically ROE. This result is in line with previous research and the expected results.

The coefficient for the social score variable in the regression of ROE (Return on Equity) as the independent variable is 0.0262, with a p-value lower than 0.1 but higher than 0.05, indicating a marginal level of statistical significance. This suggests that there is a potential positive relationship between the social score (ESG factor related to social considerations) and ROE. However, the marginal significance level implies that this relationship may be weaker or less robust compared to other variables in the regression model. While there is an indication of a positive association, further investigation is needed to confirm the significance and strength of this relationship.

And last by not least, the coefficient for the Governance score variable in the regression of ROE (Return on Equity) as the independent variable is -0.00681, with a p-value greater than 0.1. This

indicates that the relationship between the Governance score and ROE is not statistically significant at the conventional significance level. Again, it suggests that there is no strong evidence of a relationship between the Governance score and ROE. The coefficient being negative implies a potential inverse association, but the lack of statistical significance indicates that this relationship may be weak or inconclusive.

4.3. Sensitive industry and ESG score

Table 8 presents the estimation results of equations (13) to (16).

Table 8. ESG Performance and Industry

	ESG	E	S	G
	(13)	(14)	(15)	(16)
Ind	3.250*** (0.635)	0.851 (0.637)	7.011*** (0.788)	3.480*** (0.890)
TobinsQ	0.0550*** (0.00748)	0.0451*** (0.00875)	0.0564*** (0.00873)	0.0575*** (0.0111)
Firmsize	10.06*** (0.199)	6.712*** (0.214)	10.32*** (0.239)	11.52*** (0.287)
RDintensity	0.528*** (0.0692)	0.362*** (0.0813)	0.537*** (0.0808)	0.597*** (0.103)
Constant	-16.84*** (1.058)	-12.75*** (1.088)	-16.79*** (1.301)	-18.64*** (1.497)
Year	YES	YES	YES	YES
Observations	11,111	11,111	11,111	11,111
Number of firms	2,667	2,667	2,667	2,667

This table examines the effect of sensitive industry on their ESG, Environmental, Social, Governance performance. Standard errors are shown in parentheses, *, **, and ***, denote statistical significance at 10%, 5%, and 1% levels, respectively.

ESG performance

The coefficient for the industry dummy variable in the regression of ESG (Environmental, Social, and Governance) as the independent variable is 3.250, with a p-value less than 0.01. This indicates a statistically significant positive relationship between being in a sensitive industry (represented by the dummy variable) and the ESG score. It suggests that companies in sensitive industries tend to have higher ESG scores compared to those in non-sensitive industries, controlling for other variables in the regression. The positive coefficient indicates a positive association between being in a sensitive industry and the overall ESG performance of the company. Comparing these results with previous work, the statistically significant positive coefficient implies that this finding aligns with the notion that companies operating in sensitive

industries may have a greater focus on environmental, social, and governance considerations compared to companies in non-sensitive industries. Thus, H2 is not rejected.

Environmental performance

The coefficient for the industry dummy variable in the regression of the environmental score as the independent variable is 0.851, with a p-value greater than 0.1. This indicates that there is no statistically significant relationship between being in a sensitive industry (represented by the dummy variable) and the environmental score. It suggests that being in a sensitive industry does not have a significant impact on the environmental performance of the company, after controlling for other variables in the regression. The non-significant coefficient implies that there is no clear association between industry sensitivity and the environmental score. Thus, H2a is rejected.

Social performance

The coefficient of 7.011 for the industry dummy variable suggests that being in a sensitive industry has a statistically significant positive relationship with the social score. The p-value being inferior to 0.01 indicates that this relationship is unlikely to have occurred by chance. In simpler terms, companies in sensitive industries tend to have higher social scores compared to companies in non-sensitive industries. This result suggests that sensitive industries may have policies, practices, or characteristics that positively influence their social performance. Thus, H2b is not rejected.

Governance performance

Finally, the coefficient of the regression of governance score on the dummy variable industry is 3.480, and it is statistically significant with a p-value lower than 0.01. This suggests that there is a positive and significant relationship between governance score and the sensitive industry status of the company. The coefficient indicates that being in a sensitive industry is associated with a higher governance score. It suggests that governance practices may be particularly important in sensitive industries and can contribute to better Corporate Financial Performance. Thus, H2c is not rejected.

4.4. Robustness checks

Additional analyses were performed using alternative statistical models or methodologies to validate the results. Throughout the development of this research, several methodologies were tested. Three types of regression were performed, including Ordinary Least Squares, Random Effects and Fixed Effects. Furthermore, [Table 9](#), [Table 10](#), [Table 11](#), and [Table 12](#) present

estimated linear regression models with robust standard errors. These models are similar to the ordinary least squares (OLS) regression, but it provides standard errors that are robust to violations of certain assumptions, such as heteroscedasticity and the presence of outliers. The regression results moderate the robustness of our findings regarding the established relationship between ESG and CFP and the ability to scale them up.

In addition to this, the choice of control variables to be included in the model was decided by adding different variables notably firms' level of leverage, free cash flow to the firm and market risk following the methodology of Garcia, Mendes-Da-Silva, and Orsato (2017). The most accurate results are those presented and analyzed.

Table 9. Robustness: ESG Performance and Corporate Financial Performance

	(1')	(2')	(3')
	Tobin's Q	ROA	ROE
ESG	0.0194*** (0.000665)	0.00134*** (7.51e-05)	-0.000130*** (4.68e-05)
Firmsize	-0.301*** (0.0132)	0.00583*** (0.00150)	0.0287*** (0.00101)
RDintensity	2.038*** (0.00931)	-1.261*** (0.00133)	-0.348*** (0.00195)
CapitalIntensity	1.237*** (0.206)	0.172*** (0.0232)	0.00980 (0.0147)
MarketValue	2.64e-06*** (1.89e-07)	1.29e-07*** (2.13e-08)	-4.86e-08*** (1.27e-08)
Constant	1.775*** (0.193)	-0.0292*** (0.00899)	-0.0288** (0.0130)
Year	YES	YES	YES
Observations	11,134	11,132	10,369
R-squared	0.829	0.989	0.813

This table examines the effect of ESG performance on their financial performance. Standard errors are shown in parentheses, *, **, and ***, denote statistical significance at 10%, 5%, and 1% levels, respectively.

Table 10. Robustness: Environmental Performance and Corporate Financial Performance

	(4')	(5')	(6')
	Tobin's Q	ROA	ROE
Environmental	0.00875*** (0.000613)	0.000781*** (7.06e-05)	-0.000276*** (4.18e-05)
Firmsize	-0.0689*** (0.0113)	0.0189*** (0.00130)	0.0299*** (0.000858)
RDintensity	2.763*** (0.00927)	-1.219*** (0.00135)	-0.347*** (0.00192)
CapitalIntensity	1.248*** (0.206)	0.160*** (0.0237)	0.0230 (0.0147)

MarketValue	2.51e-06*** (1.91e-07)	1.13e-07*** (2.20e-08)	-3.77e-08*** (1.29e-08)
Constant	1.401*** (0.193)	-0.0408*** (0.00916)	-0.100*** (0.00542)
Year	YES	YES	YES
Observations	11,134	11,132	10,368
R-squared	0.895	0.987	0.814

This table examines the effect of environmental performance on their financial performance. Standard errors are shown in parentheses, *, **, and ***, denote statistical significance at 10%, 5%, and 1% levels, respectively.

Table 11. Robustness: Social Performance and Corporate Financial Performance

	(7')	(8')	(9')
	Tobin's Q	ROA	ROE
Social	0.0186*** (0.000533)	0.00108*** (6.10e-05)	-0.000218*** (3.78e-05)
FirmSize	-0.310*** (0.0123)	0.00852*** (0.00141)	0.0302*** (0.000953)
RDintensity	1.789*** (0.00921)	-1.270*** (0.00133)	-0.339*** (0.00195)
CapitalIntensity	1.226*** (0.203)	0.182*** (0.0232)	0.0126 (0.0146)
MarketValue	2.65e-06*** (1.86e-07)	1.35e-07*** (2.13e-08)	-4.73e-08*** (1.27e-08)
Constant	1.844*** (0.191)	-0.0281*** (0.00902)	-0.0322** (0.0130)
Year	YES	YES	YES
Observations	11,134	11,132	10,369
R-squared	0.797	0.989	0.808

This table examines the effect of social performance on their financial performance. Standard errors are shown in parentheses, *, **, and ***, denote statistical significance at 10%, 5%, and 1% levels, respectively.

Table 12. Robustness: Governance Performance and Corporate Financial Performance

	(10')	(11')	(12')
	Tobin's Q	ROA	ROE
Governance	0.00900*** (0.000470)	0.000726*** (5.32e-05)	6.71e-05** (3.24e-05)
FirmSize	-0.225*** (0.0122)	0.0146*** (0.00138)	0.0259*** (0.000917)
RDintensity	2.184*** (0.00934)	-1.243*** (0.00121)	-0.353*** (0.00193)
CapitalIntensity	1.175*** (0.207)	0.171*** (0.0234)	0.00158 (0.0147)
MarketValue	1.54e-05*** (1.89e-07)	1.56e-07*** (2.14e-08)	-5.13e-08*** (1.27e-08)
Constant	1.704***	-0.0565***	-0.0258**

	(0.194)	(0.0219)	(0.0130)
Year	YES	YES	YES
Observations	11,134	11,133	10,369
R-squared	0.857	0.990	0.816

This table examines the effect of governance performance on their financial performance. Standard errors are shown in parentheses, *, **, and ***, denote statistical significance at 10%, 5%, and 1% levels, respectively.

5. Conclusion and implications

In conclusion, this thesis contributes new insights to the relationship between ESG (Environmental, Social, and Governance) factors and Corporate Financial Performance. The findings of this thesis indicate a positive relationship between ESG score, Environmental Score, Social Score, Governance Score, and Corporate Financial Performance, as demonstrated by the results obtained with Tobin's Q. This finding reaffirms the growing body of research highlighting the significance of ESG considerations in driving financial outcomes. Using the ROA measure, the low coefficient hinders drawing definitive conclusions regarding the relationship with Corporate Financial Performance. Unlike previous studies, the results do not align with the expected positive relationship between ROA and Corporate Financial Performance, indicating the need for further investigation and potential reevaluation of the role of ROA as an indicator in the ESG-CFP relationship. Regarding ROE, the mixed results add a nuanced perspective. While no significant relationship was found between ESG score and Governance score with ROE, the significant positive relationship between the Environmental Score and ROE suggests the environmental dimension's potential impact on financial performance. Additionally, the potential positive relationship between the Social score and ROE highlights the relevance of social factors in shaping financial outcomes. Additionally, the study reveals statistically significant positive relationships between being in a sensitive industry and the ESG score, Social score, and Governance score. Another significant contribution of this thesis is the identification of statistically significant positive relationships between being in a sensitive industry and the ESG score, Social score, and Governance score. These findings shed light on the industry context as a crucial factor influencing the ESG-CFP relationship, emphasizing the need to consider industry-specific dynamics and challenges. Moreover, no clear association was found between industry sensitivity and the environmental score. These findings highlight the importance of considering different financial performance indicators and industry contexts when examining the relationship between ESG and Corporate Financial Performance.

Overall, this study adds to the existing literature by uncovering new insights and nuances in the relationship between ESG and Corporate Financial Performance. These findings provide valuable knowledge for investors, policymakers, and stakeholders seeking to better understand the implications of ESG factors on financial outcomes and make informed decisions regarding sustainability and investment strategies.

Implications

The findings of this study indicate that it can be advantageous for companies to consider the environmental, social, and governance dimensions in their strategic decision-making, particularly within sensitive industries. These results are in line with In, Rook, & Monk (2019) conclusion that ESG data, when it is of high quality, maps onto the investment decision-making processes. Furthermore, the implications of this study's results can be useful for various stakeholders involved in the corporate and regulatory landscape which is in line with Singhania & Saini (2023) recommendations. Policymakers should provide financial incentives to encourage companies to take ESG criteria into account and should do it using relevant governance mechanisms that affect the tone of CSR reports in accordance with the findings of Albitar, Abdoush, & Hussainey (2022). In order to proactively enhance ESG performance, institutional forces should take the initiative to establish more transparent and robust rules and regulations. And last by not least, ESG should be considered an important strategic element for companies aiming to improve profitability.

Future Research

Further research is needed to explore the relationship between ESG considerations and Corporate Financial Performance (CFP). This area has gained significant popularity, complementary studies can be conducted across different sectors to compare the impact of corporate responsibility on performance. as variations may arise. Replicating the study in other countries is relevant to highlight potential differences in impact, considering this study's focus on the United States. Moreover, a deeper analysis can investigate the specific effects of individual elements within each ESG pillar, such as waste management, renewable energy usage, and employee rights. Additionally, future research should investigate the impact of different environmental policy instruments on environmental performance and identify policy instruments that promote better ESG performance. It would also be beneficial to compare results obtained with smaller firms.

Appendix A. Share of companies in the sample by sector of activity

Industries included in the category "others"	Companies by industry (%)
Aerospace	0,1%
Apparel	0,5%
Automotive	0,8%
Paper	0,2%
Beverages	0,4%
Construction	0,9%
Printing & publishing	0,3%
Textiles	0,3%
Tobacco	0,1%
Diversified	0,4%
Metal producers & product manufacturers	1,2%
Food	1,3%
Chemicals	1,0%
Transportation	1,6%
Utilities	1,6%
Oil, gas, coal & related services	1,5%

Appendix B. Variable descriptions

Type of variables	Explanation of the variable
Dependent and independent variables	
Financial Performance	
Tobin's Q	Tobin's Q (%)
ROA	Return on Assets (%)
ROE	Return on Equity (%)
ESG Performance	
ESG	ESG Score (scale of 100)
E	Environmental performance – Environmental pillar score (scale of 100)
S	Social performance - Social pillar score (on a scale of 100)
G	Governance performance – Governance pillar score (scale of 100)
Control Variables	
FirmSize	Natural logarithm of total assets
RDIIntensity	Ratio of R&D expenditures to revenue
CapitalIntensity	Ratio of capital expenditures to total assets
MarketValue	Market Value (millions of US dollars)

Appendix C. Results summary

	Hypotheses	Results
H1	There is a positive and significant relationship between Tobin's Q and ESG score.	Not rejected
H1a	There is a positive and significant relationship between Tobin's Q and environmental score.	Not rejected
H1b	There is a positive and significant relationship between Tobin's Q and social score.	Not rejected
H1c	There is a positive and significant relationship between Tobin's Q and governance score.	Not rejected

H1	There is a positive and significant relationship between Return on Assets (ROA) and ESG score.	Rejected
H1a	There is a positive and significant relationship between Return on Assets (ROA) and environmental score.	Rejected
H1b	There is a positive and significant relationship between Return on Assets (ROA) and social score.	Rejected
H1c	There is a positive and significant relationship between Return on Assets (ROA) and governance score.	Rejected
H1	There is a positive and significant relationship between Return on Equity (ROE) and ESG score.	Rejected
H1a	There is a positive and significant relationship between Return on Equity (ROE) and environmental score.	Not rejected
H1b	There is a positive and significant relationship between Return on Equity (ROE) and social score.	Not rejected
H1c	There is a positive and significant relationship between Return on Equity (ROE) and governance score.	Rejected
H2	There is a positive and significant relationship between a company being in a sensitive industry and its ESG score.	Not rejected
H2a	There is a positive and significant relationship between a company being in a sensitive industry and its environmental score.	Rejected
H2b	There is a positive and significant relationship between a company being in a sensitive industry and its social score.	Not rejected
H2c	There is a positive and significant relationship between a company being in a sensitive industry and its governance score.	Not rejected

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